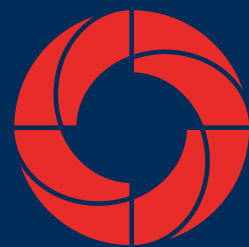


ORMAT TECHNOLOGIES, INC. 2020 ANNUAL REPORT



ORMAT



Steamboat Hills, geothermal power plant enhancement (2020)



Over
56 years
of experience

Own & operate over
1,000MW
Geothermal, Storage, Solar PV
& Recovered Energy Generation

~1,400
Employees

705\$M
2020 Revenues

86\$M
2020 Net income attributable
to the Company's stockholders

420\$M
2020 adj. EBITDA

**A LEADING
RENEWABLE
ENERGY
PROVIDER**

WITH A PROVEN TRACK
RECORD IN GEOTHERMAL
AND ENERGY STORAGE



Mammoth Complex 30 MW, CA, USA.

DEAR FELLOW SHAREHOLDERS,

2020 was a productive year for Ormat. Amidst a challenging pandemic-influenced environment, Ormat continued to deliver superior execution. We generated year-over-year improvements in our overall profitability and made significant progress in executing our long-term plan to increase our geothermal, storage, and hybrid solar geothermal capacity. We enter 2021 at the face of an important, long-term strategic transition for Ormat. We do so with the strongest balance sheet in our company's history, a proven business model, a seasoned leadership team, and a clearly structured strategic direction.

During 2020, we strengthened our balance sheet through a combination of long-term debt and an equity offering, exiting the year with more than \$530 million in cash. This capital infusion will support our expansion goals, which include increasing our generating portfolios by 50% to approximately 1.5 GW by 2023, with a significant contribution coming from our energy storage business. Our current strategic plans include increasing our geothermal and solar PV capacity by up to 29% and increasing our energy storage assets portfolio by up to 400% by the end of 2023. Our plan further suggests that we can reach an annual run-rate of \$500 million in Adjusted EBITDA towards the end of 2022, a rate we expect to increase as we move forward with our growth plans in 2023 and onwards. While growing our electricity and energy storage segments, we have not overlooked our products segment, which experienced significant impacts as a result of the Covid pandemic.



Rabbit Hill, 10 MW / 10 MWh Energy Storage Facility, TX.

CONTINUED PROFITABILITY DESPITE PANDEMIC

2020 saw a 5.5% decrease in total revenue. This decline was solely due to the pandemic-related challenges faced by our products segment. We grew revenue in our electricity segment due to added capacity at our Steamboat Complex and better performance of other projects in our portfolio. Our energy storage segment revenues increased as well, reaching 2% of our total revenues for the year, primarily due to the acquired Pomona energy storage asset and the contribution of the Rabbit Hill project in Texas. Even with the challenges caused by the pandemic, we delivered \$85.5 million in net income attributable to common shareholders and \$1.65 in earnings per share, both quite similar to the results of 2019.

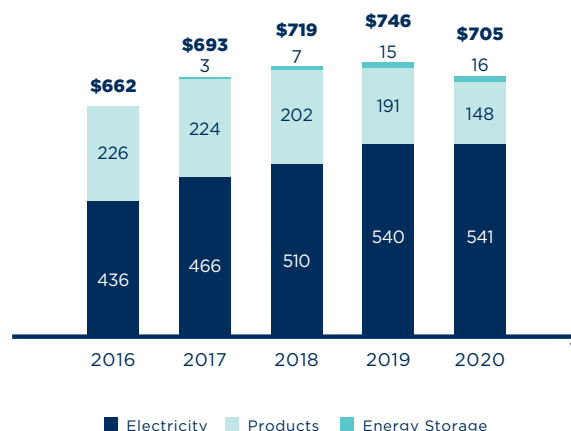
RE-ENERGIZING HAWAII

After more than two years, we resumed generating electricity at our Puna plant in Hawaii, supplying once more, clean, renewable energy to the island. The effort to bring Puna back online was not a small one, but we worked closely with our partner, HELCO, to repair the damages, redrill the wells, and reconnect the power plant to the grid. We are continuing with our efforts to increase the generation and expect we will reach close to full capacity by mid-2021.

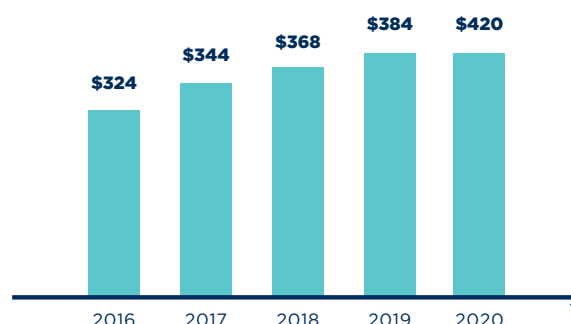
CREATING A BALANCE SHEET FOR ACCELERATED GROWTH

We successfully raised approximately \$760 million during 2020, including \$340 million in net proceeds from the issuance of common stock, \$290 million from the issuance of bonds, and approximately \$130 million from senior unsecured loans. As a result, we ended the year with cash, cash equivalents, and restricted cash of approximately \$537 million. Our net debt as of December 31, 2020 was \$920 million. This balance sheet provides the resources to expand our electricity and storage efforts to pursue longer-term growth.

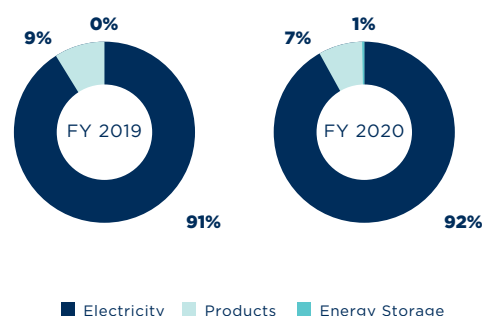
REVENUE GROWTH



ADJUSTED EBITDA*



INCREASING ADJUSTED EBITDA FROM ELECTRICITY SEGMENT TO SUPPORT PROFITABLE GROWTH*



***Note:** Our letter to shareholders contains forward looking statements and "non-GAAP financial measures" within the meaning of Regulation G under the Securities Exchange Act of 1934, as amended, including Adjusted EBITDA. Please see "Forward looking statements" in Ormat Technologies, Inc. 2020 Annual Report on Form 10-K under the "Cautionary Note Regarding Forward-Looking Statements" and the reconciliation of GAAP net income to EBITDA and Adjusted EBITDA under the Item 7 - "management's discussion and analysis of financial condition and results of operations".

ADVANCING SUSTAINABILITY

Ormat has been generating power in a sustainable manner from the start. We remain committed to providing renewable energy safely, economically, and in an environmentally responsible manner. A large part of our business involves bringing baseload energy to parts of the world that lack access to affordable, renewable energy. The current health crisis has put a brighter spotlight on the importance of sustainability, and the recent weather-related crisis in Texas demonstrated the importance of renewable energy. Our Company recognizes the importance of the fight against climate change and the imperative of lowering greenhouse gas (GHG) emissions, as well as how critical it is to address poverty and social inequality by encouraging local economic growth and employment opportunities.

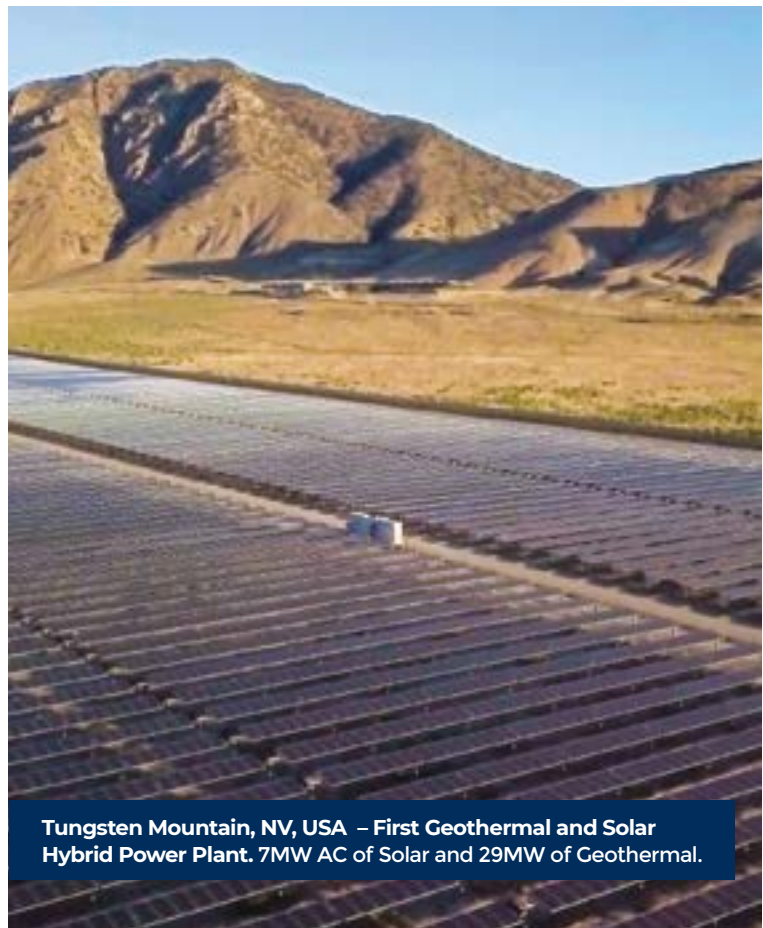
In sum, 2020 was another successful year for Ormat despite the unique challenges raised by the global pandemic. We expect continued success in 2021, as we focus on laying the foundation for accelerated growth in 2022 and beyond. We do so from a position of strength, and I am increasingly optimistic about Ormat's position. Ormat remains an industry leader, and the only vertically integrated participant, in a critically important industry. We believe continued focus on renewable energy is the future, and we are proud to be industry leaders in this important space.

Before I conclude this letter, I would like to personally thank all of our stakeholders, and first and foremost our customers, shareholders, employees, and the Ormat management team for their continued commitment and support. We look forward to achieving great things in 2021 together.

Regards,
Doron Blachar
Chief Executive Officer



Platanares, Honduras - learning in a school for the community near Platanares plant in Honduras.



Tungsten Mountain, NV, USA - First Geothermal and Solar Hybrid Power Plant. 7MW AC of Solar and 29MW of Geothermal.



UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10-K

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2020

Or

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Commission file number: 001-32347

ORMAT TECHNOLOGIES, INC.

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of incorporation or organization)

6140 Plumas Street, Reno, Nevada

(Address of principal executive offices)

88-0326081

(I.R.S. Employer Identification Number)

89519-6075

(Zip Code)

(775) 356-9029

(Registrant's telephone number, including area code)

Securities Registered Pursuant to Section 12(b) of the Act:

<u>Title of Each Class</u>	<u>Trading Symbol(s)</u>	<u>Name of Each Exchange on Which Registered</u>
Common Stock \$0.001 Par Value	ORA	New York Stock Exchange

Securities Registered Pursuant to Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☒

Accelerated filer ☐

Non-accelerated filer ☐

Smaller reporting company ☐

Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of June 30, 2020 the aggregate market value of the registrant's common stock held by non-affiliates was \$2,544,589,505. As of February 24, 2021, the number of outstanding shares of common stock, par value \$0.001 per share was 55,983,259.

Portions of the registrant's definitive proxy statement for its 2021 Annual Meeting of Stockholders are incorporated by reference into Part III of this Form 10-K..

ORMAT TECHNOLOGIES, INC.

FORM 10-K FOR THE YEAR ENDED DECEMBER 31, 2020

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Glossary of Terms

Unless the context otherwise requires, all references in this annual report to “Ormat”, “the Company”, “we”, “us”, “our company”, “Ormat Technologies”, or “our” refer to Ormat Technologies, Inc. and its consolidated subsidiaries. A glossary of certain terms and abbreviations used in this annual report appears at the beginning of this report. When the following terms and abbreviations appear in the text of this report, they have the meanings indicated below:

Term	Definition
ACUA	Atlantic County Utilities Authority
Amatitlan Loan	\$42,000,000 in initial aggregate principal amount borrowed by our subsidiary Ortitlan Limitada from Banco Industrial S.A. and Westrust Bank (International) Limited.
AMM	Administrador del Mercado Mayorista (administrator of the wholesale market — Guatemala)
ARRA	American Recovery and Reinvestment Act of 2009
Auxiliary Power	The power needed to operate a geothermal power plant’s auxiliary equipment such as pumps and cooling towers
Availability	The ratio of the time a power plant is ready to be in service, or is in service, to the total time interval under consideration, expressed as a percentage, independent of fuel supply (heat or geothermal) or transmission accessibility
BESS	Battery Energy Storage Systems
BLM	Bureau of Land Management of the U.S. Department of the Interior
BOT	Build, operate and transfer
BPP	PLN's existing average cost of generation
CAISO	California Independent System Operator
Capacity	The maximum load that a power plant can carry under existing conditions, less auxiliary power
Capacity Factor	The ratio of the actual MWh generated and the generating capacity times 8760 hours expressed in percentage

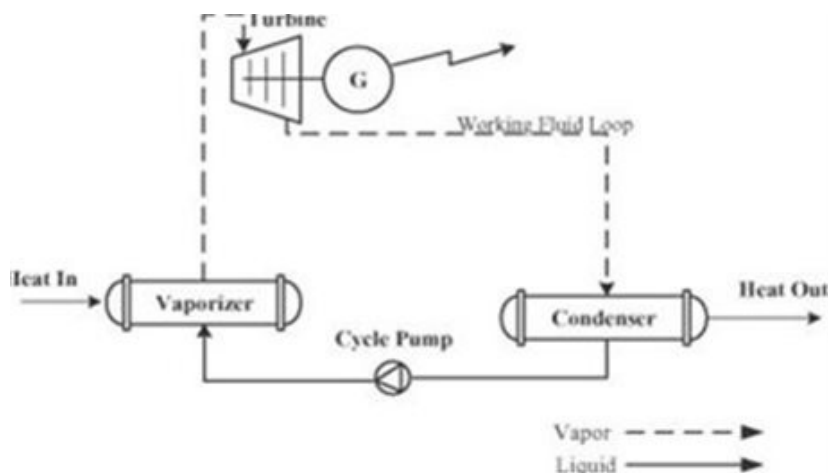
CARES	Coronavirus Aid, Relief, and Economic Security Act
CCA	Community Choice Aggregator
CDC	Caisse des Dépôts et Consignations, a French state-owned financial organization
CEO	Chief Executive Officer
CFO	Chief Financial Officer
C&I	Refers to the Commercial and Industrial sectors, excluding residential
CNEE	National Electric Energy Commission of Guatemala
COD	Commercial Operation Date
Company	Ormat Technologies, Inc., a Delaware corporation, and its consolidated subsidiaries
CPI	Consumer Price Index
CPUC	California Public Utilities Commission
DEG	Deutsche Investitions-und Entwicklungsgesellschaft mbH
CREE	The Regulatory Commission of Electric Power in Honduras
DFC	U.S. International Development Finance Corporation (formerly OPIC)
DOE	U.S. Department of Energy
DOGGR	California Division of Oil, Gas, and Geothermal Resources
DSCR	Debt Service Coverage Ratio
EBITDA	Earnings before interest, taxes, depreciation and amortization
EDF	Electricite de France S.A.
EGS	Enhanced Geothermal Systems
EIB	European Investment Bank
EMRA	Energy Market Regulatory Authority in Turkey

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ENEE	Empresa Nacional de Energía Eléctrica
Enthalpy	The total energy content of a fluid; the heat plus the mechanical energy content of a fluid (such as a geothermal brine), which, for example, can be partially converted to mechanical energy in an Organic Rankine Cycle.
EPA	U.S. Environmental Protection Agency
EPC	Engineering, procurement and construction
ERCOT	Electric Reliability Council of Texas, Inc.
EPRA	Energy and Petroleum Regulatory Authority
EWG	Exempt Wholesale Generators
Exchange Act	U.S. Securities Exchange Act of 1934, as amended
FASB	Financial Accounting Standards Board
FERC	U.S. Federal Energy Regulatory Commission
FIT	Feed-in Tariff
FPA	U.S. Federal Power Act, as amended
GAAP	Generally accepted accounting principles
GCCU	Geothermal Combined Cycle Unit
GDC	Geothermal Development Company
Geothermal Power Plant	The power generation facility and the geothermal field
Geothermal Steam Act	U.S. Geothermal Steam Act of 1970, as amended
GERD	Grand Ethiopian Renaissance Dam
GHG	Greenhouse gas
GIS	Geographic Information Systems
GW	Giga watt
GWh	Giga watt hour
HELCO	Hawaii Electric Light Company
IDWR	Idaho Department of Water
IGA	International Geothermal Association
IID	Imperial Irrigation District
INDE	Instituto Nacional de Electrificación
IOUs	Investor-Owned Utilities
IPPs	Independent Power Producers
IESO	The Independent Electricity System Operator (IESO) works at the heart of Ontario's power system.
ISO	International Organization for Standardization
ISONE	ISO New England
ITC	Investment Tax Credit
JBIC	Japan Bank for International Cooperation
JOGMEC	Japan state-owned resources agency
John Hancock	John Hancock Life Insurance Company (U.S.A.)
JPM	J.P. Morgan Capital Corporation
KenGen	Kenya Electricity Generating Company Ltd.
Kenyan Energy Act	Kenyan Energy Act, 2006
KETRACO	Kenya Electricity Transmission Company Limited
KGRA	Known Geothermal Resource Area

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kW	Kilowatt - A unit of electrical power that is equal to 1,000 watts
kWh	Kilowatt hour(s), a measure of power produced
LCOE	Levelized Costs of Energy
Mammoth Pacific	Mammoth-Pacific, L.P.
MEMR	The Indonesian Minister of Energy and Mineral Resources
MW	Megawatt - One MW is equal to 1,000 kW or one million watts
MWh	Megawatt hour(s), a measure of energy produced
NIS	New Israeli Shekel
NOA	Notice of Assessments
NV Energy	NV Energy, Inc.
NYSE	New York Stock Exchange
NYISO	New York Independent System Operator, Inc.
OEC	Ormat Energy Converter
OFC	Ormat Funding Corp., a wholly owned subsidiary of the Company
OFC 2	OFC 2 LLC, a wholly owned subsidiary of the Company
OFC 2 Senior Secured Notes	Up to \$350,000,000 Senior Secured Notes, due 2034 issued by OFC 2
Opal Geo	Opal Geo LLC
OPC	OPC LLC, a consolidated subsidiary of the Company
OrCal	OrCal Geothermal Inc., a wholly owned subsidiary of the Company
ORC	Organic Rankine Cycle - A process in which an organic fluid such as a hydrocarbon or fluorocarbon (but not water) is boiled in an evaporator to generate high pressure vapor. The vapor powers a turbine to generate mechanical power. After the expansion in the turbine, the low-pressure vapor is cooled and condensed back to liquid in a condenser. A cycle pump is then used to pump the liquid back to the vaporizer to complete the cycle. The cycle is illustrated in the figure below:



Ormat International	Ormat International Inc., a wholly owned subsidiary of the Company

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Ormat Nevada	Ormat Nevada Inc., a wholly owned subsidiary of the Company
Ormat Systems	Ormat Systems Ltd., a wholly owned subsidiary of the Company
ORIX	ORIX Corporation
ORPD	ORPD LLC, a holding company subsidiary of the Company in which Northleaf Geothermal Holdings, LLC holds a 36.75% equity interest
OrPower 4	OrPower 4 Inc., a wholly owned subsidiary of the Company
Ortitlan	Ortitlan Limitada, a wholly owned subsidiary of the Company
ORTP	ORTP, LLC, a consolidated subsidiary of the Company
Orzunil	Orzunil I de Electricidad, Limitada, a wholly owned subsidiary of the Company
PEC	Portfolio Energy Credits
PG&E	Pacific Gas and Electric Company
PGV	Puna Geothermal Venture, a wholly owned subsidiary of the Company
PJM	PJM Interconnection, LLC
PLN	PT Perusahaan Listrik Negara
Power plant equipment	Interconnection equipment, cooling towers for water cooled power plant, etc., including the generating units

PPA	Power purchase agreement
PTC	Production Tax Credit
PUC	Public Utilities Commission
PUCH	Public Utilities Commission of Hawaii
PUCN	Public Utilities Commission of Nevada
PUHCA	U.S. Public Utility Holding Company Act of 1935
PUHCA 2005	U.S. Public Utility Holding Company Act of 2005
PURPA	U.S. Public Utility Regulatory Policies Act of 1978
Qualifying Facility(ies)	Certain small power production facilities are eligible to be “Qualifying Facilities” under PURPA, provided that they meet certain power and thermal energy production requirements and efficiency standards. Qualifying Facility status provides an exemption from PUHCA 2005 and grants certain other benefits to the Qualifying Facility
RCEA	Redwood Coast Energy Authority
REC	Renewable Energy Credit
REG	Recovered Energy Generation
RER	Renewable Energy Resource certificate
RPS	Renewable Portfolio Standards
RTO	Regional Transmission Organization
SCE	Southern California Edison
SCPPA	Southern California Public Power Authority
SDG&E	San Diego Gas and Electric
SEC	U.S. Securities and Exchange Commission
Securities Act	U.S. Securities Act of 1933, as amended
SOL	Sarulla Operations Ltd.
solar PV	solar photovoltaic
SOX Act	Sarbanes-Oxley Act of 2002

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SRAC	Short Run Avoided Costs
TASE	Tel Aviv Stock Exchange
Tax Act	Tax Cuts and Jobs Act
UIC	Underground Injection Control
Union Bank	Union Bank, N.A.
U.S.	United States of America
U.S. Treasury	U.S. Department of the Treasury
USG	U.S. Geothermal Inc.
VAT	Value Added Tax
VCE	Valley Clean Energy
Viridity	Viridity Energy Solutions Inc., a wholly owned subsidiary of the Company
YTL	Turkish Lira

Cautionary Note Regarding Forward-Looking Statements

This annual report includes “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical facts, included in this report that address activities, events or developments that we expect or anticipate will or may occur in the future, including such matters as our projections of annual revenues, expenses and debt service coverage with respect to our debt securities, future capital expenditures, business strategy, competitive strengths, goals, development or operation of generation assets, market and industry developments and the growth of our business and operations, are forward-looking statements. When used in this annual report, the words “may”, “will”, “could”, “should”, “expects”, “plans”, “anticipates”, “believes”, “estimates”, “predicts”, “projects”, “potential”, or “contemplate” or the negative of these terms or other comparable terminology are intended to identify forward-looking statements, although not all forward-looking statements contain such words or expressions. The forward-looking statements in this annual report are primarily located in the material set forth under the headings Item 1 — “Business” contained in Part I of this annual report, Item 1A — “Risk Factors” contained in Part I of this annual report, Item 7 — “Management’s Discussion and Analysis of Financial Condition and Results of Operations” contained in Part II of this annual report, and “Notes to Financial Statements” contained in Item 8 — “Financial Statements and Supplementary Data” contained in Part II of this annual report, but are found in other locations as well. These forward-looking statements generally relate to our plans, objectives and expectations for future operations and are based upon management’s current estimates and projections of future results or trends. Although we believe that our plans and objectives reflected in or suggested by these forward-looking statements are reasonable, we may not achieve these plans or objectives. You should read this annual report completely and with the understanding that actual future results and developments may be materially different from what we expect attributable to a number of risks and uncertainties, many of which are beyond our control.

Summary of the risks that might cause actual results to differ from our expectations include, but are not limited to the following:

Risks Related to the Company’s Business and Operation

- Our financial performance depends on the successful operation of our geothermal and REG power plants, which are subject to various operational risks.
- Our exploration, development, and operation of geothermal energy resources are subject to geological risks and uncertainties, which may result in decreased performance or increased costs for our power plants.

- We may experience a cyber incident, cyber security breach, severe natural event or physical attack on our operational networks and information technology systems.
- We may decide not to implement, or may not be successful in implementing, one or more elements of our multi-year strategic plan, and the plan may not achieve its goal of enhancing shareholder value.
- Concentration of customers, specific projects and regions may expose us to heightened financial exposure.
- Our international operations expose us to risks related to the application of foreign laws and regulations, political or economic instability and major hostilities or acts of terrorism.
- Political, economic and other conditions in the emerging economies where we operate may subject us to greater risk than in the developed U.S. economy.
- Conditions in and around Israel, where the majority of our senior management and our main production and manufacturing facilities are located, may adversely affect our operations and may limit our ability to produce and sell our products or manage our power plants.
- Continued reduction in our Products backlog may affect our ability to fully utilize our main production and manufacturing facilities.
- Some of our leases will terminate if we do not extract geothermal resources in “commercial quantities”, thus requiring us to enter into new leases or secure rights to alternate geothermal resources, none of which may be available on terms as favorable to us as any such terminated lease, if at all.

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- Our BLM leases may be terminated if we fail to comply with any of the provisions of the Geothermal Steam Act or if we fail to comply with the terms or stipulations of such leases.
- Some of our leases (or subleases) could terminate if the lessor (or sublessor) under any such lease (or sublease) defaults on any debt secured by the relevant property, thus terminating our rights to access the underlying geothermal resources at that location.
- Reduced levels of recovered energy required for the operation of our REG power plants may result in decreased performance of such power plants.
- Our business development activities may not be successful and our projects under construction may not commence operation as scheduled.
- Our future growth depends, in part, on the successful enhancement of a number of our existing facilities.
- We rely on power transmission facilities that we do not own or control.
- Our use of joint ventures may limit our flexibility with jointly owned investments.
- Our operations could be adversely impacted by climate change.
- Geothermal projects that we plan to develop in the future, may operate as "merchant" facilities without long-term PPAs and therefore such projects will be exposed to market fluctuations.
- Storage projects that we are operating, currently developing or plan to develop in the future, may operate as "merchant" facilities without long-term power services agreements for some or all of their generating capacity and output and therefore such projects will be exposed to market fluctuations.
- We may not be able to successfully conclude the transactions, integrate companies, which we acquired and may acquire in the future.
- The power generation industry is characterized by intense competition.
- We face increasing competition from other companies engaged in energy storage and the combination of solar and energy storage.
- Changes in costs and technology may significantly impact our business by making our power plants and products less competitive, resulting in our inability to sign new PPAs for our Electricity segment and new supply and EPC contracts for our Products segment.
- Our intellectual property rights may not be adequate to protect our business.
- We may experience difficulties implementing and maintaining our new enterprise resource planning system.

Risks Related to Governmental Regulations, Laws and Taxation

- Our financial performance could be adversely affected by changes in the legal and regulatory environment affecting our operations.
- Pursuant to the terms of some of our PPAs with investor-owned electric utilities and publicly-owned electric utilities in states that have renewable portfolio standards, the failure to supply the contracted capacity and energy thereunder may result in the imposition of penalties.

- If any of our domestic power plants loses its current Qualifying Facility status under PURPA, or if amendments to PURPA are enacted that substantially reduce the benefits currently afforded to Qualifying Facilities, our domestic operations could be adversely affected.
- We may experience a reduction or elimination of government incentives.
- We are a holding company and our cash depends substantially on the performance of our subsidiaries and the power plants they operate, most of which are subject to restrictions and taxation on dividends and distributions.
- The costs of compliance with federal, state, local and foreign environmental laws and our ability in obtaining and maintaining environmental permits and governmental approvals required for development, construction and/or operation may result in liabilities, costs and delays in construction (as well as any fines or penalties that may be imposed upon us in the event of any non-compliance or delays with such laws or regulations).
- We could be exposed to significant liability for violations of hazardous substances laws because of the use or presence of such substances at our power plants.

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- Current and future urbanizing activities and related residential, commercial, and industrial developments may encroach on or limit geothermal or solar PV activities in the areas of our power plants, thereby affecting our ability to utilize access, inject and/or transport geothermal resources on or underneath the affected surface areas.
- U.S. federal income tax reform could adversely affect us.

Risks Related to Economic and Financial Conditions

- We may be unable to obtain the financing we need on favorable terms to pursue our growth strategy.
- Our foreign power plants and foreign manufacturing operations expose us to risks related to fluctuations in currency rates, which may reduce our profits from such power plants and operations.
- Our power plants have generally been financed through a combination of our corporate funds and limited or non-recourse project finance debt and lease financing. If our project subsidiaries default on their obligations under such limited or non-recourse debt or lease financing, we may be required to make certain payments to the relevant debt holders, and if the collateral supporting such leveraged financing structures is foreclosed upon, we may lose certain of our power plants.
- We may experience fluctuations in the cost of construction, raw materials, commodities and drilling.
- We are exposed to swap counterparty credit risk.
- We may not be able to obtain sufficient insurance coverage to cover damages resulting from any damages to our assets and profitability including, but not limited to, natural disasters such as volcanic eruptions, lava flows, wind and earthquakes.

Risks Related to Force Majeure

- The global spread of a public health crisis, including the COVID-19 pandemic may have an adverse impact on our business.
- The existence of a prolonged force majeure event or a forced outage affecting a power plant, or the transmission systems could reduce our net income.

Risks Related to Our Stock

- A substantial percentage of our common stock is held by stockholders whose interests may conflict with the interests of our other stockholders.
- The price of our common stock may fluctuate substantially, and your investment may decline in value.

Company Contact and Sources of Information

Our website is www.ormat.com. Information contained on our website is not part of this Report. Information that we furnish or file with the SEC, including our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to, or exhibits included in, these reports are available for download, free of charge, through our website. Our SEC filings, including exhibits filed therewith, are also available directly on the SEC's website at www.sec.gov.

You may request a copy of our SEC filings at no cost to you, by writing to the Company address appearing on the cover page of this annual report or by calling us at (775) 356-9029.

PART I

ITEM 1. BUSINESS

Overview

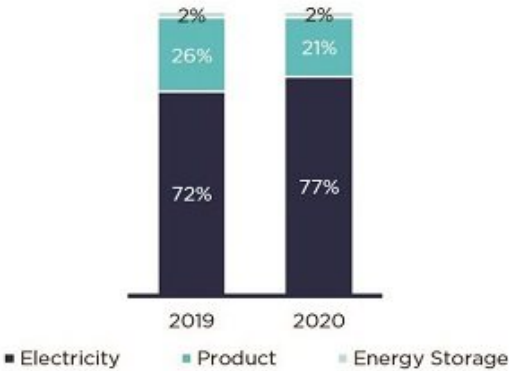
We are a leading vertically integrated company that is primarily engaged in the geothermal and recovered energy power businesses. We leveraged our core capabilities and global presence to expand our activity into different energy storage services and solar photovoltaic (PV) (including hybrid geothermal and solar PV as well as energy storage plus Solar PV). Our objective is to become a leading global provider of renewable energy and we have adopted a strategic plan to focus on several key initiatives to expand our business.

We currently conduct our business activities in three business segments:

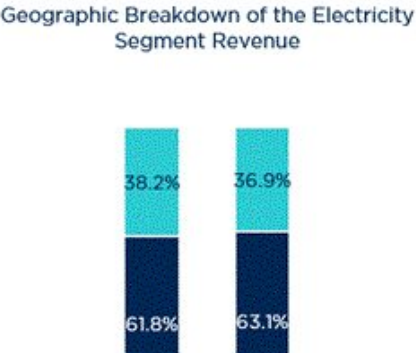
- *Electricity Segment.* In the Electricity segment, which contributed 76.8% of our total revenues in 2020, we develop, build, own and operate geothermal, solar PV and recovered energy-based power plants in the United States and geothermal power plants in other countries around the world and sell the electricity they generate. In 2020, we derived 63.1% of our Electricity segment revenues from our operations in the U.S. and 36.9% from the rest of the world.
- *Product Segment.* In the Product segment, which contributed 21.0% of our total revenues in 2020, we design, manufacture and sell equipment for geothermal and recovered energy-based electricity generation and remote power units and provide services relating to the engineering, procurement and construction of geothermal and recovered energy-based power plants. In 2020, we derived 3.9% of our Product segment revenues from our operations in the United States and 96.1% from the rest of the world.
- *Energy Storage Segment.* In the Energy Storage segment, which contributed 2.2% of our total revenues in 2020, we mainly provide energy storage, related services as well as services relating to the engineering, procurement, construction, operation and maintenance of energy storage units. In 2020, we derived all of our Energy Storage segment revenues from our operations in the United States.

The charts below show the relative contributions of each of our segments to our consolidated revenues and the geographical breakdown of our segment revenues for the fiscal year ended December 31, 2020.

The following chart sets forth a breakdown of our revenues for each of the years ended December 31, 2019 and 2020:

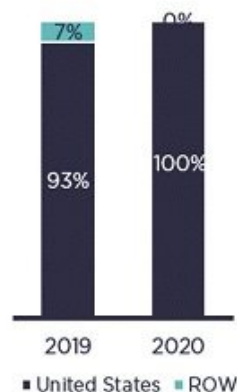


The following chart sets forth the geographical breakdown of revenues attributable to our Electricity, Product and Energy Storage segments for each of the years ended December 31, 2019 and 2020:





Geographic Breakdown of the Energy Storage Segment Revenue



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Technology and products we use in our operations include geothermal, recovered energy, solar PV and energy storage.

Our owned geothermal power plants include both power plants that we have built and power plants that we have acquired. The substantial majority of the power plants that we currently own or operate produce electricity from geothermal energy sources. Geothermal energy is a clean, renewable and generally sustainable form of energy derived from the natural heat of the earth. Unlike electricity produced by burning fossil fuels, electricity produced from geothermal energy sources is produced without emissions of certain pollutants such as nitrogen oxide, and with far lower emissions of other pollutants such as carbon dioxide. As a result, electricity produced from geothermal energy sources contributes significantly less to global warming and local and regional incidences of acid rain than energy produced by burning fossil fuels. In addition, compared to power plants that utilize other renewable energy sources, such as wind or solar, geothermal power plants are generally available all year-long and all day-long and can therefore provide base-load electricity services. Geothermal power plants can also be custom built to provide a range of electricity services such as baseload, voltage regulation, reserve and flexible capacity. Geothermal energy is also an attractive alternative to other sources of energy and can support a diversification strategy to avoid dependence on any one energy source or politically sensitive supply sources. We own and operate a geothermal and solar PV hybrid project and have similar projects currently under construction, in which the electricity generated from a solar PV power plant is used to offset the equipment's energy use at the geothermal facility, thus increasing the renewable energy delivered by the project to the grid.

In addition to our geothermal energy business, we manufacture and sell products that produce electricity from recovered energy or so-called "waste heat". We also construct, own, and operate recovered energy-based power plants. We have built all of the recovered energy-based plants that we operate. Recovered energy comes from residual heat that is generated as a by-product of gas turbine-driven compressor stations, solar thermal units and a variety of industrial processes, such as cement manufacturing. Such residual heat, which would otherwise be wasted, may be captured in the recovery process and used by recovered energy power plants to generate electricity without burning additional fuel and without additional emissions.

In our Energy Storage segment, we commissioned three energy storage facilities with a total of 42 MW in New Jersey and Vermont, a 10 MW facility in Texas and acquired a 20 MW facility in California. We plan to accelerate long-term growth in the Energy Storage segment market to establish a leading position in the U.S..

Our Power Generation Business (Electricity Segment)

Each of our current geothermal power plants sells substantially all of its output pursuant to long-term, fixed price PPAs to various counterparties denominated in or linked to the US dollar or Euro. These contracts had a total weighted average remaining term, based on contributions to segment revenue, of approximately 16 years at December 31, 2020. In addition, the counterparties to our PPAs in the United States had a credit rating of between Aa3 to Baa2 by Moody's and BB- to A by S&P. The purchasers of electricity from our foreign power plants are mainly state-owned entities in countries with below investment grade rating.

Power Plants in Operation

We own and operate 25 geothermal, REG and solar sites globally with an aggregate generating capacity of 932 MW. Geothermal comprises 94% of our generating capacity. In 2020, our geothermal and REG power plants generated at a capacity factor of 87% and 59%, respectively, which is much higher than typical capacity factors for wind and solar producers that are usually at 20% to 30%.

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The table below summarizes certain key non-financial information relating to our power plants and complexes as of February 24, 2021. The generating capacity of certain of our power plants and complexes listed below has been updated from our 2019 disclosure to reflect changes in the resource temperature and other factors that impact resource capabilities:

Type	Region	Plant	Ownership ⁽¹⁾	Generating capacity (MW) ⁽²⁾	PPA Tenor	Capacity Factor
Geothermal	California	Ormesa Complex	100%	36	23	
		Heber Complex	100%	81	14	
		Mammoth Complex	100%	30	13	80%
		Brawley	100%	13	12	
	West Nevada	Steamboat Complex	100%	84 ⁽³⁾	18	82%
		Brady Complex	100%	26	16	
	East Nevada	Tuscarora	100%	18	13	
		Jersey Valley	100%	8	13	
		McGinness Hills	100%	145	19	93%
		Don A. Campbell	63.3%	32	16	
	North West Region	Tungsten Mountain ⁽⁴⁾	100%	29	24	
		Neal Hot Springs	60%	24 ⁽⁵⁾	19	
		Raft River	100%	12	13	90%
		San Emidio	100%	11	19	
	Hawaii	Puna	63.3%	38	33	NA ⁽⁶⁾
	International	Amatitlan (Guatemala)	100%	20	9	88% ⁽⁸⁾
		Zunil (Guatemala)	97%	20 ⁽⁷⁾	15	
		Olkaria III Complex (Kenya)	100%	150	15	
		Bouillante (Guadeloupe Island, France)	63.75% ⁽⁹⁾	15	11	
		Platanares (Honduras)	100%	38	13	
Total Consolidated Geothermal				831		87% ^(8,10)
REG		OREG 1	63.3%	22	12	
		OREG 2	63.3%	22	15	
		OREG 3	63.3%	5.5	10	
		OREG 4	100%	3.5 ⁽¹¹⁾	10	
Total REG				53		59%
solar		Tungsten Mountain	100%	7	24	
Total solar				7		
Unconsolidated Geothermal	Indonesia	Sarulla Complex	12.75%	42	28	
Total Unconsolidated Geothermal				42		
Total				932		

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1. We indirectly own and operate all of our power plants, although financial institutions hold equity interests in three of our subsidiaries: (i) Opal Geo subsidiaries, which own the McGinness Hills Phases 1 and 2 geothermal power plants, the Tuscarora and Jersey Valley power plants and the second phase of the Don A. Campbell power plant, all located in Nevada; (ii) ORNI 41, which owns the McGinness Hills Phase 3 located in Nevada; and (iii) ORNI 43, which owns the Tungsten Mountain geothermal power plant located in Nevada. In the table above, we list these power plants as being 100% owned because all of the generating capacity is owned by these subsidiaries and we control the operation of the power plants. The nature of the equity interests held by the financial institution is described below in Item 8 — “Financial Statements and Supplementary Data” under Note 13.

Notwithstanding our 63.75% equity interest in the Bouillante power plant, 60% equity interest in the Neal Hot Spring power plant and 63.25% direct equity interest in the Puna plant, the first phase of Don A. Campbell, OREG 1, OREG 2 and OREG 3 power plants as well as the indirect interest in the second phase of the Don A. Campbell complex owned by our subsidiary, ORPD, we list 100% of the generating capacity of the Bouillante power plant, the Neal Hot Springs power plant and the power plants in the ORPD portfolio in the table above because we control their operations. We list our 12.75% share of the generating capacity of the Sarulla complex as we own a 12.75% minority interest. Revenues from the Sarulla complex are not consolidated and are presented under “Equity in earnings (losses) of investees, net” in our financial statements.

2. References to generating capacity generally refer to gross generating capacity less auxiliary power. We determine the generating capacity of these power plants by taking into account resource and power plant capabilities. In any given year, the actual power generation of a particular power plant may differ from that power plant's generating capacity due to variations in ambient temperature, the availability of the geothermal resource, and operational issues affecting performance during that year.
3. The Steamboat complex includes the Steamboat Hills enhancement that commenced commercial operation in June, 2020.
4. Tungsten Mountain is a hybrid geothermal and solar power plant that uses the solar energy for geothermal power plant auxiliary power. The solar power plant generates 7 MW and is presented separately in the table above.
5. We own 60% and Enbridge owns 40% of the Neal Hot Springs power plant.
6. The Puna geothermal power plant has been shut down since May 3, 2018 when the Kilauea volcano located in close proximity to it erupted following a significant increase in seismic activity in the area. In November 2020, Puna resumed operations and currently it is operating at a generating capacity of approximately 13MW. In addition, we signed an amended PPA to extend its duration and expand its contract capacity as described below in Item 7 — "Management's Discussion and Analysis of Financial Condition and Results of Operations" under the headings "Recent Development".
7. In Zunil, power plant revenues used to be calculated based on 24 MW of generating capacity and was unrelated to the performance of the reservoir. In 2019 and onward, revenues are calculated based on the actual generation of the power plant, therefore the generating capacity was updated to reflect the current generating capacity.
8. Capacity factor for Olkaria adds back the curtailed MWh.
9. We own 63.75%, CDC owns 21.25% and Sageos owns 15.0% of the Bouillante power plant.
10. The total availability of the geothermal power plants excludes the Puna power plant that is not in operation, as discussed above.
11. The OREG 4 power plant is not operating at full capacity due to low run time of the compressor station that serves as the power plant's heat source. This has resulted in lower power generation.

New Power Plants

We are currently in various stages of construction of new power plants and expansion of existing power plants. Our construction and expansion plans include 92 MW in generating capacity from geothermal and solar PV power plants in the United States. In addition, we have several geothermal and solar PV projects in the United States, Indonesia, Guatemala and Guadeloupe that are either under initial stages of construction or under different stages of development with an aggregate capacity of between 98 MW and 108 MW.

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We have substantial land positions across 31 prospects in the United States and 10 prospects in Ethiopia, Guatemala, Honduras, Indonesia and New Zealand that we expect will support future geothermal development and on which we have started or plan to start exploration activity. These land positions are comprised of various leases, exploration concessions for geothermal resources and an option to enter into leases.

We expect adding between 250 MW to 270 MW of Geothermal and Solar PV by the end of 2023.

Our Product Business (Product Segment)

We design, manufacture and sell products for electricity generation and provide the related services described below. In addition, we recently started to provide cementing services for well drilling to third parties. We primarily manufacture products to fill customer orders, but in some situations, we manufacture products as inventory for future projects that we will own and for future third party projects.

Power Units for Geothermal Power Plants

We design, manufacture and sell power units for geothermal electricity generation, which we refer to as OECs. In geothermal power plants using OECs, geothermal fluid (either hot water, also called brine, or steam or both) is extracted from the underground reservoir and flows from the wellhead to a vaporizer that heats a secondary working fluid, which is vaporized and used to drive the turbine. The secondary fluid is then condensed in a condenser, which may be cooled directly by air through an air cooling system or by water from a cooling tower and sent back to the vaporizer. The cooled geothermal fluid is then reinjected back into the reservoir. Our customers include contractors, geothermal power plant developers, owners and operators.

Power Units for Recovered Energy-Based Power Generation

We design, manufacture and sell power units used to generate electricity from recovered energy, or so-called "waste heat". This heat is generated as a residual by-product of gas turbine-driven compressor stations, solar thermal units and a variety of industrial processes, such as cement manufacturing, and is not otherwise used for any purpose. Our existing and target customers include interstate natural gas pipeline owners and operators, gas processing plant owners and operators, cement plant owners and operators, and other companies engaged in other energy-intensive industrial processes.

EPC of Power Plants

We serve as an EPC contractor for geothermal and recovered energy power plants on a turnkey basis, using power units we design and manufacture. Our customers are geothermal power plant owners as well as our target customers for the sale of our recovered energy-based power units as described above. Unlike many other companies that provide EPC services, we believe that our competitive advantage is in using equipment that we manufacture allowing us better quality and control over the timing and delivery of required equipment and its related costs.

Remote Power Units and Other Generators

We design, manufacture and sell fossil fuel powered turbo-generators with capacities ranging from 200 watts to 5,000 watts, which operate unattended in extreme hot or cold climate conditions. Our customers include contractors who install gas pipelines in remote areas and offshore platform operators and contractors. In addition, we design, manufacture, and sell generators, including heavy duty direct-current generators, for various other uses.

Our Energy Storage Segment

Our energy storage segment has grown consistently in 2019 and 2020 and we expect continuous and even stronger growth over the coming years, while we target the sector as one of our major segments for further investment and growth.

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In 2020, we successfully brought on line one new Ormat-owned BESS project, the 10 MW/10 MWh Rabbit Hill project in Georgetown, Texas. We also acquired the operating 20 MW / 80 MWh Pomona BESS project in southern California, that has been in commercial operation since December 2016 under a 10-year resource adequacy agreement with Southern California Edison. These activities brought our total operating portfolio at the end of 2020 to approximately 73 MW / 136 MWh within the footprint of 4 RTOs or ISOs: CAISO, PJM Interconnect, ERCOT and ISONE.

We are currently in the final commissioning stage of our 10 MW / 40 MWh Vallecito project in southern California, for which we secured a 20-year resource adequacy agreement with Southern California Edison. We are also in the process of constructing a 5 MW / 20 MWh Tierra Buena project in northern California, which we expect to reach commercial operation by the end of 2021 and our Andover 20 MW project in NJ, which we expect to reach commercial operation in the first quarter of 2022 and Howel 7 MW project in NJ, which we expect to reach commercial operation in the second quarter of 2022. We acquired rights in a project under development, in Upton County, Texas, and plan to start the construction of a 25 MW / 25 MWh BESS project there before the end of 2021.

We have a approximately 1.2 GW pipeline of additional potential projects, in different stages of development across the United States that we believe we will be able to commission between 200 MW and 300 MW by 2023. The development of such projects is dependent, inter alia, on site permitting, interconnection agreement and economic viability, which are not certain. We plan to continue leveraging our experience in project development and finance, as well as our engineering, procurement and construction know-how and our relationships with utilities and other market participants, to develop additional BESS projects.

Business Strategy

Our strategy is focused on further developing a geographically balanced portfolio of geothermal, energy storage, solar (PV) and recovered energy assets and continuing our leading position in the geothermal energy market with the objective of becoming a leading global provider of renewable energy. Our strategy focuses on three main elements:

- our core geothermal business in the United States as well as globally;
- establishing a strong market position in the energy storage market; and
- exploring opportunities in new areas by looking for synergistic growth opportunities utilizing our core competence, market reputation as a successful company and new market opportunities focused upon environmental solutions.

We intend to implement this strategy through:

- *Development and Construction of New Geothermal Power Plants* — continuously seeking out commercially exploitable geothermal resources, to accelerate the development and construction of new geothermal power plants by either entering into long-term PPAs providing stable cash flows or selling in the "merchant" market in jurisdictions where the regulatory, tax and business environments encourage or provide incentives for such development;
- *Expanding our Geographical Reach* — increasing our business development activities in an effort to grow our business in the global markets in all business segments. While we continue to evaluate global opportunities, we currently see the U.S., Indonesia, Central America and Ethiopia as attractive markets for our Electricity segment and New Zealand, Philippines, Turkey, Chile, Indonesia and China as attractive markets for our Product segment. We are actively looking at ways to expand our presence in those countries;
- *Accelerating the Development and Construction of New Energy Storage Assets* - increasing our business development activities seeking potential sites for development and construction of energy storage facilities (including hybrid storage and solar PV facilities) in an effort to significantly grow our energy storage market;
- *Acquisition of New Geothermal Assets* — expanding and accelerating growth through acquisition activities globally, aiming to acquire additional geothermal assets with long term PPAs or without a PPA as well as operating and development assets that can support our geothermal business;

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- *Acquisition of Energy Storage Projects and Assets* – expanding and accelerating growth through acquisition activities of operating assets, shovel ready projects and projects in various stages of development ;
- *Using Our Operational Capabilities to Increase Output from our Existing Geothermal Power Plants* — increasing output from our existing geothermal power plants by adding additional generating capacity, upgrading plant technology, and improving geothermal reservoir operations, including improving methods of heat source supply and delivery;
- *Creating Cost Savings through Increased Operating Efficiency* — increasing efficiencies in our operating power plants and manufacturing facility including procurement by adding new technologies, restructuring of management control, automating part of our manufacturing work and centralizing our operating power plants;
- *Diversifying our Customer Base* — evaluating a number of strategies for expanding our customer base to the CCA and C&I markets. In the near term, however, we expect that the substantial majority of our revenues will continue to be generated from our traditional electrical utility customer base for the Electricity segment;
- *Maintaining a Prudent and Flexible Capital Structure* — we have various financing structures in place, including non-recourse project financings, the sale of differential membership interests and equity interests in certain subsidiaries, as well as revolving credit facilities and term loans. We believe our cash flow profile, the long-term nature of our contracts, and our ability to raise capital provide greater flexibility for optimizing our capital structure;
- *Improving our Technological Capabilities* — investing in research and development of renewable energy technologies and leveraging our technological expertise to continuously improve power plant components, reduce operations and maintenance costs, develop competitive and environmentally friendly products for electricity generation and target new service opportunities. In addition, we are expanding our core geothermal competencies to provide high efficiency solutions for high enthalpy applications by utilizing our binary enhanced cycle and technology;
- *Manufacturing and Providing Products and EPC Services Related to Renewable Energy* — designing, manufacturing and contracting power plants for our own use and selling to third parties power units and other generation equipment for geothermal and recovered energy-based electricity generation;
- *Expanding into New Technologies* - leveraging our technological capabilities over a variety of renewable energy platforms, including solar power generation and energy storage. We may acquire companies with integration and technological capabilities that we do not currently have, or develop new technology ourselves, where we can effectively leverage our expertise to implement this part of our strategic plan.

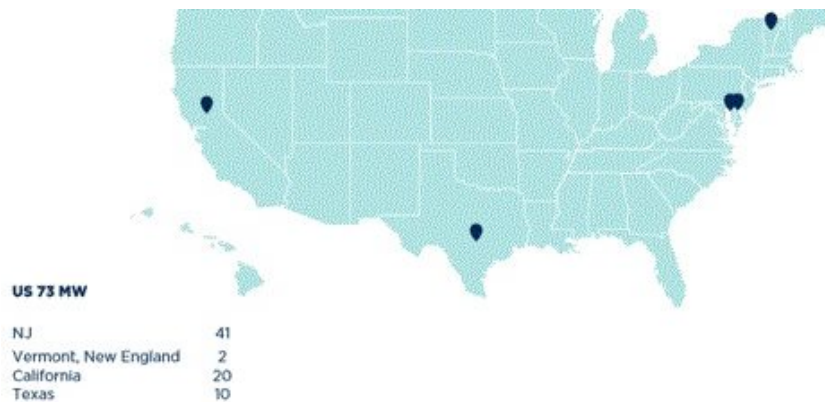
The map below shows our worldwide portfolio of operating geothermal, solar PV and recovered energy power plants as of February 25, 2021.



* In the Sarulla complex, we include our 12.75% share only.

The map below shows our portfolio of operating storage facilities as of February 25, 2021.





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Industry Background

Geothermal Energy

There are several different sources or methods of obtaining geothermal energy, which are described below.

Hydrothermal geothermal-electricity generation — Hydrothermal geothermal energy is derived from naturally occurring hydrothermal reservoirs that are formed when water comes sufficiently close to hot rock to heat the water to temperatures of 300 degrees Fahrenheit or more. The heated water then ascends toward the surface of the earth where, if geological conditions are suitable for its commercial extraction, it can be extracted by drilling geothermal wells. Geothermal production wells are normally located within several miles of the power plant, as it is not economically viable to transport geothermal fluids over longer distances due to heat and pressure loss. The geothermal reservoir is a renewable source of energy if: (i) natural ground water sources and reinjection of extracted geothermal fluids are adequate over the long-term to replenish the geothermal reservoir following the withdrawal of geothermal fluids and (ii) the well field is properly operated. Geothermal energy power plants typically have higher capital costs (primarily because of the costs attributable to well field development) but tend to have significantly lower variable operating costs (principally consisting of maintenance expenditures) than fossil fuel-fired power plants that require ongoing fuel expenses.

EGS — An EGS is a subsurface system that may be artificially created to extract heat from hot rock where the permeability and aquifers required for a hydrothermal system are insufficient or non-existent. A geothermal power plant that uses EGS techniques recovers the thermal energy from the subsurface rocks by creating or accessing a system of open fractures in the rock through which water can be injected, heated through contact with the hot rock, returned to the surface in production wells and transferred to a power unit.

Co-produced geothermal from oil and gas fields, geo-pressurized resources — Another source of geothermal energy is hot water produced as a by-product of oil and gas extraction. When oil and gas wells are deep, the extracted fluids are often at high temperatures and if the water volume associated with the extracted fluids is significant, the hot water can be used for power generation in equipment similar to a geothermal power plant.

Geothermal Power Plant Technologies

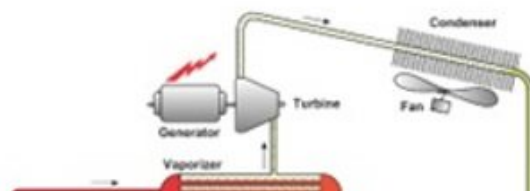
Geothermal power plants generally employ either binary systems or conventional flash design systems, as briefly described below. In our geothermal power plants, we also employ our proprietary technology of combined geothermal cycle systems.

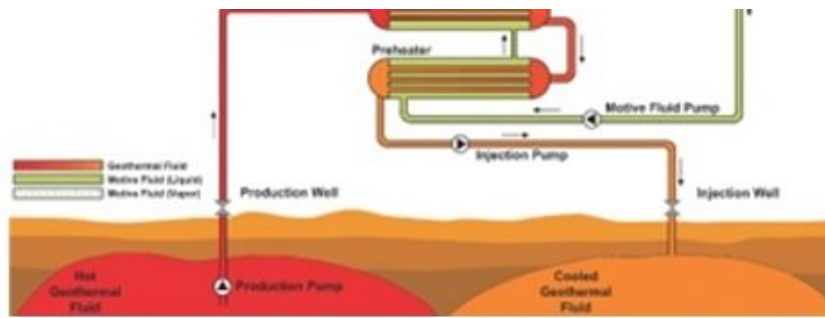
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Binary System

In a geothermal power plant using a binary system, geothermal fluid (either hot water (also called brine) or steam or both) is extracted from the underground reservoir and flows from the wellhead through a gathering system of insulated steel pipelines to a vaporizer that heats a secondary working fluid. This is typically an organic fluid, such as pentane or butane, which is vaporized and is used to drive the turbine. The organic fluid is then condensed in a condenser, which may be cooled directly by air or by water from a cooling tower and sent back to the vaporizer through a pump. The cooled geothermal fluid is then reinjected back into the reservoir. The operation of our air-cooled binary geothermal power plant is depicted in the diagram below.

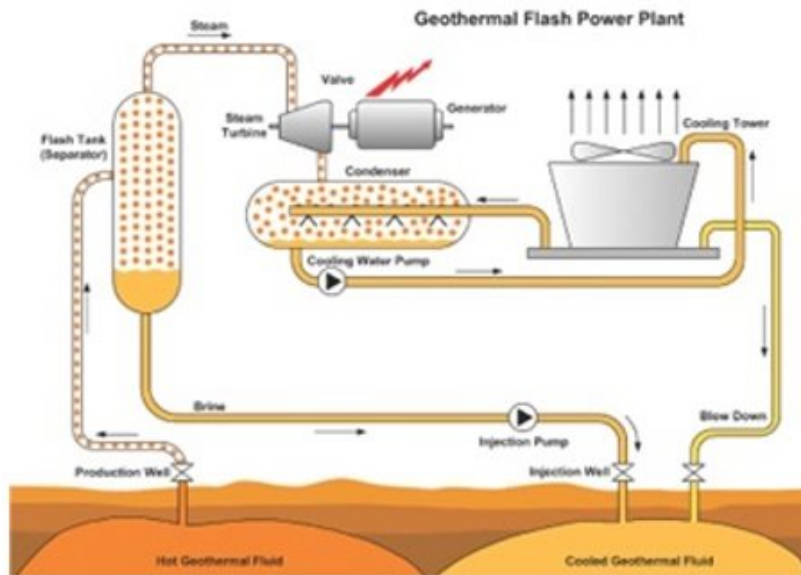
Air-Cooled Binary Geothermal Power Plant





Flash Design System

In a geothermal power plant using flash design, geothermal fluid is extracted from the underground reservoir and flows from the wellhead through a gathering system of insulated steel pipelines to flash tanks and/or separators. There, the steam is separated from the brine and is sent to a demister, where any remaining water droplets are removed. This produces a stream of dry saturated steam, which drives a steam turbine generator to produce electricity. In some cases, the brine at the outlet of the separator is flashed a second time (dual flash), providing additional steam at lower pressure used in the low-pressure section of the steam turbine to produce additional electricity. Steam exhausted from the steam turbine is condensed in a surface or direct contact condenser cooled by cold water from a cooling tower. The non-condensable gases (such as carbon dioxide) are removed by means of a vacuum system in order to maintain the performance of the steam condenser. The resulting condensate is used to provide make-up water for the cooling tower. The hot brine remaining after separation of steam is injected (either directly or after passing through a binary plant to produce additional power from the residual heat remaining in the brine) back into the geothermal resource through a series of injection wells. The flash technology is depicted in the diagram below.



In some instances, the wells directly produce dry steam and the steam is fed directly to the steam turbine with the rest of the system similar to the flash technology described above.

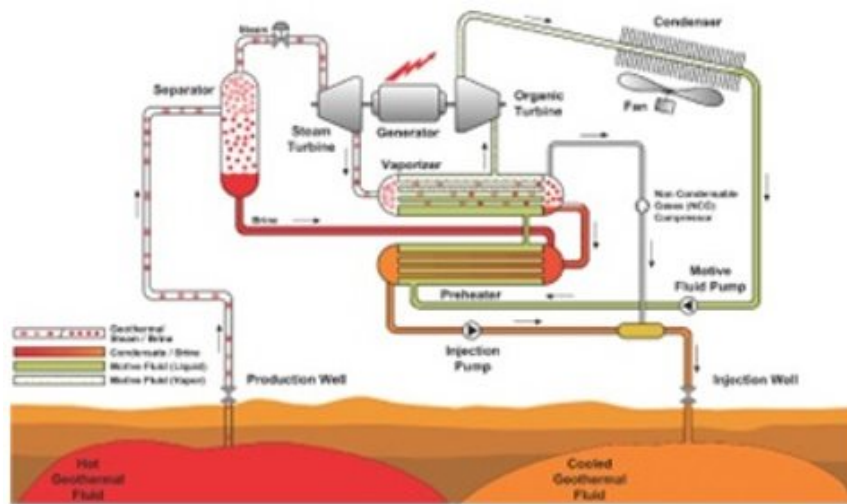
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Our Proprietary Technology

Our proprietary technology may be used either in power plants operating according to the ORC alone or in combination with various other commonly used thermodynamic technologies that convert heat to mechanical power, such as gas and steam turbines. It can be used with a variety of thermal energy sources, such as geothermal, recovered energy, biomass, solar energy and fossil fuels. Specifically, our technology involves original designs of turbines, pumps, and heat exchangers, as well as formulation of organic motive fluids (all of which are non-ozone-depleting substances). By using advanced computational fluid dynamics techniques and other computer aided design software as well as our test facilities, we continuously seek to improve power plant components, reduce operations and maintenance costs, and increase the range of our equipment and applications. We are always examining ways to increase the output of our plants by utilizing evaporative cooling, cold reinjection, configuration optimization, and topping turbines.

We also developed, patented and constructed GCCU power plants in which the steam first produces power in a backpressure steam turbine and is subsequently condensed in a vaporizer of a binary plant, which produces additional power. Our Geothermal Combined Cycle technology is depicted in the diagram below.

Geothermal Combined Cycle Power Plant (GCCU)



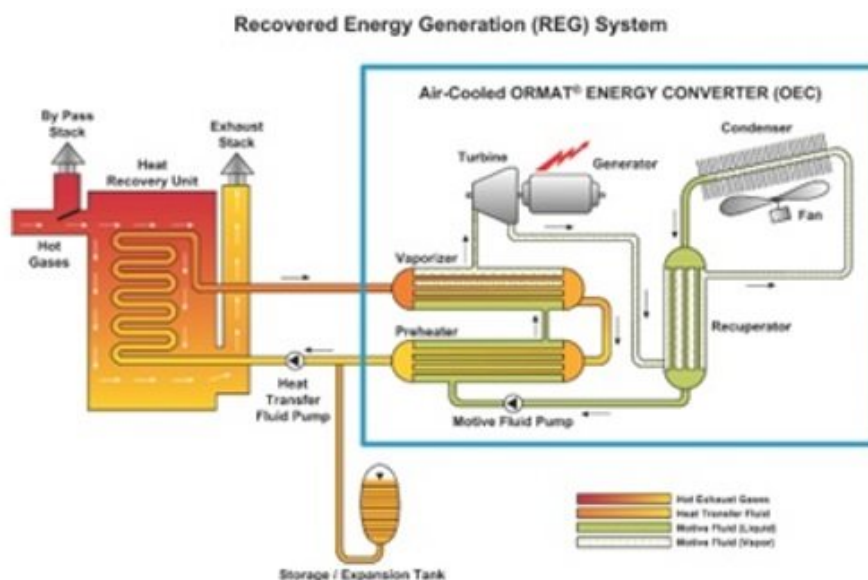
In the conversion of geothermal energy into electricity, our technology has a number of advantages over conventional geothermal steam turbine plants. A conventional geothermal steam turbine plant consumes significant quantities of water, causing depletion of the aquifer and requiring cooling water treatment with chemicals and consequently a need for the disposal of such chemicals. A conventional geothermal steam turbine plant also creates a significant visual impact in the form of an emitted plume from the cooling towers, especially during cold weather. By contrast, our binary and combined cycle geothermal power plants have a low profile with minimal visual impact and do not emit a plume when they use air-cooled condensers. Our binary and combined cycle geothermal power plants reinject all of the geothermal fluids utilized in the respective processes into the geothermal reservoir. Consequently, such processes generally have no emissions.

Other advantages of our technology include simplicity of operation and maintenance and higher yearly availability. For instance, the OEC employs a low speed and high efficiency organic vapor turbine directly coupled to the generator, eliminating the need for reduction gear. In addition, with our binary design, there is no contact between the turbine blade and geothermal fluids, which can often be very erosive and corrosive. Instead, the geothermal fluids pass through a heat exchanger, which is less susceptible to erosion and can adapt much better to corrosive fluids. In addition, with the organic vapor condensed above atmospheric pressure, no vacuum system is required.

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We use the same elements of our technology in our recovered energy products. The heat source may be exhaust gases from a Brayton cycle gas turbine, low-pressure steam, or medium temperature liquid found in the process industries such as oil refining and cement manufacturing. In most cases, we attach an additional heat exchanger in which we circulate thermal oil or water to transfer the heat into the OEC's own vaporizer in order to provide greater operational flexibility and control. Once this stage of each recovery is completed, the rest of the operation is identical to that of the OECs used in our geothermal power plants and enjoys the same advantages of using the ORC. In addition, our technology allows for better load following than conventional steam turbines, requires no water treatment (since it is air cooled and organic fluid motivated), and does not require the continuous presence of a licensed steam boiler operator on site.

Our REG technology is depicted in the diagram below.



Patents

As of February 24, 2021, we have 62 issued U.S. patents and one pending U.S. patent application. These patents and patent applications cover our products (mainly power units based on the ORC) and systems (mainly geothermal power plants and industrial waste heat recovery plants for electricity production). The

product-related patents cover components that include turbines, heat exchangers, air coolers, seals and controls as well as control of operation of geothermal production well pumps. The system-related patents cover not only particular components but also the overall energy conversion system from the “fuel supply” (e.g., geothermal fluid, waste heat, biomass or solar) to electricity production.

The system-related patents also cover subjects such as waste heat recovery related to gas pipeline compressors and industrial waste heat, solar power systems, disposal of non-condensable gases present in geothermal fluids, reinjection of other geothermal fluids ensuring geothermal resource sustainability, power plants for very high-pressure geothermal resources, two-phase fluids, low temperature geothermal brine as well as processes related to EGS. 55 of our patents cover combined cycle geothermal power plants, in which the steam first produces power in a backpressure steam turbine and is subsequently condensed in a vaporizer of a binary plant, which produces additional power. The remaining terms of our issued patents range from one year to 16 years. The loss of any single patent would not have a material effect on our business or results of operations.

Research and Development

We conduct research and development activities intended to improve plant performance, reduce costs, and increase the breadth of our product offerings. The primary focus of our research and development efforts is targeting power plant conceptual thermodynamic cycle and major equipment including continued performance, cost and land usage improvements to our condensing equipment, and development of new higher efficiency and higher power output turbines. New realms for innovation include implementation of predictive maintenance software and automation of power plants performance analysis.

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Energy Storage Technology

In the energy storage segment, our engineering and R&D efforts include:

(a) developing optimization algorithms to optimize the dispatch strategy of a battery energy storage system (BESS) so as to optimize between potential market revenues and expected battery wear and tear;

(b) running an R&D laboratory to assess different battery cell technologies and their optimization with different energy markets in which we operate. We are testing different batteries under simulated operating criteria of various energy markets. Various inverter technologies are also assessed to identify deficiencies or synergies with the battery cells.

(c) developing self-integrated BESS, leveraging Ormat’s decades of experience in system integration so we can bring to market cost-effective BESS more rapidly and more optimized to the specific use cases and target revenue streams.

Additionally, we are continuing to evaluate investment opportunities in companies with innovative technology or product offerings for renewable energy and energy storage solutions.

Market Opportunities

Geothermal Market Opportunities

Renewable energy in general provides a sustainable alternative to the existing solutions to two major global issues: climate change and diminishing fossil fuel reserves. Renewable energy is sustainable, clean and decarbonizes the grid. These environmental benefits have led major countries to focus their efforts on the development of renewable energy sources in general and geothermal specifically.

Based on the IGA, as of January 2021, geothermal power is generated in 29 countries with a total installed power generation capacity of 15,600 MW at the end of 2020. The leading countries are the U.S., Indonesia, the Philippines, Turkey, Mexico and New Zealand. The IGA estimates an additional 4,000 MW will be added by 2025.

Having realized the importance of renewable energy including geothermal alternatives, various governments have been preparing regulatory frameworks and policies, and providing incentives to develop the sector.

United States

Interest in geothermal energy in the United States remains strong for numerous reasons, including legislative support, RPS goals (as described below), coal, natural gas and nuclear power plant retirements, and an increasing awareness of the positive value of geothermal characteristics when compared to intermittent renewable technologies.

Today, electricity generation from geothermal resources is concentrated mainly in California, Nevada, Hawaii, Idaho, Oregon, and Utah, and we believe there are opportunities for expansion in other states such as New Mexico due to the potential of its geothermal resources and recent legislation that has increased its renewable energy goals to 100% by 2045 for investor-owned utilities.

Geothermal energy provides numerous benefits to the U.S. grid and economy. Geothermal development and operation bring economic benefits in the form of taxes and long term high-paying jobs, and it currently has one of the lowest LCOE of all power sources in the United States, according to the U.S. Energy Information Administration’s report published in February 2019. Additionally, improvements in geothermal production make it possible to provide ancillary and on-demand services. This helps load serving entities avoid additional costs from purchasing and then balancing intermittent resources with storage or new transmission.

At the end of 2020, the United States Congress passed one of its most significant energy legislation in over a decade as part of the omnibus spending and

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State level legislation

Many state governments have enacted an RPS program under which utilities are required to include renewable energy sources as part of their energy generation. Under an RPS, participating states have set targets for the production of their energy from renewable sources by specified dates. Renewable energy generation under RPS programs are tracked through the production of RECs. Load serving entities track the RECs to ensure they are meeting the mandate prescribed by the RPS.

Currently in the United States, 42 states plus the District of Colombia and four territories have enacted an RPS, renewable portfolio goals, or similar laws or incentives (such as clean energy standards or goals) requiring or encouraging load serving entities in such states to generate or buy a certain percentage of their electricity from renewable energy or recovered heat sources. The vast majority of Ormat’s geothermal projects can be found in California, Nevada, and Hawaii which have some of the most stringent RPS programs in the country.

We see the impact of RPS and climate legislation as the most significant driver for us to expand existing power plants and to build new renewable projects.

Below are RPS targets in the states in which we are operating:

State	RPS Target	Year	Remarks
California	60%	2030	RPS targets set for future years: 44% – 2024, 52% – 2027, and 60% – 2030. 100% zero carbon by 2045.
Nevada	50%	2030	RPS target of 50% by 2030 and 100% zero carbon by 2050. The state has a credit multiplier for photovoltaic and on peak energy savings.
Hawaii	100%	2045	RPS targets set for future years: 30% by 2020, 40% by 2030, 70% by 2040 and 100% by 2045
Oregon	25%	2025	Increased RPS of 50% by 2040 applies to IOUs who have a share of more than 3% of the state’s load; for utilities with a load-share of 1.5% – 3%, requirement is 10% in 2025, and for utilities with a load share of less than 1.5%, it is 5% in 2025

States also provide incentives to geothermal energy producers. Nevada provides a property tax abatement of up to 55% for real and tangible personal property used to generate electricity from geothermal sources. The abatement may extend up to twenty years if certain job creation requirements are met. The California Energy Commission provides favorable grants and loans to promote the development of new or existing geothermal resources and technologies within the state. In Idaho, geothermal energy producers are exempt from property tax and, in lieu, pay a tax of 3% of gross energy earnings.

Global

We believe the global markets continue to present growth and expansion opportunities in both established and emerging markets.

Operations outside of the United States may be subject to and/or benefit from increasing efforts by governments and businesses around the world to fight climate change and move towards a low carbon, resilient and sustainable future. According to a recent report by the International Renewable Energy Agency entitled Toward 100% Renewable Energy, in 2019, a total of 61 countries had set a 100% renewable energy target in at least one end-use sector, up from 60 countries in 2018.

We believe that several global initiatives will create business opportunities and support global growth of the renewable sector. One such initiative is the historic Paris Agreement that was approved by the Twenty-first Conference of the Parties to the United Nations Framework Convention on Climate Change on December 12, 2015. The Paris Agreement, for the first time, created a commitment by parties to this agreement to setting nationally determined efforts with the view to strengthening the global response to the threat of climate change and reporting on their progress. Following this agreement, the EIB and other multilateral institutions have committed to provide \$100 billion of new financing for climate action projects over the next five years to assist countries in reaching their targets. Although former President Donald J. Trump officially withdrew the United States from the Paris Agreement in 2020, President Joe Biden signed an executive order to recommit the United States to the Paris Agreement. The Paris Agreement will enter into force for the United States on February 19, 2021.

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In addition, in 2015, a group of 20 countries, including the United States, United Kingdom, France, China and India, pledged to double their respective budgets for renewable energy technology over five years as part of a separate initiative called Mission Innovation. Mission Innovation celebrated its fifth year in 2020, and has since grown to 24 countries and the European Commission. Over the past five years members have raised the profile of clean energy innovation and increased investments by \$4.9 billion annually.

Also in 2015, the Breakthrough Energy Coalition was launched by a group of 28 private investors with the objective of bringing companies with the potential to deliver affordable, reliable and carbon free power from the research lab to the market. In the same vein, in 2020, several global organizations joined the Rockefeller Foundation to form a coalition aimed at providing sustainable energy for one billion people by 2030. Joining this call to action include the African Development Bank, CDC Group plc (the UK’s development finance institution), European Investment Bank, International Energy Agency, IRENA, United Nations

Development Programme (UNDP), U.S. International Development Finance Corporation and U.S. Agency for International Development (USAID). The coalition aims to unleash the full potential of distributed renewable and sustainable energy systems, including technologies such as mini-grids, grid-connected local generation and storage, renewable power solutions for industrial and commercial clusters, and stand-alone commercial appliances.

We believe that as a general matter these developments and governmental plans will create growth and expansion opportunities for us internationally.

Outside of the United States, the majority of power generating capacity has historically been owned and controlled by governments. Since the early 1990s, however, many foreign governments have privatized their power generation industries through sales to third parties encouraging new capacity development and/or refurbishment of existing assets by independent power developers. These foreign governments have taken a variety of approaches to encourage the development of competitive power markets, including awarding long-term contracts for energy and capacity to independent power generators and creating competitive wholesale markets for selling and trading energy, capacity, and related products. Some foreign regions and countries have also adopted active government programs designed to encourage clean renewable energy power generation such as the following countries in which we operate, sell products and/or are conducting business development activities:

Europe

Europe has the fourth largest geothermal power capacity, the majority of which stems from Italy and Turkey. A significant part of our European operations is in Turkey. We are looking for opportunities to expand in Europe.

Turkey

Until recently, Turkey was the fastest growing geothermal market worldwide with the theoretical potential for 31 GW of geothermal capacity and with a proven geothermal capacity of 4.5 GW, according to the Turkish Mineral Technical Exploration Agency. Due to the economic situation in Turkey, there has been a slowdown.

Since 2004, we have established strong business relationships in the Turkish market and provided our range of solutions including our binary systems, to over 40 geothermal power plants with a total capacity of over 950 MW, of which one power plant is currently under construction.

The incentive plan and regulation for renewable energy generation in Turkey was renewed at the beginning of February 2021 for another 5 years. The updated FIT is lower than the previous one and the structure of the incentivized local manufactured items is not published yet, but will also change, to increase locally made parts. The structure of adjusting the exchange rate of the USD to the YTL has changed dramatically, both with applying the adjustment only once every three months, and by having an adjustment mechanism that takes into consideration changes not only on the USD / YTL rate, but also local indexes and the Euro exchange. Turkey's external debt and economic status also create big burden on any project financing process. Until things improve, we estimate that the slowdown in development of new sites will continue.

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The potential for geothermal growth in Turkey is still high, specifically in center-south and east areas of the country. In addition, there is a growing interest in waste heat utilization to generate electricity.

Latin America

Several Latin American countries have renewable energy programs and pursue the development of the geothermal market. We currently operate in some countries in Latin America and are looking for opportunities in others.

Guatemala

In Guatemala, where our Zunil and Amatitlan power plants are located, the government approved and adopted the Energy Policy 2013-2027 that secure, among other things, a supply of electricity at competitive prices by diversifying the energy mix with an 80% renewable energy share target for 2027.

Honduras

In Honduras, where we operate our Platanares power plant, the government set a target to reach at least 80% renewable energy production by 2034.

Caribbean

Many island nations in general and specifically the Caribbean nations, depend almost entirely on petroleum to meet their electricity needs. Caribbean nations have quite significant renewable energy potential, yet most have relatively small demand. Other than in Guadeloupe, where the geothermal power plant that we acquired has been operating since 1985, there are no other operating geothermal projects in the Caribbean region. Although few, we believe there are geothermal opportunities for us in the Caribbean islands of St. Kitts, Nevis, St. Lucia, Dominica, and Montserrat.

New Zealand

In New Zealand, where we have been actively providing geothermal power plant solutions since 1988, the government's policies to fight climate change include a net zero GHG emissions reduction target by 2050 and a renewable electricity generation target of 90% of New Zealand's total electricity generation by 2035. We continue selling power plants and products to our New Zealand customers, secured two projects in the last two years and intensified our cooperation with other potential customers for adding more geothermal power generation capacity within the coming years.

Indonesia

In Indonesia, where we hold a 12.75% equity interest in the Sarulla complex, we are currently conducting exploration activity in the Ijen geothermal power plan in East Java, in which we own a 49% equity interest and whose first phase we plan to commission by the end of 2023. The government intends to increase the share of renewable energy sources in the energy mix, aiming to meet a target of 23% of domestic energy demand by 2025, and announced its intention to reduce the country's carbon dioxide emissions by 26% by 2020. Under the current local regulation, the tariff policy for geothermal PPAs is mainly determined based on the location of the relevant power plant.

We consider Indonesia an important geothermal market, where potential for future development is significant along with an active geothermal industry that is supported by regulatory incentives and commitment from the local government.

In addition to project development, we are also pursuing various supply opportunities in Indonesia, and in other countries in Southeast Asia, including several optimization projects.

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China

In China, where we supplied our equipment to one of our clients' geothermal projects, the National Energy Administration will adopt the 14th Renewable Energy Development Five Year Plan by March 2021 that establishes targets for renewable energy deployment until 2025. Key objectives under the plan include, among others, to increase the share of non-fossil fuel energy in total primary energy consumption to 20% by 2030.

Japan

The installed capacity of Japan places ninth in the world, the potential output of 23,470 MW is third in the world after the United States and Indonesia. In 2018, the Japanese government established as its goal a target of 22% to 24% renewable energy of the Japanese energy installed base by 2030. This outlook expects new geothermal plant installation in the range of 380 MW to 850 MW - 1,000 MW. State-owned resources agency JOGMEC will conduct test bores as part of the financially risky early phase of development on behalf of potential developers starting in the fiscal year from April 2020. Japan's Ministry of Economy, Trade and Industry (METI) determined 24 successful applicants for the full year 2019 Research Project for Developing Resources for Geothermal Power Generation managed by State-owned resources agency JOGMEC.

East Africa

In East Africa the geothermal potential along the Rift Valley is estimated at several thousand MW. The different countries along the Rift Valley are at different stages of development of their respective geothermal potential.

Kenya

In Kenya, there are already several geothermal power plants, including our 150 MW Olkaria III complex. The Kenyan government has identified the country's untapped geothermal potential as the most suitable indigenous source of electricity, and it aspires to reach 5 GW of geothermal power generation by 2030.

The Kenyan government is aiming to reach 10 GW of power generating capacity by 2037, under the Least-Cost Power Development Plan 2017-37 with a target of 62% of such capacity generated from renewable energy sources (including large hydro and solar).

Other Countries

The governments of Djibouti, Eritrea, Ethiopia, Tanzania, Uganda, Rwanda and Zambia are exploring ways to develop geothermal resources in their countries, mostly through the help of international development organizations such as the World Bank.

Ethiopia electrification targets for 2025 require additional investment in generation capacities. Such growth in demand was expected to be principally met with the GERD. However, IPP's are encouraged to participate directly in the renewable development in order to meet expected local growth. Moreover, the current government sees electricity export to neighboring countries as a strategic asset. The country recently completed an interconnection with Kenya and plans to further increase connections to Djibouti, Sudan, South Sudan, Rwanda, Burundi. These exports will improve foreign exchange reserves in Ethiopia. We hold rights for four geothermal concessions in Ethiopia, for which we have completed initial exploration studies.

In January 2014, energy ministers and delegates from 19 countries committed to the creation of the Africa Clean Energy Corridor Initiative (Corridor), at a meeting in Abu Dhabi convened by the International Renewable Energy Agency. The Corridor will boost the deployment of renewable energy and aims to help meet Africa's rising energy demand with clean, indigenous, cost-effective power from sources including hydro, geothermal, biomass, wind and solar.

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Energy Storage

Globally, there is a continued increase in the use of renewable energy. In the United States and Europe, this increase is placing strains on the electric grid as

adding wind and solar PV power creates situations where a significant amount of power plant capacity must be available to ramp up and down to accommodate wind and mostly solar PV daily output cycles and variations due to atmospheric conditions. Furthermore, the output from wind and solar PV power plants can change significantly over short periods of time due to environmental conditions like cloud movement and fog burn off and cause instability on the electric grid. As a result, energy storage is becoming a key component of the future grid.

Energy storage systems utilize surplus, available electricity that enables utilities and grid operators to optimize the operation of the grid, run generators closer to full capacity for longer periods, and operate the grid more efficiently and effectively. As penetration of wind and solar resources increases, so does the need for services that energy storage systems can provide to “balance the grid”, such as local capacity, frequency regulation, ramping, reactive power, black start and movement of energy from times of excess supply to times of high demand. Common applications for energy storage systems include ancillary services, wind/solar smoothing, peaker replacement, and transmission and distribution deferral.

According to Wood Mackenzie's (formerly GTM Research) Energy Storage Monitor for Q3 2020, approximately 3.3 GWh of new energy storage projects were installed in the United States in 2020 and this number is expected to grow more than seven times to approximately 24.4 GWh in 2025.

2020 saw record growth in BESS deployment in the United States, despite the challenges presented by COVID-19, and significant growth in BESS deployment is expected to continue primarily for grid-connected (also referred to as “in front of the meter”) applications, but also for “behind the meter” applications, where end-users, such as small municipal utilities, electric cooperative, educational and health facilities, commercial and industrial customers, benefit from savings through demand charge reductions and create revenues through active market participation. Many power systems are also undergoing significant challenges and changes such as grid aging, grid congestion, retirement of aging generators, implementation of greenhouse gas emission reduction rules and increasing penetration of variable renewable energy resources.

We own and operate several grid-connected BESS facilities, where revenues come from selling energy, capacity and/or ancillary services in merchant markets like PJM Interconnect, ISO New England, the ERCOT and the CAISO. We are pursuing the development of additional grid-connected BESS projects in multiple regions, with expected revenues coming from providing energy, capacity or ancillary services on a merchant basis, or through bilateral contracts with load serving entities, e.g. investor owned utilities, publicly owned utilities and community choice aggregators. We are also pursuing the development of storage plus Solar PV facilities. We put in place financial instruments, where appropriate, to hedge some of the merchant risk.

C&I and Community BESS

The electricity industry continues to shift from a purely centralized topology where electricity flows only in one direction from centralized power plants to consumers, into a more distributed architecture, that includes distributed energy resources and consumers selling excess electricity generated on-site to the grid. Many C&I companies, campuses, and communities (e.g. electric cooperatives and small municipal utilities) are motivated to purchase renewable energy to meet sustainability goals and reduce costs. While the C&I industry could be a natural expansion of our customer base, our current focus is on the much larger and rapidly growing utility-scale front-of-the-meter applications, as well as on utility-scale behind the meter applications. The opportunity is mainly with municipal utilities and electric cooperatives, such as our Hinesburg project with Vermont Electric Cooperative, where one of the revenue streams our BESS generates comes from selling peak load contribution reduction services to the local utility, which allows it to reduce the demand charges paid to the local RTO/ISO.

Solar PV

The solar PV market continues to grow, driven by constant decline in equipment prices and an increasing desire to replace conventional generation with renewable resources that are commonly supported by favorable regulatory policies. We are monitoring market drivers with the potential to develop solar PV power plants in locations where we can offer competitively priced power generation. Our current focus is in adding solar PV systems in some of our operating geothermal power plants to reduce internal consumption loads, developing standalone solar PV projects in targeted regions where economics are favorable as well as developing combined solar PV and BESS projects. In 2019 we successfully placed in service a solar PV augmentation system at our Tungsten Mountain geothermal power plant in Churchill County, Nevada. We are also constructing the 20 MW(AC) Wister solar PV project in Imperial County, California, for which a power purchase agreement with San Diego Gas & Electric is in effect and we are currently targeting commercial operation in 2021. Additional potential projects are undergoing feasibility analysis, and some are in earlier phases of development.

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Other Opportunities

Recovered Energy Generation

In addition to our geothermal power generation activities, we are pursuing recovered energy-based power generation opportunities in the United States and worldwide. We believe recovered energy-based power generation will ultimately benefit from the efforts to reduce GHG emissions. We have built 23 power plants in North America which generate electricity utilizing “waste heat” from gas turbine-driven compressor stations along interstate natural gas pipelines, from midstream and gas processing facilities, and from other applications.

Several states, and to some extent the federal government, have recognized the environmental benefits of recovered energy-based power generation. For example, 18 states currently allow electric utilities to include recovered energy-based power generation in calculating such utilities' compliance with their mandatory or voluntary RPS and/or Energy Efficient Resources Standards. In addition, California modified the Self Generation Incentive Program to allow recovered energy-based power generation to qualify for a per watt incentive.

At the end of 2020, the United States Congress passed legislation including a provision that makes recovered energy generation property eligible for the energy investment tax credit. Recovered energy property that begins construction in 2021 or 2022 is eligible for a 26 percent tax credit, and property that begins construction in 2023 is eligible for a 22 percent tax credit.

In Europe, and specifically in Turkey, we see increasing interest in waste heat utilization to generate electricity.

In 2016, the Canadian government ratified its commitments in the Paris Agreement, which features a commitment to reduce emissions by 30% from 2005 levels by 2030. Pursuant to the Greenhouse Gas Pollution Pricing Act, Canadian provinces must have an emission reduction plan in place or be subject to a federal carbon tax in 2018.

This comprehensive climate policy, once fully implemented, will encourage the development of renewable energy technologies, including waste heat recovery, throughout Canada. We believe that Europe and other markets worldwide may offer similar opportunities in recovered energy-based power generation.

In summary, the market for the recovery of waste heat converted into electricity exists either when already available electricity is expensive or where the regulatory environment facilitates construction and marketing of power generated from recovered waste heat. However, such projects tend to be smaller than 9 MW and we expect any growth to be relatively slow and geographically scattered.

Operations of our Electricity Segment

How We Own Our Power Plants

We customarily establish a separate subsidiary to own interests in each of our power plants. This ensures that the power plant, and the revenues generated by it, will be the only source for repaying indebtedness, if any, incurred to finance the construction or the acquisition (or to refinance the construction or acquisition) of the relevant power plant. If we do not own all of the interest in a power plant, we enter into a shareholders' agreement or a partnership agreement that governs the management of the specific subsidiary and our relationship with our partner in connection with the specific power plant. Our ability to transfer or sell our interests in certain power plants may be restricted by certain purchase options or rights of first refusal in favor of our power plant partners or the power plant's power purchasers and/or certain change of control and assignment restrictions in the underlying power plant and financing documents. All of our domestic geothermal and REG power plants are Qualifying Facilities under the PURPA and are eligible for regulatory exemptions from most provisions of the FPA and certain state laws and regulations.

How We Explore and Evaluate Geothermal Resources

Since 2006, we have expanded our exploration activities, initially in the United States and in the last few years with an increasing focus internationally. It generally takes two to three years from the time we start active exploration of a particular geothermal resource to the time we have an operating production well, assuming we conclude the resource is commercially viable and determine to pursue its development. Exploration activities generally involve the phases described below.

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[Initial Evaluation](#)

We identify and evaluate potential geothermal resources by sampling and studying new areas combined with information available from public and private sources. We generally adhere to the following process, although our process can vary from site to site depending on geological circumstances and prior evaluation:

- We evaluate historic, geologic and geothermal information available from public and private databases, including geothermal, mining, petroleum and academic sources.
- We visit sites, sampling fluids for chemistry if necessary, to evaluate geologic conditions.
- We evaluate available data, and rank prospects in a database according to estimated size and perceived risk. For example, pre-drilled sites with extensive data are considered lower risk than "green field" sites. Both prospect types are considered critical for our continued growth.
- We generally create a digital, spatial geographic information systems (GIS) database and 3D geologic model containing all pertinent information, including thermal water temperature gradients derived from historic drilling, geologic mapping information (e.g., formations, structure, alteration, and topography), and any available archival information about the geophysical properties of the potential resource.
- We assess other relevant information, such as infrastructure (e.g., roads and electric transmission lines), natural features (e.g., springs and lakes), and man-made features (e.g., old mines and wells).
- We estimate potential generation capacity using several methods and based on analogous producing geothermal fields. This assessment is refined throughout the exploration process.

Our initial evaluation is usually conducted by our own staff, although we might engage outside service providers for some tasks from time to time. The costs associated with an initial evaluation vary from site to site, based on various factors, including the acreage involved and the costs, if any, of obtaining information from private databases or other sources. On average, our expenses for an initial evaluation range from approximately \$10,000 to \$50,000 including travel, chemical analyses, and data acquisition.

If we conclude, based on the information considered in the initial evaluation, that the geothermal resource could support a commercially viable power plant, taking into account various factors described below, we proceed to land rights acquisition.

[Land Acquisition](#)

We acquire land rights to any geothermal resources our initial evaluation indicates could potentially support a commercially viable power plant. For domestic power plants, we either lease or own the sites on which our power plants are located. For our foreign power plants, our lease rights for the power plant site are generally contained in the terms of a concession agreement or other contract with the host government or an agency thereof. In certain cases, we also enter into one or more geothermal resource leases (or subleases) or a concession or an option agreement or other agreement granting us the exclusive right to extract geothermal resources from specified areas of land, with the owners (or sublessors) of such land. In some cases, we first obtain the exploration license and once certain investment requirements are met, we can obtain the geothermal exploitation rights. This usually gives us the right to explore, develop, operate, and maintain the geothermal field, including, among other things, the right to drill wells (and if there are existing wells in the area, to alter them) and build pipelines for transmitting geothermal fluid. In certain cases, the holder of rights in the geothermal resource is a governmental entity and in other cases a private entity. Usually the duration of the lease (or sublease) and concession agreement corresponds to the duration of the relevant PPA, if any. In certain other cases, we own the land where the geothermal resource is located, in which case there are no restrictions on its utilization. The BLM and the Minerals Management Service regulate leasehold interests in federal land in the United States. These agencies have rules governing the geothermal leasing process as discussed below under “Description of Our Leases and Lands”.

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For most of our current exploration sites in the United States, we acquire rights to use the geothermal resource through land leases with the BLM, with various states, or through private leases. Under these leases, we typically pay an up-front non-refundable bonus payment, which is a component of the competitive lease process. In addition, we undertake to pay nominal, fixed annual rent payments for the period from the commencement of the lease through the completion of construction. Upon the commencement of power generation, we begin to pay to the lessors long-term royalty payments based on the use of the geothermal resources as defined in the respective agreements. These payments are contingent on the power plant’s revenues. A summary of our typical lease terms is provided below under “Description of our Leases and Lands”. The up-front bonus and royalty payments vary from site to site and are based on, among other things, current market conditions.

Surveys

We conduct geological, geochemical, and/or geophysical surveys on the site we acquire. Following the acquisition of land rights for a potential geothermal resource, we conduct additional surface water analysis, soil surveys, and geologic mapping to determine proximity to possible heat flow anomalies and up-flow/permeable zones. We augment our digital database with the results of those analysis and create conceptual and digital geologic models to describe geothermal system controls. We then initiate a suite of geophysical surveys (e.g., gravity, magnetics, resistivity, magnetotellurics, reflection seismic, LiDAR, and spectral surveys) to assess surface and sub-surface structure (e.g., faults and fractures) and improve the geologic model of fluid-flow conduits and permeability controls. All pertinent geological and geophysical data are used to create three-dimensional geologic models to identify drill locations. These surveys are conducted incrementally considering relative impact and cost, and the geologic model is updated continuously.

We make a further determination of the commercial viability of the geothermal resource based on the results of this process, particularly the results of the geochemical surveys estimating temperature and the overall geologic model, including potential resource size. If the results from the geochemical surveys are poor (i.e., low derived resource temperatures or poor permeability) or the geologic model indicates small or deep resource, we re-evaluate the commercial viability of the geothermal resource and may not proceed to exploratory drilling. We generally only move forward with those sites that we believe have a high probability of successful development.

Exploratory Drilling

We drill one or more exploratory wells on the high priority, relatively low risk sites to confirm and/or define the geothermal resource. If we proceed to exploratory drilling, we generally use outside contractors to create access roads to drilling sites and related activities. We have continued efforts to reduce exploration costs and therefore, after obtaining drilling permits, we generally drill temperature gradient holes and/or core holes that are lower cost than slim holes (used in the past) using either our own drilling equipment, whenever possible, or outside contractors. If the obtained data supports a conclusion that the geothermal resource can support a commercially viable power plant, it will be used as an observation well to monitor and define the geothermal resource. If the core hole indicates low temperatures or does not support the geologic model of anticipated permeability, it may be plugged, and the area reclaimed. In undrilled sites, we typically step up from shallow (500-1000 feet) to deeper (2000-4000 feet) wells as confidence improves. Following proven temperature in core wells, we typically move to slim and/or full- size wells to quantify permeability.

Each year we determine and approve an exploration budget for the entire exploration activity in such year. We prioritize budget allocation between the various geothermal sites based on commercial and geological factors. The costs we incur for exploratory drilling vary from site to site based on various factors, including the accessibility of the drill site, the geology of the site, and the depth of the resource. However, on average, exploration costs, prior to drilling of a full-size well are approximately \$1.0 million to \$3.0 million for each site, not including land acquisition. We only reach such spending levels for sites that proved to be successful in the early stages of exploration.

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At various points during our exploration activities, we re-assess whether the geothermal resource involved will support a commercially viable power plant based on information available at that time. Among other things, we consider the following factors:

- New data and interpretations obtained concerning the geothermal resource as our exploration activities proceed, and particularly the expected MW capacity power plant the resource can be expected to support. The MW capacity can be estimated using analogous systems and/or quantitative heat in place estimates until results from drilling and flow tests quantify temperature, permeability, and resulting resource size.

- Current and expected market conditions and rates for contracted and merchant electric power in the market(s) to be serviced.
- Availability of transmission capacity.
- Anticipated costs associated with further exploration activities and the relative risk of failure.
- Anticipated costs for design and construction of a power plant at the site.
- Anticipated costs for operation of a power plant at the site, particularly taking into account the ability to share certain types of costs (such as control rooms) with one or more other power plants that are, or are expected to be, operating near the site.

If we conclude that the geothermal resource involved will support a commercially viable power plant, we proceed to constructing a power plant at the site.

How We Construct Our Power Plants.

The principal phases involved in constructing one of our geothermal power plants are as follows:

- Drilling production and injection wells.
- Designing the well field, power plant, equipment, controls, and transmission facilities.
- Obtaining any required permits, electrical interconnection and transmission agreements.
- Manufacturing (or in the case of equipment we do not manufacture ourselves, purchasing) the equipment required for the power plant.
- Assembling and constructing the well field, power plant, transmission facilities, and related facilities.

In recent years, it has taken us two to three years from the time we drill a production well until the power plant becomes operational.

Drilling Production and Injection Wells

We consider completing the drilling of the first production well to be the beginning of our construction phase for a power plant. However, this is not always sufficient for a full release of a project for construction. The number of production wells varies from plant to plant depending on, among other things, the geothermal resource, the projected capacity of the power plant, the power generation equipment to be used and the way geothermal fluids will be re-injected through injection wells to maintain the geothermal resource and surface conditions. We generally drill the wells ourselves although in some cases we use outside contractors.

The cost for each production and injection well varies depending on, among other things, the depth and size of the well and market conditions affecting the supply and demand for drilling equipment, labor and operators. In the last five years, our typical cost for each production and injection well is approximately \$3.3 million with a range of \$1.0 million to \$8.5 million.

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Design

We usually use our own employees to design the well field and the power plant, including equipment that we manufacture and that will be needed for the power plant. In some cases, depending on complexity and location, we use third parties to help us with the design. The designs vary based on various factors, including local laws, required permits, the geothermal resource, the expected capacity of the power plant and the way geothermal fluids will be re-injected to maintain the geothermal resource and surface conditions.

Permits

We use our own employees and from time to time, depending on complexity and location, outside consultants to obtain any required permits and licenses for our power plants that are not already covered by the terms of our site leases. The permits and licenses required vary from site to site and are described below under “Environmental Permits”.

Manufacturing

Generally, we manufacture most of the power generating unit equipment we use at our power plants. Multiple sources of supply are generally available for all other equipment we do not manufacture.

Construction

We use our own employees to manage the construction work. For site grading, civil, mechanical, and electrical work we use subcontractors.

During 2020, in the Electricity segment, we focused on the commencement of operations at Steamboat Hills Repower in Nevada and we also began construction of CD4, Dixie Meadows and Tungsten Mountain enhancement as well as with enhancement work in some other of our operating power plants worldwide.

When deciding whether to continue holding lease rights and/or to pursue exploration activity, we diligently prioritize our prospective investments, taking into account resource and probability assessments in order to make informed decisions about whether a particular project will support commercial operation. As a result, during fiscal year 2020 we decided to discontinue our holding in one site in Nevada.

After conducting exploratory studies at those sites, we concluded that the respective geothermal resources would not support commercial operations. Costs associated with exploration activities at these sites were expensed accordingly (see “Write-off of Unsuccessful Exploration Activities” under Item 7 — “Management’s Discussion and Analysis of Financial Condition and Results of Operations”).

We added to our exploration inventory two prospective sites in 2020.

How We Operate and Maintain Our Power Plants

Our operations and maintenance practices are designed to minimize operating costs without compromising safety or environmental standards while maximizing plant flexibility and maintaining high reliability. Our operations and maintenance practices for geothermal power plants seek to preserve the sustainable characteristics of the geothermal resources we use to produce electricity and maintain steady-state operations within the constraints of those resources reflected in our relevant geologic and hydrologic studies. Our approach to plant management emphasizes the operational autonomy of our individual plant or complex managers and staff to identify and resolve operations and maintenance issues at their respective power plants; however, each power plant or complex draws upon our available collective resources and experience, and that of our subsidiaries. We have organized our operations such that inventories, maintenance, backup, and other operational functions are pooled within each power plant complex and provided by one operation and maintenance provider. This approach enables us to realize cost savings and enhances our ability to meet our power plant availability goals.

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Safety is a key area of concern to us. We believe that the most efficient and profitable performance of our power plants can only be accomplished within a safe working environment for our employees. Our compensation and incentive program include safety as a factor in evaluating our employees, and we have a well-developed reporting system to track safety and environmental incidents, if any, at our power plants.

How We Sell Electricity

In the United States, the purchasers of power from our power plants are typically investor-owned electric utility companies or electric cooperatives including public owned utilities and recently we signed a PPA with CCAs. Outside of the United States, our purchasers are either state-owned utilities or privately-owned entities and we typically operate our facilities under rights granted to us by a governmental agency pursuant to a concession agreement. In each case, we enter into long-term contracts (typically, PPAs) for the sale of electricity or the conversion of geothermal resources into electricity. Although previously our power plants’ revenues under a PPA generally consisted of two payments, energy payments and capacity payments, our recent PPAs provide for energy payments only. Energy payments are normally based on a power plant’s electrical output actually delivered to the purchaser measured in kWh, with payment rates either fixed or indexed to the power purchaser’s “avoided” power costs (i.e., the costs the power purchaser would have incurred itself had it produced the power it is purchasing from third parties) or rates that escalate at a predetermined percentage each year. Capacity payments are normally calculated based on the generating capacity or the declared capacity of a power plant available for delivery to the purchaser, regardless of the amount of electrical output actually produced or delivered. In addition, we have six domestic power plants located in California, Nevada and Hawaii that are eligible for capacity bonus payments under the respective PPAs upon reaching certain levels of generation, or subject to a capacity payment reduction if certain levels of generation are not reached.

How We Finance Our Power Plants

Historically we have funded our power plants with different sources of liquidity such as a non-recourse or limited recourse debt, lease financing, tax monetization transactions, internally generated cash, which includes funds from operation, as well as proceeds from loans under corporate credit facilities, public equity offerings, senior unsecured corporate bonds, and the sale of equity interests and other securities. Such leveraged financing permits the development of power plants with a limited amount of equity contributions, but also increases the risk that a reduction in revenues could adversely affect a particular power plant’s ability to meet its debt obligations. Leveraged financing also means that distributions of dividends or other distributions by our power plant subsidiaries to us are contingent on compliance with financial and other covenants contained in the applicable financing documents.

Non-recourse debt or lease financing refers to debt or lease arrangements involving debt repayments or lease payments that are made solely from the power plant’s revenues (rather than our revenues or revenues of any other power plant) and generally are secured by the power plant’s physical assets, major contracts and agreements, cash accounts and, in many cases, our ownership interest in our affiliate that owns that power plant. These forms of financing are referred to as “project financing”.

In the event of a foreclosure after a default, our affiliate that owns the power plant would only retain an interest in the power plant assets, if any, remaining after all debts and obligations have been paid in full. In addition, incurrence of debt by a power plant may reduce the liquidity of our equity interest in that power plant because the equity interest is typically subject both to a pledge in favor of the power plant’s lenders securing the power plant’s debt and to transfer and change of control restrictions set forth in the relevant financing agreements.

Limited recourse debt refers to project financing as described above with the addition of our agreement to undertake limited financial support for our affiliate that owns the power plant in the form of certain limited obligations and contingent liabilities. These obligations and contingent liabilities may take the form of guarantees of certain specified obligations, indemnities, capital infusions and agreements to pay certain debt service deficiencies. Creditors of a project financing of a particular power plant may have direct recourse to us to the extent of these limited recourse obligations.

In 2020, we completed an equity offering, issued senior unsecured corporate bonds and raised corporate credit facilities to support our geothermal and storage growth.

We have used financing structures to monetize PTCs and depreciation, such as our tax equity partnership transaction involving McGinness Hills phase 3, Tungsten, and an operating lease arrangement relating to our Puna complex power plants that was recently retired in 2019.

We have also used a sale of equity interests in three of our geothermal assets and nine of our REG facilities to fund corporate needs including funding for the construction of new projects. We may use some of the same financing structures in the future.

How We Mitigate International Political Risk.

We generally purchase insurance policies to cover our equity exposure to certain political risks involved in operating in developing countries, as described below under “Insurance”. However, insurance may not cover all political risks or coverage amounts may not be sufficient.

Description of Our Leases and Lands

We have domestic leases on approximately 338,123 acres of federal, state, and private land in California, Hawaii, Nevada, New Mexico, Utah Idaho and Oregon. The approximate breakdown between federal, state and private leases and owned land is as follows:

- 78% of the acreage under our control is leased from the U.S. government, acting mainly through the BLM;
- 18% is leased or subleased from private landowners and/or leaseholders;
- 2% is owned by us; and
- 2% is leased from various states.

Each of the leases within each of the categories above has standard terms and requirements, as summarized below. Internationally, our land position includes approximately 60,903 acres.

BLM Geothermal Leases

Certain of our domestic project subsidiaries have entered into geothermal resources leases with the U.S. government, pursuant to which they have obtained the right to conduct their geothermal development and operations on federally-owned land. These leases are made pursuant to the Geothermal Steam Act and the lessor under such leases is the U.S. government, acting through the BLM.

BLM geothermal leases grant the geothermal lessee the right and privilege to drill for, extract, produce, remove, utilize, sell, and dispose of geothermal resources on certain lands, together with the right to build and maintain necessary improvements thereon. The actual ownership of the geothermal resources and other minerals beneath the land is retained in the federal mineral estate. The geothermal lease does not grant to the geothermal lessee the exclusive right to develop the lands, although the geothermal lessee does hold the exclusive right to develop geothermal resources within the lands. Since BLM leases do not grant to the geothermal lessee the exclusive right to use the surface of the land, BLM may grant rights to others for activities that do not unreasonably interfere with the geothermal lessee’s uses of the same land, including use, off-road vehicles, and/or wind or solar energy developments.

Typical BLM leases issued to geothermal lessees before August 8, 2005 have a primary term of ten years and will renew so long as geothermal resources are being produced or utilized in commercial quantities but cannot exceed a period of forty years after the end of the primary term. If at the end of the forty-year period geothermal steam is still being produced or utilized in commercial quantities and the lands are not needed for other purposes, the geothermal lessee will have a preferential right to renew the lease for a second forty-year term, under terms and conditions as the BLM deems appropriate.

BLM leases issued after August 8, 2005 have a primary term of ten years. If the geothermal lessee does not reach commercial production within the primary term, the BLM may grant two five-year extensions. If the lessee is drilling a well for the purposes of commercial production, the lease may be extended for five years and thereafter as long as steam is being produced and used in commercial quantities the lease may be extended for up to thirty-five years. If, at the end of the extended thirty-five-year term, geothermal steam is still being produced or utilized in commercial quantities and the lands are not needed for other purposes, the geothermal lessee will have a preferential right to renew the lease under terms and conditions as the BLM deems appropriate.

For BLM leases issued before August 8, 2005, the geothermal lessee is required to pay an annual rental fee (on a per acre basis), which escalates according to a schedule described therein, until production of geothermal steam in commercial quantities has commenced. After such production has commenced, the geothermal lessee is required to pay royalties (on a monthly basis) on the amount or value of (i) steam, (ii) by-products derived from production, and (iii) commercially mineralized water sold or utilized by the project (or reasonably susceptible to such sale or use).

For BLM leases issued after August 8, 2005, (i) a geothermal lessee who has obtained a lease through a non-competitive bidding process will pay an annual rental fee equal to \$1.00 per acre for the first ten years and \$5.00 per acre each year thereafter; and (ii) a geothermal lessee who has obtained a lease through a competitive process will pay a rental equal to \$2.00 per acre for the first year, \$3.00 per acre for the second through tenth year and \$5.00 per acre each year thereafter. Rental fees paid before the first day of the year for which the rental is owed will be credited towards royalty payments for that year. For BLM leases issued, effective, or pending on August 5, 2005 or thereafter, royalty rates are fixed between 1.0-2.5% of the gross proceeds from the sale of electricity during the

first ten years of production under the lease. The royalty rate set by the BLM for geothermal resources produced for the commercial generation of electricity but not sold in an arm’s length transaction is 1.75% for the first ten years of production and 3.5% thereafter. The royalty rate for geothermal resources sold by the geothermal lessee or an affiliate in an arm’s length transaction is 10.0% of the gross proceeds from the arm’s length sale.

In the event of a default under any BLM lease, or the failure to comply with any of the provisions of the Geothermal Steam Act or regulations issued under the Geothermal Steam Act or the terms or stipulations of the lease, the BLM may, 30 days after notice of default is provided to the relevant project, (i) suspend operations until the requested action is taken, or (ii) cancel the lease.

Private Geothermal Leases

Certain of our domestic project subsidiaries have entered into geothermal resources leases with private parties, pursuant to which they have obtained the right to conduct their geothermal development and operations on privately owned land. In many cases, the lessor under these private geothermal leases owns only the geothermal resource and not the surface of the land.

Typically, the leases grant our project subsidiaries the exclusive right and privilege to drill for, produce, extract, take and remove from the leased land water, brine, steam, steam power, minerals (other than oil), salts, chemicals, gases (other than gases associated with oil), and other products produced or extracted by such project subsidiary. The project subsidiaries are also granted certain non-exclusive rights pertaining to the construction and operation of plants, structures, and facilities on the leased land. Additionally, the project subsidiaries are granted the right to dispose geothermal fluid as well as the right to re-inject into the leased land water, brine, steam, and gases in a well or wells for the purpose of maintaining or restoring pressure in the productive zones beneath the leased land or other land in the vicinity. Because the private geothermal leases do not grant to the lessee the exclusive right to use the surface of the land, the lessor reserves the right to conduct other activities on the leased land in a manner that does not unreasonably interfere with the geothermal lessee’s uses of the same land, which other activities may include agricultural use (farming or grazing), recreational use and hunting, and/or wind or solar energy developments.

The leases provide for a term consisting of a primary term in the range of five to 30 years, depending on the lease, and so long thereafter as lease products are being produced or the project subsidiary is engaged in drilling, extraction, processing, or reworking operations on the leased land.

As consideration under most of our project subsidiaries’ private leases, the project subsidiary must pay to the lessor a certain specified percentage of the value “at the well” (which is not attributable to the enhanced value of electricity generation), gross proceeds, or gross revenues of all lease products produced, saved, and sold on a monthly basis. In certain of our project subsidiaries’ private leases, royalties payable to the lessor by the project subsidiary are based on the gross revenues received by the lessee from the sale or use of the geothermal substances, either from electricity production or the value of the geothermal resource “at the well”.

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In addition, pursuant to the leases, the project subsidiary typically agrees to commence drilling, extraction or processing operations on the leased land within the primary term, and to conduct such operations with reasonable diligence until lease products have been found, extracted and processed in quantities deemed “paying quantities” by the project subsidiary, or until further operations would, in such project subsidiary’s judgment, be unprofitable or impracticable. The project subsidiary has the right at any time within the primary term to terminate the lease and surrender the relevant land. If the project subsidiary has not commenced any such operations on said land (or on the unit area, if the lease has been unitized), or terminated the lease within the primary term, the project subsidiary must pay to the lessor, in order to maintain its lease position, annually in advance, a rental fee until operations are commenced on the leased land.

If the project subsidiary fails to pay any installment of royalty or rental when due and if such default continues for a period of fifteen days specified in the lease, for example, after its receipt of written notice thereof from the lessor, then at the option of the lessor, the lease will terminate as to the portion or portions thereof as to which the project subsidiary is in default. If the project subsidiary defaults in the performance of any obligations under the lease, other than a payment default, and if, for a period of 90 days after written notice is given to it by the lessor of such default, the project subsidiary fails to commence and thereafter diligently and in good faith take remedial measures to remedy such default, the lessor may terminate the lease.

We do not regard any property that we lease as material unless and until we begin construction of a power plant on the property, that is, until we drill a production well on the property.

Description of Our Power Plants

Domestic Operating Power Plants

The following descriptions summarize certain industry metrics for our domestic operating power plants:

Power plants in the United States

Project Name	Size (MW)	Technology	Resource Cooling	Customer	PPA Expiration
Brawley	13	Geothermal water-cooled binary system	Depends on the mix of used production wells	SCE	2031
Brady Complex	26	Geothermal air and water-cooled binary system	Brady - 2.6°F per year Desert Peak 2 - 2°F per year		Brady — 2022 Desert Peak 2 — 2027

Don A. Campbell Complex (1)(2)	32	Geothermal air cooled binary system	Testing is in process to develop a plan to mitigate temperature decline	SCPPA	Phase 1 - 2034 Phase 2 - 2036
Heber Complex (3)	81	Geothermal dual flash and binary systems using a water cooled system	1°F per year	SCPPA	Heber 1 — 2025 Heber 2 — 2023 Heber South — 2031(13)
Jersey Valley	8	Geothermal air cooled binary system	3°F per year	Nevada Power Company	2032

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Mammoth Complex	30	Geothermal air cooled binary system	Less than 0.5°F per year	PG&E and Southern California Edison.	G-1 and G-3 - 2034 G-2 plant - 2027
McGinness Hills Complex	145	Geothermal air cooled binary system	Initial declined of 3°F observed in the past two years	Nevada Power Company and SCPPA.	Phases 1 and 2 - 2033 Phase 3 - 2043.
Neal Hot Springs (4)	24	Geothermal air cooled binary system	1°F over the past year	Idaho Power Company	2038
OREG 1 (2)	22	Geothermal air cooled binary system	NA	Basin Electric Power Cooperative	2031
OREG 2 (2)	22	Geothermal air cooled binary system	NA	Basin Electric Power Cooperative	2034
OREG 3 (2)	5.5	Geothermal air cooled binary system	NA	Great River Energy.	2029
OREG 4	3.5	Geothermal air cooled binary system	NA	Highline Electric Association.	2029
Ormesa Complex (5)	36	Geothermal water-cooled binary system and water-cooled flash system.	Less than 1°F per year	SCPPA under a single PPA.	2042
Puna Complex (2),(6)	38	Geothermal combined cycle and air cooled binary system	The resource temperature was stable prior to the volcano eruption. The shut- down of the power plant resulted in some increase in temperature, and reservoir studies are underway to quantify any changes	HELCO	2027
Raft River	12	Geothermal water-cooled binary system	No cooling. Temperatures remain stable.	Idaho Power Company.	2032
San Emidio	11	Geothermal- water-cooled binary system	In 2020, the average brine inlet temperature reduced by 1oF	NV Energy.	2038
Steamboat Complex (7)	84	Geothermal air and water-cooled binary system and a single flash system	Lower Steamboat - between 2°F to 3°F per year Steamboat Hills 4°F per year	* Steamboat 2 & 3- Sierra Pacific Power Company * Galena1 & 3- Nevada Power Company * Galena 2 & Steamboat Hills- SCPPA	Steamboat 2 and 3- 2022 Galena1- 2026 Steamboat Hills and Galena 2 - 2043 Galena 3- 2028

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Tungsten Mountain Geothermal (8)	29	Geothermal air and water-cooled binary system	1°F to 2°F per year	SCPPA	2043
Tungsten Mountain solar	7	solar PV System	NA	SCPPA	2043
Tuscarora	18	Geothermal water-cooled binary system	We expect continued gradual decline in the cooling rate from less than 3°F per year to less than 1°F per year over the long term	Nevada Power Company.	2032

Power plants in Rest of the World

Project Name	Size (MW)	Technology	Resource Cooling	Customer	PPA Expiration
Amatitlan (Guatemala) (8)	20	Geothermal air cooled binary system and a small back pressure steam turbine (one MW)	Stable	INDE and another local purchaser.	2028
Bouillante (France) (9)	15	Geothermal direct steam turbines.	Stable	EDF pursuant to a PPA.	2030
Olkaria III Complex (Kenya) (12)	150	Geothermal air cooled binary system	Less than 1°F per year	KPLC	Plant 2 - 2033 Plant 1&3 - 2034 Plant 4 - 2036
Platanares (Honduras) (10)	38	Geothermal air cooled binary system	2°F per year	ENEE pursuant to a PPA.	2047
Sarulla Complex - (Indonesia) (11)	330 (our share is 42)	Geothermal Combined Cycle steam and binary systems	Stable	PLN	2047
Zunil (Guatemala)	20	Geothermal air cooled binary system	Stable	INDE	2034

(1) Don A. Campbell is experiencing cooling since mid-2016 that is reducing its generating capacity. Injection tests and tracer studies, along with reservoir modeling have been used to develop a plan to mitigate temperature decline of the reservoir. First stages of this plan occurred in Q1 2019, and work will continue through 2021.

(2) Indirectly owned 36.75% by Northleaf.

(3) We are currently in the process of enhancing the Heber 1 and Heber 2 power plants as discussed below.

(4) Owned 40% by Enbridge Inc. Upgrades to the power plant were completed in 2020.

(5) We successfully replaced old equipment at the Ormesa power plant.

(6) On May 3, 2018, the Kilauea volcano located in close proximity to our Puna 38 MW geothermal power plant in the Puna district of Hawaii's Big Island erupted following a significant increase in seismic activity in the area. The power plant was shut down immediately and resumed partial operation in November 2020. We plan to continue drilling and workovers and get back to full operation by mid-2021. In 2019, we reached an agreement with HELCO and signed a new PPA that was filed with the local PUC for approval. The new PPA extends the current term until 2052 and increases the current contract capacity by 8 MW to 46MW. In addition, the new PPA has a fixed price with no escalation, regardless of changes to fossil fuel pricing, which impacts the majority of our current pricing under the existing PPA.

(7) In June 2020, we completed the enhancement of Steamboat Hills and added 19MW to the Steamboat complex.

(8) Planning 2021 workover to maintain production.

(9) 85% of the Bouillante power plant is owned jointly by Ormat and CDC allocated 75% to Ormat and 25% to CDC.

(10) We hold the Platanares assets, including the project's wells, land, permits and a PPA, under a BOT structure for 15 years from the date the Platanares plant commenced commercial operation on September 26, 2017. A portion of the land on which the project is located is held by us through a lease from a local

municipality.

(11) The Sarulla complex is experiencing a reduction in generation due to well field issues at the NIL power plants.

(12) The Olkaria complex experienced significant curtailments from the local off-taker that reduced generation in 2020.

(13) Under the Heber South contract the parties have six months notice termination right.

Future Projects

Projects Released for Construction

We have several projects in various stages of construction, including six projects that we have fully released for construction and one project that is in the early stage of construction. In 2020, due to COVID-19 and other factors, we saw continuous delays in getting all relevant permits and as a result we are seeing continuous delays in the expected COD.

These projects are expected to have a total geothermal generating capacity between 82 MW and 87 MW (representing our interest) and one solar PV projects with a total of 20 MW .

Project Name	Expected Size (MW)	Technology	Customer	Expected COD	Current Condition
Heber Complex	11	Geothermal air-cooled binary system	SCE and SCPPA	H1 2022	Permitting, engineering and procurement ongoing. Manufacturing and construction commenced.
CD4	30	Geothermal air-cooled binary system	SCPPA - 16 MW Silicon Valley Clean Energy - 7 MW Monterey Bay Community Power - 7 MW	Q1 2022	Engineering and procurement commenced
McGinness Hills Expansion	8	Geothermal air-cooled binary system	SCPPA	H1 2021	Construction is in progress
Dixie Meadows	12	Geothermal air-cooled binary system	SCPPA	End 2021	Engineering and procurement are ongoing. Delays due to permitting
Tungsten Mountain 2	11	Geothermal air-cooled binary system	SCPPA	H2 2022	Engineering and procurement have commenced
Wister solar	20 AC	solar PV	SDG&E	H2 2021	Engineering and procurement ongoing
Carson Lake	10 - 15	Geothermal air-cooled binary system	No PPA	TBD	Early stage of construction

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Projects under Various Stages of Development that were not Released for Construction

We also have projects under various stages of development in the United States and Guadeloupe. We expect to continue to explore these and other opportunities for expansion so long as they continue to meet our business objectives and investment criteria.

The following is a description of the projects currently under various stages of development and for which we are able to estimate their expected generating capacity. Upon completion of these projects, the generating capacity of our geothermal projects would increase by approximately between 68 MW to 73 MW (representing our interest) and solar PV projects with a total of 20 MW . However, we prioritize our investments based on their readiness for continued construction and expected economics and therefore we are not planning to invest in all of such projects in 2021.

Project	Location	Technology	Size (MW)	Customer	Expected COD
Bouillante power plant	Guadeloupe	Geothermal	10	Under discussion with EDF	2023

Steamboat solar	Nevada, U.S.	solar PV	10 AC	SCPPA	2022/2023
North Valley	Nevada, U.S.	Geothermal	30	TBD	2022
Puna Expansion	Hawaii, U.S.	Geothermal	8	HELCO	2022
Ijen	Indonesia	Geothermal	15-20 (1)	PLN	2023
Zunil	Guatemala	Geothermal	5	ENEE	2022
Tungsten Solar 2	Nevada, U.S.	solar PV	4 AC	SCPPA	2022
Brady Solar	Nevada, U.S.	solar PV	6 AC	SCPPA	2022

(1) The size of the project reflects Ormat's 49% interest share in the project

Future Prospects

We have a substantial land position that is expected to support future development and on which we have started or plan to start exploration activity. When deciding whether to continue holding lease rights and/or to pursue exploration activity, we diligently prioritize our prospective investments, taking into account resource and probability assessments in order to make informed decisions about whether a particular project will support commercial operation.

During fiscal year 2020, we discontinued holding a lease at one prospect at Mary's River, Nevada and we moved one prospect to construction (Tungsten Mountain 2) and one prospect (North Valley) to development. In 2019 we discontinued holding two prospects at Glamis, California and at Lake View, Oregon. We added three new prospects in 2020, in the United States and Indonesia.

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Our current land position is comprised of various leases, concessions and private land for geothermal resources of approximately 254,000 acres in 41 prospects including the following:

Nevada (21)

1	Alum	Under exploration drilling;
2	Baltazor	Under exploration drilling;
3	Colado	Exploration studies in progress;
4	Comstock	Exploration studies in progress;
5	Crescent Valley	Exploration studies in progress;
6	Dixie Meadows 2	Exploration studies in progress;
7	Lone Mountain (formerly Emigrant)	Exploration studies in progress;
8	Gerlach	Exploration studies in progress;
9	Whirlwind (formerly Horsehaven)	Exploration studies in progress;
10	Juniper (Formerly North Valley)	Exploration studies in progress;
11	Lee Hot Springs	Exploration studies in progress;
12	Mason	Exploration studies in progress;
13	McGee	Exploration studies in progress;
14	New York Canyon	Under exploration drilling;
15	Pearl Hot Springs	Exploration studies in progress;
16	Pinto Hot Springs	Exploration studies in progress;
17	Rawhide	Exploration studies in progress;
18	Rhodes Marsh	Exploration studies in progress;
19	South Brady	Lease acquired but no further actions has been taken yet
20	Tuscarora 2	Assessment for future expansion; and
21	Twin Buttes	Under exploration studies.

California (4)

1	Geysers	Exploration studies in progress;
2	Rhyolite Plateau	Exploration studies in progress;
3	Sandpiper	Exploration studies in progress; and
4	Truckhaven	Exploration studies in progress.

Oregon (2)

1	Crump Geysers	Exploration studies in progress; and
2	Vale	Exploration studies in progress.

New Mexico (1)

1.	Rincon	Exploration studies in progress.

Utah (2)

1	Baily Mountain (Formerly Roosevelt Hot Springs)	Exploration studies in progress; and
2	Pavant	Exploration studies in progress.

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Guatemala (2)

1.	Amatitlan Phase II	Exploration studies in progress; and
2.	Tecumburu	Exploration studies in progress.

New Zealand (1)

1.	Tikitere	Signed BOT agreement; exploration activity is on hold.

Honduras (1)

1.	San Ignacio (12 Tribes)	Exploration studies in progress.

Madagascar (1)

1.	Antsirabe	Exploration studies in progress.

Indonesia (2)

1.	Bitung	Under exploration drilling; and
2.	Wapsalit	Under Exploration drilling.

Ethiopia (4)

1.	Boku	Under exploration studies;
2.	Dofan	Under exploration studies;
3.	Dugumo Fango	Under exploration studies; and
4.	Shashamane	Under exploration studies.

Operations of our Product Segment

Power Units for Geothermal Power Plants

We design, manufacture, and sell power units for geothermal electricity generation, which we refer to as OECs. Our customers include contractors and geothermal plant owners and operators.

The power units are usually paid for in installments, in accordance with milestones set forth in the supply agreement. We also provide the purchaser with spare parts (either upon their request or our recommendation). We provide the purchaser with at least a 12-month warranty for such products. We provide the purchaser with performance guarantees (usually in the form of standby letters of credit), which partially terminates upon delivery of the equipment to the site and terminates in full at the end of the warranty period.

Power Units for Recovered Energy-Based Power Generation

We design, manufacture, and sell power units used to generate electricity from recovered energy or so-called “waste heat”. Our existing and target customers include interstate natural gas pipeline owners and operators, gas processing plant owners and operators, cement plant owners and operators, and other companies

engaged in other energy-intensive industrial processes. We manufacture and sell the power units for recovered energy-based power generation to third parties for use in “inside-the-fence” installations or otherwise. Our customers include gas processing plant owners and operators, cement plant owners and operators and companies in the process industry.

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Remote Power Units and other Generators

We design, manufacture and sell fossil fuel powered turbo-generators with capacities ranging from 200 watts to 5,000 watts, which operate unattended in extreme hot or cold climate conditions. The remote power units supply energy to remote unmanned installations and along communications lines and provide cathodic protection along gas and oil pipelines. Our customers include contractors installing gas pipelines in remote areas. In addition, we manufacture and sell generators, including heavy duty direct current generators, for various other uses. The terms for sale of the turbo-generators are similar to those for the power units we produce for power plants.

EPC of Power Plants

We engineer, procure and construct, as an EPC contractor, geothermal and recovered energy power plants on a turnkey basis, using power units we design and manufacture. Our customers are geothermal power plant owners as well as our target customers for the sale of our recovered-energy based power units described above. Unlike many other companies that provide EPC services, we believe that our advantage is in using our own manufactured equipment and thus have better quality and control over the timing and delivery of equipment and related costs. The consideration for such services is usually paid in installments, in accordance with milestones set forth in the EPC contract and related documents. We provide performance guarantees (usually in the form of standby letters of credit) securing our obligations under the contract.

In connection with the sale of our power units for geothermal power plants, power units for recovered energy-based power generation, remote power units and other generators, we enter into sales agreements, from time to time, with sales representatives for the marketing and sale of such products pursuant to which we are obligated to pay commissions to such representatives upon the sale of our products in the relevant territory covered by such agreements by such representatives or, in some cases, by other representatives in such territory.

Our manufacturing operations and products are certified ISO 9001, ISO 14001, American Society of Mechanical Engineers, and TÜV, and we are an approved supplier to many electric utilities around the world.

Backlog

We have a product backlog of approximately \$33.4 million as of February 24, 2021, which includes revenues for the period between January 1, 2021 and February 24, 2021, compared to \$141.9 million as of February 25, 2020, which included revenues for the period between January 1, 2020 and February 25, 2020. The reduction in 2021 backlog is mainly related to the impact of COVID 19 on our business as described in Item 7 of this Annual Report on Form 10-K.

The following is a breakdown of the Product segment backlog amount (in \$ millions) by countries as of February 24, 2021:

Country	Backlog Amount	Percentage of Backlog
Germany	10.3	30.8 %
Guatemala	8.0	24.0 %
New Zealand	5.9	17.7 %
Chile	6.8	20.4 %
Israel	0.9	2.7 %
Turkey	0.4	1.2 %
Others	1.1	3.3 %
Total	33.4	100 %

The following is a breakdown of the Product segment backlog by technology as of February 24, 2021:

	% of Total Backlog	Latest Expected Completion
Geothermal	96.00%	2021
Recovered Energy	0.2%	2021
Generators	1.9%	2021
Other	1.9%	2021

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Operations of our Energy Storage Segment

Storage Projects

In addition to our Geothermal activity, we own and operate as well as working to develop energy storage projects in the United States including the following:

Under operation

Project Name	Customer	Location	Size (MW)	Duration (hours)	Type of contract
ACUA	PJM	NJ	1	1	Merchant
Plumsted	PJM	NJ	20	1	Merchant
Stryker	PJM	NJ	20	1	Merchant
Hinesburg	ISONE	VT	2	2.5	Merchant
Rabbit Hill	ERCOT	TX	10	1.0	Merchant
Pomona	SCE/CAISO	CA	20	4.0	Capacity PPA and Merchant
Total			73		

Under construction and development

Project Name	Customer	Location	Size (MW)	Duration (hours)	Type of contract	Expected COD
Vallecito	CAISO and SCE	CA	10	4	Capacity PPA and Merchant	Q2 2021
Tierra Buena	CAISO, RCEA and VCE	CA	5	4	Capacity PPA and Merchant	Q4 2021
Upton	ERCOT	TX	25	1	Merchant	Q4 2021
Andover	PJM	NJ	20	1	Merchant	Q1 2022
Howell	PJM	NJ	7	1	Merchant	Q2 2022

Energy Storage Pipeline

For an energy storage prospect to move into the EPC phase, it requires site control, an executed interconnection agreement, permits from all authorities and a viable financial model. We have a substantial pipeline of approximately 1.2 GW of projects in different stages of development for future development in the United States that we expect to commission between 200 MW and 300 MW by 2023.

Competition

Electricity Segment

In our Electricity segment, we face competition from geothermal power plant owners and developers as well as other renewable energy providers and developers.

Competition in the Electricity segment occurs in the very early stage of development and in advanced stages when obtaining a PPA. The early stage is primarily obtaining the rights to the resource for development of future projects or acquiring a site already in a more advanced stage of development. From time to time and in different jurisdictions competing geothermal developers become our customers in the Product segment.

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Our main competitors in the geothermal sector in the United States are CalEnergy, Calpine Corporation, Terra-Gen Power LLC, Enel Green Power S.p.A., Cyrq Energy Inc. and other smaller pure play developers. Outside the United States, in many cases our competitors are companies that are gaining experience developing geothermal projects in their own countries such as Mercury (formerly Mighty River Power) and Contact Energy in New Zealand, Energy Development Corporation from the Philippines and Enel Green Power from Italy. Some Turkish developers are also focusing on the international market. Additionally, we face competition from country-specific companies and smaller pure play geothermal developers.

In obtaining new PPAs, we also face competition from companies engaged in the power generation business from other renewable energy sources, such as wind power, biomass, solar power and hydroelectric power. In the United States we primarily compete against solar power generation combined with energy storage. We also face competition from existing geothermal power plants as they are re-contracted.

As a geothermal company, we are focused on niche markets where our baseload and flexibility advantages can allow us to develop competitive projects.

Product Segment

In our Product segment, we face competition from power plant equipment manufacturers and system integrators as well as engineering or project management companies.

Our competitors among power plant equipment suppliers are divided by technology, steam turbines and binary power plant manufacturers. Our main steam turbine competitors are industrial steam turbine manufacturers such as Mitsubishi Heavy Industries, Fuji Electric Co., Ltd. and Toshiba Corporation of Japan, GE/Nuovo Pignone and Ansaldo Energia of Italy.

Our binary technology competitors are binary systems manufacturers using the ORC such as Fuji Electric Co., Ltd of Japan, Mitsubishi Heavy Industries through Turboden, TICA, a Chinese air conditioning company that acquired Italian Exergy, Egesim, a Turkish electrical contractor who is collaborating with Atlas Copco mainly in the Turkish market and internationally, and Kaishan, a compressor manufacturer from China who develops its own projects. While we believe that we have a distinct competitive advantage based on our accumulated experience and current worldwide share of installed binary generation capacity (which is approximately 82%), an increase in competition, which we are currently experiencing, has started to affect our ability to secure new purchase orders from potential

customers. The increased competition led to a reduction in the prices that we are able to charge for our binary equipment, which in turn impacted our profitability.

In the REG business, our competitors are other ORC manufacturers (such as GE, Exergy and Mitsubishi/Turboden), manufacturers that use Kalina technology (such as Geothermal Energy Research & Development Co., Ltd in Japan), other manufacturers of conventional steam turbines and small developers of small scale ORCs.

Currently, none of our competitors competes with us in both the Electricity and the Product segments.

In the case of proposed EPC projects we also compete with other service suppliers, such as project/engineering companies or EPC contractors.

Energy Storage Segment

In our Energy Storage segment, we face significant competition from companies that already have established businesses in those technologies and markets as well as companies seeking to acquire established businesses and other new market entrants like us.

In the demand response markets, our Viridity business competes primarily with specialized demand management providers and traditional curtailment service providers. Viridity differentiates itself from its competitors by its proprietary software and analytical strengths, wider use cases, customer base, business model, and market presence.

The energy storage space is comprised of many companies divided into different verticals and sub verticals like independent power producers, project developers, system integrators, EPC contractors, component suppliers (e.g. batteries, inverters, control software, and balance of plant), scheduling coordinators, etc. Our proprietary software, analytical operational platform and experience in energy storage operation and integration with electricity markets, as well as our engineering and system integration capabilities, allow us to provide multiple value streams (commonly referred to as value stacking) from a single storage installation. We have continued and plan to continue to grow our energy storage business in these markets.

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Customers

All of our revenues from the sale of Electricity in the year ended December 31, 2020 were derived from fully-contracted energy and/or capacity payments under long-term PPAs with governmental, public or private utility entities. The percentage of total revenues above 5% is detailed in the table below:

<u>Utility</u>	<u>% of total revenues for the year ended December 31, 2020</u>
SCPPA (U.S.)	20.6%
NV Energy (U.S.)	17.5%
KPLC (Kenya)	16.4%

Based on publicly available information, as of December 31, 2020, the credit ratings of our rated electric utility customers are as set forth below:

<u>Issuer</u>	<u>Standard & Poor's Ratings Services</u>	<u>Moody's Investors Service Inc.</u>
Southern California Edison	BBB (Negative)	Baa2 (Stable)
HELCO	BBB- (Positive)	Ratings withdrawn
Sierra Pacific Power Company	A (Stable)	Baa1 (Stable)
Nevada Power Company	A (Stable)	Baa1 (Stable)
SCPPA	BBB+ (Stable)	(Stable)
PG&E	BB- (Negative)	B1 (Stable)
EDF	BBB+ (Stable)	A3 (Negative)

The credit ratings of any power purchaser may change from time to time. There is no publicly available information with respect to the credit rating or stability of the power purchasers under the PPAs for our foreign power plants other than EDF (France).

While we have historically been able to collect on substantially all of our receivable balances, we have received late payments and have amounts overdue from KPLC in Kenya related to our Olkaria III Complex and from ENEE in Honduras related to our Plataneros power plant. We believe we will be able to collect all past due amounts.

Our revenues from the Product segment are derived from contractors, owners, or operators of power plants, process companies, and pipelines.

Our revenues from the Energy Storage segment is derived from selling energy, capacity and/or ancillary services in merchant markets like PJM, ISO New England, ERCOT and CAISO. We are pursuing the projects that will serve entities, such as investor owned utilities, publicly owned utilities and community choice aggregators.

Raw Materials, Suppliers and Subcontractors

In connection with our manufacturing activities, we use raw materials such as steel and aluminum. We do not rely on any one supplier for the raw materials used in our manufacturing activities, as all of these raw materials are readily available from various suppliers.

We use subcontractors for some of the manufacturing activities with respect to our products components and for construction activities with respect to our

power plants, which allows us to expand our construction and development capacity on an as-needed basis. We are not dependent on any one subcontractor and expect to be able to replace any subcontractor or assume such manufacturing and construction activities ourselves, if necessary or desirable, without adverse effect to our operations.

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Employees

As of December 31, 2020, we employed 1,402 employees, of whom 572 were located in Israel, 585 were located in the United States and 245 were located in other countries. We expect that any material future growth in the number of our employees will be generally attributable to the purchase or development of new power plants and energy storage facilities.

As of December 31, 2020, the only employees that are represented by a labor union are the employees of our acquired Bouillante power plant located in Guadeloupe. The employees in Guadeloupe are represented by the Confédération Générale du Travail de Guadeloupe. We have never experienced any labor dispute, strike or work stoppage. We believe that our relations with our employees are positive.

We have no collective bargaining agreements with respect to our Israeli employees. However, by order of the Israeli Ministry of Economy and Industry, the provisions of a collective bargaining agreement between the Histadrut (the General Federation of Labor in Israel) and the Coordination Bureau of Economic Organizations (which includes the Industrialists Association) may apply to some of our Israeli non-managerial, finance and administrative, and sales and marketing personnel. This collective bargaining agreement principally concerns cost of living pay increases, length of the workday, minimum wages and insurance for work-related accidents, annual and other vacation, sick pay, and determination of severance pay, pension contributions, and other conditions of employment. We currently provide such employees with benefits and working conditions, which are at least as favorable as the conditions specified in the collective bargaining agreement.

We believe that our success depends in large part on our ability to recruit, develop and retain a productive and engaged workforce. Accordingly, investing in our employees, focusing on safety, offering competitive compensation and benefits, promoting a diverse workforce, adopting forward thinking human capital management practices and community outreach are critical elements of our corporate strategy.

- *Investing in our Employees.* We strive to provide employees at all levels with benefits that express our level of appreciation and care for employee well-being.
- *Safety.* The health and safety of our employees, subcontractors, the public and the environment is an overarching priority for us. We manage risks by identifying, assessing and managing risks in our facilities and offices that we own and operate. We promote safety awareness and values and our goal is to report, analyze, learn and improve performance in order to reduce the number of incidents. We also work to continuously improve our safety performance and to instill a workplace safety culture. We also conduct quality, environment, health and safety audits of our plants and facilities on a periodic basis.
- *Competitive Compensation and Benefits.* We strive to ensure that our employees receive fair and competitive compensation and benefits, including, for most of our employees, paid maternity or paternity leave, sponsorship of learning opportunities, health care insurance, sick leave benefits and coverage in the event of disability and/or infirmity, among others. At times, benefits are made available to part-time and temporary employees as well. All our global employees are entitled to retirement and pension benefits at or beyond the legally required level of employer contribution in the relevant country of operation, including access to 401(k) plans in the U.S. We fully cover retirement and pension plan liabilities in relevant countries of operation with our general resources. All current employees in Israel who are entitled to benefits in the event of termination or retirement in accordance with the Israeli Government sponsored programs are provided with limited non-pension benefits.
- *Diversity Initiatives.* We strive to provide a diverse and inclusive working environment, where people are respected and feel a sense of belonging regardless of their race, nationality, gender, age, religion or sexual orientation. Our offices, manufacturing plants and power plants are in multiple jurisdictions and our global workforce operates across many different beliefs. We are committed to local employment at all our operational and manufacturing locations. While our first and foremost consideration of a potential candidate is professional skills and overall qualifications for the position, we work with several organizations in the U.S. to help us present opportunities to ethnic minorities and veterans for open positions. Furthermore, we are committed to eliminating any form of discrimination in our hiring and employment termination practices and ensuring that all employees are adequately accommodated and treated equally.
- *Employee Development.* We focus on creating opportunities for employee education, development and training. Our training opportunities include relevant professional as well as soft skills to help our employees improve their performance and expand their horizons. We have annual performance reviews for most of our employees.
- *Response to the COVID-19 Pandemic.* In response to the COVID-19 pandemic, we acted quickly to put social distancing mechanisms in place to protect our employees while maintaining and enhancing business activity during this global crisis. We did not lay off any employees due the Covid-19 Pandemic, except for in the ordinary course of business. We also launched an outreach plan to support communities where we do business such as addressing the reduced availability of food to vulnerable populations and providing medical and personal protective equipment to local communities' healthcare workers across the globe. Throughout this global pandemic, we will continue following stringent protective measures necessary to safeguard the health, and safety of our employees. This includes adhering to all government regulations and maintaining clear, comprehensive plans and protective measures for employees who work in our energy plants, manufacturing facilities, offices and elsewhere.

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Insurance

We maintain physical damage and business interruption insurance, including the perils of flood, volcanic eruption, earthquake and windstorm, cyber coverage, general and excess liability, pollution legal liability, control of well, drilling rigs, construction risks, as well as customary worker's compensation and automobile, marine transportation insurance and such other commercially available insurance as is generally carried by companies engaged in similar businesses and owning similar properties in the same general areas as us. Such insurance covering our properties extends to Ormat and/or our owned, controlled, direct or indirect affiliated or associated companies, subsidiary companies or corporations in amounts generally based upon the estimated replacement value and maximum foreseeable loss of our facilities (provided that certain perils including earthquake, volcanic eruption and flood coverage may be subject to sublimit and/or annual aggregate limits depending on the type and location of the facility) and business interruption insurance coverage in an amount that also varies from location to location.

We purchase certain insurance policies to cover our equity exposure to specified political risks involved in operating in developing countries. We hold a global political risk insurance program covering the significant political risks at certain of our locations. This program is issued by the global insurers in the private sector. Such insurance policies generally cover, subject to the limitations and restrictions contained therein, losses derived from a specified governmental act, such as expropriation, political violence, and the inability to convert local currency into hard currency and, in certain cases, the breach of agreements with governmental entities, in approximately 90% of our book net equity investment.

Regulation of the Electric Utility Industry in the United States

The following is a summary overview of the electric utility industry and applicable federal and state regulations and should not be considered a full statement of the law or all issues pertaining thereto.

PURPA

PURPA and FERC's regulations thereunder exempt owners of small power production Qualifying Facilities that use geothermal resources as their primary source and other Qualifying Facilities that are 30 MW or under in size from regulation under the PUHCA 2005, from many provisions of the FPA and from state laws relating to the financial, organization and rate regulation of electric utilities.

PURPA provides the owners of power plants certain benefits described below if a power plant is a "Qualifying Facility." A small power production facility is a Qualifying Facility if: (i) the facility does not exceed 80 MW; (ii) the primary energy source of the facility is biomass, waste, geothermal, or renewable resources, or any combination thereof, and at least 75% of the total energy input of the facility is from these sources, and fossil fuel input is limited to specified uses; and (iii) the facility, if larger than one megawatt, has filed with FERC a notice of self-certification of qualifying status, or has been certified as a Qualifying Facility by FERC. The 80 MW size limitation, however, does not apply to a facility if (i) it produces electric energy solely by the use, as a primary energy input, of solar, wind, waste or geothermal resources; and (ii) an application for certification or a notice of self-certification of qualifying status of the facility was submitted to not later than December 31, 1994, and construction of the facility commenced not later than December 31, 1999.

With respect to the FPA, FERC's regulations under PURPA do not exempt from the rate provisions of the FPA sales of energy or capacity from Qualifying Facilities larger than 20 MW in size that are made (a) pursuant to a contract executed after March 17, 2006 or (b) not pursuant to a state regulatory authority's implementation of PURPA. The practical effect of these regulations is to require owners of Qualifying Facilities that are larger than 20 MW in size to obtain market-based rate authority from FERC if they seek to sell energy or capacity other than pursuant to a contract executed on or before March 17, 2006 or pursuant to a state regulatory authority's implementation of PURPA. A sale to a public utility under PURPA at state approved avoided cost rates is generally exempt from FERC rate regulation.

In addition, provided that the purchasing electric utility has not been relieved from its mandatory purchase obligation, PURPA and FERC's regulations under PURPA obligate electric utilities to purchase energy and capacity from Qualifying Facilities at either the electric utility's avoided cost or a negotiated rate. FERC's regulations under PURPA allow FERC, upon request of a utility, to terminate a utility's obligation to purchase energy from Qualifying Facilities upon a finding that Qualifying Facilities have nondiscriminatory access to: (i) independently administered, auction-based day ahead, and real time markets for electric energy and wholesale markets for long-term sales of capacity and electric energy; (ii) transmission and interconnection services provided by a FERC-approved regional transmission entity and administered under an open-access transmission tariff that affords nondiscriminatory treatment to all customers, and competitive wholesale markets that provide a meaningful opportunity to sell capacity, including long-term and short-term sales, and electric energy, including long-term, short-term, and real-time sales, to buyers other than the utility to which the Qualifying Facility is interconnected; or (iii) wholesale markets for the sale of capacity and electric energy that are at a minimum of comparable competitive quality as markets described in (i) and (ii) above. FERC regulations protect a Qualifying Facility's rights under any contract or obligation involving purchases or sales that are entered into before FERC has determined that the contracting utility is entitled to relief from the mandatory purchase obligation. FERC has granted the request of California investor-owned utilities for a waiver of the mandatory purchase obligation for Qualifying Facilities larger than 20 MW in size. In addition, FERC recently amended its PURPA regulations to reduce the rebuttable presumption that small power production facilities in organized markets have nondiscriminatory access to markets from 5 MW to 20 MW. Therefore, the California investor-owned utilities may have a basis to further reduce their mandatory purchase obligation.

We expect that our power plants in the U.S will continue to meet all of the criteria required for Qualifying Facility status under PURPA. However, since the Heber power plants have PPAs with Southern California Edison that require Qualifying Facility status to be maintained, maintaining Qualifying Facility status remains a key obligation. If any of the Heber power plants loses its Qualifying Facility status our operations could be adversely affected. Loss of Qualifying Facility status would eliminate the Heber power plants' exemption from the FPA and thus, among other things, the rates charged by the Heber power plants in the PPAs with Southern California Edison and SCPPA would become subject to FERC regulation. Further, it is possible that the utilities that purchase power from the power plants could successfully obtain a waiver of the mandatory-purchase obligation in their service territories. For example, the three California investor-owned utilities have received such a waiver from FERC for projects larger than 20 MW. If a waiver of the mandatory purchase obligation is obtained, or if FERC reduces the 20 MW threshold or eliminates the mandatory purchase obligation, the power plants' existing PPAs will not be affected, but the utilities will not be obligated under PURPA to renew or extend these PPAs or execute new PPAs upon the existing PPAs' expiration.

PUHCA

Under PUHCA 2005, the books and records of a utility holding company, its affiliates, associate companies, and subsidiaries are subject to FERC and state commission review with respect to transactions that are subject to the jurisdiction of either FERC or the state commission or costs incurred by a jurisdictional utility in the same holding company system. However, if a company is a utility holding company solely with respect to Qualifying Facilities, exempt wholesale generators, or foreign utility companies, it will not be subject to review of books and records by FERC under PUHCA 2005. Qualifying Facilities or exempt wholesale generators that make only wholesale sales of electricity are not subject to state commissions' rate regulations and, therefore, in all likelihood would not be subject to any review of their books and records by state commissions pursuant to PUHCA 2005 as long as the Qualifying Facility is not part of a holding company system that includes a utility subject to regulation in that state.

FPA

Pursuant to the FPA, FERC has exclusive jurisdiction over the rates for most wholesale sales of electricity and transmission in interstate commerce. These rates may be based on a cost of service approach or may be determined on a market basis through competitive bidding or negotiation. FERC can accept, reject or suspend rates. The rates can be suspended for up to five months, at which point the rates become effective subject to refund. FERC can order refunds for rates that are found to be "unjust and unreasonable" or "unduly discriminatory or preferential."

Moreover, the loss of the Qualifying Facility status of any of our power plants selling energy to Southern California Edison could also permit Southern California Edison, pursuant to the terms of its PPA, to cease taking and paying for electricity from the relevant power plant and to seek refunds for past amounts paid and/or a reduction in future payments.

Additionally, FERC possesses civil penalty authority, up to approximately \$1.3 million per violation of the FPA per day. FERC can also require the disgorgement of unjust profits earned in connection with such violations of the FPA and revoke the right of the power plants to make sales at market-based rates.

Under the Energy Policy Act of 2005, the FPA was supplemented to empower FERC to ensure the reliability of the bulk electric system. Such authority required that FERC assume both oversight and enforcement roles. Pursuant to its new directive, FERC certified the North American Electric Reliability Corporation as the nation's Electric Reliability Organization (ERO) to develop and enforce mandatory reliability standards to address medium and long-term reliability concerns. Today, enforcement of the mandatory reliability standards, including the protection of critical energy infrastructure, is a substantial function of the ERO and of FERC, which may impose penalties of up to approximately \$1.3 million a day for violating mandatory reliability standards.

Thus, if any of the power plants were to lose Qualifying Facility status, the application of the FPA and other applicable state regulations to such power plants could require compliance with an increasingly complex regulatory regime that may be costly and greatly reduce our operational flexibility. Even if a power plant does not lose Qualifying Facility status, the owner of a Qualifying Facility/power plant in excess of 20 MW will become subject to rate regulation under the FPA for sales of energy or capacity pursuant to a contract executed after March 17, 2006 or not pursuant to a state regulatory authority's implementation of PURPA. A decrease in existing rates or being ordered by FERC to pay refunds for rates found to be "unjust and unreasonable" or "unduly discriminatory or preferential" would likely result in a decrease in our future revenues.

State Regulation

Our power plants in California, Nevada, Oregon, and Idaho, by virtue of being Qualifying Facilities that make only wholesale sales of electricity, are not subject to rate, financial and organizational regulations applicable to electric utilities in those states. The power plants each sell or will sell their electrical output under PPAs to electric utilities (Sierra Pacific Power Company, Nevada Power Company, Southern California Edison, SCPPA and Idaho Power Company). All of the utilities except SCPPA are regulated by their respective state public utilities commissions. Sierra Pacific Power Company and Nevada Power Company, which merged and are doing business as NV Energy, are regulated by the PUCN. Southern California Edison is regulated by the CPUC.

Under Hawaiian law, non-fossil generators are not subject to regulation as public utilities. Hawaiian law provides that a geothermal power producer is to negotiate the rate for its output with the public utility purchaser. If such rate cannot be determined by mutual accord, the PUCH will set a just and reasonable rate. If a non-fossil generator in Hawaii is a Qualifying Facility, federal law applies to such Qualifying Facility and the utility is required to purchase the energy and capacity at its avoided cost. The rates for our power plant in Hawaii are established under a long-term PPA with HELCO.

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Environmental Permits

U.S. environmental permitting regimes with respect to geothermal projects center upon several general areas of focus. The first involves land use approvals. These may take the form of Special Use Permits or Conditional Use Permits from local planning authorities or a series of development and utilization plan approvals and right of way approvals where the geothermal facility is entirely or partly on BLM or United States Forest Service lands. Certain federal approvals require a review of environmental impacts in conformance with the federal National Environmental Policy Act. In California, some local permit approvals require a similar review of environmental impacts under a state statute known as the California Environmental Quality Act. These federal and local land use approvals typically impose conditions and restrictions on the construction, scope and operation of geothermal projects.

The second category of permitting focuses on the installation and use of the geothermal wells themselves. Geothermal projects typically have three types of wells: (i) exploration wells designed to define and verify the geothermal resource, (ii) production wells to extract the hot geothermal liquids (also known as brine) for the power plant, and (iii) injection wells to inject the brine back into the subsurface resource. For example, on BLM lands in Nevada, California, Oregon, and Idaho, the well permits take the form of geothermal drilling permits for well installation. Approvals are also required to modify wells, including for use as production or injection wells. For all wells drilled in Nevada, a geothermal drilling permit must be obtained from the Nevada Division of Minerals. Those wells in Nevada to be used for injection will also require UIC permits from the Nevada Division of Environmental Protection and Bureau of Water Pollution Control. All

geothermal wells drilled in Oregon (except on tribal lands) require a geothermal well drilling permit from the Oregon Department of Geology and Mineral Industries. All geothermal wells drilled in Idaho require a well construction permit from the IDWR and injection wells also require UIC permitting through IDWR. Geothermal wells on private lands in California require drilling permits from the California Department of Conservation's DOGGR. The eventual designation of these installed wells as individual production or injection wells and the ultimate closure of any wells is also reviewed and approved by DOGGR pursuant to a DOGGR-approved Geothermal Injection Program.

A third category of permits involves the regulation of potential air emissions associated with the construction and operation of wells and power plants and surface water discharges associated with construction and operations activities. Generally, each well and plant requires a preconstruction air permit and storm water discharge permit before earthwork can commence. In addition, in some jurisdictions the wells that are to be used for production require, and those used for injection may require air emissions permits to operate. Internal combustion engines and other air pollutant emissions sources at the projects may also require air emissions permits. For our projects, these permits are typically issued at the state or county level. Permits are also required to manage storm water during project construction and to manage drilling mud from well construction, as well as to manage certain discharges to surface impoundment, if any.

A fourth category of permits, required in Nevada, California, Oregon, and Idaho, includes ministerial permits such as building permits, hazardous materials storage and management permits, and pressure vessel operating permits. We are also required to obtain water rights permits in Nevada if water cooling is being used at the power plant. In addition to permits, there are various regulatory plans and programs that are required, including risk management plans (federal and state programs) and hazardous materials management plans (in California).

In some cases, our projects may also require permits, issued by the applicable federal agencies or authorized state agencies, regarding threatened or endangered species, permits to impact wetlands or other waters and notices of construction of structures which may have an impact on airspace. Environmental laws and regulations may change in the future that may modify the time to receive such permits and associated costs of compliance.

Our BESS projects are subject to similar permitting and regulatory compliance requirements. All of our current BESS projects are located on privately owned land and may require ministerial permits from local agencies as described above or undergo a state environmental permitting process (e.g., under the California Environmental Quality Act) with the city or county as the lead permitting agency. Storage projects are also required to comply with all applicable federal, state, and local laws and regulations, and similar to geothermal projects, storage projects may require various regulatory plans and programs including emergency action plans and fire response plans.

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As of the date of this report, all of the material environmental permits and approvals currently required for our operating power plants and BESS projects have been obtained. We sometimes experience regulatory delays in obtaining various environmental permits and approvals required for projects in development and construction. These delays may lead to increases in the time and cost to complete these projects. Our operations are designed and conducted to comply with applicable environmental permit and approval requirements. Non-compliance with any such requirements could result in fines and penalties and could also affect our ability to operate the affected project.

Environmental Laws and Regulations

Our facilities and operations are subject to a number of federal, state, local and foreign environmental laws and regulations relating to development, construction and operation. In the U.S, these may include the Clean Air Act, the Clean Water Act, the Emergency Planning and Community Right-to-Know Act, the Endangered Species Act, the National Environmental Policy Act, the Resource Conservation and Recovery Act, and related state laws and regulations.

Our geothermal operations involve significant quantities of brine (substantially, all of which we reinject into the subsurface) and scale, both of which can contain materials (such as arsenic, antimony, lead, and naturally occurring radioactive materials) in concentrations that exceed regulatory limits used to define hazardous waste. We also use various substances, including isopentane and industrial lubricants that could become potential contaminants and are generally flammable. As a result, our projects are subject to domestic and foreign federal, state and local statutory and regulatory requirements regarding the generation, handling, transportation, use, storage, treatment, fugitive emissions, and disposal of hazardous substances. The cost of investigation and removal or remediation activities associated with a spill or release of such materials could be significant. Hazardous materials are also used in our equipment manufacturing operations in Israel.

Although we are not aware of any mismanagement of these materials, including any mismanagement prior to the acquisition of some of our power plants that has materially impaired any of the power plant sites, any disposal or release of these materials onto the power plant sites, other than by means of permitted injection wells, could lead to contamination of the environment and result in material cleanup requirements or other responsive obligations under applicable environmental laws.

Regulation Related to Energy storage activity

Our participation in energy storage space and in energy management and demand response require us to obtain and maintain certain additional authorizations and approvals. These include (1) authorization from FERC to make wholesale sales of energy, capacity, and ancillary services at market-based rates, and (2) membership status with eligibility to serve designated contractual functions in the ISO/RTOs of PJM, NYISO, and ERCOT. In the future, we may need to obtain and maintain similar membership and eligibility status with other ISO/RTOs in order to offer such services in their respective areas.

Regulation of the Electric Utility Industry in our Foreign Countries of Operation

The following is a summary overview of certain aspects of the electric industry in the foreign countries in which we have an operating geothermal power plant. As such, it should not be considered a full statement of the laws in such countries or all of the issues pertaining thereto.

Guatemala

The General Electricity Law of 1996, Decree 93-96, created a wholesale electricity market in Guatemala and established a new regulatory framework for the electricity sector. The law created a new regulatory commission, the CNEE, and a new wholesale power market administrator, the AMM, for the operation and administration of the sector. The AMM is a private not-for-profit entity. The CNEE functions as an independent agency under the Ministry of Energy and Mines and is in charge of regulating, supervising, and controlling compliance with the electricity law, overseeing the market and setting rates for transmission services, and distribution to medium and small customers. All distribution companies must supply electricity to such customers pursuant to long-term contracts with electricity generators. Large customers can contract directly with the distribution companies, electricity generators or power marketers, or buy energy in the spot market. Guatemala has approved a Law of Incentives for the Development of Renewable Energy Power plants, Decree 52-2003, in order to promote the development of renewable energy power plants in Guatemala. This law provides certain benefits to companies utilizing renewable energy, including a 10-year exemption from corporate income tax and VAT on imports and customs duties. On September 16, 2008, CNEE issued a resolution that approved the Technical Norms for the Connection, Operation, Control and Commercialization of the Renewable Distributed Generation and Self-producers Users with Exceeding Amounts of Energy. This Technical Norm was created to regulate all aspects of generation, connection, operation, control and commercialization of electric energy produced with renewable sources to promote and facilitate the installation of new generation plants, and to promote the connection of existing generation plants which have excess amounts of electric energy for commercialization. It is applicable to projects with a capacity of up to 5 MW. At present, the General Electricity Law and the Law of Incentives for the Development of Renewable Energy Power Plants are still in force.

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Kenya

The electric power sector in Kenya is regulated by the Kenyan Energy Act. Among other things, the Kenyan Energy Act provides for the licensing of electricity power producers and public electricity suppliers or distributors. KPLC is the major licensed public electricity supplier and has a virtual monopoly in the distribution of electricity in the country with the exception of a few off-grid, which have recently been licensed by the EPRA. The Kenyan Energy Act permits IPPs to install power generators and sell electricity to KPLC, which is owned by various private and government entities, and which currently purchases energy and capacity from other IPPs in addition to our Olkaria III complex. The electricity sector is regulated by the EPRA under the Kenyan Energy Act. KPLC's retail electricity rates are subject to approval by the EPRA. The EPRA has an expanded mandate to regulate not just the electric power sector but the entire energy sector in Kenya. Transmission of electricity is now undertaken by KETRACO while another company, GDC, is responsible for geothermal assessment, drilling of wells and sale of steam for electricity operations to IPPs and KenGen. Both KETRACO and GDC are wholly owned by the government of Kenya. Renewable energy dominated by geothermal, wind and, presently at a lower level, solar is one of the key energy sub-sectors in Kenya contributing significantly to the overall energy mix as a result of the implementation of the feed-in- tariff policy by the Ministry of Energy. Under the national constitution enacted in August 2010, formulation of energy policy (including electricity) and energy regulation are functions of the national government. However, the constitution lists the planning and development of electricity and energy regulation as a function of the county governments (i.e. the regional or local level where an individual power plant is or is intended to be located).

Indonesia

The 2009 Electricity Law (as amended by the Indonesian Omnibus Law in 2020) divides the power business into two broad categories: (i) activities that supply electrical power, both public supply and captive supply (own use), such as electrical power generation, electrical power transmission, electrical power distribution and the sale of electrical power and (ii) the activities involved in electrical power support such as services businesses (consulting, construction, installation, operation & maintenance, certification & training, testing etc.) and industry businesses (power tools & power equipment supply electricity power supporting businesses). Currently, power generation is dominated by PLN (state owned company), which controls around 70% of generating assets in Indonesia. Private sector participation is allowed through an IPP scheme. IPP appointment mostly is done through tenders although IPPs can also be directly appointed or selected. The 2009 Electricity Law, as amended, provides PLN priority rights to conduct the electricity power business nationwide. As the sole owner of transmission and distribution assets, PLN remains the only business entity involved in transmitting and distributing, although the 2009 Electricity Law, as amended, allows private participation. The Geothermal Law issued in 2014 (as also amended by the Indonesian Omnibus Law in 2020), endorses private participation as geothermal IPP. The geothermal IPP appointment is done through tender held by the Central Government. The central government will also award the tender winner a Geothermal License (IPB). Accordingly, the Geothermal License holder can conduct exploration and feasibility studies within five years and subject to two one-year extensions, conduct well development and power plant construction and sell the electricity generated to PLN for a maximum of 30 years. Prior to the expiration of the Geothermal License, the IPP can propose to extend the license for an additional 20 years. Starting in 2017, the regulatory framework with respect to tariffs is based on PLN's existing average cost of generation (known by its Indonesian acronym, BPP) with respect to the relevant local grid cost of generation, excluding transmission and distribution costs. The Indonesian Minister of Energy and Mineral Resources ("MEMR") releases each year a list of local BPPs for each region and a national BPP (which is an average of the local BPPs). The BPPs for a particular year are based on PLN's previous year audited generation costs. In 2019, the MEMR published BPP figures of year 2018. The national BPP was set at Rp 983/kWh (equivalent to US\$ cent 7.39/kWh at Rp 13,307/US\$) based on 86 US\$ per kWh. The MEMR did not publish PLN's 2016 audited generation costs.

For 2020, the regulation was not clear and has been revoked, but the general interpretation is that for geothermal projects in Sumatera, Java and Bali islands, the tariff will be determined based on mutual agreement between PLN and the IPP, regardless of the BPP figures in those regions. The central government is currently assessing preparing a draft presidential regulation that is expected to amend the tariff mechanism for renewable IPPs, including geothermal. The latest plan to adopt a Feed in Tariff scheme for Geothermal and Renewable Energy IPP is to revert to the previous geographically based ceiling tariff regime, with an added dimension of the timing of achieving commercial operation date.

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Guadeloupe

EDF is the transmission and distribution utility in Guadeloupe and also operates a significant portion of Guadeloupe's fossil fuel energy generation. There are

also a number of IPPs in Guadeloupe, primarily producing renewable electricity. The electricity sector in Guadeloupe is regulated by the Commission Regulation of Energy (CRE), which also regulates EDF's operations in mainland France and its other overseas territories. The electricity sector in Guadeloupe is characterized by both enabling features and obstacles with respect to renewable energy. One of the most influential enabling features is a French law requiring the utility to purchase power from any interconnected renewable generator. The major obstacle preventing further uptake of renewable electricity generation is the cap on variable generation at 30% of instantaneous system load. According to the multi-annual energy program (PPE) for Guadeloupe, the island aims to reach total energy independence by 2030. The program outlines the development schedule with an emphasis on solar, wind and geothermal growth for the years 2023-2026. The PPE also predict a geothermal installed capacity of 78MW for the year 2028.

Honduras

In 2014, Honduras approved its new Law of Electrical Industry (Decree 404-2013, and its Regulation, published in the Official Newspaper on November 18, 2015; and by Executive Accord 07-2015), which provides the legal framework for the electricity sector and replaces the previous Electricity Subsector Framework Law (Decree 158 of 1994, regulated by Accord 934 of 1997). The Law establishes technology-specific auctions for renewable energy. It creates the Regulatory Commission of Electric Power (CREE) as the entity in charge of supervising the bidding processes and the awarding of PPAs. The CREE is also responsible for granting study permits for the construction of generation projects that use renewable natural resources. Permits will have a maximum duration of two years, and will be revoked if no studies have been initiated within a period of six months and the reports required by the CREE have not been submitted. The new Law also establishes that all new capacity must be contracted through auctions and that the government can set a minimum quota for renewables in each auction. With respect to metering, after previous regulation applied legal incentives to renewable energy metering, the new law mandates utilities to buy excess power and credit it towards monthly bills and to install bi-directional meters.

Among others, the objectives of the law are to adapt the electricity sector's legislation to the Framework Treaty for the Central American Electricity Market, which Honduras is a party to, and update the operating rules in the country's electricity industry by incorporating structures and modern practices to increase the sector's efficiency and competency in the production and marketing of electricity services.

With the passage of this new law, Honduras is moving into a new and open market. Under this legislation, all aspects of the market have been opened to private parties. This legislation is still being implemented within the market.

Honduras has also approved a Law of Incentives for Renewable Energy Projects, Decree 70-2007, further amended by Decree 138-2013, with additional incentives to solar PV projects, etc. The purpose, as in other countries of the region, is to promote the development of renewable energy power plants. Laws provide certain benefits to companies that generate power through renewable sources, including a 10-year exemption from corporate income tax and VAT on imports and customs duties, a fast track process for certain permits and a Sovereign Guaranty by the Central Government for the payments of the off-taker, the Public Utility Company, ENEE. At present, the Law of the Electrical Industry and the Laws of Incentives for Renewable Energy Projects are still in force.

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ITEM 1A. RISK FACTORS

The following risk factors should be read carefully in connection with evaluating us and this Annual Report on Form 10-K. Certain statements in "Risk Factor" are forward-looking statements. See "Cautionary Note Regarding Forward-Looking Statements" elsewhere in the report.

Risks Related to the Company's Business and Operation

Our financial performance depends on the successful operation of our geothermal and REG power plants, which are subject to various operational risks.

Our financial performance depends on the successful operation of our geothermal and REG power plants. In connection with such operations, we derived 76.8% of our total revenues for the year ended December 31, 2020 from the sale of electricity. The cost of operation and maintenance and the operating performance of our geothermal power and REG plants may be adversely affected by a variety of factors, including the following:

- regular and unexpected maintenance and replacement expenditures;
- shutdowns due to the breakdown or failure of our equipment or the equipment of the transmission serving utility;
- labor disputes;
- the presence of hazardous materials on our power plant sites;
- continued availability of cooling water supply;
- catastrophic events such as fires, explosions, earthquakes, volcanic activity, landslides, floods, releases of hazardous materials, severe weather storms or other weather events (including weather conditions associated with climate change), or similar occurrences affecting our power plants or any of the power purchasers or other third parties providing services to our power plants, such as the 2018 volcanic eruption that occurred in Hawaii's Big Island that impacted our Puna project, as discussed elsewhere in this Report;
- the aging of power plants (which may reduce their availability and increase the cost of their maintenance); and
- cyber attacks that may interrupt the operation of our power plants.

Any of these events could significantly increase the expenses incurred by our power plants or reduce the overall generating capacity of our power plants and could significantly reduce or entirely eliminate the revenues generated by one or more of our power plants, which in turn would reduce our net income and could materially and adversely affect our business, financial condition, future results and cash flows.

Our exploration, development, and operation of geothermal energy resources are subject to geological risks and uncertainties, which may result in decreased performance or increased costs for our power plants.

Our primary business involves the exploration, development, and operation of geothermal energy resources. These activities are subject to uncertainties that, in certain respects, are similar to those typically associated with oil and gas exploration, development, and exploitation, such as dry holes, uncontrolled releases, and pressure and temperature decline. Any of these uncertainties may increase our capital expenditures and our operating costs or reduce the efficiency of our power plants. We may not find geothermal resources capable of supporting a commercially viable power plant at exploration sites where we have conducted tests, acquired land rights, and drilled test wells, which would adversely affect our development of geothermal power plants. Further, since the commencement of their operations, several of our power plants have experienced geothermal resource cooling, uncontrolled flow and/or reservoir pressure decline in the normal course of operations. Because geothermal reservoirs are complex geological structures, we can only estimate their geographic area and sustainable output. The viability of geothermal power plants depends on different factors directly related to the geothermal resource (such as the temperature, pressure, storage capacity, transmissivity, and recharge) as well as operational factors relating to the extraction or reinjection of geothermal fluids. Our geothermal energy power plants may also suffer an unexpected decline in the capacity of their respective geothermal wells and are exposed to a risk of geothermal reservoirs not being sufficient for sustained generation of the electrical power capacity desired over time. A recent example is the Sarulla complex, which experienced a reduction in generation due to well field issues at the NIL power plant. The Sarulla complex is currently developing a remediation plan with a target to increase generation back to previous levels and we are following the remediation plans as well as assessing the accounting impact and its implication on our financial statements and our investment in the Sarulla complex.

Another aspect of geothermal operations is the management and stabilization of subsurface impacts caused by fluid injection pressures of production and injection fluids to mitigate ground subsidence or inflation. Inflation and subsidence, if not controlled, can adversely affect farming operations and other infrastructure at or near the land surface.

Additionally, active geothermal areas, such as the areas in which our power plants are located, may be subject to frequent low-level seismic disturbances. Serious seismic disturbances, volcanic eruptions and lava flows are possible and could result in damage to our power plants (or transmission lines used by customers who buy electricity from us) or equipment or degrade the quality of our geothermal resources to such an extent that we could not perform under the PPA for the affected power plant, which in turn could reduce our net income and materially and adversely affect our business, financial condition, future results and cash flow. If we suffer a serious seismic disturbance, volcanic eruptions and lava flows, our business interruption and property damage insurance may not be adequate to cover all losses sustained as a result thereof. In addition, insurance coverage may not continue to be available in the future in amounts adequate to insure against such seismic disturbances, volcanic eruptions and lava flows.

Furthermore, absent additional geologic/hydrologic studies, any increase in power generation from our geothermal power plants, failure to reinject the geothermal fluid or improper maintenance of the hydrological balance may affect the operational duration of the geothermal resource and cause it to decline in value over time and may adversely affect our ability to generate power from the relevant power plant.

We may decide not to implement, or may not be successful in implementing, one or more elements of our multi-year strategic plan, and the plan as implemented may not achieve its goal of enhancing shareholder value through the long-term growth of our Company

We are implementing a multi-year strategic plan to:

- strengthen our core geothermal business in the United States as well as globally;
- establishing market position in the energy storage market; and
- exploring opportunities in new areas by looking for synergistic growth opportunities utilizing our core competence, market reputation as a successful company and new market opportunities focused upon environmental solutions.

There are uncertainties and risks associated with our strategic plan, including with respect to implementation and outcome. We may decide to change, or to not implement, one or more elements of the plan over time or we may not be successful in implementing one or more elements of the plan, in each case for a number of reasons. For example, we may face significant challenges and risks expanding into the energy storage market (or expanding our core geothermal business), including:

- our ability to compete with the large number of other companies pursuing similar business opportunities in energy storage and solar PV power generation, many of which already have established businesses in these areas and/or have greater financial, strategic, technological or other resources than we have;
- our ability to obtain financing on terms we consider acceptable, or at all, which we may need, for example, to obtain any technology, personnel, intellectual property, or to acquire one or more existing businesses as a platform for our expansion, or to fund internal research and development, for energy storage and solar PV electric power generation products and services;

- our ability to provide energy storage or solar power generation products or services that keep pace with rapidly changing technology, customer preferences, equipment costs, market conditions and other factors that are unknown to us now that will impact these markets;
- Our ability to manage the risks and uncertainties associated with our operating storage facilities and future development of storage and geothermal projects which operate as "merchant" facilities without long-term sales agreements, including the variability of revenues and profitability of such projects;
- our ability to devote the amount of management time and other resources required to implement this plan, while continuing to grow our core geothermal and recovered energy businesses; and
- our ability to recruit appropriate employees.

Strengthening our core geothermal business to new customers and geographical areas will have many of the same risks and uncertainties as those outlined above.

Implementing the plan may also involve various costs, including, among other things:

- opportunity costs associated with foregone alternative uses of our resources;
- various expense items that will impact our current financial results; and
- asset revaluations (for example, businesses or other assets acquired for new energy storage or solar PV power generation products or services may suffer impairment charges, as a result of rapidly changing technology, market conditions or otherwise).

These costs may not be recovered, in whole or in part, if one or more elements of the plan are not successfully implemented. These costs, or the failure to implement successfully one or more elements of the plan, could adversely affect our reputation and the reputation of our subsidiaries and could materially and adversely affect our business, financial condition, future results and cash flow.

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Apart from the risks associated with implementing the plan, the plan itself will expose us to other risks and uncertainties once implemented. Expanding our customer base may expose us to customers with different credit profiles than our current customers. Expanding our geographic base will subject us to risks associated with doing business in new foreign countries in which we will have to learn the business and political environment. In addition, expanding into new technologies will expose us to new risks and uncertainties that are unknown to us now in addition to the risks and uncertainties that may be similar to those we now face. The success of the plan, once implemented, will depend, among other things, on our ability to manage these risks effectively.

The trading price of our common stock could decline if securities, industry analysts or our investors disagree with our strategic plan or the way we implement it. Accordingly, there is no assurance that the plan will enhance shareholder value through long-term growth of the Company to the extent currently anticipated by our management or at all.

Concentration of customers, specific projects and regions may expose us to heightened financial exposure.

Our businesses often rely on a single customer to purchase all or a significant portion of a facility's output. The financial performance of these facilities depends on such customer continuing to perform its obligations under a long-term agreement between the parties. A facility's financial results could be materially and adversely affected if any of our customers fail to fulfill its contractual obligations and we are unable to find other customers to purchase at the same level of profitability. We cannot assure that such performance failures by our customers will not occur, or that if they do occur, such failures will not adversely affect the cash flows or profitability of our businesses. Our business relies significantly on the performance of our two largest projects, the McGinness Hills complex in East Nevada and Olkaria III Complex in Kenya, which together accounted for more than 30% of the total generating capacity of our Electricity segment in 2020. These two facilities accounted for 30% of our total revenues for the year ended December 31, 2020. Any disruption to the operation of these facilities would have a disproportionately adverse effect on our revenues and on our profitability.

For example, in the Electricity segment, we are exposed to the credit and financial condition of KPLC that buys the power generated from our Olkaria III in Kenya. In 2020, KPLC accounted for 16.4% of our total revenues. There has been a deterioration in the collection from KPLC that became slower than in the past, and as of December 31, 2020, the amount overdue from KPLC in Kenya was \$48.9 million of which \$16.2 million was paid in January and February of 2021. Any change in KPLC's financial condition may adversely affect us. Another example, we are exposed to the credit and financial condition of SCPA and its municipal utility members that account for 20.6% of our total revenues, as customers that buy the output from seven of our geothermal power plants. Because our contracts with SCPA are long-term, we may be adversely affected if the credit quality of any of these customers were to decline or if their respective financial conditions were to deteriorate or if they are otherwise unable to perform their obligations under our long-term contracts.

In the Product segment, 9.3% and 44.2% of our 2019 total revenues and Products segment revenue, respectively, were derived from our operations in Turkey and we rely on the continued geothermal development growth and government support for geothermal development in the country. Our revenue exposure to the Turkish market was significant in 2019 and was reduced in 2020, due to the slowdown in project development in the Turkish market resulting from the COVID 19 pandemic and uncertainty with respect to a local incentive regulation extension that was ultimately extended in January 2021. Adverse political developments in the relationship between Turkey and the U.S., adverse economic developments in this region including the 2018 failed coup, devaluation of the Turkish Lira, a general slowdown in the Turkish economy and an inability to obtain project and bank financing or a decline in government support for the development of geothermal power in the country could materially and adversely affect regional demand for the geothermal equipment and services we provide in the Turkish market or the prices we may charge for such equipment and services, which in turn could materially and adversely affect our Product segment profit margins and, consequently, our business, financial condition, future results and cash flows.

Ormat established a facility in Turkey in order to locally produce several power plant components that entitle our customer to increased incentives under the renewable energy laws. The use of local equipment in renewable energy based generating facilities in Turkey entitles such facilities to significant benefits under Turkish law, provided such facilities have obtained an RER Certificate from EMRA, which requires the issuance of a local certificate. If we do not obtain the local certificate, then some of our customers under the relevant supply agreements in Turkey may not be issued a RER Certificate based on the equipment we supply to them, and we will be required to make a payment to such customers equal to the amount of the expected lost benefit.

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Our international operations expose us to risks related to the application of foreign laws and regulations, any of which may adversely affect our business, financial condition, future results and cash flows.

Our foreign operations in Kenya, Turkey, Guadeloupe, Guatemala, Honduras and other countries are subject to regulation by various foreign governments and regulatory authorities and are subject to the application of foreign laws. Such foreign laws or regulations may not provide the same type of legal certainty and rights, in connection with our contractual relationships in such countries, as are afforded to our operations in the United States, which may adversely affect our ability to receive revenues or enforce our rights in connection with our foreign operations. The systems of some of these countries can be characterized by:

- selective or inconsistent enforcement of laws or regulations, sometimes in ways that have been perceived as being motivated by political or financial considerations;
- a perceived lack of judicial and prosecutorial independence from political, social and commercial forces;
- a high degree of discretion on the part of the judiciary and governmental authorities;
- legal and bureaucratic obstacles and corruption; and
- rapid evolution of legal systems in ways that may not always coincide with market developments.

These characteristics give rise to investment risks that do not exist in countries with more established legal systems in more developed economies.

We face additional risks inherent in conducting business internationally, including compliance with laws and regulations of many jurisdictions that apply to our international operations. These laws and regulations include data privacy requirements, labor relations laws, tax laws, competition regulations, import and trade restrictions, economic sanctions, export requirements, the Foreign Corrupt Practices Act, and other local laws that prohibit corrupt payments to governmental officials or certain payments or remunerations to customers. Given the high level of complexity of these laws, there is a risk that some provisions may be breached by us, for example through fraudulent or negligent behavior of individual employees (or third parties acting on our behalf), our failure to comply with certain formal documentation requirements, or otherwise. Violations of these laws and regulations could result in fines, criminal sanctions against us, our officers or our employees, requirements to obtain export licenses, cessation of business activities in sanctioned countries, implementation of compliance programs and prohibitions on the conduct of our business. Any such violation could include prohibitions on our ability to offer our products in one or more countries and could materially damage our reputation, our brand, our ability to attract and retain employees, our business, our financial condition and our results of operations.

Furthermore, existing laws or regulations may be amended or repealed, and new laws or regulations may be enacted or issued. In addition, the laws and regulations of some countries may limit our ability to hold a majority interest in some of the power plants that we may develop or acquire, thus limiting our ability to control the development, construction and operation of such power plants, or our ability to import our products into such countries.

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Political, economic and other conditions in the emerging economies where we operate may subject us to greater risk than in the developed U.S. economy, which may have a materially adverse effect on our business.

We have substantial operations outside of the United States, both in our Electricity segment and our Product segment. In 2020, 48.5% of our total revenues were derived from international operations, and our international operations were significantly more profitable than our U.S. operations. A substantial portion of international revenues came from Kenya and Turkey and, to a lesser extent, from Honduras, Guatemala, Guadeloupe and other countries. Thus, disturbances to and challenges facing our foreign operations, especially in Kenya and Turkey, could have impacts on our business ranging from moderate to severe. Our foreign operations subject us to significant political, economic and financial risks, which vary by country, and include:

- changes in government policies or personnel;
- changes in general economic conditions;
- restrictions on currency transfer or convertibility;
- the adoption or expansion of trade restrictions, the occurrence or escalation of a “trade war,” or other governmental action related to tariffs or trade agreements or policies among the governments of the United States and countries where we operate;
- reduced protection for intellectual property rights in some countries;

- changes in labor relations;
- political instability and civil unrest, and risk of war;
- changes in the local electricity and/or geothermal markets;
- difficulties enforcing our rights against a governmental agency because of the doctrine of sovereign immunity and foreign sovereignty over international operations;
- breach or repudiation of important contractual undertakings by governmental entities; and
- expropriation and confiscation of assets and facilities, including without adequate compensation.

Electricity Segment. In 2020, the international operations of the Electricity segment accounted for 28% of our total revenues, but accounted for 51% of our gross profit, 70% of our net income and 45% of our EBITDA. A substantial portion of Electricity segment international revenues came from Kenya (which also contributed disproportionately to our gross profit and net income) and, to a lesser extent, from Guadeloupe, Guatemala and Honduras. In Kenya, any break-up or potential privatization of KPLC, the power purchase for our power plants located in Kenya, may adversely affect our Olkaria III complex and our overall results of operations. Additionally, in Guatemala the electricity sector was partially privatized, and it is currently unclear whether further privatization will occur in the future. Such developments may affect our Amatitlan and Zunil power plants if, for example, they result in changes to the prevailing tariff regime or in the identity and creditworthiness of our power purchasers.

Product Segment. With respect to our Product segment, 96% of our Product segment revenues in 2020 came from international sales, primarily Turkey. Since we primarily engage in sales in those markets where there is a geothermal reservoir, any such change might adversely affect geothermal developers in those markets and, subsequently, the ability of such developers to purchase our products.

Generally. Outbreaks of civil and political unrest and acts of terrorism have also occurred in several countries in Africa, the Middle East and Latin America, where we have significant operations, such as Kenya and Turkey. For instance, Kenya experienced numerous terrorist attacks in 2014 and 2015, and has experienced an upsurge in attacks in more recent years, including in early 2019, from extremist groups. Continued or escalated civil and political unrest and acts of terrorism in the countries in which we operate could result in our curtailing operations. In the event that countries in which we operate experience civil or political unrest or acts of terrorism, especially in events where such unrest leads to an unseating of the established government, our operations in such countries could be materially impaired. Although we generally obtain political risk insurance in connection with our foreign power plants, such political risk insurance does not mitigate all of the above-mentioned risks. In addition, insurance proceeds received pursuant to our political risk insurance policies, where applicable, may not be adequate to cover all losses sustained as a result of any covered risks and may at times be pledged in favor of the power plant lenders as collateral. Also, insurance may not be available in the future with the scope of coverage and in amounts of coverage adequate to insure against such risks and disturbances. Any or all of the changes discussed above could materially and adversely affect our business, financial condition, future results and cash flow.

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Conditions in and around Israel, where the majority of our senior management and our main production and manufacturing facilities are located, may adversely affect our operations and may limit our ability to produce and sell our products or manage our power plants.

The majority of our senior management and our main production and manufacturing facilities are located in Israel approximately 26 miles from the border with the Gaza Strip. As such, political, economic and security conditions in Israel directly affect our operations.

The political instability and civil unrest in the Middle East and North Africa (including the ongoing civil war in Syria) as well as the increased tension between Iran and Israel have raised new concerns regarding security in the region and the potential for armed conflict or other hostilities involving Israel. We could be adversely affected by any such hostilities, the interruption or curtailment of trade between Israel and its trading partners, or a significant downturn in the economic or financial condition of Israel. In addition, the sale of products manufactured in Israel may be adversely affected in certain countries by restrictive laws, policies or practices directed toward Israel or companies having operations in Israel.

In addition, some of our employees in Israel are subject to being called upon to perform military service in Israel, and their absence may have an adverse effect upon our operations.

These events and conditions could disrupt our operations in Israel, which could materially and adversely affect our business, financial condition, future results, and cash flow.

Continued reduction in our Products backlog may affect our ability to fully utilize our main production and manufacturing facilities and may have a materially adverse effect on our business.

In our Product segment, the economic downturn as a result of the recent Covid-19 pandemic has adversely impacted customers' purchasing decisions and travel restrictions have adversely impacted our sales and marketing efforts and we experienced a decrease in our backlog. Continued reduction in our backlog may affect our ability to fully utilize our manufacturing facility and we may incur higher costs that our Product segment revenues may not be able to cover, which could materially and adversely affect our business, financial condition, future results, and cash flow.

We have significant operations globally, including in countries that may be adversely affected by political or economic instability, major hostilities or acts of terrorism, which exposes us to risks and challenges associated with conducting business internationally.

We have substantial operations outside of the U.S., both in our Electricity segment and our Product segment. Terrorist acts or other similar events could harm

our business by limiting our ability to generate or transmit power and by delaying the development and construction of new generating facilities and capital improvements to existing facilities. These events, and governmental actions in response, could result in a material decrease in revenues and significant additional costs to repair and insure our assets, and could adversely affect operations by contributing to the disruption of supplies and markets for geothermal and recovered energy. Such events could also impair our ability to raise capital by contributing to financial instability and lower economic activity.

Some of our leases will terminate if we do not extract geothermal resources in “commercial quantities”, thus requiring us to enter into new leases or secure rights to alternate geothermal resources, none of which may be available on terms as favorable to us as any such terminated lease, if at all.

Most of our geothermal resource leases are for a fixed primary term, and then continue for so long as geothermal resources are extracted in “commercial quantities” or pursuant to other terms of extension. The land covered by some of our leases (approximately 293,000 acres in the U.S. and approximately 15,000 acres elsewhere) is undeveloped and has not yet produced geothermal resources in commercial quantities. Leases that cover land which remains undeveloped and does not produce, or does not continue to produce, geothermal resources in commercial quantities and leases that we allow to expire, may terminate. In the event that a lease is terminated and we determine that we will need that lease once the applicable power plant is operating, we would need to enter into one or more new leases with the owner(s) of the premises that are the subject of the terminated lease(s) in order to develop geothermal resources from, or inject geothermal resources into, such premises or secure rights to alternate geothermal resources or lands suitable for injection. We may not be able to do this or may not be able to do so without incurring increased costs, which could materially and adversely affect our business, financial condition, future results and cash flow.

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Our BLM leases may be terminated if we fail to comply with any of the provisions of the Geothermal Steam Act or if we fail to comply with the terms or stipulations of such leases, which could materially and adversely affect our business, financial condition, future results and cash flow.

Pursuant to the terms of our BLM leases, we are required to conduct our operations on BLM-leased land in a workmanlike manner and in accordance with all applicable laws and BLM directives and to take all mitigating actions required by the BLM to protect the surface of and the environment surrounding the relevant land. Additionally, certain BLM leases contain additional requirements, some of which relate to the mitigation or avoidance of disturbance of any antiquities, cultural values or threatened or endangered plant, wildlife and species. In the event of a default under any BLM lease, or the failure to comply with such requirements, or any non-compliance with any of the provisions of the Geothermal Steam Act or regulations issued thereunder, the BLM may, 30 days after notice of default is provided to our relevant project subsidiary, suspend our operations until the requested action is taken or terminate the lease, either of which could materially and adversely affect our business, financial condition, future results and cash flow.

Some of our leases (or subleases) could terminate if the lessor (or sublessor) under any such lease (or sublease) defaults on any debt secured by the relevant property, thus terminating our rights to access the underlying geothermal resources at that location.

The fee interest in the land which is the subject of some of our leases (or subleases) may currently be or may become subject to encumbrances securing loans from third-party lenders to the lessor (or sublessor). Our rights as lessee (or sublessee) under such leases (or subleases) are or may be subject and subordinate to the rights of any such lender. Accordingly, a default by the lessor (or sublessor) under any such loan could result in a foreclosure on the underlying fee interest in the property and thereby terminate our leasehold interest and result in the shutdown of the power plant located on the relevant property and/or terminate our right of access to the underlying geothermal resources required for our operations.

Reduced levels of recovered energy required for the operation of our REG power plants may result in decreased performance of such power plants.

Our REG power plants generate electricity from recovered energy or so-called “waste heat” that is generated as a residual by-product of gas turbine-driven compressor stations and a variety of industrial processes. Any interruption in the supply of the recovered energy source, such as a result of reduced gas flows in the pipelines or reduced level of operation at the compressor stations, or in the output levels of the various industrial processes, may cause an unexpected decline in the capacity and performance of our recovered energy power plants.

Our business development activities may not be successful and our projects under construction may not commence operation as scheduled.

We are in the process of developing and constructing a number of new power plants. Our success in developing a project is contingent upon, among other things, negotiation of satisfactory engineering and construction agreements and obtaining PPAs and transmission services agreements, receipt of required governmental permits, obtaining adequate financing, and the timely implementation and satisfactory completion of field development, testing and power plant construction and commissioning. We may be unsuccessful in accomplishing any of these matters or doing so on a timely basis. Although we may attempt to minimize the financial risks attributable to the development of a project by securing a favorable PPA and applicable transmission services agreements, obtaining all required governmental permits and approvals and arranging, in certain cases, adequate financing prior to the commencement of construction, the development of a power project may require us to incur significant expenses for preliminary engineering, permitting and legal and other expenses before we can determine whether a project is feasible, economically attractive or capable of being financed.

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Currently, we have geothermal projects and prospects under exploration, development or construction in the United States, as well as in Ethiopia, Guadeloupe, Guatemala, Honduras, Indonesia and New Zealand, and we intend to pursue the expansion of some of our existing plants and the development of other new plants. Our completion of these facilities is subject to substantial risks, including:

- inability to secure a PPA;
- inability to secure transmission services agreements;

- inability to secure the required financing;
- cost increases and delays due to unanticipated shortages of adequate resources to execute the project such as equipment, material and labor;
- work stoppages resulting from force majeure events including riots, strikes and weather conditions;
- inability to obtain permits, licenses and other regulatory approvals;
- failure to secure sufficient land positions for the wellfield, power plant and rights of way;
- failure by key contractors and vendors to timely and properly perform, including where we use equipment manufactured by others;
- inability to secure or delays in securing the required transmission line and/or capacity;
- adverse environmental and geological conditions (including inclement weather conditions);
- adverse local business law;
- our attention to other projects and activities, including those in the solar energy and energy storage sectors; and
- changes in laws that mandate, incentivize or otherwise favor renewable energy sources.

Any one of these could give rise to delays, cost overruns, the termination of the plant expansion, construction or development or the loss (total or partial) of our interest in the project under development, construction, or expansion.

Our future growth depends, in part, on the successful enhancement of a number of our existing facilities.

Our current growth plans include enhancement and repowering of a number of our operating facilities, including the Heber and Puna complexes and involve replacement of old equipment and optimization of the geothermal field, including repair and enhancement of existing wells and drilling of new wells. Such enhancement and repowering are subject to geological risks and uncertainties and satisfactory completion of field development, testing, permitting and power plant construction and commissioning, which may result in delays and cost overruns.

We rely on power transmission facilities that we do not own or control.

We depend on transmission facilities owned and operated by others to deliver the power we sell from our power plants to our customers. If transmission is disrupted, or if the transmission capacity infrastructure is inadequate, or if there is a failure that requires long shutdown for repair, or if curtailment is required due to load system inefficiency, our ability to sell and deliver power to our customers may be adversely impacted and we may either incur additional costs or forego revenues. In addition, lack of access to new transmission capacity may affect our ability to develop new projects. Existing congestion of transmission capacity, as well as expansion of transmission systems and competition from other developers seeking access to expanded systems, could also affect our performance.

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Our use of joint ventures may limit our flexibility with jointly owned investments.

We have partners in several of our plants and we may continue in the future to develop and/or acquire and/or hold properties in joint ventures with other entities when circumstances warrant the use of these structures. Ownership of assets in joint ventures is subject to risks that may not be present with other methods of ownership, including:

- we could experience an impasse on certain decisions because we do not have sole decision-making authority, which could require us to expend additional resources on resolving such impasses or potential disputes, including arbitration or litigation;
- our joint venture partners could have investment goals that are not consistent with our investment objectives, including the timing, terms and strategies for any investments in the projects that are owned by the joint ventures, which could affect decisions about future capital expenditures, major operational expenditures and retirement of assets, among other things;
- our ability to transfer our interest in a joint venture to a third party may be restricted and the market for our interest may be limited;
- our joint venture partners may be structured differently than us for tax purposes, and this could impact our ability to fully take advantage of federal tax incentives available for renewable energy projects;
- our joint venture partners might become bankrupt, fail to fund their share of required capital contributions or fail to fulfill their obligations as a joint venture partner, which may require us to infuse our own capital into the venture on behalf of the partner despite other competing uses for such capital; and
- our joint venture partners may have competing interests in our markets and investments in companies that compete directly or indirectly with us that could create conflict of interest issues.

Our operations could be adversely impacted by climate change.

Daily and seasonal fluctuations in temperature generally have a more significant impact on the generating capacity of geothermal energy plants than conventional power plants. Some of our power plants experience reduced generation in warm periods due to the lower heat differential between geothermal fluid and the ambient surroundings. While we generally account for the projected impact seasonal fluctuations in temperature based on our historic experience, the impact of climate change on traditional weather patterns has become more pronounced. This has reduced the certainty of our modelling efforts. For example, in 2019, we experienced prolonged elevated temperatures in the Western United States which impacted generating capacity at our facilities and adversely impacted our revenues in the fourth quarter of the year. To the extent weather conditions continue to be impacted by climate change, the generating capacity of certain of our facilities may be adversely impacted in a manner that we could not predict which may in turn adversely impact our results of operations.

Geothermal projects that we plan to develop in the future, may operate as "merchant" facilities without long-term PPAs and therefore such projects will be exposed to market fluctuations.

Geothermal projects that we plan to develop in the United States as part of our growth plans may operate as "merchant" facilities and sell electricity without long-term PPAs for some or all of their generating capacity and output. Such projects are exposed to market fluctuations. Without the benefit of long-term PPAs for these assets, we cannot be sure that we will be able to sell any or all of the power generated by these facilities at commercially attractive rates or that these facilities will be able to operate profitably. This could lead to future impairments of our property, plant and equipment resulting in economic losses and liabilities, which could have a material adverse effect on our results of operations, financial condition or cash flows.

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We may not be able to successfully conclude the transactions, integrate companies, which we acquired and may acquire in the future, which could materially and adversely affect our business, financial condition, future results and cash flow.

Our strategy is to continue to expand in the future, including through acquisitions. Integrating acquisitions is often costly, and we may not be able to successfully integrate our acquired companies with our existing operations without substantial costs, delays or other adverse operational or financial consequences. Completion of M&A transactions may be subject to fulfilling conditions and receiving regulatory approval. Integrating our acquired companies involves a number of risks that could materially and adversely affect our business, including:

- failure of the acquired companies to achieve the results we expect;
- inability to retain key personnel of the acquired companies;
- risks associated with unanticipated events or liabilities; and
- the difficulty of establishing and maintaining uniform standards, controls, procedures and policies, including accounting controls and procedures.

If any of our acquired companies suffers customer dissatisfaction or performance problems, this could adversely affect the reputation of our group of companies and could materially and adversely affect our business, financial condition, future results and cash flow.

The power generation industry is characterized by intense competition, and we encounter competition from electric utilities, other power producers, and power marketers that could materially and adversely affect our business, financial condition, future results and cash flow.

The power generation industry is characterized by intense competition from electric utilities, other power producers and power marketers. In recent years, there has been increasing competition in the sale of electricity, in part due to excess capacity in a number of United States markets and an emphasis on short-term or "spot" markets, and competition has contributed to a reduction in electricity prices. For the most part, we expect that power purchasers interested in long-term arrangements will engage in "competitive bid" solicitations to satisfy new capacity demands. This competition could adversely affect our ability to obtain and/or renew long-term PPAs and the price paid for electricity by the relevant power purchasers. There is also increasing competition between electric utilities. This competition has put pressure on electric utilities to lower their costs, including the cost of purchased electricity, and increasing competition in the future will put further pressure on power purchasers to reduce the prices at which they purchase electricity from us.

We face increasing competition from other companies engaged energy storage.

We are experiencing intense competition in the energy storage market from independent power producers, developers, and third-party investors. If we are unable, as a result of increased competition, to grow our energy storage portfolio while meeting our profitability goals, our business, financial condition, future results and cash flow could be materially and adversely affected.

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Changes in costs and technology may significantly impact our business by making our power plants and products less competitive resulting in the inability to sign new PPAs for our Electricity segment and new supply and EPC contracts for our Products segment.

A basic premise of our business model is that generating baseload power at geothermal power plants produces electricity at a competitive price. However, traditional coal-fired systems and gas-fired systems may under certain economic conditions produce electricity at lower average prices than our geothermal plants. In addition, there are other technologies that can produce electricity such as hydroelectric systems, fuel cells, microturbines, wind turbines, energy storage systems

and solar PV systems. Some of these alternative technologies currently produce electricity at higher average prices than our geothermal plants while others produce electricity at lower average prices. It is possible that technological advances and economies of scale will further reduce the cost of alternate methods of power generation. It is also possible that energy technologies will compete with our basic premise of a firm (non-intermittent) renewable baseload power source by combining renewable technologies with energy storage to provide an alternative to firm baseload energy. If this were to happen, the competitive advantage of our power plants may be significantly impaired and will cause reduction and/or inability to sign new PPAs for our Electricity segment and new supply and EPC contracts for our Products segment.

Our intellectual property rights may not be adequate to protect our business.

Our existing intellectual property rights, including those we acquired in connection with the acquisition of our Viridity business, may not be adequate to protect our business. We occasionally file patent applications. However, the patent application process is expensive, time-consuming and complex and we may not be able to prepare, file, prosecute, maintain and enforce all necessary or desirable patent applications at a reasonable cost or in a timely manner. Patents may be invalidated and patents may not be issued on the basis of our patent applications. Additionally, the scope of patent protection can be reinterpreted after issuance. Even if our patent applications do issue as patents, they may not issue in a form that is sufficiently broad to protect our technology, prevent competitors or other third parties from competing with us or otherwise provide us with any competitive advantage. In addition, any patents issued to us or for which we have use rights may be challenged, narrowed, invalidated or circumvented. Third parties may initiate opposition, interference, re-examination, post-grant review, inter partes review, nullification or derivation actions, or similar proceedings challenging the inventorship, validity, enforceability or scope of our patents. An adverse determination in any such proceeding or litigation could reduce the scope of, or invalidate our patent rights, allow third parties to commercialize our technology and compete directly with us, without payment to us, or result in our inability to commercialize our technology without infringing third-party patent rights. Such proceedings also may result in substantial cost and require significant time from our management, even if the eventual outcome is favorable to us. Our competitors or other third parties may also be able to circumvent our patents by developing similar or alternative technologies in a non-infringing manner. Consequently, we do not know whether any of our technology will be protectable or remain protected by valid and enforceable patents.

In order to safeguard our unpatented proprietary know-how, trade secrets and technology, we rely on a combination of trade secret protection and non-disclosure provisions in agreements with employees and third parties having access to confidential or proprietary information. These measures may not adequately protect us from disclosure, use, reverse engineering, infringement, misappropriation or other violation of our proprietary information and other intellectual property rights by third parties. Furthermore, non-disclosure provisions can be difficult to enforce and, even if successfully enforced, may not be entirely effective. In addition, we cannot guarantee that we have entered into non-disclosure agreements with all employees and third parties that have or may have had access to our trade secrets and other confidential or proprietary information.

Even if we adequately protect our intellectual property rights, litigation may be necessary to enforce these rights, which could result in substantial costs to us and a substantial diversion of management attention. Furthermore, attempts to enforce our intellectual property rights against third parties could also provoke these third parties to assert their own intellectual property or other rights against us, or result in a holding that invalidates or narrows the scope of our rights, in whole or in part. Our success and ability to compete also depends in part on our ability to operate without infringing, misappropriating or otherwise violating the intellectual or proprietary rights of third parties. While we have attempted to ensure that our technology and the operation of our business does not infringe other parties' patents and other intellectual property or proprietary rights, our competitors or other third parties may assert that certain aspects of our business or technology infringe upon, misappropriate or otherwise violate their intellectual property or proprietary rights. In addition, former employers of our current, former or future employees may assert claims that such employees have improperly disclosed to us the confidential or proprietary information of these former employers. Infringement, misappropriation or other intellectual property violation claims, regardless of merit or ultimate outcome, can be expensive, hard to predict and time-consuming and can divert management's attention from our core business. An assertion of an intellectual property infringement, misappropriation or other violation claim against us may result in adverse judgments, settlements on unfavorable terms or cause us to pay significant money damages, lose significant revenues, be prohibited from using the relevant technology or other intellectual property, or incur significant license, royalty or technology development expenses. Future litigation may also involve non-practicing entities or other intellectual property owners who have no relevant product offerings or revenue and against whom our own intellectual property may therefore provide little or no deterrence or protection.

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We may experience difficulties implementing and maintaining our new enterprise resource planning system

We purchased a new enterprise resource planning ("ERP") system and are currently in the initial phases of implementing the new system. ERP implementations are complex and time-consuming, and involve substantial expenditures on system software and implementation activities. The ERP system will be critical to our ability to provide important information to our management, obtain and deliver products, provide services and customer support, send invoices and track payments, fulfill contractual obligations, accurately maintain books and records, provide accurate, timely and reliable reports on our financial and operating results or otherwise operate our business. ERP implementations also require transformation of business and financial processes in order to reap the benefits of the ERP system; any such transformation involves risks inherent in the conversion to a new computer system, including loss of information and potential disruption to our normal operations. The implementation and maintenance of the new ERP system has required, and will continue to require, the investment of significant financial and human resources and the implementation may be subject to delays and cost overruns. In addition, we may not be able to successfully complete the implementation of the new ERP system without experiencing difficulties. Any disruptions, delays or deficiencies in the design and implementation or the ongoing maintenance of the new ERP system could adversely affect our ability to process orders, ship products, provide services and customer support, send invoices and track payments, fulfill contractual obligations, accurately maintain books and records, provide accurate, timely and reliable reports on our financial and operating results, or otherwise operate our business. Additionally, if we do not effectively implement the ERP system as planned or the system does not operate as intended, the effectiveness of our internal control over financial reporting could be adversely affected or our ability to assess it adequately could be delayed.

A cyber-incident, cyber security breach, severe natural event or physical attack on our operational networks and information technology systems could have a material adverse effect on our financial condition, results of operations, liquidity and cash flows.

We rely on information technology systems that allow us to create, store, retain, transmit and otherwise process proprietary and sensitive or confidential information, including our business and financial information, and personal information regarding our employees and third-parties. We also rely on our operational

technology systems to manufacture equipment for our energy projects, operate our power plants and provide our services. In addition, we often rely on third-party vendors to host, maintain, modify and update our systems.

Our and our third-party vendors' technology systems can be damaged by malicious events such as cyber and physical attacks, computer viruses, malicious and destructive code, phishing attacks, denial of service or information, as well as security breaches, natural disasters, fire, power loss, telecommunications failures, employee misconduct, human error, and third parties such as traditional computer hackers, persons involved with organized crime or foreign state or foreign state-supported actors. Furthermore, our disaster recovery planning may not be sufficient for all situations. Any failure, disruptions to or decrease in the functionality of our or our third-party vendors' operational and information technology networks could impact our ability to maintain effective internal controls over financial reporting, cause harm to the environment, the public or our employees, and significantly disrupt and damage our assets and operations or those of third parties.

We and our third-party vendors have been, and may in the future be, subject to breaches and attempts to gain unauthorized access to our information technology systems or sensitive or confidential data, or to disrupt our operations. To date, none of these breaches or attempts has, individually or in the aggregate, resulted in a security incident with a material effect on our operations or our financial condition, results of operations, liquidity, or cash flows. Despite implementation of security and control measures, we and our third-party vendors have not always been able to, and there can be no assurance that we or our third-party vendors will be able to in the future, anticipate or prevent unauthorized access to our or our third-party vendors' operational technology networks, information technology systems or data, or the disruption of our or our third-party vendors' operations. The techniques used to obtain unauthorized access to our and our third-party vendors' operational technology networks, information technology systems or data are constantly evolving and have become increasingly complex and sophisticated. Furthermore, such techniques change frequently and are often not detected until after they have been launched against a target. Therefore, we may be unable to anticipate these techniques and may not become aware in a timely manner of such a security breach, which could exacerbate any damage we experience. Such events could cause interruptions in the operation of our business, damage our operational technology networks and information technology systems, subject us to significant expenses, remediation costs, litigation, disputes, claims by third parties and regulatory actions or investigations that could result in damages, material fines and penalties, and harm to our reputation, any of which could have a material adverse effect on our financial condition, results of operations, liquidity, and cash flows. We may maintain cyber liability insurance that covers certain damages caused by cyber incidents. However, there is no guarantee that adequate insurance will continue to be available at rates that we believe are reasonable or that the costs of responding to and recovering from a cyber incident will be covered by insurance or recoverable in rates.

In addition, we are subject to various legislation, regulations, directives and guidelines from federal, state, local and foreign agencies, such as FERC, that are intended to strengthen cybersecurity measures required for information and operational technology and critical energy infrastructure and that apply to the collection, use, retention, protection, disclosure, transfer and other processing of personal information. These cybersecurity, data protection and privacy law regimes continue to evolve and may result in ever-increasing public scrutiny and escalating levels of capital expenditures, regulatory enforcement, sanctions and fines and increased costs for compliance. Failure to comply with any of these laws could result in enforcement action against us, including fines, imprisonment of company officials and public censure, any of which could harm our reputation and have a material adverse effect on our financial condition, results of operations, liquidity, and cash flows.

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Risks Related to Governmental Regulations, Laws and Taxation

Our financial performance could be adversely affected by changes in the legal and regulatory environment affecting our operations.

All of our power plants are subject to extensive regulation, and therefore changes in applicable laws or regulations, or interpretations of those laws and regulations, could result in increased compliance costs, the need for additional capital expenditures or the reduction of certain benefits currently available to our power plants. The structure of domestic and foreign energy regulation currently is, and may continue to be, subject to challenges, modifications, the imposition of additional regulatory requirements, and restructuring proposals. We or our power purchasers may not be able to obtain all regulatory approvals that may be required in the future, or any necessary modifications to existing regulatory approvals, or maintain all required regulatory approvals. In addition, the cost of operation and maintenance and the operating performance of geothermal power plants may be adversely affected by changes in certain laws and regulations, including tax laws.

Any changes to applicable laws and regulations or interpretations of those laws and regulations could significantly increase the regulatory-related compliance, tax and other expenses incurred by the power plants and could significantly reduce or entirely eliminate the revenues generated by one or more of the power plants, which in turn would reduce our net income and could materially and adversely affect our business, financial condition, future results and cash flow. A recent example is the assessment letters we received from the KRA with respect to our operation in Kenya in relation to the 2013 to 2017 tax years in which the KRA demanded we pay approximately \$200.0 million including interest and penalties. We recently entered into settlement agreements and concluded these tax assessments.

Pursuant to the terms of some of our PPAs with investor-owned electric utilities and publicly-owned electric utilities in states that have renewable portfolio standards, the failure to supply the contracted capacity and energy thereunder may result in the imposition of penalties.

Pursuant to the terms of certain of our PPAs, we may be required to make payments to the relevant power purchaser under certain conditions, such as shortfall in delivery of renewable energy and energy credits, and not meeting certain performance threshold requirements, as defined in the relevant PPA. The amount of payment required is dependent upon the level of shortfall in delivery or performance requirements and is recorded in the period the shortfall occurs. In addition, if we do not meet certain minimum performance requirements, the capacity of the relevant power plant may be permanently reduced. Any or all of these considerations could materially and adversely affect our business, financial condition, future results and cash flow.

If any of our domestic power plants loses its current Qualifying Facility status under PURPA, or if amendments to PURPA are enacted that substantially reduce the benefits currently afforded to Qualifying Facilities, our domestic operations could be adversely affected.

Most of our domestic power plants are Qualifying Facilities pursuant to PURPA, which largely exempts the power plants from the FPA, and certain state and local laws and regulations regarding rates and financial and organizational requirements for electric utilities.

If any of our domestic power plants were to lose its Qualifying Facility status, such power plant could become subject to the full scope of the FPA and applicable state regulation. The application of the FPA and other applicable state regulation to our domestic power plants could require our operations to comply with an increasingly complex regulatory regime that may be costly and greatly reduce our operational flexibility.

If a domestic power plant were to lose its Qualifying Facility status, it would become subject to full regulation as a public utility under the FPA, and the rates charged by such power plant pursuant to its PPAs may be subject to the review and approval of FERC. FERC, upon such review, may determine that the rates currently set forth in such PPAs are not appropriate and may set rates that are lower than the rates currently charged. In addition, FERC may require that the affected domestic power plant refund amounts previously paid by the relevant power purchaser to such power plant. Even if a power plant does not lose its Qualifying Facility status, pursuant to regulations issued by FERC for Qualifying Facility power plants above 20 MW, if a power plant's PPA is terminated or otherwise expires, and the subsequent sales are not made pursuant to a state's implementation of PURPA, that power plant will become subject to FERC's ratemaking jurisdiction under the FPA. Moreover, a loss of Qualifying Facility status also could permit the power purchaser, pursuant to the terms of the particular PPA, to cease taking and paying for electricity from the relevant power plant or, consistent with FERC precedent, to seek refunds of past amounts paid. This could cause the loss of some or all of our revenues payable pursuant to the related PPAs, result in significant liability for refunds of past amounts paid, or otherwise impair the value of our power plants. If a power purchaser were to cease taking and paying for electricity or seek to obtain refunds of past amounts paid, there can be no assurance that the costs incurred in connection with the power plant could be recovered through sales to other purchasers or that we would have sufficient funds to make such payments. In addition, the loss of Qualifying Facility status would be an event of default under the financing arrangements currently in place for some of our power plants, which would enable the lenders to exercise their remedies and enforce the liens on the relevant power plant.

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Pursuant to the Energy Policy Act of 2005, FERC also has the authority to prospectively lift the mandatory obligation of a utility under PURPA to offer to purchase the electricity from a Qualifying Facility if the utility operates in a workably competitive market. Our existing PPAs between a Qualifying Facility and a utility are not affected. If, in addition to the California utilities' waiver of the mandatory purchase obligation for QF projects that exceed 20 MW described in the risk factor above, the utilities in the other regions in which our domestic power plants operate were to be relieved of the mandatory purchase obligation, they would not be required to purchase energy from the power plant in the region under Federal law upon termination of the existing PPA or with respect to new power plants, which could materially and adversely affect our business, financial condition, future results and cash flow. Moreover, FERC has the authority to modify its regulations relating to the utility's mandatory purchase obligation under PURPA, which could result in the reduction in the purchase obligation of California and other utilities to a level below 20 MW, or the elimination of the purchase obligation. If that were to occur it could materially and adversely affect our business, financial condition, future results and cash flow.

The PURPA and QF described risks identified above are not likely to affect our Nevada based facilities that entered into PPAs with NV Energy as the off-taker after Nevada initially adopted its RPS in 2001. Those PPAs and the related rates agreed to for such facilities by the off-taker were not based upon PURPA or a QF mandated rate but were instead adopted as a result of a competitive bidding process and approved as part of the off-taker's integrated resource planning process and in order for the off-taker to comply with Nevada's RPS. While those PPAs were initially required to file for QF or EWG status with the FERC, the PPAs and their related prices for the term of the PPA were not approved by the FERC pursuant to PURPA. The PURPA and QF risks described above also are not likely to affect our Nevada and California based projects that have their PPAs with the SCPPA because SCPPA is not a regulated public utility under PURPA.

The reduction or elimination of government incentives could adversely affect our business, financial condition, future results and cash flows.

Construction and operation of our geothermal power plants and recovered energy-based power plants has benefited, and may benefit in the future, from public policies and government incentives that support renewable energy and enhance the economic feasibility of these projects in regions and countries where we operate. Such policies and incentives include PTCs (that are applicable for projects that begin construction by the end of 2020) and ITCs (for projects that begin construction by the end of 2021), accelerated depreciation tax benefits, renewable portfolio standards, carbon trading mechanisms, rebates, and mandated feed-in-tariffs, and may include similar or other incentives to end users, distributors, system integrators and manufacturers of geothermal, solar and other power products. Some of these measures have been implemented at the federal level, while others have been implemented by different states within the United States or countries outside the United States where we operate. In particular, the current U.S. presidential administration has made public statements that indicate that the administration may be supportive of various renewable energy programs. For example, an Executive Order titled "Tackling the Climate Crisis at Home and Abroad" signed by President Biden on January 27, 2021 directs the Secretary of the Interior to, among other actions, review siting and permitting processes on public lands and in offshore waters as part of an effort to increase renewable energy production on those lands and in those waters.

The availability and continuation of these public policies and government incentives have a significant effect on the economics and viability of our development program and continued construction of new geothermal, recovered energy-based, solar PV facilities and, recently, energy storage projects. Any changes to such public policies, or any reduction in or elimination or expiration of such government incentives could affect us in different ways. For example, any reduction in, termination or expiration of renewable portfolio standards may result in less demand for generation from our geothermal and recovered energy-based, power plants. Any reductions in, termination or expiration of other government incentives could reduce the economic viability of, and cause us to reduce, the construction of new geothermal, recovered energy-based, solar PV or any other power plants. Policies supporting or deregulating the exploration, production and use of fossil fuels may create regulatory uncertainty in the renewable energy industry. Similarly, any such changes that affect the geothermal energy industry in a manner that is different from other sources of renewable energy, such as wind or solar, may put us at a competitive disadvantage compared to businesses engaged in the development, construction and operation of renewable power projects using such other resources. Any of the foregoing outcomes could have a material adverse effect on our business, financial condition, future results, and cash flows.

We are a holding company and our cash depends substantially on the performance of our subsidiaries and the power plants they operate, most of which is subject to restrictions and taxation on dividends and distributions.

We are a holding company whose primary assets are our ownership of the equity interests in our subsidiaries. We conduct no other business and, as a result, we depend entirely upon our subsidiaries' earnings and cash flow.

The agreements pursuant to which some of our subsidiaries have incurred debt restrict the ability of these subsidiaries to pay dividends, make distributions or otherwise transfer funds to us prior to the satisfaction of other obligations, including the payment of operating expenses, debt service and replenishment or maintenance of cash reserves. In the case of some of our power plants that are owned jointly with other partners, there may be certain additional restrictions on dividend distributions pursuant to our agreements with those partners. In all of the foreign countries where our existing power plants are located, dividend payments to us may also be subject to withholding taxes. Each of the events described above may reduce or eliminate the aggregate amount of cash we can receive from our subsidiaries.

The costs of compliance with federal, state, local and foreign environmental laws and our ability in obtaining and maintaining environmental permits and governmental approvals required for development, construction and/or operation may result in liabilities, costs and delays in construction (as well as any fines or penalties that may be imposed upon us in the event of any non-compliance or delays with such laws or regulations) that could materially and adversely affect our business, financial condition, future results and cash flow and these liabilities and costs may increase in the future.

Our operations are subject to extensive environmental laws, ordinances and regulations, which may cause us to incur significant costs and liabilities. These laws, ordinances and regulations can be subject to change and such change could result in increased compliance costs, the need for additional capital expenditures, or otherwise adversely affect us. In addition, our power plants are required to comply with numerous federal, state, local and foreign statutory and regulatory environmental standards and to maintain numerous environmental permits and governmental approvals required for development, construction and/or operation. We may not be able to renew, maintain or obtain all environmental permits and governmental approvals required for the continued operation or further development and construction of the power plants. We have not yet obtained certain permits and government approvals required for the completion and successful operation of power plants under development, construction or enhancement. Our failure to renew, maintain or obtain required permits or governmental approvals, including the permits and approvals necessary for operating power plants under development, construction or enhancement, could cause our operations to be limited or suspended. Finally, some of the environmental permits and governmental approvals that have been issued to the power plants contain conditions and restrictions, including restrictions or limits on emissions and discharges of pollutants and contaminants, or may have limited terms. If we fail to satisfy these conditions or comply with these restrictions, or with any statutory or regulatory environmental standards, we may become subject to regulatory enforcement action and the operation of the power plants could be adversely affected or be subject to fines, penalties or additional costs or other sanctions, including the imposition of investigatory or remedial obligations of the issuance of orders limiting or prohibiting our operations.

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We could be exposed to significant liability for violations of hazardous substances laws because of the use or presence of such substances at our power plants.

Our power plants are subject to numerous domestic and foreign federal, regional, state and local statutory and regulatory standards relating to the generation, handling, transportation, use, storage, treatment and disposal of hazardous substances. We use butane, pentane, industrial lubricants, and other substances at our power plants which are or could become classified as hazardous substances. If any hazardous substances are found to have been released into the environment at or by the power plants in concentrations that exceed regulatory limits, we could become liable for the investigation and removal of those substances, regardless of their source and time of release. If we fail to comply with these laws, ordinances or regulations (or any change thereto), we could be subject to civil or criminal liability, the imposition of liens or fines, and cessation of operations, large expenditures to bring the power plants into compliance or other sanctions. Furthermore, under certain federal and states laws in the United States, we can be held liable for the cleanup of releases of hazardous substances at any of our current or former facilities or at any other locations where we arranged for disposal of those substances, even if we did not cause the release at that location or if the release complied with applicable law at the time it occurred. Liability under these laws can be joint and several. The cost of any remediation activities in connection with a spill or other release of such substances could be significant and could expose us to significant liability.

Current and future urbanizing activities and related residential, commercial, and industrial developments may encroach on or limit geothermal or solar PV activities in the areas of our power plants, thereby affecting our ability to utilize access, inject and/or transport geothermal resources on or underneath the affected surface areas.

Current and future urbanizing activities and related residential, commercial and industrial development may encroach on or limit geothermal activities in the areas of our power plants or construction and operation of solar PV facilities, thereby affecting our ability to utilize, access, inject, and/or transport geothermal resources on or underneath the affected surface areas or build solar PV facilities, which require large areas of relatively flat land. In particular, the Heber power plants rely on an area, which we refer to as the Heber Known Geothermal Resource Area, or Heber KGRA, for the geothermal resource necessary to generate electricity at the Heber power plants. Imperial County has adopted a “specific plan area” that covers the Heber KGRA, which we refer to as the “Heber Specific Plan Area”. The Heber Specific Plan Area allows commercial, residential, industrial and other employment-oriented development in a mixed-use orientation, which currently includes geothermal uses. Several of the landowners from whom we hold geothermal leases have expressed an interest in developing their land for residential, commercial, industrial or other surface uses in accordance with the parameters of the Heber Specific Plan Area. Currently, Imperial County’s Heber Specific Plan Area is coordinated with the cities of El Centro and Calexico. There has been ongoing underlying interest since the early 1990s to incorporate the community of Heber. While any incorporation process would likely take several years, if Heber were to be incorporated, the City of Heber could replace Imperial County as the governing land use authority, which, depending on its policies, could have a significant effect on land use and availability of geothermal resources.

Current and future development proposals within Imperial County and the City of Calexico, applications for annexations to the City of Calexico, and plans to expand public infrastructure may affect surface areas within the Heber KGRA, thereby limiting our ability to utilize, access, inject and/or transport the geothermal resource on or underneath the affected surface area that is necessary for the operation of our Heber power plants, which could adversely affect our operations and reduce our revenues.

Current construction works and urban developments in the vicinity of our Steamboat complex of power plants in Nevada may also affect future permitting for geothermal operations relating to those power plants. Such works and developments include plans for the construction of a new casino hotel and other commercial or industrial developments on land in the vicinity of our Steamboat complex.

U.S. federal, state and international income tax law changes could adversely affect us

The Company continuously monitors and examines the impact of US and international tax law changes, such as the Tax Act, CARES and similar tax law changes internationally, in order to determine the impact it may have on our business. The overall impact of the global tax law changes is uncertain, and our business, financial condition, future results and cash flow, as well as our stock price, could be adversely affected.

Risks Related to Economic and Financial Conditions

We may be unable to obtain the financing we need to pursue our growth strategy and any future financing we receive may be less favorable to us than our current financing arrangements, either of which may adversely affect our ability to expand our operations.

Most of our geothermal power plants generally have been financed using leveraged financing structures, consisting of non-recourse or limited recourse debt obligations. Each of our projects under development or construction and those projects and businesses we may seek to acquire, or construct will require substantial capital investment. Our continued access to capital on acceptable terms is necessary for the success of our growth strategy. Our attempts to obtain future financings may not be successful or on favorable terms.

Market conditions and other factors may not permit future project and acquisition financings on terms similar to those our subsidiaries have previously received. Our ability to arrange for financing on a substantially non-recourse or limited recourse basis, and the costs of such financing, are dependent on numerous factors, including general economic conditions, conditions in the global capital and credit markets, investor confidence, the continued success of current power plants, the credit quality of the power plants being financed, the political situation in the country where the power plant is located, and the continued existence of tax and securities laws which are conducive to raising capital. If we are not able to obtain financing for our power plants on a substantially non-recourse or limited recourse basis, we may have to finance them using recourse capital such as direct equity investments or the incurrence of additional debt by us.

Also, in the absence of favorable financing options, we may decide not to build new plants or acquire facilities from third parties. Any of these alternatives could have a material adverse effect on our growth prospects.

We may also need additional financing to implement our strategic plan. For example, our cash flow from operations and existing liquidity facilities may not be adequate to finance any acquisitions we may want to pursue or new technologies we may want to develop or acquire. Financing for acquisitions or technology development activities may not be available on the non-recourse or limited recourse basis we have historically used for our business, or on other terms we find acceptable.

Our foreign power plants and foreign manufacturing operations expose us to risks related to fluctuations in currency rates, which may reduce our profits from such power plants and operations.

Risks attributable to fluctuations in currency exchange rates can arise when any of our foreign subsidiaries incur operating or other expenses in one type of currency but receive revenues in another. In such cases, an adverse change in exchange rates can reduce such subsidiary's ability to meet its debt service obligations, reduce the amount of cash and income we receive from such foreign subsidiary or increase such subsidiary's overall expenses. In addition, the imposition by foreign governments of restrictions on the transfer of foreign currency abroad, or restrictions on the conversion of local currency into foreign currency, would have an adverse effect on the operations of our foreign power plants and foreign manufacturing operations, and may limit or diminish the amount of cash and income that we receive from such foreign power plants and operations.

Our power plants have generally been financed through a combination of our corporate funds and limited or non-recourse project finance debt and lease financing. If our project subsidiaries default on their obligations under such limited or non-recourse debt or lease financing, we may be required to make certain payments to the relevant debt holders, and if the collateral supporting such leveraged financing structures is foreclosed upon, we may lose certain of our power plants.

Our power plants have generally been financed using a combination of our corporate funds and limited or non-recourse project finance debt or lease financing. Limited recourse project finance debt refers to our additional agreement, as part of the financing of a power plant, to provide limited financial support for the power plant subsidiary in the form of limited guarantees, indemnities, capital contributions and agreements to pay certain debt service deficiencies. Non-recourse project finance debt or lease financing refers to financing arrangements that are repaid solely from the power plant's revenues and are secured by the power plant's physical assets, major contracts, cash accounts and, in many cases, our ownership interest in the project subsidiary. If our project subsidiaries default on their obligations under the relevant debt documents, creditors of a limited recourse project financing will have direct recourse to us, to the extent of our limited recourse obligations, which may require us to use distributions received by us from other power plants, as well as other sources of cash available to us, in order to satisfy such obligations. In addition, if our project subsidiaries default on their obligations under the relevant debt documents (or a default under such debt documents arises as a result of a cross-default to the debt documents of some of our other power plants) and the creditors foreclose on the relevant collateral, we may lose our ownership interest in the relevant project subsidiary or our project subsidiary owning the power plant would only retain an interest in the physical assets, if any, remaining after all debts and obligations were paid in full.

Possible fluctuations in the cost of construction, raw materials, commodities and drilling may materially and adversely affect our business, financial condition, future results, and cash flow.

Our manufacturing operations are dependent on the supply of various raw materials, including primarily steel and aluminum, commodities and industrial equipment components that we use. We currently obtain all such raw materials, commodities and equipment at prevailing market prices. We are not dependent on any one supplier and do not have any long-term agreements with any of our suppliers. Global events such as the ongoing Covid-19 outbreak that began in 2020 has

resulted in the extended shutdown of certain businesses in the certain regions and may result in delays in the supply of raw materials and components that we purchase for our equipment manufacturing, which may lead to cost increases. Future cost increases of such raw materials, commodities and equipment, to the extent not otherwise passed along to our customers, could adversely affect our profit margins.

Our commodity derivative activity may limit potential gains, increase potential losses, result in earnings volatility and involve other risks.

We enter, from time to time, into commodity derivative contracts to manage our price exposure to our energy storage segment revenue. While these transactions are intended to limit our exposure to the adverse effects of fluctuations of storage services prices, they may also limit our ability to benefit from favorable changes in market conditions, and may subject us to periodic earnings volatility in the instances where we do not seek hedge accounting for these transactions or if the correlation between the hedge and the actual performance of the asset will be lower. Also, in connection with such derivative transactions, we may be required to make cash payments to maintain margin accounts and to settle the contracts at their value upon termination. Finally, this activity exposes us to potential risk of counterparties to our derivative contracts failing to perform under the contracts. As a result, the effectiveness of our risk management could have an impact on our business, results of operations and cash flows.

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We are exposed to swap counterparty credit risk that could materially and adversely affect our business, operating results, and financial condition.

We rely on cross-currency swap contracts to effectively manage our currency risk related to our Senior Unsecured Bonds - Series 4 issued in July 2020. Failure of any of our counterparties to perform under derivatives contracts could disrupt our hedging operations if the counterparties do not fulfill their obligations under the agreements, particularly if we were entitled to a termination payment under the terms of the contract that we did not receive, if we had to make a termination payment upon default of the counterparty, or if we were unable to reposition the swap with a new counterparty.

We may not be able to obtain sufficient insurance coverage to cover damages resulting from any damages to our assets and profitability including but not limited to natural disasters such as volcanic eruptions, lava flows, wind and earthquake, which could materially and adversely affect our business, operating results, and financial condition.

Our business interruption and property damage insurance coverage may not be sufficient to cover all losses sustained as a result of natural disasters such as volcanic eruptions, lava flows, wind and earthquake or any other insurable risk. We experienced increased costs and difficulties in obtaining sufficient insurance coverage for natural disasters for our Puna power plant in Hawaii following the May 2018 eruption of the Kilauea volcano. Before the eruption in 2018, we obtained natural disasters business interruption and property damage insurance coverage of up to approximately \$100 million compared to \$30 million that was secured in 2020.

Risks Related to Force Majeure

The global spread of the COVID-19 pandemic may have an adverse impact and could adversely affect our financial results.

The COVID-19 pandemic and efforts to control its spread have significantly curtailed the movement of people, goods and services worldwide. Governments around the world have ordered companies to limit or suspend non-essential operations and imposed operational and travel restrictions resulting in a decline in global economic activity and an increase in market volatility. We have implemented significant measures both to comply with government requirements and to preserve the health and safety of our employees. These measures include working remotely where possible and operating separate shifts in our power plants, manufacturing facilities and other locations while trying to continue operations as close to full capacity in all locations.

While we did not experience any material impact on our results of operations during the first quarter of 2020, we have started to experience impacts in the second, third and fourth quarters of 2020 which varied among our business segments, as described below:

- In our Electricity segment, our future growth in the electricity segment is and would be adversely impacted by delays we are experiencing in receiving the required development and construction permits, as well as by the implications of global and local restrictions on our ability to procure raw material and ship our products.
- In our Product segment, the economic downturn has adversely impacted customers' purchasing decisions and travel restrictions have adversely impacted our sales and marketing efforts. We experienced a decrease in our backlog that we believe was due to the impact of the COVID-19 pandemic. We may face similar challenges in future periods in the event of a prolonged shutdown.
- Our Energy Storage segment generates revenues mainly from participating in the energy and ancillary services markets, run by regional transmission operators and independent system operators in the various markets where our assets operate. Therefore, the revenues these assets generate are directly impacted by the prevailing market prices for energy and/or ancillary services.
- In addition, we have experienced and continue to experience delays and increased costs related to permitting and construction for new projects in all business segments.

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The extent to which the COVID-19 pandemic ultimately impacts our business, operations, financial results and financial condition will depend on numerous evolving factors, which are currently uncertain and cannot be predicted, including:

- the duration and scope of the pandemic;
- governmental, business and individuals' actions taken in response;
- the effect on our customers and customers' demand for our services and products;
- the effect on our suppliers and disruptions to the global supply chain;
- our ability to sell and provide our services and products, including as a result of travel restrictions and people working from home;
- disruptions to our operations resulting from the illness of any of our employees;
- our ability to oversee remote operations due to travel restrictions;
- restrictions or disruptions to transportation, including reduced availability of ground or air transport; and
- decrease in electricity demand and the ability of our customers to pay for our services and products.

In addition, the impact of COVID-19 on macroeconomic conditions may impact the proper functioning of financial and capital markets, foreign currency exchange rates, commodity and interest rates. Any of the events described above could amplify the other risks and uncertainties described in this report and could materially adversely affect our business, financial condition, results of operations and/or stock price.

The existence of a prolonged force majeure event or a forced outage affecting a power plant, or the transmission systems could reduce our net income and materially and adversely affect our business, financial condition, future results and cash flow.

The operation of our subsidiaries' geothermal power plants is subject to a variety of risks, including events such as fires, explosions, earthquakes, landslides, floods, severe storms, volcanic eruptions, lava flow or other similar events. If a power plant experiences an occurrence resulting in a force majeure event, although our subsidiary that owns that power plant would be excused from its obligations under the relevant PPA, the relevant power purchaser may not be required to make any capacity and/or energy payments with respect to the affected power plant for as long as the force majeure event continues and, pursuant to certain of our PPAs, will have the right to prematurely terminate the PPA. Additionally, to the extent that a forced outage has occurred, and if as a result the power plant fails to attain certain performance requirements under certain of our PPAs, the power purchaser may have the right to permanently reduce the contract capacity (and correspondingly, the amount of capacity payments due pursuant to such agreements in the future), seek refunds of certain past capacity payments, and/or prematurely terminate the PPA. As a consequence, we may not receive any net revenues from the affected power plant other than the proceeds from any business interruption insurance that applies to the force majeure event or forced outage after the relevant waiting period and may incur significant liabilities in respect of past amounts required to be refunded.

On May 3, 2018, the Kilauea volcano located in close proximity to our Puna 38 MW geothermal power plant in the Puna district of Hawaii's Big Island erupted following a significant increase in seismic activity in the area. The lava ultimately covered the wellheads of three geothermal wells, monitoring wells and the substation of the Puna complex and an adjacent warehouse that stored a drilling rig that was also consumed by the lava. We recently resumed operations and the Puna power plant is operating at approximately 13 MW. Further details on the status of the power plant is described under "Recent Development" below. The Company continues to assess the accounting implications of this event on its balance sheet and whether an impairment will be required.

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In addition to our power plant in Puna, Hawaii, our power plant in Amatitlan, Guatemala is located in proximity to an active volcano. As a result of recent events impacting our Puna facility, we cannot be certain how investors will assess the risks to which our facilities are subject and whether this assessment will adversely impact perceptions of our business and our share price.

Threats of terrorism, natural catastrophes or public health crises and other catastrophic events may impact our operations in unpredictable ways and could adversely affect our business, financial condition, future results and cash flow.

We are subject to the potentially adverse operating and financial effects of terrorist acts and threats, natural disasters, public health crises, fire, power loss and telecommunication failures, as well as cyber-attacks, including, among others, malware, computer viruses and attachments to e-mails, phishing attacks, denial of service or information, remote interruption to the operation of our power plants and other disruptive activities of individuals or groups, including traditional computer hackers, persons involved with organized crime or foreign state or foreign state-supported actors. Our generation and transmission facilities, information technology systems and other infrastructure facilities, systems and physical assets, including our Viridity business's VPower™ software platform, as well as the information technology systems of our third-party vendors, could be directly or indirectly affected by such events or activities.

We operate in a highly regulated industry that requires the continued operation of sophisticated information technology systems and network infrastructure. Despite our implementation of security measures, all of our and our third-party vendors' technology systems (and any programs or data stored thereon or therein) are vulnerable to security breaches, disruptions, failures, data leakage or unauthorized access due to such activities. Those breaches and events may result from acts of our employees, contractors or third parties. If our technology systems were to fail or be breached and we were unable to recover in a timely way, we would be unable to fulfill critical business functions, and sensitive confidential and other data could be compromised, which could adversely affect our business, financial condition, future results and cash flow. In addition, such events or activities could require significant management attention and resources and could adversely affect our reputation among customers and the public. The implementation of security guidelines and measures and maintenance of insurance, to the extent available, addressing such events or activities could significantly increase our costs. Furthermore, there is no guarantee that such security guidelines and measures will

adequately anticipate or prevent such events or activities and our insurance may not cover any or all losses arising out of such events or activities.

A disruption of transmission or the transmission infrastructure facilities of third parties could negatively impact our business. Because generation and transmission systems are part of an interconnected system, we face the risk of possible loss of business due to a disruption caused by the impact of an event on the interconnected system within our systems or within a neighboring system. Any such disruption could adversely affect our business, financial condition, future results and cash flow.

Risks Related to Our Stock

A substantial percentage of our common stock is held by stockholders whose interests may conflict with the interests of our other stockholders.

On July 26, 2017, ORIX purchased approximately 22% of our shares of common stock outstanding and following Ormat's recent equity public offering, in November 2020, ORIX holds 19.7% of our shares of common stock outstanding. Pursuant to the Governance Agreement between us and ORIX entered into in connection with this stock purchase transaction, ORIX has the right to designate three directors to our Board for as long as ORIX and its affiliates collectively hold at least 18% of the voting power of all of our outstanding voting securities, the right to representation on certain committees of our Board as well as preemptive rights pursuant to the Governance Agreement. In addition, the Governance Agreement provides ORIX preemptive rights in the event we issue common stock or other securities that entitle the holder to vote for the election of directors. ORIX may also exercise certain registration rights pursuant to the Registration Rights Agreement between us and ORIX.

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As a result of these rights and ORIX's beneficial ownership of our common stock, ORIX could exert influence through its Board representation on our and our subsidiaries' business, operations and management, including our strategic plans, or, as a significant stockholder, on matters submitted to a vote of our stockholders, including mergers, consolidations and the sale of all or substantially all of our assets. This concentration of ownership of our common stock could delay or prevent proxy contests, mergers, tender offers, or other purchases of our common stock that might otherwise give our stockholders the opportunity to realize a premium over the then-prevailing market price for our shares. If ORIX exercises its registration rights to require us to register for sale the common stock held by ORIX or ORIX otherwise sells its common stock in the public markets, the price of our common stock may decline. This concentration of ownership may also adversely affect the liquidity of our common stock.

The price of our common stock may fluctuate substantially, and your investment may decline in value.

The market price of our common stock may be highly volatile and may fluctuate substantially due to many factors, including:

- actual or anticipated fluctuations in our results of operations including as a result of seasonal variations in our Electricity segment-based revenues or variations from year-to-year in our Product segment-based revenues;
- variance in our financial performance from the expectations of market analysts;
- conditions and trends in the end markets we serve, and changes in the estimation of the size and growth rate of these markets;
- our ability to integrate acquisitions;
- announcements of significant contracts by us or our competitors;
- changes in our pricing policies or the pricing policies of our competitors;
- restatements of historical financial results and changes in financial forecasts;
- loss of one or more of our significant customers;
- legislation;
- changes in market valuation or earnings of our competitors;
- the trading volume of our common stock;
- the trading of our common stock on multiple trading markets, which takes place in different currencies and at different times; and
- general economic conditions.

In addition, the stock market in general, and the NYSE and the market for energy companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of particular companies affected. These broad market and industry factors may materially harm the market price of our common stock, regardless of our operating performance. In the past, following periods of volatility in the market price of a company's securities, securities class-action litigation has often been instituted against that company. Such litigation, if instituted against us, such as the recent class action filed on June 2018 by Mac Costas and discussed elsewhere in this report, could result in substantial costs and a diversion of management's attention and resources, which could materially harm our business, financial condition, future results and cash flow.

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ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We currently lease corporate offices at 6140 Plumas street Reno, Nevada 89519 to which we moved in the second quarter of 2018. We also occupy an approximately 807,000 square foot office and manufacturing facility located in the Industrial Park of Yavne, Israel, which we lease from the Israel Land Administration. See Item 13 — “Certain Relationships and Related Transactions”. In Turkey, we established and leased a facility to locally produce power plant components to our local customers.

We believe that our current offices and manufacturing facilities will be adequate for our operations as currently conducted.

Each of our power plants is located on property leased or owned by us or one of our subsidiaries or is a property that is subject to a concession agreement.

Information and descriptions of our plants and properties are included in Item 1 — “Business”, of this annual report.

ITEM 3. LEGAL PROCEEDINGS

The information required with respect to this item can be found under “Commitments and Contingencies” in Note 21 of notes to the consolidated financial statements contained in this annual report and is incorporated by reference into this Item 8.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II**ITEM 5. MARKET FOR REGISTRANT’S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES**

Our common stock has traded on the NYSE under the symbol “ORA” since November 11, 2004. Prior to November 11, 2004, there was no public market for our common stock. Effective on February 10, 2015, our common stock also began trading on the TASE under the same symbol.

As of February 24, 2021, there were 13 record holders of our common stock. On February 24, 2021, the closing price of our common stock as reported on the NYSE was \$103.96 per share.

Stock Performance Graph

The following performance graph represents the cumulative total shareholder return for the period December 30, 2015 through December 31, 2020 for our common stock, compared to the Standard and Poor’s Composite 500 Index, and two peer groups.

Comparison of Cumulative Returns for the Period December 31, 2015 through December 31, 2020



	2015	2016	2017	2018	2019	2020
Ormat Technologies Inc.	34.2%	47.0%	75.4%	43.4%	104.3%	147.5%
Standard & Poor's Composite 500 Index	-0.7%	9.5%	30.8%	22.6%	58.1%	83.8%
PBW - Invesco WilderHill Clean Energy ETF	0.2%	-19.0%	-4.2%	-15.1%	20.1%	186.2%
IPP Peers*	-38.8%	8.8%	54.7%	91.4%	113.8%	116.5%
Renewable Peers*	20.4	-9.1%	-9.1%	-1.6%	-6.2%	31.9%

* IPP Peers are The AES Corporation, NRG Energy Inc. and Covanta Holding Corp.

** Renewable Energy (Renewable) Peers are Acciona S.A., Nextera Energy, Inc., TransAlta Renewables Inc. and SunPower Corporation.

The above Stock Performance Graph shall not be deemed to be soliciting material or to be filed with the SEC under the Securities Act and the Exchange Act except to the extent that we specifically request that such information be treated as soliciting material or specifically incorporate it by reference into a filing under the Securities Act or the Exchange Act.

Equity Compensation Plan Information

For information on our equity compensation plan, refer to Item 12 — “Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters”.

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ITEM 6. SELECTED FINANCIAL DATA

We complied with the Securities and Exchange Commission's amendments to Regulation S-K from November 19, 2020 specifically eliminating the requirement for Selected Financial Data under this Item

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis of our results of operations, financial condition and liquidity in conjunction with our consolidated financial statements and the related notes. Some of the information contained in this discussion and analysis or set forth elsewhere in this annual report including information with respect to our plans and strategies for our business, statements regarding the industry outlook, our expectations regarding the future performance of our business, and the other non-historical statements contained herein are forward-looking statements. See “Cautionary Note Regarding Forward-Looking Statements.” You should also review Item 1A — “Risk Factors” for a discussion of important factors that could cause actual results to differ materially from the results described herein or implied by such forward-looking statements.

General

Overview of Fiscal Year 2020 Revenues

For the year ended December 31, 2020, our total revenues decreased by 5.5% (from \$746.0 million to \$705.3 million) over the previous year driven by lower revenues in the Product segment.

For the year ended December 31, 2020, Electricity segment revenues were \$541.4 million, compared to \$540.3 million for the year ended December 31, 2019, an increase of 0.2%. Product segment revenues for the year ended December 31, 2020 were \$148.1 million, compared to \$191.0 million for the year ended December 31, 2019, a decrease of 22.5%. Energy Storage segment revenues for the year ended December 31, 2020 were \$15.8 million, compared to \$14.7 million for the year ended December 31, 2019 an increase of 7.6%.

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During the years ended December 31, 2020 and 2019, our consolidated power plants generated 6,043,993 MWh and 6,238,272 MWh, respectively, decreased of 3.1%. The average prices during the years ended December 31, 2020 and 2019 were \$89.6 and \$86.6 per MWh, respectively.

For the year ended December 31, 2020, our Electricity segment generated 76.8% of our total revenues (72.4% in 2019), while our Product segment generated 21.0% of our total revenues (25.6% in 2019), and our Energy Storage segment generated 2.2% of our total revenues (2.0% in 2019).

For the year ended December 31, 2020, approximately 98.2% of our Electricity segment revenues were from PPAs with fixed energy rates which are not

affected by fluctuations in energy commodity prices. We have variable price PPAs in California and Hawaii, which provide for payments based on the local utilities' avoided cost, which is the incremental cost that the power purchaser avoids by not having to generate such electrical energy itself or purchase it from others, as follows:

- The energy rates under the PPAs in California for each Heber 2 power plant in the Heber Complex and the G2 power plant in the Mammoth Complex, a total of between 30 to 40 MW, change primarily based on fluctuations in natural gas prices.
- The prices paid for electricity pursuant to the 25 MW PPA for the Puna Complex in Hawaii change primarily as a result of variations in the price of oil as well as other commodities. In 2019, we signed a new PPA related to Puna with fixed prices, increased capacity and extended the term until 2052.

To comply with obligations under their respective PPAs, certain of our project subsidiaries are structured as special purpose, bankruptcy remote entities and their assets and liabilities are ring-fenced. Such assets are not generally available to pay our debt, other than debt at the respective project subsidiary level. However, these project subsidiaries are allowed to pay dividends and make distributions of cash flows generated by their assets to us, subject in some cases to restrictions in debt instruments, as described below.

Electricity segment revenues are also subject to seasonal variations and are affected by higher-than-average ambient temperatures, as described below under "Seasonality".

Revenues attributable to our Product segment are based on the sale of equipment, EPC contracts and the provision of various services to our customers. Product segment revenues may vary from period to period because of the timing of our receipt of purchase orders and the progress of our equipment manufacturing and execution of the relevant project.

Revenues attributable to our Energy Storage segment are generated by several grid-connected BESS facilities that we own and operate from selling energy, capacity and/or ancillary services in merchant markets like PJM Interconnect, ISO New England, the ERCOT and CAISO. The revenues fluctuate over time since a large portion of such revenues are generated in the merchant markets where price volatility is inherent.

Our management assesses the performance of our operating segments differently. In the case of our Electricity segment, when making decisions about potential acquisitions or the development of new projects, management typically focuses on the internal rate of return of the relevant investment, technical and geological matters and other business considerations. Management evaluates our operating power plants based on revenues, expenses, and EBITDA, and our projects that are under development based on costs attributable to each such project. Management evaluates the performance of our Product segment based on the timely delivery of our products, performance quality of our products, revenues and costs actually incurred to complete customer orders compared to the costs originally budgeted for such orders. We evaluate Energy Storage segment performance similar to the Electricity segment with respect to projects that we own and operate and similar to the Product segment when we provide services to third parties.

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Recent Developments

The most significant recent developments for our company and business during 2019 and 2020 to date are described below.

- As of February 2021, the Puna power plant that was shut down following the Kilauea volcano eruption in May 2018, has resumed operation and currently is operating at approximately 13 MW. On the field side, the Company connected one new production well to the power plant and the Company continues its field recovery work, which includes drilling new wells and expects a gradual increase in generation to full capacity by the middle of 2021, assuming field recovery is successfully achieved.
- In December 2020, we announced that we completed the acquisition of a shovel-ready energy storage asset in Upton County, Texas. We acquired the asset from Con Edison Development. Ormat's wholly owned subsidiary will design, build, own and operate a 25 MW BESS project at the site. Ormat is targeting commercial operation of the BESS before the end of 2021.
- In December Ormat announced several departures and appointments in its executive management team:
 - Zvi Krieger announced that he will step down from his role as Executive Vice President—Electricity Segment on March 31, 2021 and will continue to perform certain duties until his June 30, 2022 retirement date.
 - Shimon Hatzir was appointed to the role of Executive Vice President—Electricity Segment, effective April 1, 2021.
 - Shlomi Argas, Executive Vice President—Operations and Products of Ormat, was appointed to serve as a President of Ormat, effective January 1, 2021.
- In October and December of 2020, the Company entered into two settlement agreements with the KRA in relation to three the NoAs which were previously issued by the KRA, totaling approximately \$200 million, including interest and penalties. The settlement agreements covered tax years from 2013 through 2019, included deferral of tax benefits to be utilized in years subsequent to 2019 in an amount of approximately \$28 million and resulted in a tax payment of approximately \$29.5 million, including interest and penalties which was made in 2020. This concluded all open audits and NoAs with the KRA.
- In November 2020, we announced that we closed a public offering of 4,150,000 shares of our common stock at a price of \$74.00 per share and fully exercised the underwriters' option to purchase an additional 622,500 shares of common stock at the same price. We intend to use the net proceeds from the offering for general corporate purposes, including working capital and capital expenditures, and for potential acquisitions, including complementary

businesses, technologies or assets.

- In October 2020, we announced the signing of two Resource Adequacy Agreements, each for 50% of our 5 MW / 20 MWh Tierra Buena battery energy storage project currently under development in Sutter County, northern California. The agreements were signed with two Community Choice Aggregators, Redwood Coast Energy Authority and Valley Clean Energy.
- In September 2020, we announced that ENEE, our customer for our Platanares geothermal power plant in Honduras, had paid the \$20 million overdue payment that was outstanding from prior years.
- In July 2020, we completed the acquisition of the Pomona energy storage asset in California from Alta Gas for a total net consideration of \$43.3 million. The Pomona energy storage facility has been in commercial operation since December 31, 2016 under a 10-year energy storage resource adequacy agreement with Southern California Edison Company. It also participates in the energy and ancillary services markets run by the California Independent System Operator.
- In July 2020, we issued approximately \$290.0 million of bonds (the "Bonds") that were issued in New Israeli Shekels and were converted to U.S. Dollars using a cross-currency swap transaction (the "Swap") at an effective fixed interest rate of 4.34%. The \$290 million of bonds will mature in June 2031 and bear, prior to the Swap, a fixed interest rate of 3.35% per annum, payable semi-annually starting December 2020. The Bonds will be repaid in 10 equal installments starting June 2022, unless prepaid earlier by Ormat pursuant to the terms and conditions of the trust instrument that will govern the Bonds. The Bonds received a rating of iLAA- from Maloot S&P in Israel with a stable outlook. In April and May 2020, we also raised approximately \$130 million of new corporate debt from existing lenders.
- In June 2020, we completed the enhancement of our Steamboat Hills complex and increased its generating capacity by 19MW to a total of 84MW. Enhancement work included the replacement of all old generating unit equipment with new, state-of-the-art equipment and resource modifications. The new equipment will increase the productivity and efficiency of the power plant and is expected to reduce maintenance costs per kWh. The Steamboat Hills power plant continues to sell its electricity under the current 25-year long term portfolio power purchase agreement with SCPPA, with 100% of the capacity going to the Los Angeles Department of Water and Power.

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- In April 2020, we announced the commercial operation of the Rabbit Hill Battery Energy Storage System ("BESS") facility, providing required ancillary services and energy optimization to the wholesale markets managed by ERCOT. The facility is located in the City of Georgetown, Texas, and it is sized to provide approximately 10 MW of fast responding capacity to the ERCOT market.
- In February 2020, we announced a transition of our senior management. Mr. Isaac Angel retired from his position as Chief Executive Officer in July 1, 2020, after six years of service and became a member of Ormat's Board of Directors and its chairman. Ormat's Board of Directors has appointed Mr. Blachar as the Company's Chief Executive Officer and Mr. Assaf Ginzburg as the Chief Financial Officer.
- In January 2020, we signed two similar PPAs with Silicon Valley Clean Energy ("SVCE") and Monterey Bay Community Power ("MBCP"). Under the PPAs, SVCE and MBCP will each purchase 7 MW (for a total of 14 MW) of power generated by the expected 30 MW Casa Diablo-IV ("CD4") geothermal project located in Mammoth Lakes, California that is under construction. The PPAs are for a term of 10 years and have a fixed MWh price, which includes energy, capacity, environmental attributes, and all other ancillary benefits. The remaining 16 MW of generating capacity will be sold under an additional PPA with SCPPA, which was signed in early 2019. The CD4 power plant is expected to be on-line in Q1 2022, and will be the first geothermal power plant built within the CAISO balancing authority in the last 30 years and will be the first in Ormat's portfolio that will sell its output to a Community Choice Aggregator.

COVID 19 Update

In March 2020, the World Health Organization declared the outbreak of the novel coronavirus ("COVID-19") a pandemic.

The Company implemented significant measures both to comply with government requirements and to preserve the health and safety of its employees. These measures include working remotely where possible and operating separate shifts in its power plants, manufacturing facilities and other locations while trying to continue operations as close to full capacity in all locations. During the year and subsequently, the Company's power plants, manufacturing facility and storage facilities have been operating at close to full capacity and there has been no material impact on our operations as a result of these measures. With respect to our employees, we have not laid-off or furloughed any employees due to the COVID-19 and continued to pay full salaries.

We experienced the following impacts on our segment operations:

- In our Electricity segment, almost all of our revenues in 2020 were generated under long term contracts and the majority have a fixed energy rate. As a result, despite logistical and other challenges, we experienced limited impact of COVID-19 on our Electricity segment. Nevertheless, we received two notices declaring a force majeure event in Kenya from KPLC and in Honduras from ENEE, both had an immaterial impact on our revenues and removed. In addition, we experienced a higher rate of curtailments during the first half of 2020 by KPLC in the Olkaria complex that was reduced in the second half of 2020. The impact of the curtailments is limited because of the structure of the PPA which secures the vast majority of our revenues with fixed capacity payments and is unrelated to the electricity actually generated (in 2019 and 2020, capacity payments represented 70.1% and 74.4% of our revenues, respectively). ENEE has initiated discussions with several IPPs, including Ormat, on potential changes in their existing PPAs. However, our Platanares geothermal power plant has one of the lowest rates of renewable energy in the country, and we expect this fact to have positive implications for our discussions with ENEE. In addition, our future growth in the Electricity segment is and would be adversely impacted by delays we are experiencing in receiving the required development and construction permits, as well as by the implications of global and local restrictions on our ability to procure raw materials and ship to our products. Furthermore, our future growth in the Electricity segment might be adversely impacted by a lack of funding for

projects, a decrease in demand for electricity, delays in permitting and the implications of global and local restrictions on our ability to procure raw material and ship our products.

- Our Product segment revenues are generated from sales of products and services pursuant to contracts, under which we have a right to payment for any product that was produced for the customer. Recognition of revenue under these contracts is impacted by delays in the progress of the third-party projects into which our products and services are incorporated. We experienced delays and significant cost increases in one of the projects in the Product segment that adversely impacted our results of operations during 2020. We had a product backlog of \$33.4 million as of February 24, 2020, which includes revenues for the period between January 1, 2021 and February 24, 2020, compared to \$141.9 million as of February 25, 2020. We believe that the decline in backlog resulted mainly from the impact of COVID-19 and the unwillingness of potential customers to enter into new commitments at this time. Nevertheless, for the reasons set out above, restrictions on travel and because our customers are deferring their decision to purchase, we expect that 2021 product segment revenues will be significantly lower than revenues of 2020.

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- Our Energy Storage segment generates revenues mainly from participating in the energy and ancillary services markets, run by regional transmission operators and independent system operators in the various markets where our assets operate. Therefore, the revenues these assets generate is directly impacted by the prevailing market prices for energy and/or ancillary services.
- In addition, we experience delays in the permitting for new projects in all segments that may create penalties and cause a delay in those projects.

Despite our efforts to provide insight into the performance of our business and the trends affecting it, as of the date of this filing, significant uncertainty exists concerning the magnitude of the impact and duration of the COVID-19 pandemic. We may continue to become subject to any of the following impacts:

- limitations on the ability of our suppliers to obtain raw materials that are required for the manufacturing of the products we either sell to third parties or build for ourselves or to meet delivery requirements and commitments that may result in penalty payments;
- impact on our efforts to sign new contracts for our Product segment due to operational and travel restrictions and availability of our customers and their willingness to enter into new agreements;
- limitations on the ability of our customers to pay us on a timely basis;
- additional declarations of COVID-19 as force majeure by our customers and suppliers;
- a reduction in the demand for electricity and for our products;
- change in regulations, taxes and levies that may affect our operations and cost structure;
- risk of infection among employees that may impact the day-to-day operations;
- delays in obtaining the required permits that may create penalties and impact our ability to implement our growth plan;
- limited ability to oversee remote operation due to travel restrictions.

Opportunities, Trends and Uncertainties

Different trends, factors and uncertainties may impact our operations and financial condition, including many that we do not or cannot foresee. However, we believe that our results of operations and financial condition for the foreseeable future will be primarily affected by the following trends, factors and uncertainties that are from time to time also subject to market cycles:

- There has been increased demand for energy generated from geothermal and other renewable resources in the United States as costs for electricity generated from renewable resources have become more competitive. Much of this is attributable to legislative and regulatory requirements and incentives, such as state RPS and federal tax credits such as PTCs or ITCs (which are discussed in more detail in the section entitled “Government Grants and Tax Benefits” below). We believe that future demand for energy generated from geothermal and other renewable resources in the United States will be driven primarily by further commitment to, and implementation of, state RPS and greenhouse gas reduction initiatives.
- We expect that a variety of local governmental initiatives will create new opportunities for the development of new projects with the potential to realize higher returns on our equity as well as to create additional markets for our products. These initiatives include the award of long-term contracts to independent power generators, the creation of competitive wholesale markets for selling and trading energy, capacity and related energy products and the adoption of programs designed to encourage “clean” renewable and sustainable energy sources.

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- In the Electricity segment, we expect intense domestic competition from the solar, hybrid solar and energy storage and wind power generation industries to continue and increase as well as increased competition from the solar combined with storage projects. While we believe the expected demand for renewable energy will be large enough to accommodate increased competition, any such increase in competition, including increasing amounts of renewable energy under contract as well as any further decline in natural gas prices attributable to increased production and reduction in energy storage costs are contributing to a reduction in electricity prices. However, despite increased competition from the solar and wind power generation industries, we believe that firm and flexible, base-load electricity, such as geothermal-based energy, will continue to be an important source of renewable energy in areas with commercially viable geothermal resources.
- In the Product segment, we see new opportunities in New Zealand, Turkey, the U.S., Asia Pacific and Central and South America. We have experienced increased competition from binary power plant equipment suppliers including the major steam turbine manufacturers. While we believe that we have a distinct competitive advantage based on our technology, accumulated experience and current worldwide share of installed binary generation capacity, an increase in competition may impact our ability to secure new purchase orders from potential customers. The increased competition may also lead to

further reductions in the prices that we are able to charge for our binary equipment

- The average price per MWh, which is one of the metrics some investors may use to evaluate power plant revenues, can fluctuate from period to period. Based on our Electricity segment, we earned, on average, \$89.6 and \$86.6 per MWh in 2020 and 2019, respectively. Oil and natural gas prices, together with other factors that affect our Electricity segment revenues, could cause changes in our average price per MWh in the future.
- Turkey's geothermal market is one of the fastest growing markets in the geothermal industry worldwide, mainly due to governmental and regulatory support. Turkey is ranked fourth globally with an installed geothermal capacity of over 1,600 MW. In 2020 we had less revenue exposure to the Turkish market, due to a slowdown in project development in that market, with further impacts from the COVID-19 outbreak. The continued deterioration in that Turkish economy, devaluation in the Turkish Lira and increase in local interest rates or a decline in government support for the development of geothermal power in the country could affect local demand for the geothermal equipment and services we provide, collection from our customers or the prices we may charge for such equipment and services. In February 2021, the incentive plan and regulation for renewable energy generation in Turkey was renewed and the updated FIT is lower than the previous one. This recent update and the economic status of the country lead us to estimate that the slowdown in development of new sites will continue. In addition, the impact of threatened or actual U.S. sanctions on the Turkish economy and the straining of U.S.-Turkey diplomatic relations may harm regional demand or price competitiveness for the geothermal equipment and services we provide in the Turkish market, in turn decreasing our Product segment profit margins, cash flows and financial condition. For the year ended December 31, 2020, we derived 9% and 44% of our Total revenues and Product revenues, respectively, from our Turkish operations. We are monitoring any change in the political and business environments that may affect our future business and operations in the country.
- Ormat established a manufacturing facility in Turkey in order to locally produce several power plant components that entitle our customers to increased incentives under the renewable energy laws. The use of local equipment in renewable energy based generating facilities in Turkey entitles such facilities to significant benefits under Turkish law, provided such facilities have obtained an RER Certificate from EMRA, which requires the issuance of a local certificate. If we do not obtain the local certificate, then some of our customers under the relevant supply agreements in Turkey may not be issued a RER Certificate based on the equipment we supply to them, and we will be required to make a payment to such customers equal to the amount of the expected lost benefit.

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Revenues

Sources of Revenues

We generate our revenues from the sale of electricity from our geothermal and recovered energy-based power plants; the design, manufacture and sale of equipment for electricity generation; the construction, installation and engineering of power plant equipment; and the sale of energy storage services and electricity from our operating energy storage facilities .

Revenues attributable to our Electricity segment are derived from the sale of electricity from our power plants pursuant to long-term PPAs. While approximately 98.2% of our Electricity revenues for the year ended December 31, 2020 were derived from PPAs with fixed price components and the balance from variable price PPAs in California and Hawaii. Accordingly, our revenues from those power plants may fluctuate.

Our Electricity segment revenues are also subject to seasonal variations, as more fully described in "Seasonality" below.

Our PPAs generally provide for energy payments alone, or energy and capacity payments. Generally, capacity payments are payments calculated based on the amount of time and capacity that our power plants are available to generate electricity. Some of our PPAs provide for bonus payments in the event that we are able to exceed certain capacity target levels and the potential forfeiture of payments if we fail to meet certain minimum capacity target levels. Energy payments, on the other hand, are payments calculated based on the amount of electrical energy delivered to the relevant power purchaser at a designated delivery point. Our more recent PPAs generally provide for energy payments alone with an obligation to compensate the off-taker for its incremental costs as a result of shortfalls in our supply.

Revenues attributable to our Product segment fluctuate between periods, primarily based on our ability to receive customer orders, the status and timing of such orders, delivery of raw materials and the completion of manufacturing. Larger customer orders for our products are typically the result of our sales efforts, our participation in, and winning tenders or requests for proposals issued by potential customers in connection with projects they are developing and orders by returning customers. Such projects often take a significant amount of time to design and develop and are subject to various contingencies, such as the customer's ability to raise the necessary financing for a project. Consequently, we are generally unable to predict the timing of such orders for our products and may not be able to replace existing orders that we have completed with new ones. As a result, revenues from our Product segment fluctuate (sometimes extensively) from period to period.

Revenues attributable to our Energy Storage segment are generated by several grid-connected BESS facilities that we own and operate from selling energy, capacity and/or ancillary services in merchant markets like PJM Interconnect, ISO New England, ERCOT and CAISO. The revenues fluctuate over time since a large portion of such revenues are generated in the merchant markets, where price volatility is inherent.

We are pursuing the development of additional grid-connected BESS projects in multiple regions, with expected revenues coming from providing energy, capacity and/or ancillary services on a merchant basis, and/or through bilateral contracts with load serving entities, investor owned utilities, publicly owned utilities and community choice aggregators. We also pursue financial instruments, where appropriate, to hedge some of the merchant risk.

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The following table sets forth a breakdown of our revenues for the years indicated:

	Revenues			% of Revenues for Period Indicated		
	Year Ended December 31,			Year Ended December 31,		
	2020	2019	2018	2020	2019	2018
	(Dollars in thousands)					
Revenues:						
Electricity	\$ 541,393	\$ 540,333	\$ 509,879	76.8%	72.4%	70.9%
Product	148,125	191,009	201,743	21.0	25.6	28.0
Energy Storage	15,824	14,702	7,645	2.2	2.0	1.1
Total revenues	<u>\$ 705,342</u>	<u>\$ 746,044</u>	<u>\$ 719,267</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>

Geographic Breakdown of Results of Operations

The following table sets forth the geographic breakdown of the revenues attributable to our Electricity, Product and Energy Storage segments for the years indicated:

	Revenues			% of Revenues for Period Indicated		
	Year Ended December 31,			Year Ended December 31,		
	2020	2019	2018	2020	2019	2018
	(Dollars in thousands)					
Electricity Segment:						
United States	\$ 341,399	\$ 333,797	\$ 305,962	63.1%	61.8%	60.0%
International	199,994	206,536	203,917	36.9	38.2	40.0
Total	<u>\$ 541,393</u>	<u>\$ 540,333</u>	<u>\$ 509,879</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Product Segment:						
United States	\$ 5,800	\$ 30,562	\$ 14,999	3.9%	16.0%	7.4%
International	142,325	160,447	186,744	96.1	84.0	92.6
Total	<u>\$ 148,125</u>	<u>\$ 191,009</u>	<u>\$ 201,743</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Energy Storage Segment:						
United States	\$ 15,824	\$ 13,597	\$ 7,645	100.0%	92.5%	100.0%
International	—	1,105	—	0.0	7.5	0.0
Total	<u>\$ 15,824</u>	<u>\$ 14,702</u>	<u>\$ 7,645</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>

In 2020, 2019 and 2018, 49%, 49% and 54% of our revenues were derived from international operations of all 3 segments combined, respectively, and our international operations were more profitable than our U.S. operations in each of those years. A substantial portion of international revenues came from Kenya and Turkey and, to a lesser extent, from Honduras, Guadeloupe, Guatemala and other countries. Our operations in Kenya contributed disproportionately to gross profit and net income. The contribution to combined pre-tax income of our domestic and foreign operations within our Electricity segment and Product segment differ in a number of ways.

Electricity Segment. Our Electricity segment domestic revenues were approximately 63%, 62% and 60% of our total Electricity segment for the years ended December 31, 2020, 2019 and 2018, respectively. However, domestic operations in our Electricity segment have higher costs of revenues and expenses than the foreign operations in our Electricity segment. Our foreign power plants are located in lower-cost regions, like Kenya, Guatemala, Honduras and Guadeloupe, which favorably impact payroll and maintenance expenses among other items. They are also newer than most of our domestic power plants and therefore tend to have lower maintenance costs and higher availability factors than our domestic power plants. Consequently, in 2020 the international operations of the segment accounted for 51% of our total gross profits, 70% of our net income and 45% of our EBITDA. However, financing costs related to the international projects are higher than financing costs related to our domestic activity.

Product Segment. Our Product segment foreign revenues were 96%, 84% and 93% of our total Product segment revenues for the years ended December 31, 2020, 2019 and 2018, respectively. Our Product segment foreign activity also benefits from lower costs of revenues and expenses than Product segment domestic activity such as labor and transportation costs. Accordingly, our Product segment foreign activity contributes more than our Product segment domestic activity to our pre-tax income from operations.

Seasonality

Electricity generation from some of our geothermal power plants is subject to seasonal variations; in the winter, our power plants produce more energy primarily attributable to the lower ambient temperature, which has a favorable impact on the energy component of our Electricity segment revenues and the prices under many of our contracts are fixed throughout the year with no time-of-use impact. The prices paid for electricity under the PPAs for the Heber 2 power plant in the Heber Complex, the Mammoth Complex and the North Brawley power plant in California, the Raft River power plant in Idaho and the Neal Hot Springs power plant in Oregon, are higher in the months of June through September. The higher payments payable under these PPAs in the summer months partially offset the negative impact on our revenues from lower generation in the summer attributable to a higher ambient temperature. As a result, we expect the revenues and gross profit in the winter months to be higher than the revenues and gross profit in the summer months.

Breakdown of Cost of Revenues

Electricity Segment

The principal cost of revenues attributable to our operating power plants are operation and maintenance expenses comprised of salaries and related employee benefits, equipment expenses, costs of parts and chemicals, costs related to third-party services, lease expenses, royalties, startup and auxiliary electricity purchases, property taxes, insurance, depreciation and amortization and, for some of our projects, purchases of make-up water for use in our cooling towers. In our California power plants, our principal cost of revenues also includes transmission charges and scheduling charges. In some of our Nevada power plants we also incur transmission and wheeling charges. Some of these expenses, such as parts, third-party services and major maintenance, are not incurred on a regular basis. This results in fluctuations in our expenses and our results of operations for individual power plants from quarter to quarter. Payments made to government agencies and private entities on account of site leases where power plants are located are included in cost of revenues. Royalty payments, included in cost of revenues, are made as compensation for the right to use certain geothermal resources and are paid as a percentage of the revenues derived from the associated geothermal rights. Royalties constituted approximately 3.8% and 4.1% of Electricity segment revenues for the years ended December 31, 2020 and 2019, respectively.

Product Segment

The principal cost of revenues attributable to our Product segment are materials, salaries and related employee benefits, expenses related to subcontracting activities, and transportation expenses. Sales commissions to sales representatives are included in selling and marketing expenses. Some of the principal expenses attributable to our Product segment, such as a portion of the costs related to labor, utilities and other support services are fixed, while others, such as materials, construction, transportation and sales commissions, are variable and may fluctuate significantly, depending on market conditions. As a result, the cost of revenues attributable to our Product segment, expressed as a percentage of total revenues, fluctuates. Another reason for such fluctuation is that in responding to bids for our products, we price our products and services in relation to existing competition and other prevailing market conditions, which may vary substantially from order to order.

Energy Storage Segment

The principal cost of revenues attributable to our Energy Storage segment are direct costs attributable to providing services to our customers, direct costs associated with software development and the direct cost of BESS that we own. Direct costs include labor costs of our network operations center, the labor of software development effort and the labor associated with operations and maintenance of owned BESS. Cost of revenues attributable to our Energy Storage segment also include cost of equipment sold to customers in delivering our automated demand response and software services at a customer's location.

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Critical Accounting Estimates and Assumptions

Our significant accounting policies are more fully described in Note 1 to our consolidated financial statements set forth in Item 8 of this annual report. However, certain of our accounting policies are particularly important to an understanding of our financial position and results of operations. In applying these critical accounting estimates and assumptions, our management uses its judgment to determine the appropriate assumptions to be used in making certain estimates. Such estimates are based on management's historical experience, the terms of existing contracts, management's observance of trends in the geothermal industry, information provided by our customers and information available to management from other outside sources, as appropriate. Such estimates are subject to an inherent degree of uncertainty and, as a result, actual results could differ from our estimates. Our critical accounting policies include:

- *Revenues and Cost of Revenues.* Revenues generated from the construction of geothermal and recovered energy-based power plant equipment and other equipment on behalf of third parties (Product revenues) are recognized using the percentage of completion method, which requires estimates of future costs over the full term of product delivery. Such cost estimates are made by management based on prior operations and specific project characteristics and designs. If management's estimates of total estimated costs with respect to our Product segment are inaccurate, then the percentage of completion is inaccurate resulting in an over- or under-estimate of gross margins. As a result, we review and update our cost estimates on significant contracts on a quarterly basis, and at least on an annual basis for all others, or when circumstances change and warrant a modification to a previous estimate. Changes in job performance, job conditions, and estimated profitability, including those arising from the application of penalty provisions in relevant contracts and final contract settlements, may result in revisions to costs and revenues and are recognized in the period in which the revisions are determined. Provisions for estimated losses relating to contracts are made in the period in which such losses are determined. Revenues generated from engineering and operating services and sales of products and parts are recorded once the service is provided or product delivery is made, as applicable.
- *Property, Plant and Equipment.* We capitalize all costs associated with the acquisition, development and construction of power plant facilities. Major improvements are capitalized and repairs and maintenance (including major maintenance) costs are expensed. We estimate the useful life of our power plants to range between 25 and 30 years. Such estimates are made by management based on factors such as prior operations, the terms of the underlying PPAs, geothermal resources, the location of the assets and specific power plant characteristics and designs. Changes in such estimates could result in useful lives which are either longer or shorter than the depreciable lives of such assets. We periodically re-evaluate the estimated useful life of our power plants and revise the remaining depreciable life on a prospective basis.

We capitalize costs incurred in connection with the exploration and development of geothermal resources beginning when we acquire land rights to the potential geothermal resource. Prior to acquiring land rights, we make an initial assessment that an economically feasible geothermal reservoir is probable on that land using available data and external assessments vetted through our exploration department and occasionally outside service providers. Costs incurred prior to acquiring land rights are expensed. It normally takes two to three years from the time we start active exploration of a particular geothermal resource to the time we have an operating production well, assuming we conclude the resource is commercially viable.

In most cases, we obtain the right to conduct our geothermal development and operations on land owned by the BLM, various states or with private

parties. In consideration for certain of these leases, we may pay an up-front non-refundable bonus payment which is a component of the competitive lease process. This payment and other related costs are capitalized and included in construction-in-process. Once we acquire land rights to the potential geothermal resource, we perform additional activities to assess the commercial viability of the resource. Such activities include, among others, conducting surveys and other analysis, obtaining drilling permits, creating access roads to drilling sites, and exploratory drilling which may include temperature gradient holes and/or slim holes. Such costs are capitalized and included in construction-in-process. Once our exploration activities are complete, we finalize our assessment as to the commercial viability of the geothermal resource and either proceed to the construction phase for a power plant or abandon the site. If we decide to abandon a site, all previously capitalized costs associated with the exploration project are written off.

Our assessment of economic viability of an exploration project involves significant management judgment and uncertainties as to whether a commercially viable resource exists at the time we acquire land rights and begin to capitalize such costs. As a result, it is possible that our initial assessment of a geothermal resource may be incorrect and we will have to write off costs associated with the project that were previously capitalized. Due to the uncertainties inherent in geothermal exploration, historical impairments may not be indicative of future impairments. Included in construction-in-process are costs related to projects in exploration and development of \$51.5 million and \$84.6 million at December 31, 2020 and 2019, respectively. Included in these amounts at December 31, 2020 and 2019, respectively, are \$5.3 million and \$17.0 million, respectively, which relate to up-front bonus payments.

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- *Impairment of Long-Lived Assets and Long-Lived Assets to be Disposed of.* We evaluate long-lived assets, such as property, plant and equipment and construction-in-process for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Factors which could trigger an impairment include, among others, significant underperformance relative to historical or projected future operating results, significant changes in our use of assets or our overall business strategy, negative industry or economic trends, a determination that an exploration project will not support commercial operations, a determination that a suspended project is not likely to be completed, a significant increase in costs necessary to complete a project, legal factors relating to our business or when we conclude that it is more likely than not that an asset will be disposed of or sold.

We test our operating plants that are operated together as a complex for impairment at the complex level because the cash flows of such plants result from significant shared operating activities. For example, the operating power plants in a complex are managed under a combined operation management generally with one central control room that controls all of the power plants in a complex and one maintenance group that services all of the power plants in a complex. As a result, the cash flows from individual plants within a complex are not largely independent of the cash flows of other plants within the complex. We test for impairment of our operating plants which are not operated as a complex, as well as our projects under exploration, development or construction that are not part of an existing complex, at the plant or project level. To the extent an operating plant becomes part of a complex in the future, we will test for impairment at the complex level.

Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to the estimated future net undiscounted cash flows expected to be generated by the asset. The significant assumptions that we use in estimating our undiscounted future cash flows include (i) projected generating capacity of the power plant and rates to be received under the respective PPA and (ii) projected operating expenses of the relevant power plant. Estimates of future cash flows used to test recoverability of a long-lived asset under development also include cash flows associated with all future expenditures necessary to develop the asset. If future cash flows are less than the assumptions we used in such estimates, we may incur impairment losses in the future that could be material to our financial condition and/or results of operations.

If our assets are considered to be impaired, the impairment to be recognized is the amount by which the carrying amount of the assets exceeds their fair value. Assets to be disposed of are reported at the lower of the carrying amount or fair value less costs to sell. We believe that for the year ended December 31, 2020, no impairment exists for any of our long-lived assets; however, estimates as to the recoverability of such assets may change based on revised circumstances. Estimates of the fair value of assets require estimating useful lives and selecting a discount rate that reflects the risk inherent in future cash flows.

- *Goodwill.* Goodwill represents the excess of the fair value of consideration transferred in the business combination transactions over the fair value of tangible and intangible assets acquired, net of the fair value of liabilities assumed and the fair value of any noncontrolling interest in the acquisitions. Goodwill is not amortized but rather subject to a periodic impairment testing on an annual basis (on December 31 of each year) or if an event occurs or circumstances change that would more likely than not reduce the fair value of the reporting unit below its carrying amount. Additionally, we are permitted to first assess qualitative factors to determine whether a quantitative goodwill impairment test is necessary. Further testing is only required if the entity determines, based on the qualitative assessment, that it is more likely than not that a reporting unit's fair value is less than its carrying amount. Otherwise, no further impairment testing is required. An entity has the option to bypass the qualitative assessment for any reporting unit in any period and proceed directly to step one of the quantitative goodwill impairment test. This would not preclude the entity from performing the qualitative assessment in any subsequent period. The first step compares the fair value of the reporting unit to its carrying value, including goodwill. In January 2017, the FASB issued ASU 2017-04, Intangibles – Goodwill and Other (Topic 350), which was adopted by us in 2018, under which step two of the goodwill impairment test was eliminated. Step two measured a goodwill impairment test by comparing the implied fair value of the reporting unit's goodwill with the carrying amount of that goodwill. Under ASU 2017-04, Intangibles – Goodwill and Other, an entity should recognize an impairment charge for the amount by which the carrying amount of the reporting unit exceeds its fair value as calculated under step one described above. However, the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit.

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- *Obligations Associated with the Retirement of Long-Lived Assets.* We record the fair market value of legal liabilities related to the retirement of our assets in the period in which such liabilities are incurred. These liabilities include our obligation to plug wells upon termination of our operating activities, the dismantling of our power plants upon cessation of our operations, and the performance of certain remedial measures related to the land on which such operations were conducted. When a new liability for an asset retirement obligation is recorded, we capitalize the costs of such liability by increasing the

carrying amount of the related long-lived asset. Such liability is accreted to its present value each period and the capitalized cost is depreciated over the useful life of the related asset. At retirement, we either settle the obligation for its recorded amount or report either a gain or a loss with respect thereto. Estimates of the costs associated with asset retirement obligations are based on factors such as prior operations, the location of the assets and specific power plant characteristics. We review and update our cost estimates periodically and adjust our asset retirement obligations in the period in which the revisions are determined. If actual results are not consistent with our assumptions used in estimating our asset retirement obligations, we may incur additional losses that could be material to our financial condition or results of operations.

- *Accounting for Income Taxes.* Significant estimates are required to arrive at our consolidated income tax provision. This process requires us to estimate our actual current tax exposure and to make an assessment of temporary differences resulting from differing treatments of items for tax and accounting purposes. Such differences result in deferred tax assets and liabilities which are included in our consolidated balance sheets. For those jurisdictions where the projected operating results indicate that realization of our net deferred tax assets is not more likely than not, a valuation allowance is recorded.

We evaluate our ability to utilize the deferred tax assets quarterly and assess the need for a valuation allowance. In assessing the need for a valuation allowance, we estimate future taxable income, including the impacts of the enacted tax law, the feasibility of ongoing tax planning strategies and the realizability of tax credits and tax loss carryforwards. Valuation allowances related to deferred tax assets can be affected by changes in tax laws, statutory tax rates, and future taxable income. We have recorded a partial valuation allowance related to our U.S. deferred tax assets. In the future, if there is sufficient evidence that we will be able to generate sufficient future taxable income in the United States, we may be required to reduce this valuation allowance, resulting in income tax benefits in our consolidated statement of operations.

In the ordinary course of business, there can be inherent uncertainty in quantifying our income tax positions. We assess our income tax positions and record tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, which is greater than 50% likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information, we recognize between 0 to 100% of the tax benefit. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, we do not recognize any tax benefit in the consolidated financial statements. Resolution of uncertainties in a manner inconsistent with our expectations could have a material impact on our financial condition or results of operations.

New Accounting Pronouncements

See Note 1 to our consolidated financial statements set forth in Item 8 of this annual report for information regarding new accounting pronouncements.

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Results of Operations

Our historical operating results in dollars and as a percentage of total revenues are presented below.

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands, except per share data)		
Revenues:			
Electricity	\$ 541,393	\$ 540,333	\$ 509,879
Product	148,125	191,009	201,743
Energy storage	15,824	14,702	7,645
Total revenues	705,342	746,044	719,267
Cost of revenues:			
Electricity	300,059	312,835	298,255
Product	114,948	145,974	140,697
Energy storage	14,060	17,912	9,880
Total cost of revenues	429,067	476,721	448,832
Gross profit (loss)			
Electricity	241,334	227,498	211,624
Product	33,177	45,035	61,046
Energy storage	1,764	(3,210)	(2,235)
Total gross profit	276,275	269,323	270,435
Operating expenses:			
Research and development expenses	5,395	4,647	4,183
Selling and marketing expenses	17,384	15,047	19,802
General and administrative expenses	60,226	55,833	47,750
Impairment charge	—	—	13,464
Write-off of unsuccessful exploration activities	—	—	126
Business interruption insurance income	(20,743)	—	—
Operating income	214,013	193,796	185,110
Other income (expense):			
Interest income	1,717	1,515	974
Interest expense, net	(77,953)	(80,384)	(70,924)
Derivatives and foreign currency transaction gains (losses)	3,802	624	(4,761)
Income attributable to sale of tax benefits	25,720	20,872	19,003

Other non-operating income (expense), net	1,418	880	7,779
Income from operations before income tax and equity in earnings (losses) of investees	168,717	137,303	137,181
Income tax (provision) benefit	(67,003)	(45,613)	(34,733)
Equity in earnings (losses) of investees, net	92	1,853	7,663
Net Income	101,806	93,543	110,111
Net income attributable to noncontrolling interest	(16,350)	(5,448)	(12,145)
Net income attributable to the Company's stockholders	\$ 85,456	\$ 88,095	\$ 97,966
Earnings per share attributable to the Company's stockholders:			
Basic:	\$ 1.66	\$ 1.73	\$ 1.93
Diluted:	\$ 1.65	\$ 1.72	\$ 1.92
Weighted average number of shares used in computation of earnings per share attributable to the Company's stockholders:			
Basic	51,567	50,867	50,643
Diluted	51,937	51,227	50,969

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Results as a percentage of revenues

	Year Ended December 31,		
	2020	2019	2018
Revenues:			
Electricity	76.8%	72.4%	70.9%
Product	21.0	25.6	28.0
Energy storage	2.2	2.0	1.1
Total revenues	100.0	100.0	100.0
Cost of revenues:			
Electricity	55.4	57.9	58.5
Product	77.6	76.4	69.7
Energy storage	88.9	121.8	129.2
Total cost of revenues	60.8	63.9	62.4
Gross profit (loss)			
Electricity	44.6	42.1	41.5
Product	22.4	23.6	30.3
Energy storage	11.1	(21.8)	(29.2)
Total gross profit	39.2	36.1	37.6
Operating expenses:			
Research and development expenses	0.8	0.6	0.6
Selling and marketing expenses	2.5	2.0	2.8
General and administrative expenses	8.5	7.5	6.6
Impairment charge	0.0	0.0	1.9
Business interruption insurance income	(2.9)	0.0	0.0
Operating income	30.3	26.0	25.7
Other income (expense):			
Interest income	0.2	0.2	0.1
Interest expense, net	(11.1)	(10.8)	(9.9)
Derivatives and foreign currency transaction gains (losses)	0.5	0.1	(0.7)
Income attributable to sale of tax benefits	3.6	2.8	2.6
Other non-operating income (expense), net	0.2	0.1	1.1
Income from continuing operations before income tax and equity in earnings (losses) of investees	23.9	18.4	19.1
Income tax (provision) benefit	(9.5)	(6.1)	(4.8)
Equity in earnings (losses) of investees, net	0.0	0.2	1.1
Net Income	14.4	12.5	15.3
Net income attributable to noncontrolling interest	(2.3)	(0.7)	(1.7)
Net income attributable to the Company's stockholders	12.1%	11.8%	13.6%

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Comparison of the Year Ended December 31, 2020 and the Year Ended December 31, 2019

Total Revenues

	Year Ended December 31, 2020	Year Ended December 31, 2019	Increase (Decrease)	
	(Dollars in millions)			
Electricity segment revenues	\$ 541.4	\$ 540.3	\$ 1.1	0.2%
Product segment revenues	148.1	191.0	(42.9)	(22.5)
Energy Storage segment revenues	15.8	14.7	1.1	7.6
Total Revenues	\$ 705.3	\$ 746.0	\$ (40.7)	(5.5)%

Total revenues for the year ended December 31, 2020 were \$705.3 million, compared to \$746.0 million for the year ended December 31, 2019, which represented a 5% decrease from the prior year period. This decrease was attributable to a \$42.9 million or 22% decrease in our Product segment revenues compared to the corresponding period in 2019, as discussed below. The decrease was partially offset by a slight increase in our Electricity segment revenues and Energy Storage segment revenues.

Electricity Segment

Revenues attributable to our Electricity segment for the year ended December 31, 2020 were \$541.4 million, compared to \$540.3 million for the year ended December 31, 2019, representing a 0.2% increase from the prior period.

Power generation in our power plants decreased by 3.1% from 6,238,272 MWh for the year ended December 31, 2019 to 6,043,993 MWh in the year ended December 31, 2020, due to the lower generation at some of our power plants, including our OREG facilities and Olkaria complex that were impacted by lower demand due to COVID-19. However, revenues remained unchanged due to higher average energy rate per MWh of our entire portfolio.

Product Segment

Revenues attributable to our Product segment for the year ended December 31, 2020 were \$148.1 million, compared to \$191.0 million for the year ended December 31, 2019, representing a 22.5% decrease from the prior period. The decrease in our Product segment revenues was mainly due to projects in Turkey and the U.S., which were completed in 2019 and accounted for \$75.9 million in revenues in the year ended December 31, 2019. The decrease was partially offset by other projects in Turkey, New Zealand and Chile, which started in 2019, and provided \$98.3 million in revenue recognized during the year ended December 31, 2020 compared to \$86.6 million for the year ended December 31, 2019, and other projects in mainly in Turkey, which started in 2020 and provided \$29.6 million for the year ended December 31, 2020. The overall decrease in Product revenues is also attributable to the impact of COVID-19 which resulted in delays in the progress of the third-party projects as well as unwillingness of potential customers to enter into new commitments.

Energy Storage Segment

Revenues attributable to our Energy Storage segment for the year ended December 31, 2020 were \$15.8 million compared to \$14.7 million for the year ended December 31, 2019, representing a 7.6% increase. The increase was mainly driven by \$4.8 million of revenues from the acquisition of the Pomona energy storage asset as well as the commissioning of Rabitt Hill in Texas, offset by \$2.8 million in revenues from a one-time EPC project in the year ended December 31, 2019.

Total Cost of Revenues

	Year Ended December 31, 2020	Year Ended December 31, 2019	Increase (Decrease)	
	(Dollars in millions)			
Electricity segment cost of revenues	\$ 300.1	\$ 312.8	\$ (12.8)	(4.1)%
Product segment cost of revenues	114.9	146.0	(31.0)	(21.3)
Energy Storage segment cost of revenues	14.1	17.9	(3.9)	(21.5)
Total Cost of Revenues	\$ 429.1	\$ 476.7	\$ (47.7)	(10.0)%

Total cost of revenues for the year ended December 31, 2020 was \$429.1 million compared to \$476.7 million for the year ended December 31, 2019, which represented a 10.0% decrease. This decrease was attributable to a decrease of \$12.8 million, or 4.1%, in cost of revenues from our Electricity segment, a decrease of \$31.0 million, or 21.3%, in cost of revenues from our Product segment and a decrease of \$3.9 million, or 21.5%, in cost of revenues from our Energy Storage segment, all as discussed above. As a percentage of total revenues, our total cost of revenues for the year ended December 31, 2020 decreased to 60.8% from 63.9% for the year ended December 31, 2019.

Electricity Segment

Total cost of revenues attributable to our Electricity segment for the year ended December 31, 2020 was \$300.1 million, compared to \$312.8 million for the year ended December 31, 2019, representing a 4.1% decrease from the prior period. This decrease was primarily attributable to a decrease in cost of revenues at our Puna power plant that was shut down immediately following the Kilauea volcanic eruption on May 3, 2018, as the cost of revenues at our Puna power plant for the year ended December 31, 2020 includes a decrease in lease expense of \$5.4 million due to the termination of the lease transaction. The decrease was also due to lower operational costs in some of our power plants in the year ended December 31, 2020 compared to the year ended December 31, 2019. Cost of revenues at our Puna power plant included business interruption recovery of \$7.8 million in the year ended December 31, 2020, compared to \$9.3 million in the year ended December 31, 2019. As a percentage of total Electricity revenues, the total cost of revenues attributable to our Electricity segment for the year ended December 31, 2020 was 55.4%, compared to 57.9% for the year ended December 31, 2019. The cost of revenues attributable to our international power plants was 21.5% of our

Electricity segment cost of revenues for the year ended December 31, 2020.

Product Segment

Total cost of revenues attributable to our Product segment for the year ended December 31, 2020 was \$114.9 million, compared to \$146.0 million for the year ended December 31, 2019, representing a 21.3% decrease from the prior period. This decrease was primarily attributable to the decrease in Product segment revenues, different product scope and different margins in the various sales contracts we entered into mainly in Turkey, New Zealand and Chile for the Product segment during these periods. As a percentage of total Product segment revenues, our total cost of revenues attributable to our Product segment for the year ended December 31, 2020 was 77.6%, compared to 76.4% for the year ended December 31, 2019. This increase is mainly related to the higher cost of revenues related to the Nawgha project that we are constructing in New Zealand and that was impacted, among other things, by the restrictions and limitations in the country associated with COVID-19.

Energy Storage Segment

Cost of revenues attributable to our Energy Storage segment for the year ended December 31, 2020 were \$14.1 million as compared to \$17.9 million in the year ended December 31, 2019. The decrease was mainly driven by cost of revenues from a one-time EPC project in the amount of \$2.2 million in the year ended December 31, 2019, and a decrease in payroll, professional fees and consulting, offset partially by \$3.1 million in cost of revenues from the acquisition of the Pomona energy storage asset. The Energy Storage segment includes cost of revenues related to the delivery of energy storage services.

Research and Development Expenses

Research and development expenses for the year ended December 31, 2020 were \$5.4 million, compared to \$4.6 million for the year ended December 31, 2019. The increase is mainly due to new development projects that took place during the year ended December 31, 2020.

Selling and Marketing Expenses

Selling and marketing expenses for the year ended December 31, 2020 were \$17.4 million, compared to \$15.0 million for the year ended December 31, 2019. The increase was mainly due to an increase in sales commissions due to different product mix and increase in marketing activities. Selling and marketing expenses constituted 2.5% of total revenues for the year ended December 31, 2020, compared to 2.0%, for the year ended December 31, 2019.

General and Administrative Expenses

General and administrative expenses for the year ended December 31, 2020 were \$60.2 million, compared to \$55.8 million for the year ended December 31, 2019. The increase was primarily attributable to an increase in professional fees, and \$1.3 million in costs associated with one of our legal claims, partially offset by a \$1.3 million gain from the sale of a concession in one of our foreign locations. General and administrative expenses for the year ended December 31, 2020 constituted 8.5% of total revenues for such period, compared to 7.5%, excluding the earn out adjustment, for the year ended December 31, 2019.

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Business Interruption Insurance Income

Business interruption insurance income for the year ended December 31, 2020 is attributable to business interruption recoveries relating to the Puna power plant. For the year ended December 31, 2020, the Company recognized business insurance income of \$28.6 million which was included in cost of revenues up to the amount covering the related costs and the remainder, totaling \$20.7 million, was included as a business interruption insurance income under operating expenses in the consolidated statements of operations and comprehensive income.

Interest Expense, Net

Interest expense, net, for the year ended December 31, 2020 was \$78.0 million, compared to \$80.4 million for the year ended December 31, 2019, representing a 3.0% decrease from the prior period. This decrease was primarily due to (i) \$2 million decrease in interest related to the sale of tax benefits; and (ii) \$7 million increase in interest capitalized to projects. The decrease was partially offset by interest expense from: (i) \$79.4 million of proceeds from a senior unsecured bonds series 3 received in April and May 2020; (ii) \$50.0 million of proceeds from a senior unsecured loan received in April 2020; and (iii) \$289.9 million of proceeds from bonds series 4 received in July 2020.

Derivatives and Foreign Currency Transaction Gains (Losses)

Derivatives and foreign currency transaction gains for the year ended December 31, 2020 were \$3.8 million, compared to \$0.6 million for the year ended December 31, 2019. Derivatives and foreign currency transaction gains for the year ended December 31, 2020 were attributable primarily to gains from foreign currency forward contracts, which were not accounted for as hedge transactions.

Income Attributable to Sale of Tax Benefits

Income attributable to the sale of tax benefits for the year ended December 31, 2020 was \$25.7 million, compared to \$20.9 million for the year ended December 31, 2019. Tax equity is a form of financing used for renewable energy projects. This income primarily represents the value of PTCs and taxable income or loss generated by certain of our power plants allocated to investors under tax equity transactions.

Other Non-Operating Income (Expense), Net

Other non-operating income, net for the year ended December 31, 2020 was \$1.4 million, compared to \$0.9 million for the year ended December 31, 2019. Other non-operating income for the year ended December 31, 2020 mainly includes income of \$0.6 million for property damage recovery related to the Puna power plant. Other non-operating income for the year ended December 31, 2019 mainly includes income of \$1.0 million from the sale of PG&E receivables relating to the January 2019 monthly invoice which was not paid as it occurred before PG&E filed for reorganization under Chapter 11 bankruptcy.

Income from operations, before income taxes and equity in earnings of investees

Income from operations, before income taxes and equity in earnings of investees for the year ended December 31, 2020 was \$168.7 million, compared to \$137.3 million for the year ended December 31, 2019, representing an 22.9% increase from the prior period. This increase was mainly driven by business interruption insurance income of \$20.7 million, as described above.

Income Taxes

Income tax provision for the year ended December 31, 2020, was \$67.0 million, an increase of \$21.4 million compared to an income tax provision of \$45.6 million for the year ended December 31, 2019. Our effective tax rate for the year ended December 31, 2020 and 2019, was 39.7% and 33.2%, respectively. The effective rate differs from the federal statutory rate of 21% for the year ended December 31, 2020 due to: (i) the mix of business in various countries with higher statutory tax rates than the federal statutory tax rate, and (ii) a net increase in the valuation allowance on deferred tax assets related to U.S. tax attributes, offset by the release of uncertain tax positions in foreign jurisdictions.

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Equity in Earnings (losses) of investees, net

Equity in earnings (losses) of investees, net in the year ended December 31, 2020 was \$0.1 million, compared to \$1.9 million in the year ended December 31, 2019. Equity in earnings of investees, net is primarily derived from our 12.75% share in the earnings or losses in the Sarulla complex and indirect costs related to our 49% ownership interest in the Ijen project, both located in Indonesia. The decrease was mainly attributable to a lower result of operations due to well-field issues in the NIL power plant which resulted in lower generation. Sarulla is currently developing a remediation plan with a target to increase generation in the near-term. We are following the remediation plans in Sarulla as well as the potential accounting impact on our financial statements in respect of our investment in Sarulla.

Net Income attributable to the Company's Stockholders

Net income attributable to the Company's stockholders for the year ended December 31, 2020 was \$85.5 million, compared to \$88.1 million for the year ended December 31, 2019, which represents a decrease of \$2.6 million. This decrease was attributable to a \$10.9 million in net income attributable to noncontrolling interest, which increased mainly due to the business interruption recovery of the Puna power plant in Hawaii, offset partially by an increase in net income of \$8.3 million, all as discussed above.

Comparison of the year ended December 31, 2019 and the year ended December 31, 2018

A discussion of changes in our results of operations in 2019 compared to 2018 has been omitted from this Form10-K, but may be found in "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" of our Form 10-K for the fiscal year ended December 31, 2019, filed with the SEC on March 2, 2020, which is available free of charge on the SEC's website at www.sec.gov and at www.Ormat.com, by clicking "Investors" located at the top of the home page.

Liquidity and Capital Resources

Our principal sources of liquidity have been derived from cash flows from operations, proceeds from third party debt such as borrowings under our credit facilities, private offerings and issuances of debt securities, equity offerings, project financing and tax monetization transactions, short term borrowing under our lines of credit, and proceeds from the sale of equity interests in one or more of our projects. We have utilized this cash to develop and construct power plants, fund our acquisitions, pay down existing outstanding indebtedness, and meet our other cash and liquidity needs.

As of December 31, 2020, we had access to: (i) \$448.3 million in cash and cash equivalents, of which \$42.4 million was held by our foreign subsidiaries; and (ii) \$389.4 million of unused corporate borrowing capacity under existing lines of credit with different commercial banks.

Our estimated capital needs for 2021 include approximately \$445 million for capital expenditures on new projects under development or construction including storage projects, exploration activity and maintenance capital expenditures for our existing projects. In addition, we expect \$78.6 million for long-term debt repayments.

As of December 31, 2020, \$190.3 million in the aggregate was outstanding under credit agreements with several banks as detailed below under "Letters of Credits under the Credit Agreements".

We expect to finance these requirements with: (i) the sources of liquidity described above; (ii) positive cash flows from our operations; and (iii) future project financings and re-financings (including construction loans and tax equity). Management believes that, based on the current stage of implementation of our strategic plan, the sources of liquidity and capital resources described above will address our anticipated liquidity, capital expenditures, and other investment requirements.

During 2019, we have revised our assertion to no longer indefinitely reinvest foreign funds held by our foreign subsidiaries, with the exception of a certain balance held in Israel and have accrued the incremental foreign withholding taxes. As a result, we have further liquidity to move funds freely.

Letters of Credits under the Credit Agreements

Some of our customers require our project subsidiaries to post letters of credit in order to guarantee their respective performance under relevant contracts. We are also required to post letters of credit to secure our obligations under various leases and licenses and may, from time to time, decide to post letters of credit in lieu of cash deposits in reserve accounts under certain financing arrangements. In addition, our subsidiary, Ormat Systems, is required from time to time to post performance letters of credit in favor of our customers with respect to orders of products.

Credit Agreements	Issued Amount	Issued and Outstanding as of December 31, 2020	Termination Date
(Dollars in millions)			
Committed lines for credit and letters of credit	\$ 478.0	\$ 113.6	April 2021-July 2022
Committed lines for letters of credit	145.0	66.6	April 2021-December 2021
Non-committed lines	-	10.1	December 2021
Total	\$ 623.0	\$ 190.3	

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Restrictive covenants

Our obligations under the credit agreements, the loan agreements, and the trust instrument governing the bonds described above, are unsecured, but we are subject to a negative pledge in favor of the banks and the other lenders and certain other restrictive covenants. These include, among other things, a prohibition on: (i) creating any floating charge or any permanent pledge, charge or lien over our assets without obtaining the prior written approval of the lender; (ii) guaranteeing the liabilities of any third party without obtaining the prior written approval of the lender; and (iii) selling, assigning, transferring, conveying or disposing of all or substantially all of our assets, or a change of control in our ownership structure. Some of the credit agreements, the term loan agreements, and the trust instrument contain cross-default provisions with respect to other material indebtedness owed by us to any third party. In some cases, we have agreed to maintain certain financial ratios, which are measured quarterly, such as: (i) equity of at least \$750 million and in no event less than 25% of total assets; (ii) 12-month debt, net of cash, cash equivalents, and short-term bank deposits to Adjusted EBITDA ratio not to exceed 6.0; and (iii) dividend distributions not to exceed 50% of net income in any calendar year. As of December 31, 2020: (i) total equity was \$1,941.4 million and the actual equity to total assets ratio was 49.9% and (ii) the 12-month debt, net of cash and cash equivalents to Adjusted EBITDA ratio was 2.36. During the year ended December 31, 2020, we distributed interim dividends in an aggregate amount of \$22.5 million. The failure to perform or observe any of the covenants set forth in such agreements, subject to various cure periods, would result in the occurrence of an event of default and would enable the lenders to accelerate all amounts due under each such agreement.

As described above, we are currently in compliance with our covenants with respect to the credit agreements, the loan agreements and the trust instrument, and believe that the restrictive covenants, financial ratios and other terms of any of our full-recourse bank credit agreements will not materially impact our business plan or operations.

Future minimum payments

Future minimum payments under long-term obligations, excluding revolving credit lines with commercial banks, as of December 31, 2020, are detailed under the caption Contractual Obligations and Commercial Commitments, below.

Third-Party Debt

Our third-party debt consists of (i) non-recourse and limited-recourse project finance debt or acquisition financing that we or our subsidiaries have obtained for the purpose of developing and constructing, refinancing or acquiring our various projects and (ii) full-recourse debt incurred by us or our subsidiaries for general corporate purposes.

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Non-Recourse and Limited-Recourse Third-Party Debt

Loan	Line of Credit	Amount Outstanding as of December 31, 2020	Interest Rate	Maturity Date	Related Projects	Location
(Dollars in millions)						
OFC 2 Senior Secured Notes – Series A	\$ 151.7	\$ 86.9	4.69%	2032	McGinness Hills phase 1 and Tuscarora	United States
OFC 2 Senior Secured Notes – Series B	140.0	101.3	4.61%	2032	McGinness Hills phase 2	United States
Olkaria III Financing Agreement with DFC – Tranche 1	85.0	47.2	6.34%	2030	Olkaria III Complex	Kenya

Olkaria III Financing Agreement with DFC – Tranche 2	180.0	100.6	6.29%	2030	Olkaria III Complex	Kenya
Olkaria III Financing Agreement with DFC – Tranche 3	45.0	26.9	6.12%	2030	Olkaria III Complex	Kenya
Amatitlan Financing (1)	42.0	22.8	LIBOR+4.35%	2027	Amatitlan	Guatemala
Don A. Campbell Senior Secured Notes	92.5	73.1	4.03%	2033	Don A. Campbell Complex	United States
Prudential Capital Group Idaho Loan (2)	20.0	17.5	5.8%	2023	Neal Hot Springs and Raft River	United States
U.S. Department of Energy loan (3)	96.8	42.0	2.61%	2035	Neal Hot Springs	United States
Prudential Capital Group Nevada Loan	30.7	26.3	6.75%	2037	San Emidio	United States
Platanares Loan with DFC	114.7	96.3	7.02%	2032	Platanares	Honduras
Viridity - Plumstriker	23.5	18.1	LIBOR+3.5%	2026	Plumsted+Striker	United States
Geothermie Bouillante (4)	8.9	7.8	1.52%	2026	Geothermie Bouillante	Guadeloupe
Geothermie Bouillante (4)	8.9	9.8	1.93%	2026	Geothermie Bouillante	Guadeloupe
Total	\$ 1,039.7	\$ 676.6				

(1) LIBOR Rate cannot be lower than 1.25%. Margin of 4.35% as long as the Company's guaranty of the loan is outstanding (current situation) or 4.75% otherwise. Current interest is 5.6%.

(2) Secured by equity interest.

(3) Secured by the assets.

(4) Loan in Euros and issued amount is EUR 8.0 million

Full-Recourse Third-Party Debt

Loan	Amount Issued	Amount Outstanding as of December 31, 2020	Interest Rate	Maturity Date
(Dollars in millions)				
Senior Unsecured Bonds Series 3	\$ 218.0	218.0	4.45%	September 2022
Senior Unsecured Bonds Series 4 (1)	\$ 289.8	311.0	3.35%	June 2031
Senior Unsecured Loan 1	100.0	100.0	4.80%	March 2029
Senior Unsecured Loan 2	50.0	50.0	4.60%	March 2029
Senior Unsecured Loan 3	50.0	50.0	5.44%	March 2029
DEG Loan 2	50.0	37.5	6.28%	June 2028
DEG Loan 3	41.5	32.8	6.04%	June 2028
Total	\$ 799.3	\$ 799.3		

(1) Bonds issued in total aggregate principal amount of NIS 1.0 billion.

For additional description of our long term debt, see Note 11, Long-term Debt, Credit Agreements and Commercial Paper to our consolidated financial statements.

Liquidity Impact of Uncertain Tax Positions

As discussed in Note 17 - Income Taxes, to our consolidated financial statements set forth in Item 8 of this annual report, we have a liability associated with unrecognized tax benefits and related interest and penalties in the amount of approximately \$2.0 million as of December 31, 2020. This liability is included in long-term liabilities in our consolidated balance sheet, because we generally do not anticipate that settlement of the liability will require payment of cash within the next 12 months. We are not able to reasonably estimate when we will make any cash payments required to settle this liability.

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Dividends

We have adopted a dividend policy pursuant to which we currently expect to distribute at least 20% of our annual profits available for distribution by way of quarterly dividends. In determining whether there are profits available for distribution, our Board will take into account our business plan and current and expected obligations, and no distribution will be made that in the judgment of our Board would prevent us from meeting such business plan or obligations.

The following are the dividends declared by us during the past two years:

Dividend Amount per

Date Declared	Share	Record Date	Payment Date
February 26, 2019	\$	0.11 March 14, 2019	March 28, 2019
May 6, 2019	\$	0.11 May 20, 2019	May 28, 2019
August 7, 2019	\$	0.11 August 20, 2019	August 27, 2019
November 6, 2019	\$	0.11 November 20, 2019	December 4, 2019
February 25, 2020	\$	0.11 March 12, 2020	March 26, 2020
May 8, 2020	\$	0.11 May 21, 2020	June 2, 2020
August 4, 2020	\$	0.11 August 18, 2020	September 1, 2020
November 4, 2020	\$	0.11 November 18, 2020	December 2, 2020
February 24, 2021	\$	0.12 March 11, 2021	March 11, 2021

Historical Cash Flows

The following table sets forth the components of our cash flows for the relevant periods indicated:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Net cash provided by operating activities	\$ 265,005	\$ 236,493	\$ 145,822
Net cash used in investing activities	(385,969)	(254,538)	(342,434)
Net cash provided by (used in) financing activities	503,478	(5,765)	251,131
Translation adjustments on cash and cash equivalents	1,154	(575)	(660)
Net change in cash and cash equivalents and restricted cash and cash equivalents	<u>\$ 383,668</u>	<u>\$ (24,385)</u>	<u>\$ 53,859</u>

For the Year Ended December 31, 2020

Net cash provided by operating activities for the year ended December 31, 2020 was \$265.0 million, compared to \$236.5 million for the year ended December 31, 2019. This increase of \$28.5 million resulted primarily from (i) a decrease in costs and estimated earnings in excess of billing on uncompleted contracts, net of \$22.2 million in the year ended December 31, 2020, compared to an increase of \$11.9 million in the year ended December 31, 2019, as a result of timing of billing to our customers; (ii) a decrease of \$3.5 million in receivables in the year ended December 31, 2020 compared to an increase of \$15.1 million in the year ended December 31, 2019 because of timing of collections from our customers. and (iii) a withholding tax payment of approximately \$8 million in the year ended December 31, 2020 compared to \$14 million in the year ended December 31, 2019, because of a distribution from OSL.

Net cash used in investing activities for the year ended December 31, 2020 was \$386.0 million, compared to \$254.5 million for the year ended December 31, 2019. The principal factors that affected our net cash used in investing activities during the year ended December 31, 2020 were: (i) capital expenditures of \$320.7 million, primarily for our facilities under construction that support our growth plan; (ii) cash paid for the acquisition of the Pomona energy storage asset in California from Alta Gas for a total net consideration of \$43.4 million; and (iii) an investment in an unconsolidated company of \$21.0 million.

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Net cash provided by financing activities for the year ended December 31, 2020 was \$503.5 million, compared to \$5.8 million used in financing activities for the year ended December 31, 2019. The principal factors that affected net cash provided by financing activities during the year ended December 31, 2020 were: (i) Proceeds from issuance of common stock, net of stock issuance costs of \$339.5 million; (ii) \$289.9 million of proceeds from bonds series 4; (iii) \$79.4 million of proceeds from a senior unsecured bonds series 3; and (iv) \$50.0 million of proceeds from a senior unsecured loan, partially offset by: (i) the repayment of commercial paper debt of \$50.0 million; (ii) net payment of \$40.6 million from our revolving credit lines with commercial banks which were withdrawn primarily to secure cash in hand in order to meet our capital needs in light of the uncertainty related to the COVID-19 pandemic, (iii) the repayment of long-term debt in the amount of \$135.4 million; (iv) a \$22.5 million cash dividend payment and (v) \$9.7 million cash paid to a noncontrolling interest.

For the Year Ended December 31, 2019

A discussion of changes in our cash flows in 2019 compared to 2018 has been omitted from this Form10-K, but may be found in “Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations” of our Form 10-K for the fiscal year ended December 31, 2019, filed with the SEC on March 2, 2020, which is available free of charge on the SEC's website at www.sec.gov and at www.Ormat.com, by clicking “Investors” located at the top of the home page.

Total EBITDA and Adjusted EBITDA

We calculate EBITDA as net income before interest, taxes, depreciation and amortization. We calculate Adjusted EBITDA as net income before interest, taxes, depreciation and amortization, adjusted for (i) termination fees, (ii) impairment of long-lived assets, (iii) write-off of unsuccessful exploration activities, (iv) any mark-to-market gains or losses from accounting for derivatives, (v) merger and acquisition transaction costs, (vi) stock-based compensation, (vii) gain or loss from extinguishment of liabilities, (viii) gain or loss on sale of subsidiary and property, plant and equipment and (ix) other unusual or non-recurring items. EBITDA and Adjusted EBITDA are not measurements of financial performance or liquidity under accounting principles generally accepted in the United States, or U.S. GAAP, and should not be considered as an alternative to cash flow from operating activities or as a measure of liquidity or an alternative to net earnings as indicators of our operating performance or any other measures of performance derived in accordance with U.S. GAAP. Our Board of Directors and senior management use EBITDA and Adjusted EBITDA to evaluate our financial performance. However, other companies in our industry may calculate EBITDA and Adjusted EBITDA differently than we do.

This information should not be considered in isolation from, or as a substitute for, or superior to, measures of financial performance prepared in accordance

with GAAP or other non-GAAP financial measures.

Net income for the year ended December 31, 2020 was \$101.8 million, compared to \$93.5 million for the year ended December 31, 2019 and \$110.1 million for the year ended December 31, 2018.

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Adjusted EBITDA for the year ended December 31, 2020 was \$420.2 million, compared to \$384.3 million for the year ended December 31, 2019 and \$368.0 million for the year ended December 31, 2018.

The following table reconciles net income to EBITDA and adjusted EBITDA for the years ended December 31, 2020, 2019 and 2018:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Net income	\$ 101,806	\$ 93,543	\$ 110,111
Adjusted for:			
Interest expense, net (including amortization of deferred financing costs)	76,236	78,869	69,950
Income tax provision (benefit)	67,003	45,613	34,733
Adjustment to investment in an unconsolidated company: our proportionate share in interest expense, tax and depreciation and amortization in Sarulla complex	11,549	13,089	9,184
Depreciation and amortization	151,371	143,242	127,732
EBITDA	407,965	374,356	351,710
Mark-to-market on derivative instruments	(1,192)	(1,402)	2,032
Stock-based compensation	9,830	9,358	10,218
Insurance proceeds in excess of assets carrying value	—	—	(7,150)
Termination fee	—	—	4,973
Impairment of goodwill, net of reversal of a contingent liability	—	—	3,142
Loss from extinguishment of liability	—	468	—
Merger and acquisition transaction costs	2,279	1,483	2,910
Settlement expenses	1,277	—	—
Write-off of unsuccessful exploration activities	—	—	126
Adjusted EBITDA	\$ 420,159	\$ 384,263	\$ 367,961

EBITDA includes the proportionate share (12.75%) of net depreciation, interest and tax expenses from our unconsolidated investment in the Sarulla complex that is accounted for under the equity method.

On May 2014, the Sarulla consortium (“SOL”) closed \$1,170 million in financing. As of December 31, 2020, the credit facility has an outstanding balance of \$1,010.0 million. Our proportionate share in the SOL credit facility is \$128.8 million. In October 2020, Sarulla has not met its debt service coverage ratio under the credit facility agreement and is undergoing negotiations with its lenders for a waiver covering this non-compliance as well as a remediation plan aiming to achieve compliance in the future.

Capital Expenditures

Our capital expenditures primarily relate to the enhancement of our existing power plants and the exploration, development and construction of new power plants.

We have budgeted approximately \$454 million in capital expenditures for construction of new projects and enhancements to our existing power plants, of which we had invested \$177 million as of December 31, 2020. We expect to invest approximately \$200 million in 2021 and the remaining approximately \$77 million on thereafter.

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In addition, we estimate approximately \$245 million in additional capital expenditures in 2021 to be allocated as follows: (i) approximately \$150 million for the exploration and development of new projects and enhancements of existing power plants that are not yet released for full construction; (ii) approximately \$40 million for maintenance of capital expenditures to our operating power plants including drilling in our Puna power plant; (iii) approximately \$45 million for the construction and development of storage projects; and (iv) approximately \$10.0 million for enhancements to our production facilities.

In the aggregate, we estimate our total capital expenditures for 2021 to be approximately \$445 million.

Exposure to Market Risks

Based on current conditions, we believe that we have sufficient financial resources to fund our activities and execute our business plans. However, the cost of obtaining financing for our project needs may increase significantly or such financing may be difficult to obtain.

We, like other power plant operators, are exposed to electricity price volatility risk. Our exposure to such market risk is currently limited because many of our long-term PPAs (except for the 25 MW PPA for the Puna Complex and the between 30 MW and 40 MW PPAs in the aggregate for the Heber 2 power plant in the Heber Complex and the G2 power plant in the Mammoth Complex) have fixed or escalating rate provisions that limit our exposure to changes in electricity prices. Our energy storage projects sell on "merchant" and are exposed to changes in the electricity market prices. The energy payments under the PPAs of the Heber 2 power plant in the Heber Complex and the G2 power plant in the Mammoth Complex are determined by reference to the relevant power purchaser's SRAC. A decline in the price of natural gas will result in a decrease in the incremental cost that the power purchaser avoids by not generating its electrical energy needs from natural gas, or by reducing the price of purchasing its electrical energy needs from natural gas power plants, which in turn will reduce the energy payments that we may charge under the relevant PPA for these power plants. The Puna Complex is currently benefiting from energy prices which are higher than the floor under the 25 MW PPA for the Puna Complex.

As of December 31, 2020, 97.2% of our consolidated long-term debt was fixed rate debt and therefore was not subject to interest rate volatility risk and 2.8% of our long-term debt was floating rate debt, exposing us to interest rate risk in connection therewith. As of December 31, 2020, \$40.8 million of our long-term debt remained subject to interest rate risk.

We currently maintain our surplus cash in short-term, interest-bearing bank deposits, money market securities and commercial paper with a minimum investment grade rating of AA by Standard & Poor's Ratings Services.

Our cash equivalents are subject to interest rate risk. Fixed rate securities may have their market value adversely impacted by a rise in interest rates, while floating rate securities may produce less income than expected if interest rates fall. As a result of these factors, our future investment income may fall short of expectations because of changes in interest rates, or we may suffer losses in principal if we are forced to sell securities that decline in market value because of changes in interest rates. As of December 31, 2020, we do not hold such securities.

We are also exposed to foreign currency exchange risk, in particular the fluctuation of the U.S. dollar versus the NIS in Israel and Euro. Risks attributable to fluctuations in currency exchange rates can arise when we or any of our foreign subsidiaries borrow funds or incur operating or other expenses in one type of currency but receive revenues in another. In such cases, an adverse change in exchange rates can reduce such subsidiary's ability to meet its debt service obligations, reduce the amount of cash and income we receive from such foreign subsidiary, or increase such subsidiary's overall expenses. In Kenya, the tax asset is recorded in KES similar to the tax liability, however any change in the exchange rate in the KES versus the USD has an impact on our financial results. Risks attributable to fluctuations in foreign currency exchange rates can also arise when the currency denomination of a particular contract is not the U.S. dollar. Substantially all of our PPAs in the international markets are either U.S. dollar-denominated or linked to the U.S. dollar except for our operations on Guadeloupe, where we own and operate the Bouillante power plant which sells its power under a Euro-denominated PPA with Électricité de France S.A. Our construction contracts from time to time contemplate costs which are incurred in local currencies. The way we often mitigate such risk is to receive part of the proceeds from the contract in the currency in which the expenses are incurred. Currently, we have forward and cross-currency swap contracts in place to reduce our NIS/Dollar currency exposure and expect to continue to use currency exchange and other derivative instruments to the extent we deem such instruments to be the appropriate tool for managing such exposure.

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On July 1, 2020, we concluded an auction tender and accepted subscriptions for senior unsecured bonds comprised of NIS 1.0 billion aggregate principal amount (the "Senior Unsecured Bonds - Series 4"). The Senior Unsecured Bonds - Series 4 were issued in New Israeli Shekels and converted to approximately \$290 million using a cross-currency swap transaction shortly after the completion of such issuance. We performed a sensitivity analysis on the fair values of our long-term debt obligations, and foreign currency exchange forward contracts. The foreign currency exchange forward contracts listed below principally relate to trading activities. The sensitivity analysis involved increasing and decreasing forward rates at December 31, 2020 and 2019 by a hypothetical 10% and calculating the resulting change in the fair values.

At this time, the development of our strategic plan has not exposed us to any additional market risk. However, as the implementation of the plan progresses, we may be exposed to additional or different market risks.

The results of the sensitivity analysis calculations as of December 31, 2020 and 2019 are presented below:

Risk	Assuming a 10% Increase in Rates		Assuming a 10% Decrease in Rates		Change in the Fair Value of
	As of December 31,		As of December 31,		
	2020	2019	2020	2019	
	(In thousands)				
Foreign Currency	\$ (1,996)	\$ (4,198)	\$ 2,439	\$ 5,131	Foreign Currency Forward Contracts
Interest Rate	\$ (3,025)	\$ (4,574)	\$ 3,090	\$ 4,723	OFC 2 Senior Secured Notes
Interest Rate	\$ (3,193)	\$ (4,647)	\$ 3,273	\$ 4,812	DFC Loan
Interest Rate	\$ (311)	\$ (516)	\$ 318	\$ 534	Amatitlan loan
Interest Rate	\$ (4,278)	\$ (1,797)	\$ 4,313	\$ 1,822	Senior Unsecured Bonds
Interest Rate	\$ (586)	\$ (905)	\$ 599	\$ 934	DEG 2 Loan
Interest Rate	\$ (1,266)	\$ (1,835)	\$ 1,299	\$ 1,906	DAC 1 Senior Secured Notes
					Migdal Loan and the Additional Migdal Loan and the
Interest Rate	\$ (3,194)	\$ (3,272)	\$ 3,270	\$ 3,363	Second Addendum Migdal Loan
Interest Rate	\$ (941)	\$ (1,141)	\$ 983	\$ 1,207	San Emidio Loan
Interest Rate	\$ (444)	\$ (776)	\$ 450	\$ 797	DOE Loan
Interest Rate	\$ (151)	\$ (281)	\$ 153	\$ 286	Idaho Holdings Loan
Interest Rate	\$ (2,146)	\$ (2,978)	\$ 2,209	\$ 3,099	Platanares DFC Loan

Interest Rate	\$	(452)	\$	(728)	\$	461	\$	749	DEG 3 Loan
Interest Rate	\$	(179)	\$	(342)	\$	181	\$	350	Plumstriker Loan
Interest Rate	\$	—	\$	(295)	\$	—	\$	298	Commercial Paper
Interest Rate	\$	(107)	\$	(201)	\$	108	\$	204	Other long-term loans

In July 2019, the United Kingdom's Financial Conduct Authority, which regulates LIBOR (London Interbank Offered Rate), announced that it intends to phase out LIBOR by the end of 2021. It is unclear whether or not LIBOR will cease to exist at that time and/or whether new methods of calculating LIBOR will be established such that it will continue to exist after 2021. The U.S. Federal Reserve, in conjunction with the Alternative Reference Rates Committee, a steering committee comprised of large U.S. financial institutions, is considering replacing U.S. dollar LIBOR with a new SOFR (Secured Overnight Financing Rate) index calculated by short-term repurchase agreements, backed by Treasury securities.

We have evaluated the impact of the transition from LIBOR, and currently believe that the transition will not have a material impact on our consolidated financial statements.

Effect of Inflation

We expect that inflation will not be a significant risk in the near term, given the current global economic conditions, however, that could change in the future. To address the possibility of rising inflation, some of our contracts include certain provisions that mitigate inflation risk.

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In connection with the Electricity segment, none of our U.S. PPAs, including the SCPPA Portfolio PPA, are directly linked to the CPI. Inflation may directly impact an expense we incur for the operation of our projects, thereby increasing our overall operating costs and reducing our profit and gross margin. The negative impact of inflation would be partially offset by price adjustments built into some of our PPAs that could be triggered upon such occurrences. The energy payments pursuant to our PPAs for some of our power plants such as the Brady power plant, the Steamboat 2 and 3 power plants and the McGinness Complex, increase every year through the end of the relevant terms of such agreements, although such increases are not directly linked to the CPI or any other inflationary index. Lease payments are generally fixed, while royalty payments are generally calculated as a percentage of revenues and therefore are not significantly impacted by inflation. In our Product segment, inflation may directly impact fixed and variable costs incurred in the construction of our power plants, thereby increasing our operating costs in the Product segment. We are more likely to be able to offset all or part of this inflationary impact through our project pricing. With respect to power plants that we build for our own electricity production, inflationary pricing may impact our operating costs which may be partially offset in the pricing of the new long-term PPAs that we negotiate.

Contractual Obligations and Commercial Commitments

The following tables set forth our material contractual obligations as of December 31, 2020 (in thousands):

	Payments Due by Period						
	Remaining Total	2021	2022	2023	2024	2025	Thereafter
Long-term liabilities principal	\$ 1,475,853	\$ 78,602	\$ 337,166	\$ 134,549	\$ 118,395	\$ 118,831	\$ 688,310
Interest on long-term liabilities (1)	381,869	71,771	66,687	46,759	44,196	38,279	114,177
Finance lease obligations	16,723	4,177	4,116	3,015	1,156	565	3,694
Operating lease obligations	20,320	3,255	2,539	1,902	1,625	1,440	9,559
Benefits upon retirement (2)	20,454	4,968	1,910	148	686	1,160	11,582
Asset retirement obligation	63,457	—	—	—	—	—	63,457
Purchase commitments (3)	159,850	159,850	—	—	—	—	—
	<u>\$ 2,138,526</u>	<u>\$ 322,623</u>	<u>\$ 412,418</u>	<u>\$ 186,373</u>	<u>\$ 166,058</u>	<u>\$ 160,275</u>	<u>\$ 890,779</u>

(1) See interest rates and maturity dates under Liquidity and Capital Resources section above.

(2) The above amounts were determined based on employees' current salary rates and the number of years' service that will have been accumulated at their expected retirement date. These amounts do not include amounts that might be paid to employees that will cease working with us before reaching their expected retirement age.

(3) We purchase raw materials for inventories, construction-in-process and services from a variety of vendors. During the normal course of business, in order to manage manufacturing lead times and help assure adequate supply, we enter into agreements with contract manufacturers and suppliers that either allow them to procure goods and services based upon specifications defined by us, or that establish parameters defining our requirements. At December 31, 2020, total obligations related to such supplier agreements were approximately \$159.9 million (approximately \$77.8 million of which relate to construction-in-process). All such obligations are payable in 2021.

The table above does not reflect unrecognized tax benefits of \$2.0 million, the timing of which is uncertain. Refer to Note 17 to our consolidated financial statements set forth in Item 8 of this annual report for additional discussion of unrecognized tax benefits. The above table also does not reflect a liability associated with the sale of tax benefits of \$111.5 million, the timing of which is uncertain and other long-term liabilities of \$6.2 million that are deemed immaterial. Refer to Note 13 to our consolidated financial statements as set forth in Item 8 of this annual report for additional discussion of our liability associated with the sale of tax benefits.

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Concentration of Credit Risk

Our credit risk is currently concentrated with the following major customers: Sierra Pacific Power Company and Nevada Power Company (subsidiaries of NV Energy), KPLC and SCPPA. If any of these electric utilities fail to make payments under its PPAs with us, such failure would have a material adverse impact on our financial condition. Also, by implementing our multi-year strategic plan we may be exposed, by expanding our customer base, to different credit profile customers than our current customers.

The Company's revenues from its primary customers as a percentage of total revenues are as follows:

	Year Ended December 31,		
	2020	2019	2018
Southern California Public Power Authority ("SCPPA")	20.6	17.9	15.2
Sierra Pacific Power Company and Nevada Power Company	17.5%	16.8%	16.1%
Kenya Power and Lighting Co. Ltd. ("KPLC")	16.4	16.3	16.6

We have historically been able to collect on substantially all of our receivable balances. As of December 31, 2020, the amount overdue from KPLC in Kenya was \$48.9 million of which \$16.2 million was paid in January and February of 2021. These amounts are an average of 78 days overdue. In Honduras, the Company successfully collected during the year an overdue debt from Empresa Nacional de Energía Eléctrica ("ENEE") of \$20.1 million that was related to the period from October 2018 to April 2019. However, due to continuing restrictive measures related to the COVID-19 pandemic in Honduras, the Company may experience delays in collection. As of December 31, 2020, the total amount overdue from ENEE of \$2.9 million was collected in January 2021. In addition, on April 30, 2020, the Company also received from ENEE a notice declaring a force majeure event in Honduras due to the impact of COVID-19 that was ultimately withdrawn.

Government Grants and Tax Benefits

The U.S. federal government encourages production of electricity from geothermal resources or solar energy through certain tax subsidies:

- PTC - the PTC rules provide an income tax credit for each kWh of electricity produced from certain renewable energy sources, including geothermal, and sold to an unrelated person during a taxable year. The PTC was first introduced in 1992 and has since been revised a number of times. The PTC, which in 2020 was 2.5 cents per kWh, is adjusted annually for inflation and may be claimed for 10 years on the net electricity output sold to third parties after the project is first placed in service. The tax extender package signed into law in December 2020 provides that any qualifying project that starts construction by December 31, 2021 would be eligible for PTC. The qualifying project must ordinarily be placed in service within four years after the end of the year in which construction started or show continued construction to qualify for PTC. The PTC is not available for power produced from geothermal resources for projects that started construction on or after January 1, 2022.
- The ITC rules have been amended a number of times. A qualified new geothermal power plant in the United States that starts construction by the end of 2021 would be eligible to claim an ITC of 30% of the project eligible cost. New solar projects that were under construction by December 31, 2019 will qualify for a 30% ITC. The credit will phase down to 26% for solar PV projects starting construction by the end of 2022 and to 22% for solar PV projects starting construction in 2023. Projects that were under construction before these deadlines must be placed in service by December 31, 2025 to qualify for the ITC at these rates. Solar projects placed in service after December 31, 2025 will only qualify for a 10% ITC. Under current tax rules, any unused tax credit has a one-year carry back and a twenty-year carry forward.

We are also permitted to depreciate most of the cost of a new geothermal power plant. In cases where we claim the one-time 30% (or 10%) ITC, our tax basis in the plant that is eligible for depreciation is reduced by one-half of the ITC amount. In cases where we claim the PTC, there is no reduction in the tax basis for depreciation. Projects that were placed in service in 2016 and 2017 were eligible for "bonus" depreciation of 50% of the cost of that equipment in the year the power plant was placed in service. Following the Tax Act, projects that were or will be placed in service after September 27, 2017, could qualify for a 100% bonus depreciation with respect to its qualifying assets. After applying any depreciation bonus that is available, we can depreciate the remainder of our tax basis in the plant, if any, mostly over five years on an accelerated basis, meaning that more of the cost may be deducted in the first few years than during the remainder of the depreciation period. We will continue to analyze this new provision under the Act and determine if an election is appropriate as it relates to our business needs.

Ormat Systems received "Benefited Enterprise" status under Israel's Law for Encouragement of Capital Investments, 1959 (the Investment Law), with respect to two of its investment programs through 2011. In January 2011, new legislation amending the Investment Law was enacted. Under the new legislation, a uniform rate of corporate tax will apply to all qualified income of certain industrial companies, as opposed to the previous law's incentives that are limited to income from a "Benefited Enterprise" during their benefits period. As a result, we now pay a uniform corporate tax rate of 16% with respect to that qualified income. In January 2021, Ormat Systems received an approval from the Israeli Innovation Authority that it owns an "Innovation Promoting Enterprise" and therefore is eligible for a reduced corporate tax rate of 12% on its "Preferred Technological Income" for the tax years 2019 and 2020 (effective tax rate of approximately 13% for 2019 and 2020). This impact will be recorded in the first quarter of 2021. See Note 24 to our consolidated financial statements set forth in Item 8 of this annual report for further information.

Kenya tax audit

The Company was audited by the Kenya Revenue Authority ("KRA") for income tax years 2013 to 2017 for which it had received during 2019 and 2020 three separate Notices of Assessments ("NoA") detailing different issues relating to certain findings in respect of the KRA review of such years.

On October 19, 2020, the Company entered into a settlement agreement in relation to the second NoA that was issued by the KRA on December 4, 2019

totaling approximately \$190 million of proposed adjustments, including interest and penalties. The settlement agreement extended the audit period for the issues addressed within the assessment, to cover the period from 2013 through 2019 and resulted in a total settlement payment of approximately \$28 million, including interest and penalties, related to late payment in respect of 2019 taxable income. Additionally, the settlement included a deferral of tax benefits to be utilized in years subsequent to 2019 in an amount of approximately \$28 million. The assessment was paid on October 27, 2020.

On December 21, 2020, the Company entered into a settlement agreement with the KRA in relation to the first and third NoA's that were issued by the KRA on June 28, 2019 and May 12, 2020, respectively, totaling approximately \$9 million, including interest and penalties. The total settlement amount reflected in the agreement was \$1.5 million, which was paid on December 28, 2020. This concluded all open audits and NoAs with the KRA.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Information responding to Item 7A is included in Item 7 — “Management’s Discussion and Analysis of Financial Condition and Results of Operations” of this annual report.

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ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Consolidated Financial Statements as of December 31, 2020 and 2019 and for Each of the Three Years in the Period Ended December 31, 2020:

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of Ormat Technologies, Inc.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Ormat Technologies, Inc. and its subsidiaries (the "Company") as of December 31, 2020 and 2019, and the related consolidated statements of operations and comprehensive income (loss), of equity and of cash flows for each of the three years in the period ended December 31, 2020, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company’s consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence

regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

[Table of Contents](#)***Definition and Limitations of Internal Control over Financial Reporting***

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Percentage of Completion Estimates in Product Revenue Recognition

As described in Note 18 to the consolidated financial statements, \$148 million of the Company's total revenue for the year ended December 31, 2020 was generated from product revenue. As disclosed by management, product revenue is recognized using the percentage of completion method, which requires estimating future costs over the full term of product delivery. The percentage of completion method is used because management believes that measure best depicts the transfer of control to the customer, which occurs as the Company incurs costs on the contracts. Under the percentage of completion method, the extent of progress towards completion is based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. Revenue is recognized proportionately as costs are incurred. Such estimates of future costs are made by management based on prior historical contracts that have been completed and specific project characteristics. Due to the nature of the work performed to deliver the products, management's estimation of future costs requires significant judgment.

The principal consideration for our determination that performing procedures relating to percentage of completion estimates in product revenue recognition is a critical audit matter is that there was significant judgment by management when developing the estimates of future costs to complete projects. This in turn led to significant auditor judgment and effort in performing procedures to evaluate management's estimates of future costs to complete projects.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the revenue recognition process, including controls over the determination of estimates of future costs to complete projects. These procedures also included, among others, evaluating and testing management's process for determining the estimates of future costs for a sample of projects. Evaluating the reasonableness of significant assumptions involved evaluating management's ability to estimate future costs to complete projects by (i) performing a comparison of the originally estimated and actual costs incurred on similar completed projects; (ii) evaluating the timely identification of circumstances that may warrant a modification to estimated costs to complete projects, including changes in job performance, job conditions, and estimated profitability; and (iii) testing management's process for evaluating the Company's ability to execute the specific contract characteristics.

[Table of Contents](#)***Realizability of Deferred Tax Assets***

As described in Note 17 to the consolidated financial statements, the Company's deferred tax asset balance as of December 31, 2020 is \$119 million. As disclosed by management, significant estimates are required to calculate the consolidated income tax provision and tax balances. Management calculates temporary differences resulting from differing treatments of items for tax and accounting purposes, which can result in the creation of deferred tax assets or liabilities. For those jurisdictions where the realization of net deferred tax assets is not more likely than not, a valuation allowance is recorded. In assessing the need for a valuation allowance, management estimates future taxable income by jurisdiction while also considering the feasibility of ongoing tax planning strategies and the realization of tax credits and net operating loss carryforwards. Significant estimates are required in estimating future taxable income by jurisdiction, leading to significant judgment from management.

The principal consideration for our determination that performing procedures relating to the realizability of deferred tax assets is a critical auditor matter is that there was significant judgment by management in estimating future taxable income by jurisdiction. This in turn led to significant auditor judgment and effort in performing procedures to evaluate management's estimates of future taxable income.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the income tax process, including controls over estimating future taxable income by jurisdiction in order to assess the realizability of deferred tax assets. These procedures also included, among others, testing management's process for assessing the realizability of deferred tax assets, testing the completeness and accuracy of underlying data used in management's assessment and evaluating the reasonableness of management's assumptions related to estimating future taxable income. Evaluating management's assumptions related to estimating future taxable income involved evaluating whether the assumptions used by management were reasonable considering (i) the current and past performance of the Company; (ii) the consistency with external market and industry data; and (iii) the consistency of the assumptions with evidence obtained in other areas of the audit.

/s/ Kesselman & Kesselman
Certified Public Accountants (Isr.)
A member firm of PricewaterhouseCoopers International Limited

Tel Aviv, Israel
February 26, 2021

We have served as the Company's auditor since 2018.

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ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS

	December 31,	
	2020	2019
	(Dollars in thousands)	
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 448,252	\$ 71,173
Restricted cash and cash equivalents (primarily related to VIEs)	88,526	81,937
Receivables:		
Trade less allowance for credit losses of \$597 and \$0, respectively (primarily related to VIEs)	149,170	154,525
Other	17,987	22,048
Inventories	35,321	34,949
Costs and estimated earnings in excess of billings on uncompleted contracts	24,544	38,365
Prepaid expenses and other	15,354	12,667
Total current assets	779,154	415,664
Investment in unconsolidated companies	98,217	81,140
Deposits and other	66,989	38,284
Deferred income taxes	119,299	129,510
Property, plant and equipment, net (\$1,978,220 and \$1,880,547 related to VIEs, respectively)	2,099,046	1,971,415
Construction-in-process (\$198,812 and \$149,830 related to VIEs, respectively)	479,315	376,555
Operating leases right of use (\$4,721 and \$4,688 related to VIEs, respectively)	16,347	17,405
Finance leases right of use (\$7,001 and \$8,479 related to VIEs, respectively)	11,633	14,161
Intangible assets, net	194,421	186,220
Goodwill	24,566	20,140
Total assets	\$ 3,888,987	\$ 3,250,494
LIABILITIES AND EQUITY		
Current liabilities:		
Accounts payable and accrued expenses	\$ 152,763	\$ 141,857
Short term revolving credit lines with banks (full recourse)	—	40,550
Commercial paper	—	50,000
Billings in excess of costs and estimated earnings on uncompleted contracts	11,179	2,755
Current portion of long-term debt:		
Limited and non-recourse (primarily related to VIEs):		
Senior secured notes	24,949	24,473
Other loans	35,897	34,458
Full recourse	17,768	76,572
Operating lease liabilities	2,922	2,743
Finance lease liabilities	3,169	3,068
Total current liabilities	248,647	376,476
Long-term debt, net of current portion:		
Limited and non-recourse (primarily related to VIEs):		
Senior secured notes (less deferred financing costs of \$5,318 and \$6,317, respectively)	315,195	339,336
Other loans (less deferred financing costs of \$8,557 and \$10,482, respectively)	284,928	317,395
Full recourse:		
Senior unsecured bonds (less deferred financing costs of \$2,086 and \$675, respectively)	717,534	286,453
Other loans (less deferred financing costs of \$1,340 and \$1,519, respectively)	59,556	68,747
Operating lease liabilities	12,897	14,008
Finance lease liabilities	9,104	11,209
Liability associated with sale of tax benefits	111,476	123,468
Deferred income taxes	87,972	97,126
Liability for unrecognized tax benefits	1,970	14,643

Liabilities for severance pay	18,749	18,751
Asset retirement obligation	63,457	50,183
Other long-term liabilities	6,235	8,039
Total liabilities	<u>\$ 1,937,720</u>	<u>\$ 1,725,834</u>
Commitments and contingencies (Note 21)		
Redeemable noncontrolling interest	<u>9,830</u>	<u>9,250</u>
Equity:		
The Company's stockholders' equity:		
Common stock, par value \$0.001 per share; 200,000,000 shares authorized; 55,983,259 and 51,031,652 issued and outstanding as of December 31, 2020 and December 31, 2019, respectively	56	51
Additional paid-in capital	1,262,446	913,150
Retained earnings	550,103	487,873
Accumulated other comprehensive loss	(6,620)	(8,654)
Total stockholders' equity attributable to Company's stockholders	<u>1,805,985</u>	<u>1,392,420</u>
Noncontrolling interest	<u>135,452</u>	<u>122,990</u>
Total equity	<u>1,941,437</u>	<u>1,515,410</u>
Total liabilities, redeemable noncontrolling interest and equity	<u><u>\$ 3,888,987</u></u>	<u><u>\$ 3,250,494</u></u>

The accompanying notes are an integral part of the consolidated financial statements.

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ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands, except per share data)		
Revenues:			
Electricity	\$ 541,393	\$ 540,333	\$ 509,879
Product	148,125	191,009	201,743
Energy storage	15,824	14,702	7,645
Total revenues	<u>705,342</u>	<u>746,044</u>	<u>719,267</u>
Cost of revenues:			
Electricity	300,059	312,835	298,255
Product	114,948	145,974	140,697
Energy storage	14,060	17,912	9,880
Total cost of revenues	<u>429,067</u>	<u>476,721</u>	<u>448,832</u>
Gross profit	<u>276,275</u>	<u>269,323</u>	<u>270,435</u>
Operating expenses:			
Research and development expenses	5,395	4,647	4,183
Selling and marketing expenses	17,384	15,047	19,802
General and administrative expenses	60,226	55,833	47,750
Impairment charge	—	—	13,464
Write-off of unsuccessful exploration activities	—	—	126
Business interruption insurance income	(20,743)	—	—
Operating income	<u>214,013</u>	<u>193,796</u>	<u>185,110</u>
Other income (expense):			
Interest income	1,717	1,515	974
Interest expense, net	(77,953)	(80,384)	(70,924)
Derivatives and foreign currency transaction gains (losses)	3,802	624	(4,761)
Income attributable to sale of tax benefits	25,720	20,872	19,003
Other non-operating income (expense), net	<u>1,418</u>	<u>880</u>	<u>7,779</u>
Income from operations before income tax and equity in earnings (losses) of investees	168,717	137,303	137,181
Income tax (provision) benefit	<u>(67,003)</u>	<u>(45,613)</u>	<u>(34,733)</u>
Equity in earnings (losses) of investees, net	92	1,853	7,663
Net income	<u>101,806</u>	<u>93,543</u>	<u>110,111</u>
Net income attributable to noncontrolling interest	<u>(16,350)</u>	<u>(5,448)</u>	<u>(12,145)</u>
Net income attributable to the Company's stockholders	<u><u>\$ 85,456</u></u>	<u><u>\$ 88,095</u></u>	<u><u>\$ 97,966</u></u>
Comprehensive income:			
Net income	101,806	93,543	110,111
Other comprehensive income (loss), net of related taxes:			
Change in foreign currency translation adjustments	3,813	(1,810)	(1,831)
Change in unrealized gains or losses in respect of the Company's share in derivatives instruments of unconsolidated investment	(3,975)	(3,417)	2,235
Change in unrealized gains or losses in respect of a cross currency swap derivative instrument that qualifies as a cash flow hedge	3,366	—	—

Other changes in comprehensive income	274	44	24
Comprehensive income	105,284	88,360	110,539
Comprehensive income attributable to noncontrolling interest	(17,794)	(5,120)	(11,666)
Comprehensive income attributable to the Company's stockholders	<u>\$ 87,490</u>	<u>\$ 83,240</u>	<u>\$ 98,873</u>
Earnings per share attributable to the Company's stockholders:			
Basic:	<u>\$ 1.66</u>	<u>\$ 1.73</u>	<u>\$ 1.93</u>
Diluted:	<u>\$ 1.65</u>	<u>\$ 1.72</u>	<u>\$ 1.92</u>
Weighted average number of shares used in computation of earnings per share attributable to the Company's stockholders:			
Basic	<u>51,567</u>	<u>50,867</u>	<u>50,643</u>
Diluted	<u>51,937</u>	<u>51,227</u>	<u>50,969</u>

The accompanying notes are an integral part of the consolidated financial statements.

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ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF EQUITY

	The Company's Stockholders' Equity							
	Common Stock		Additional Paid-in Capital	Retained Earnings (Accumulated Deficit)	Accumulated Other Comprehensive Income (Loss)	Total	Noncontrolling Interest	Total Equity
	Shares	Amount						
	(Dollars in thousands, except per share data)							
Balance at January 1, 2018	50,609	\$ 51	\$ 888,778	\$ 351,090	\$ (4,706)	\$ 1,235,213	\$ 84,322	\$ 1,319,535
Stock-based compensation	—	—	10,218	—	—	10,218	—	10,218
Exercise of options by employees and directors	91	—	—	—	—	—	—	—
Cash paid to noncontrolling interest	—	—	—	—	—	—	(10,972)	(10,972)
Cash dividend declared, \$0.53 per share	—	—	—	(26,834)	—	(26,834)	—	(26,834)
Increase in noncontrolling interest in Guadeloupe	—	—	—	—	—	—	5,339	5,339
Increase in noncontrolling interest related to the Tungsten transaction	—	—	—	—	—	—	996	996
Tax effect of partnership interest buyout	—	—	2,367	—	—	2,367	—	2,367
Purchase of U.S. Geothermal	—	—	—	—	—	—	34,898	34,898
Net income	—	—	—	97,966	—	97,966	11,155	109,121
Other comprehensive income (loss), net of related taxes:								
Foreign currency translation adjustments	—	—	—	—	(1,352)	(1,352)	(479)	(1,831)
Change in respect of derivative instruments designated for cash flow hedge (net of related tax of \$24)	—	—	—	—	81	81	—	81
Change in unrealized gains or losses in respect of the Company's share in derivative instruments of unconsolidated investment (net of related tax of \$0)	—	—	—	—	2,235	2,235	—	2,235
Amortization of unrealized gains in respect of derivative instruments designated for cash flow hedge (net of related tax of \$18)	—	—	—	—	(57)	(57)	—	(57)
Balance at December 31, 2018	50,700	51	901,363	422,222	(3,799)	1,319,837	125,259	1,445,096
Cumulative effect of changes in accounting principles	—	—	—	(58)	—	(58)	—	(58)
Adjusted balance as of the beginning of the year	50,700	51	901,363	422,164	(3,799)	1,319,779	125,259	1,445,038
Stock-based compensation	—	—	9,358	—	—	9,358	—	9,358
Exercise of options by employees and directors	332	—	2,429	—	—	2,429	—	2,429
Cash paid to noncontrolling interest	—	—	—	—	—	—	(8,329)	(8,329)
Cash dividend declared, \$0.44 per share	—	—	—	(22,386)	—	(22,386)	—	(22,386)
Increase in noncontrolling interest in McGinness Hills 3	—	—	—	—	—	—	2,072	2,072
Net income	—	—	—	88,095	—	88,095	4,316	92,411
Other comprehensive income (loss), net of related taxes:								
Foreign currency translation adjustments	—	—	—	—	(1,482)	(1,482)	(328)	(1,810)
Change in respect of derivative instruments designated for cash flow hedge	—	—	—	—	75	75	—	75
Change in unrealized gains or losses in respect of the Company's share in derivative instruments of unconsolidated investment	—	—	—	—	(3,417)	(3,417)	—	(3,417)
Amortization of unrealized gains in respect of derivative instruments designated for cash flow hedge	—	—	—	—	(31)	(31)	—	(31)
Balance at December 31, 2019	51,032	51	913,150	487,873	(8,654)	1,392,420	122,990	1,515,410
Cumulative effect of changes in accounting principles	—	—	—	(755)	—	(755)	—	(755)
Adjusted balance as of the beginning of the year	51,032	51	913,150	487,118	(8,654)	1,391,665	122,990	1,514,655
Stock-based compensation	—	—	9,830	—	—	9,830	—	9,830
Exercise of stock-based awards by employees and directors	178	—	—	—	—	—	—	—
Common stock issuance	4,773	5	339,466	—	—	339,471	—	339,471
Cash paid to noncontrolling interest	—	—	—	—	—	—	(6,756)	(6,756)
Cash dividend declared, \$0.44 per share	—	—	—	(22,471)	—	(22,471)	—	(22,471)
Increase in noncontrolling interest	—	—	—	—	—	—	2,754	2,754
Net income	—	—	—	85,456	—	85,456	15,020	100,476

Other comprehensive income (loss), net of related taxes:									
Foreign currency translation adjustments	—	—	—	—	2,369	2,369	1,444	3,813	
Change in unrealized gains or losses in respect of the Company's share in derivative instruments of unconsolidated investment (net of related tax of \$0)	—	—	—	—	(3,975)	(3,975)	—	(3,975)	
Change in unrealized gains or losses in respect of a cross currency swap derivative instrument that qualifies as a cash flow hedge (net of related tax of \$1,095)	—	—	—	—	3,366	3,366	—	3,366	
Other comprehensive income	—	—	—	—	274	274	—	274	
Balance at December 31, 2020	55,983	56	1,262,446	550,103	(6,620)	1,805,985	135,452	1,941,437	

The accompanying notes are an integral part of the consolidated financial statements.

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ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Cash flows from operating activities:			
Net income	\$ 101,806	\$ 93,543	\$ 110,111
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	156,612	148,761	132,233
Accretion of asset retirement obligation	3,232	2,709	2,474
Stock-based compensation	9,830	9,358	10,218
Amortization of deferred lease income	—	(2,685)	(2,685)
Income attributable to sale of tax benefits, net of interest expense	(12,090)	(10,084)	(8,609)
Equity in losses (earnings) of investees, net	(92)	(1,853)	(7,663)
Mark-to-market of derivative instruments	(1,192)	(1,402)	2,032
Write-off of unsuccessful exploration activities	—	—	126
Impairment charge	—	—	13,464
Loss (gain) on severance pay fund asset	(893)	(1,016)	1,186
Deferred income tax provision	5,102	27,896	19,360
Liability for unrecognized tax benefits	(12,673)	2,874	2,879
Deferred lease revenues	—	(574)	(402)
Gain from insurance recoveries	—	—	(4,463)
Other	338	914	100
Changes in operating assets and liabilities, net of businesses acquired:			
Receivables	3,520	(15,133)	(29,928)
Costs and estimated earnings in excess of billings on uncompleted contracts	13,821	3,765	(1,185)
Inventories	178	5,500	(9,318)
Prepaid expenses and other	(2,687)	3,452	(11,172)
Change in operating lease right of use asset	3,825	8,167	—
Deposits and other	(893)	(22,525)	18
Accounts payable and accrued expenses	(5,373)	8,738	(56,724)
Billings in excess of costs and estimated earnings on uncompleted contracts	8,424	(15,647)	(1,839)
Liabilities for severance pay	(2)	757	(3,147)
Change in operating lease liabilities	(3,765)	(8,405)	—
Other liabilities, net	(2,023)	(617)	(11,244)
Net cash provided by operating activities	265,005	236,493	145,822
Cash flows from investing activities:			
Capital expenditures	(320,738)	(279,986)	(258,521)
Cash received from insurance recoveries	4,700	35,435	10,427
Investment in unconsolidated companies	(20,960)	(10,674)	(3,800)
Buyout of Class B membership in OPC	—	—	2,367
Cash paid for acquisition of a business, net of cash acquired	(43,397)	—	(95,093)
Decrease (increase) in severance pay fund asset, net of payments made to retired employees	845	687	2,186
Other investing activities	(6,419)	—	—
Net cash used in investing activities	(385,969)	(254,538)	(342,434)
Cash flows from financing activities:			
Proceeds from sale of membership interests to noncontrolling interest, net of transaction costs	—	—	3,174
Proceeds from long-term loans, net of transaction costs	419,262	132,847	214,700
Proceeds from exercise of options by employees	—	2,429	—
Proceeds from issuance of common stock, net of stock issuance costs	339,471	—	—
Proceeds from the sale of limited liability company interest, net of transaction costs	—	58,289	32,175
Repayments of commercial paper and prepayments of long-term debt	(50,000)	(21,073)	—
Proceeds from issuance of commercial paper	—	50,000	—
Proceeds from revolving credit lines with banks	1,249,400	1,450,850	4,097,000
Repayment of revolving credit lines with banks	(1,289,950)	(1,569,300)	(3,989,500)
Cash received from noncontrolling interest	7,577	3,346	4,134
Repayments of long-term debt	(135,384)	(72,708)	(62,774)
Cash paid to noncontrolling interest	(9,739)	(9,730)	(13,106)
Payments under finance lease obligations	(2,890)	(3,164)	(2,551)
Deferred debt issuance costs	(1,798)	(5,165)	(5,287)
Cash dividends paid	(22,471)	(22,386)	(26,834)
Net cash provided by (used in) financing activities	503,478	(5,765)	251,131
Effect of exchange rate changes	1,154	(575)	(660)
Net change in cash and cash equivalents and restricted cash and cash equivalents	383,668	(24,385)	53,859
Restricted cash and cash equivalents acquired in a business combination	—	—	26,993
Cash and cash equivalents and restricted cash and cash equivalents at beginning of period	153,110	177,495	96,643
Cash and cash equivalents and restricted cash and cash equivalents at end of period	\$ 536,778	\$ 153,110	\$ 177,495

Supplemental disclosure of cash flow information:

Cash paid during the year for:

Interest, net of interest capitalized	\$ 60,830	\$ 61,628	\$ 53,864
Income taxes, net	\$ 64,795	\$ 1,649	\$ 18,028
Supplemental non-cash investing and financing activities:			
Increase (decrease) in accounts payable related to purchases of property, plant and equipment	\$ 3,148	\$ 9,423	\$ (6,878)
Right of use assets obtained in exchange for new lease liabilities	\$ 3,642	\$ 11,626	\$ 8,584
Increase in asset retirement cost and asset retirement obligation	\$ 8,963	\$ 8,334	\$ 881

The accompanying notes are an integral part of the consolidated financial statements.

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ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1 — BUSINESS AND SIGNIFICANT ACCOUNTING POLICIES***Business***

The Company is primarily engaged in the geothermal and recovered energy business and primarily designs, develops, builds, sells, owns and operates clean, environmentally friendly geothermal and recovered energy-based power plants, usually using equipment that it designs and manufactures. The Company owns and operates geothermal and recovered energy-based power plants in various countries, including the United States, Kenya, Guatemala, Guadeloupe and Honduras. The Company's equipment manufacturing operations are primarily located in Israel. Additionally, the Company owns and operates independent storage facilities in the United States providing energy storage and related services.

Most of the Company's domestic power plant facilities are Qualifying Facilities under the PURPA. The Power Purchase Agreements ("PPAs") for certain of such facilities are dependent upon their maintaining Qualifying Facility status.

Rounding

Dollar amounts, except per share data, in the notes to these financial statements are rounded to the closest \$1,000, unless otherwise indicated.

Basis of presentation

The consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP") and include the accounts of the Company and of all majority-owned subsidiaries in which the Company exercises control over operating and financial policies, and variable interest entities in which the Company has an interest and is the primary beneficiary. Intercompany accounts and transactions have been eliminated in consolidation.

Investments in less-than-majority-owned entities or other entities in which the Company exercises significant influence over operating and financial policies are accounted for using the equity method of accounting or consolidated if they are a variable interest entity in which the Company has an interest and is the primary beneficiary. Under the equity method, original investments are recorded at cost and adjusted by the Company's share of undistributed earnings or losses of such companies. The Company's earnings or losses in investments accounted for under the equity method have been reflected as "equity in earnings (losses) of investees, net" on the Company's consolidated statements of operations and comprehensive income (loss).

Cash and cash equivalents

The Company considers all highly liquid instruments, with an original maturity of three months or less, to be cash equivalents.

Restricted cash, cash equivalents, and marketable securities

Under the terms of certain long-term debt agreements, the Company is required to maintain certain debt service reserves, including principal and interest, cash collateral and operating fund accounts, including for future wells drilling, that have been classified as restricted cash and cash equivalents. Funds that will be used to satisfy obligations due during the next 12 months are classified as current restricted cash and cash equivalents, with the remainder classified as non-current restricted cash and cash equivalents. Such amounts were invested primarily in money market accounts and commercial paper with a minimum investment grade of "A".

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Reconciliation of cash and cash equivalents and restricted cash and cash equivalents

The following table provides a reconciliation of cash and cash equivalents and restricted cash and cash equivalents reported on the balance sheet that sum to the total of the same amounts shown on the statement of cash flows:

	December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Cash and cash equivalents	\$ 448,252	\$ 71,173	\$ 98,802
Restricted cash and cash equivalents	88,526	81,937	78,693
Total cash and cash equivalents and restricted cash and cash equivalents	<u>\$ 536,778</u>	<u>\$ 153,110</u>	<u>\$ 177,495</u>

Concentration of credit risk

Financial instruments which potentially subject the Company to concentration of credit risk consist principally of temporary cash investments and accounts receivable.

The Company places its temporary cash investments with high credit quality financial institutions located in the U.S. and in foreign countries. At December 31, 2020 and 2019, the Company had deposits totaling \$18.9 million and \$12.9 million, respectively, in ten United States financial institutions that were federally insured up to \$250,000 per account. At December 31, 2020 and 2019, the Company's deposits in foreign countries of approximately \$72.4 million and \$84.8 million, respectively, were not insured.

At December 31, 2020 and 2019, accounts receivable related to operations in foreign countries amounted to approximately \$111.3 million and \$118.8 million, respectively. At December 31, 2020 and 2019, accounts receivable from the Company's major customers (see Note 18) amounted to approximately 65% and 58%, respectively, of the Company's accounts receivable.

The Company has historically been able to collect substantially all of its receivable balances. As of December 31, 2020, the amount overdue from KPLC in Kenya was \$48.9 million of which \$16.2 million was paid in January and February of 2021. These amounts represent an average of 78 days overdue. The Company believes it will be able to collect all past due amounts in Kenya. This belief is supported by the fact that in addition to KPLC's obligations under its power purchase agreement, the Company holds a support letter from the Government of Kenya that covers certain cases of KPLC non-payment (such as where caused by government actions/political events). Additionally, on April 17, 2020, the company received from KPLC a notice declaring a force majeure event in Kenya due to the impact of COVID-19 that was withdrawn by KPLC in early September 2020. In addition, the Company experienced a higher rate of curtailments in the second quarter of 2020 by KPLC in the Olkaria complex that was later reduced in the third quarter of 2020. The impact of the curtailments is limited as the structure of the PPA secures the vast majority of the Company's revenues with fixed capacity payments unrelated to the electricity actually generated.

In Honduras, the Company successfully collected during the year an overdue debt from Empresa Nacional de Energía Eléctrica ("ENEE") of \$20.1 million that was related to the period from October 2018 to April 2019. However, due to continuing restrictive measures related to the COVID-19 pandemic in Honduras, the Company may experience delays in collection. As of December 31, 2020, the total amount overdue from ENEE of \$2.9 million was collected in January 2021. In addition, on April 30, 2020, the Company also received from ENEE a notice declaring a force majeure event in Honduras due to the impact of COVID-19 that was ultimately withdrawn.

The Company may experience delays in collection in other locations due to the restrictive measures related to the COVID-19 pandemic which were imposed globally to different extents.

Inventories

Inventories consist primarily of raw material parts and sub-assemblies for power units and are stated at the lower of cost or net realizable value, using the weighted-average cost method. Inventories are reduced by a provision for slow-moving and obsolete inventories. This provision was not material at December 31, 2020 and 2019.

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Deposits and other

Deposits and other consist primarily of performance bonds for construction projects, long-term insurance contract funds and receivables, certain deferred costs and derivative instruments.

Property, plant and equipment, net

Property, plant and equipment are stated at cost. All costs associated with the acquisition, development and construction of power plants operated by the Company are capitalized. Major improvements are capitalized and repairs and maintenance (including major maintenance) costs are expensed. Power plants operated by the Company, which include geothermal wells and exploration and resource development costs, are depreciated using the straight-line method over their estimated useful lives, which range from 15 to 30 years. The other assets are depreciated using the straight-line method over the following estimated useful lives of the assets:

	Years
Buildings	25
Leasehold improvements	15 - 30
Machinery and equipment — manufacturing and drilling	10
Machinery and equipment — computers	3 - 5
Energy storage equipment	15
Office equipment — furniture and fixtures	5 - 15
Office equipment — other	5 - 10
Vehicles	5 - 7

The cost and accumulated depreciation of items sold or retired are removed from the accounts. Any resulting gain or loss is recognized currently and recorded in the accompanying statements of operations.

The Company capitalizes interest costs as part of constructing power plant facilities. Such capitalized interest is recorded as part of the asset to which it relates and is amortized over the asset's estimated useful life. Capitalized interest costs amounted to \$10.4 million, \$3.3 million, and \$3.7 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Exploration and development costs

The Company capitalizes costs incurred in connection with the exploration and development of geothermal resources once it acquires land rights to the potential geothermal resource. Prior to acquiring land rights, the Company makes an initial assessment that an economically feasible geothermal reservoir is probable on that land. The Company determines the economic feasibility of potential geothermal resources internally, with all available data and external assessments vetted through the exploration department and occasionally using outside service providers. Costs associated with the initial assessment are expensed and included in cost of electricity revenues in the consolidated statements of operations and comprehensive income (loss). Such costs were immaterial during the years ended December 31, 2020, 2019 and 2018. It normally takes two to three years from the time active exploration of a particular geothermal resource begins to the time a production well is in operation, assuming the resource is commercially viable. However, in certain sites the process may take longer due to permitting delays, transmission constraints or any other commercial milestones that are required to be reached in order to pursue the development process.

In most cases, the Company obtains the right to conduct the geothermal development and operations on land owned by the Bureau of Land Management ("BLM"), various states or with private parties. The up-front bonus payments and other related costs, such as legal fees, are capitalized and included in construction-in-process. The annual land lease payments made during the exploration, development and construction phase are accounted under lease accounting as further described under the caption Leases below and reflected as expenses in "electricity cost of revenues" in the consolidated statements of operations and comprehensive income (loss). Upon commencement of power generation on the leased land, the Company begins to pay the lessor's long-term royalty payments based on the utilization of the geothermal resources as defined in the respective agreements. Such payments are expensed when the related revenues are earned and included in "electricity cost of revenues" in the consolidated statements of operations and comprehensive income (loss).

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Following the acquisition of land rights to the potential geothermal resource, the Company conducts further studies and surveys, including water and soil analyses, among others, and augments its database with the results of these studies. The Company then initiates a suite of geophysical surveys to assess the resource and determine drilling locations. If the results of these activities support the initial assessment of the feasibility of the geothermal resource, the Company then proceeds to exploratory drilling and other related activities which may include drilling of temperature gradient holes, drilling of slim holes, building access roads to drilling locations, drilling full size production and/or injection wells and flow tests. If the slim hole supports a conclusion that the geothermal resource will support a commercially viable power plant, it may be converted to a full-size commercial well, used either for extraction or re-injection of geothermal fluids, or be used as an observation well to monitor and define the geothermal resource. Costs associated with these activities and other directly attributable costs, including interest once physical exploration activities begin and permitting costs are capitalized and included in "construction-in-process". If the Company concludes that a geothermal resource will not support commercial operations, capitalized costs are expensed in the period such determination is made.

When deciding whether to continue holding lease rights and/or to pursue exploration activity, the Company diligently prioritizes prospective investments, taking into account resource and probability assessments in order to make informed decisions about whether a particular project will support commercial operation. As a result, write-off of unsuccessful activities for the years ended December 31, 2020, 2019 and 2018 was \$0.0 million, \$0.0 million, and \$0.1 million, respectively.

All exploration and development costs that are being capitalized will be depreciated over their estimated useful lives when the related geothermal power plant is substantially complete and ready for use. A geothermal power plant is substantially complete and ready for use when electricity generation commences.

Asset retirement obligation

The Company records the fair value of a legal liability for an asset retirement obligation in the period in which it is incurred. The Company's legal liabilities include plugging wells and post-closure costs of power producing sites. When a new liability for asset retirement obligations is recorded, the Company capitalizes the costs of the liability by increasing the carrying amount of the related long-lived asset. The liability is accreted to its present value each period, and the capitalized cost is depreciated over the useful life of the related asset. The Company periodically reassesses the assumptions used to estimate the expected cash flows required to settle the asset retirement obligation, including changes in estimated probabilities, amounts, and timing of the settlement of the asset retirement obligation, as well as changes in the legal requirements of an obligation and revises the previously recorded asset retirement obligation accordingly. At retirement, the obligation is settled for its recorded amount at a gain or loss.

Deferred financing costs

Deferred financing costs are presented as a direct deduction from the carrying value of the associated debt liability or under "Deposits and other" if associated with lines of credit. Such deferred costs are amortized over the term of the related obligation using the effective interest method or ratably, as applicable. Amortization of deferred financing costs is presented as interest expense in the consolidated statements of operations and comprehensive income (loss). Amortization expense for the years ended December 31, 2020, 2019 and 2018 amounted to \$3.5 million, \$5.4 million, and \$4.6 million, respectively. During the years ended December 31, 2020, 2019 and 2018, no amounts were written-off as a result of extinguishment of liabilities.

Goodwill

Goodwill represents the excess of the fair value of consideration transferred in the business combination transactions over the fair value of tangible and intangible assets acquired, net of the fair value of liabilities assumed and the fair value of any noncontrolling interest in the acquisitions. Goodwill is not amortized but rather subject to a periodic impairment testing on an annual basis, which the Company performs on December 31 of each year, or if an event occurs or circumstances change that would more likely than not reduce the fair value of the reporting unit below its carrying amount. Additionally, an entity is permitted to first assess qualitative factors to determine whether a quantitative goodwill impairment test is necessary. Further testing is only required if the entity determines, based on the qualitative assessment, that it is more likely than not that a reporting unit's fair value is less than its carrying amount. Otherwise, no further impairment testing is required. An entity has the option to bypass the qualitative assessment for any reporting unit in any period and proceed directly to the quantitative goodwill impairment test. This would not preclude the entity from performing the qualitative assessment in any subsequent period. The quantitative assessment compares the fair value of the reporting unit to its carrying value, including goodwill. Under ASU 2017-04, Intangibles – Goodwill and Other (Topic 350), which was adopted by the Company in 2018, an entity should recognize an impairment charge for the amount by which the carrying amount of the reporting unit exceeds its fair value as calculated under step one described above. However, the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. For further information relating to goodwill see Note 9 - Intangible Assets and Goodwill to the consolidated financial statements.

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Intangible assets

Intangible assets consist of allocated acquisition costs of PPAs, which are amortized using the straight-line method over the 15 to 29-year terms of the agreements (see Note 9) as well as acquisition costs allocation related to the Company's Energy Storage segment activities that are amortized over a period of between approximately 6 and 19 years. Intangible assets are tested for recoverability whenever events or changes in circumstances indicate that their carrying amount may not be recoverable. In case there are no such events or change in circumstances, there is no need to perform the impairment testing. The recoverability is tested by comparing the net carrying value of the intangible assets to the undiscounted net cash flows to be generated from the use and eventual disposition of these assets. If the carrying amount of a long-lived asset (or asset group) is not recoverable, the fair value of the asset (asset group) is measured and if the carrying amount exceeds the fair value, an impairment loss is recognized.

Impairment of long-lived assets and long-lived assets to be disposed of

The Company evaluates long-lived assets, such as property, plant and equipment and construction-in-process for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Factors which could trigger an impairment include, among others, significant underperformance relative to historical or projected future operating results, significant changes in the Company's use of assets or its overall business strategy, negative industry or economic trends, a determination that an exploration project will not support commercial operations, a determination that a suspended project is not likely to be completed, a significant increase in costs necessary to complete a project, legal factors relating to its business or when it concludes that it is more likely than not that an asset will be disposed of or sold.

The Company tests its operating plants that are operated together as a complex for impairment at the complex level because the cash flows of such plants result from significant shared operating activities. For example, the operating power plants in a complex are managed under a combined operation management generally with one central control room that controls all of the power plants in a complex and one maintenance group that services all of the power plants in a complex. As a result, the cash flows from individual plants within a complex are not largely independent of the cash flows of other plants within the complex. The Company tests for impairment of its operating plants which are not operated as a complex as well as its projects under exploration, development or construction that are not part of an existing complex at the plant or project level. To the extent an operating plant becomes part of a complex, the Company will test for impairment at the complex level.

Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to the estimated future net undiscounted cash flows expected to be generated by the asset. The significant assumptions that the Company uses in estimating its undiscounted future cash flows include: (i) projected generating capacity of the complex or power plant and rates to be received under the respective PPAs and expected market rates thereafter and (ii) projected operating expenses of the relevant complex or power plant. Estimates of future cash flows used to test recoverability of a long-lived asset under development also include cash flows associated with all future expenditures necessary to develop the asset.

If the assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds their fair value. Assets to be disposed of are reported at the lower of the carrying amount or fair value less costs to sell. Management believes that no impairment exists for long-lived assets; however, estimates as to the recoverability of such assets may change based on revised circumstances. If actual cash flows differ significantly from the Company's current estimates, a material impairment charge may be required in the future.

Derivative instruments

Derivative instruments (including certain derivative instruments embedded in other contracts) are measured at their fair value and recorded as either assets or liabilities unless exempted from derivative treatment as a normal purchase and sale. Changes in the fair value of derivatives not designated as hedging instruments are recognized in earnings. Changes in the fair value of derivatives designated as cash flow hedging instruments are initially recorded in "Other comprehensive income (loss)" and a corresponding amount is reclassified out of "Accumulated other comprehensive income (loss)" to earnings to offset the remeasurement of the underlying hedge transaction which also impacts the same line item in the consolidated statements of operations and comprehensive income.

The Company maintains a risk management strategy that may incorporate the use of swap contracts, put options, forward exchange contracts, interest rate swaps, and cross-currency swaps to minimize significant fluctuation in cash flows and/or earnings that are caused by oil and natural gas prices, exchange rate or interest rate volatility.

Foreign currency translation

The U.S. dollar is the functional currency for all of the Company's consolidated operations and those of its equity affiliates except for the Guadeloupe power plant and the Company's operations in New Zealand. For those entities, all gains and losses from currency translations are included within the line item "Derivatives and foreign currency transaction gains (losses)" within the consolidated statements of operations and comprehensive income (loss). The Euro and New Zealand Dollar are the functional currencies of the Guadeloupe power plant and the Company's operations in New Zealand, respectively, and thus the impact from currency translation adjustments in those locations are included as currency translation adjustments in Accumulated other comprehensive income in the consolidated statements of equity and in comprehensive income. The accumulated currency translation adjustments amounted to \$(0.9) million and \$1.5 million as of December 31, 2020 and 2019, respectively.

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Comprehensive income (loss) reporting

Comprehensive income (loss) includes net income or loss plus other comprehensive income (loss), which for the Company consists of changes in unrealized gains or losses in respect of the Company's share in derivatives instruments of an unconsolidated investment, foreign currency translation adjustments and changes in respect of derivative instruments designated as a cash flow hedge. The changes in foreign currency translation adjustments during the years ended December 31, 2020, 2019 and 2018 were immaterial and the changes in the Company's share in derivative instruments of unconsolidated investment and gains or losses in respect of derivative instruments designated as a cash flow hedge are disclosed under Note 5 – Investment in unconsolidated companies and Note 7 - Fair value of financial instruments, respectively, to the consolidated financial statements.

Power purchase agreements

Substantially all of the Company's Electricity revenues are recognized pursuant to PPAs in the United States and in various foreign countries, including Kenya, Guatemala, Guadeloupe and Honduras. These PPAs generally provide for the payment of energy payments or both energy and capacity payments through their respective terms which expire in varying periods from 2022 to 2047. Generally, capacity payments are calculated based on the amount of time that the power plants are available to generate electricity. The energy payments are calculated based on the amount of electrical energy delivered at a designated delivery point. The price terms are customary in the industry and include, among others, a fixed price, SRAC (the incremental cost that the power purchaser avoids by not having to generate such electrical energy itself or purchase it from others), and a fixed price with an escalation clause that includes the value for environmental attributes, known as renewable energy credits. Certain of the PPAs provide for bonus payments in the event that the Company is able to exceed certain target levels and potential payments by the Company if it fails to meet minimum target levels. The Company has PPAs that give the power purchaser or its designee a right of first refusal or a right of first offer to acquire the geothermal power plants at fair market value as negotiated between the parties. One of the Company's subsidiaries in Guatemala sells power at an agreed upon price subject to terms of a "take or pay" PPA.

Pursuant to the terms of certain of the PPAs, the Company may be required to make payments to the relevant power purchaser under certain conditions, such as shortfall in delivery of renewable energy and energy credits, and not meeting certain performance threshold requirements, as defined in the relevant PPA. The amount of payment required is dependent upon the level of shortfall in delivery or performance requirements and is recorded in the period the shortfall occurs. In addition, if the Company does not meet certain minimum performance requirements, the capacity of the power plant may be permanently reduced.

Revenues and cost of revenues

Upon adoption of ASU 2014-09, Revenue from Contracts with Customers (Topic 606) on January 1, 2018, revenues from contracts with customers are recognized in connection with the transfer of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. Specifically, the Company is required to apply each of the following steps: (1) identify the contract(s) with the customer; (2) identify the performance obligations in the contracts; (3) determine the transaction price; (4) allocate the transaction price to the performance obligations in the contract; and (5) recognize revenue when (or as) the entity satisfies a performance obligation.

Revenues are primarily related to: (i) sale of electricity from geothermal and recovered energy-based power plants owned and operated by the Company; (ii) geothermal and recovered energy-based power plant equipment engineering, sale, construction and installation, and operating services and (iii) Energy storage services as well as services relating to the engineering, procurement, construction, operation and maintenance of energy storage units.

Electricity segment revenues: Revenues related to the sale of electricity from geothermal and recovered energy-based power plants and capacity payments are recorded based upon output delivered and capacity provided at rates specified under relevant contract terms. The Company assesses whether PPAs entered into, modified, or acquired in business combinations contain a lease element requiring lease accounting. Revenue from such PPAs are accounted for in electricity revenues. In the Electricity segment, revenues for all but five power plants are accounted as operating leases, and therefore equipment related to geothermal and recovered energy generation power plants as described in Note 8 is considered held for leasing. For power plants in the scope of ASC 606, the Company identified electricity as a separate performance obligation. Performance obligations identified were evaluated and determined to be satisfied over time and qualified for the invoicing practical expedient since the invoiced amounts reasonably represents the value to customers of performance obligations fulfilled to date. The transaction price is determined based on the price per actual mega-watt output or available capacity as agreed to in the respective PPA. Customers are generally billed on a monthly basis and payment is typically due within 30 to 60 days after the issuance of the invoice.

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Product segment revenues: Revenues from engineering, operating services, and parts and product sales are recorded upon providing the service or delivery of the products and parts and when collectability is reasonably assured. Revenues from the supply and/or construction of geothermal and recovered energy-based power plant equipment and other equipment to third parties are recognized over time since control is transferred continuously to the Company's customers. The majority of the Company's contracts include a single performance obligation which is essentially the promise to transfer the individual goods or services that are not separately identifiable from other promises in the contracts and therefore deemed as not distinct. Performance obligations are satisfied over-time if the customer receives the benefits as we perform work, if the customer controls the asset as it is being constructed, or if the product being produced for the customer has no alternative use and the Company has a contractual right to payment. In the Company's Product segment, revenues are spread over a period of one to two years and are recognized over time based on the cost incurred to date in ratio to total estimated costs which represents the input method that best depicts the transfer of control over the performance obligation to the customer. Costs include direct material, labor, and indirect costs. Provisions for estimated losses on uncompleted contracts are made in the period in which such losses are determined.

In contracts for which the Company determines that control is not transferred continuously to the customer, the Company recognizes revenues at the point in time when the customer obtains control of the asset. Revenues for such contracts are recorded upon delivery and acceptance by the customer. This generally is the case for the sale of spare parts, generators or similar products.

Accounting for product contracts that are satisfied over time includes use of several estimates such as variable consideration related to bonuses and penalties and total estimated cost for completing the contract. The estimated amount of variable consideration will be included in the transaction price only to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. These estimates are based on historical experience, anticipated performance and the Company's best judgment at the time.

The nature of the Company's product contracts give rise to several modifications or change requests by its customers. Substantially all of the modifications are treated as cumulative catch-ups to revenues since the additional goods are not distinct from those already provided. The Company includes the additional revenues related to the modifications in its transaction price when both parties to the contract approved the modification. As a significant change in one or more of these estimates could affect the profitability of the Company's contracts, the Company reviews and updates its contract-related estimates regularly. If at any time the estimate of contract profitability indicates an anticipated loss on the contract, the Company recognizes the total loss in the period in which it is identified.

Energy Storage segment revenues: Battery energy storage systems as a service, demand-response and energy management related services revenues are recorded based on energy management of load curtailment capacity delivered or service provided at rates specified under the relevant contract terms. The Company determined that such revenues are in the scope of ASC 606 and identified energy management services as a separate performance obligation. Performance obligations are satisfied once the Company provides verification to the electric power grid operator or utility of its ability to meet the committed capacity, the power curtailment requirements or the ancillary services and thus entitled to cash proceeds. Such verification may be provided by the Company bi-weekly, monthly or under any other frequency as set by the related program and are typically followed by a payment shortly after. Performance obligations identified were evaluated and determined to be satisfied over time and qualified for the invoicing practical expedient since the amounts included in the verification document reasonably represent the value of performance obligations fulfilled to date. The transaction price is determined based on mechanisms specified in the contract with the customer.

Contract assets related to the Company's Product segment reflect revenues recognized and performance obligations satisfied in advance of customer billing. Contract liabilities related to the Company's Product segment reflect payments received in advance of the satisfaction of performance under the contract. The Company receives payments from customers based on the terms established in the contracts. Total contract assets and contract liabilities as of December 31, 2020 and 2019 are as follows:

	December 31, 2020	December 31, 2019
	(Dollars in thousands)	
Contract assets (*)	\$ 24,544	\$ 38,365
Contract liabilities (*)	\$ (11,179)	\$ (2,755)

(*) Contract assets and contract liabilities are presented as "Costs and estimated earnings in excess of billings on uncompleted contracts" and "Billings in excess of costs and estimated earnings on uncompleted contracts", respectively, on the consolidated balance sheets. The contract liabilities balance at the beginning of the year was fully recognized as product revenues during the years ended December 31, 2020 and 2019 as a result of performance obligations satisfied.

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The following table presents the significant changes in the contract assets and contract liabilities for the years ended December 31, 2020 and 2019:

	Years Ended December 31,			
	2020		2019	
	Contract assets	Contract liabilities	Contract assets	Contract liabilities
	(Dollars in thousands)			
Recognition of contract liabilities as revenue as a result of performance obligations satisfied	\$ —	\$ 5,336	\$ —	\$ 12,675
Cash received in advance for which revenues have not yet recognized, net of expenditures made	—	(11,177)	—	(3,323)
Reduction of contract assets as a result of rights to consideration becoming unconditional	(145,548)	—	(130,918)	—
Contract assets recognized, net of recognized receivables	129,144	—	133,448	—
Net change in contract assets and contract liabilities	<u>\$ (16,404)</u>	<u>\$ (5,841)</u>	<u>\$ 2,530</u>	<u>\$ 9,352</u>

The timing of revenue recognition, billings and cash collections results in accounts receivable, contract assets and contract liabilities on the consolidated balance sheet. In the Company's Products segment, amounts are billed as work progresses in accordance with agreed-upon contractual terms, or upon achievement of contractual milestones. Generally, billing occurs subsequent to the recognition of revenue, resulting in contract assets. However, the Company sometimes receives advances or deposits from its customers before revenue can be recognized, resulting in contract liabilities. These assets and liabilities are reported on the consolidated balance sheet on a contract-by-contract basis at the end of each reporting period. The timing of billing its customers and receiving advance payments vary from contract to contract. The majority of payments are received no later than the completion of the project and satisfaction of the Company's performance obligation.

On December 31, 2020, the Company had approximately \$33.4 million of remaining performance obligations not yet satisfied or partly satisfied related to its Product segment. The Company expects to recognize approximately 100% of this amount as Product revenues during the next 24 months.

The following schedule reconciles revenues accounted under lease accounting, and ASC 606, Revenues from Contracts with Customers, to total consolidated revenues for the years ended December 31, 2020 and 2019:

	Year Ended December 31,	
	2020	2019
	(Dollars in thousands)	
Electricity revenues accounted under lease accounting	\$ 473,260	\$ 479,059
Electricity, Product and Energy Storage revenues accounted under ASC 606	232,082	266,985
Total consolidated revenues	<u>\$ 705,342</u>	<u>\$ 746,044</u>

Disaggregated revenues from contracts with customers for the years ended December 31, 2020 and 2019 are disclosed under Note 18 - Business Segments, to the consolidated financial statements.

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Leases

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842). This standard introduced a number of changes and simplified previous guidance, primarily the recognition of lease assets and lease liabilities by lessees for those leases classified as operating leases. The standard retained the distinction between finance leases and operating leases and the classification criteria between the two types remains substantially similar. Also, lessor accounting remained largely unchanged from previous guidance. However, key aspects of the new standard were aligned with the revenue recognition guidance in Topic 606. Additionally, the standard defined a lease as a contract, or part of a contract, that conveys the right to control the use of an identified asset for a period of time in exchange for consideration. Control over the use of the identified asset means that the customer has both (a) the right to obtain substantially all of the economic benefits from the use of the asset and (b) the right to direct the use of the asset. The Company adopted this new standard as of January 1, 2019 using the modified retrospective approach and accordingly recognized a cumulative-effect adjustment to the opening balance of retained earnings, which was an immaterial amount, with no restatement of comparative information.

The Company is a lessee in operating lease transactions primarily consisting of land leases for its exploration and development activities. Additionally, the Company is a lessee in finance lease transactions primarily consisting of fleet vehicles and office rentals. As further described above under Revenues and cost of revenues, the Company acts as a lessor in PPAs that are accounted under ASC 842, Leases.

In accordance with the new standard, for agreements in which the Company is the lessee, the Company applies a unified accounting model by which it recognizes a right-of-use asset ("ROU") and a lease liability at the commencement date of the lease contract for all the leases in which the Company has a right to control identified assets for a specified period of time. The classification of the lease as a finance lease or an operating lease determines the subsequent accounting for the lease arrangement.

Upon the adoption of the new standard the Company, both as a lessee and as a lessor, chose to apply the following permitted practical expedients:

1. Not reassess whether any existing contracts are or contain a lease;
2. Not reassess the classification of leases that commenced before the effective date (for example, all existing leases that were classified as operating leases in accordance with Topic 840 continued to be classified as operating leases, and all existing leases that were classified as capital leases in accordance with Topic 840 continued to be classified as finance leases);
3. Exclude initial direct costs from measurement of the ROU asset at the date of initial application;
4. Applying the practical expedient (for a lessor) to not separate non-lease components accounted for under Topic 606 from lease components and, instead, to account for each separate lease component and the non-lease components associated with that lease as a single component. If the non-lease components are the predominant components, the Company will account for the combined component as a single performance obligation entirely in accordance with Topic 606. Otherwise, the combined component will be accounted as an operating lease entirely in accordance with the new standard.
5. Applying the practical expedient (for a lessee) regarding the recognition and measurement of short-term leases, for leases for a period of up to 12 months from the commencement date. Instead, the Company continued to recognize the lease payments for those leases in profit or loss on a straight-line basis over the lease term.

Since the Company elected to apply the practical expedients above, it applied the new standard to all contracts entered into before January 1, 2019 and identified as leases in accordance with Topic 840.

The new significant accounting policies regarding leases that were applied as from January 1, 2019 following the application of the new standard are as follows:

1. Determining whether an arrangement contains a lease

On the inception date of the lease, the Company determines whether the arrangement is a lease or contains a lease, while examining if it conveys the right to control the use of an identified asset for a period of time in exchange for consideration.

2. The Company as a lessee

a. Lease classification:

At the commencement date, a lease is a finance lease if it meets any one of the criteria below; otherwise the lease is an operating lease:

- The lease transfers ownership of the underlying asset to the lessee by the end of the lease term.
- The lease grants the lessee an option to purchase the underlying asset that the lessee is reasonably certain to exercise.
- The lease term is for the major part of the remaining economic life of the underlying asset.
- The present value of the sum of the lease payments and any residual value guaranteed by the lessee that is not already reflected in the lease payments equals or exceeds substantially all of the fair value of the underlying asset.
- The underlying asset is of such a specialized nature that it is expected to have no alternative use to the lessor at the end of lease term.

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b. Leased assets and lease liabilities - initial recognition

Upon initial recognition, the Company recognizes a liability at the present value of the lease payments to be made over the lease term, and concurrently recognizes a ROU asset at the same amount of the liability, adjusted for any prepaid or accrued lease payments, plus initial direct costs incurred in respect of the lease. Since the interest rate implicit in the lease is not readily determinable, the incremental borrowing rate of the Company is used. The subsequent measurement depends on whether the lease is classified as a finance lease or an operating lease.

c. The lease term

The lease term is the non-cancellable period of the lease plus periods covered by an extension or termination option if it is reasonably certain that the Company will exercise the option.

d. Subsequent measurement of operating leases

After lease commencement, the Company measures the lease liability at the present value of the remaining lease payments using the discount rate determined at lease commencement (as long as the discount rate has not been updated as a result of a reassessment event).

The Company subsequently measures the ROU asset at the present value of the remaining lease payments, adjusted for the remaining balance of any lease incentives received, any cumulative prepaid or accrued rent if the lease payments are uneven throughout the lease term and any unamortized initial direct costs.

Further, the Company will recognize lease expense on a straight-line basis over the lease term.

e. Subsequent measurement of finance leases

After lease commencement, the Company measures the lease liability by increasing the carrying amount to reflect interest on the lease liability and reducing the carrying amount to reflect the lease payments made during the period. The Company shall determine the interest on the lease liability in each period during the lease term as the amount that produces a constant periodic discount rate on the remaining balance of the liability, taking into consideration the reassessment requirements.

After lease commencement, the Company measures the ROU assets at cost less any accumulated amortization and any accumulated impairment losses, taking into consideration the reassessment requirements. The Company amortizes the ROU asset on a straight-line basis, unless another systematic basis better represents the pattern in which the Company expects to consume the ROU asset's future economic benefits. The ROU asset is amortized over the shorter of the lease term or the useful life of the ROU asset as follows:

	(in years)
Vehicles	5
Building	15

The total periodic expense (the sum of interest and amortization expense) of a finance lease is typically higher in the early periods and lower in the later periods.

f. Variable lease payments:

Variable lease payments that depend on an index or a rate

On the commencement date, the lease payments may include variability and depend on an index or a rate (such as the Consumer Price Index or a market interest rate). The Company does not remeasure the lease liability for changes in future lease payments arising from changes in an index or rate unless the lease liability is remeasured for another reason. Therefore, after initial recognition, such variable lease payments are recognized in profit or loss as they are incurred.

Other variable lease payments:

Variable payments that depend on performance or use of the underlying asset are not included in the lease payments. Such variable payments are recognized in profit or loss in the period in which the event or condition that triggers the payment occurs.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. The Company as a lessor

At lease commencement, the Company as a lessor classifies leases as either finance or operating leases. Finance leases are further classified as a sales-type lease or as a direct financing lease.

Under an operating lease, the Company recognizes the lease payment as income over the lease term, generally on a straight-line basis or as earned.

2. Impact of the new standard

- a) The effects of the initial application of the new standard on the Company's consolidated balance sheet as of January 1, 2019 are as follows:

	According to the previous accounting policy	The change (Dollars in thousands)	As presented according to Topic 842
As of January 1, 2019:			
Prepaid expenses and other	\$ 51,441	\$ (35,385)	\$ 16,056
Deferred financing and lease costs, net	3,242	(1,659)	1,583
Property, plant and equipment, net	1,959,578	(12,855)	1,946,723
Operating leases right of use	—	62,244	62,244
Finance leases right of use	—	13,476	13,476
Accounts payable and accrued expenses	116,362	(2,860)	113,502
Current maturity of operating lease liabilities	—	7,532	7,532
Current maturity of finance lease liabilities	—	2,841	2,841
Other long-term liabilities	16,087	(9,970)	6,117
Long term portion of operating lease liabilities	—	17,668	17,668
Long term portion of finance lease liabilities	—	10,668	10,668
Retained earnings	422,222	(58)	422,164

The operating leases right of use is higher than the related lease liabilities as a result of prepayments of leases, including the Puna lease and deferred financing lease costs.

- a) A weighted-average nominal incremental interest rate of 5% and 5% was used to discount future lease payments in the calculation of the lease liabilities in respect of operating leases and in respect of finance leases, respectively.

Termination fee

Fees to terminate PPAs are recognized in the period incurred as selling and marketing expenses. During 2018, the Company signed a termination agreement with NV Energy, Inc. for the Galena 2 PPA under which it agreed to pay a termination fee of approximately \$5 million which was recorded under Selling and marketing expenses in 2018. In 2020 and 2019, no termination fees were incurred.

Warranty on products sold

The Company generally provides a one to two year warranty against defects in workmanship and materials related to the sale of products for electricity generation. The Company considers the warranty to be an assurance type warranty since the warranty provides the customer the assurance that the product complies with agreed-upon specifications. Estimated future warranty obligations are included in operating expenses in the period in which the related revenue is recognized. Such charges are immaterial for the years ended December 31, 2020, 2019 and 2018.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Research and development

Research and development costs incurred by the Company for the development of existing and new geothermal and recovered energy power plants as well as storage related technologies are expensed as incurred.

Stock-based compensation

The Company accounts for stock-based compensation using the fair value method whereby compensation cost is measured at the grant date, based on the calculated fair value of the award, and is recognized as an expense over the requisite employee service period (generally the vesting period of the grant). The Company uses the Complex Lattice, Three-based Option Pricing model to calculate the fair value of the stock-based compensation awards.

Tax monetization Transactions

The Company has three tax monetization transactions, Opal Geo, Tungsten and McGinness Hills 3 as further described under Note 13 – Tax monetization transactions to the consolidated financial statements. The purpose of these transactions is to form tax partnerships, whereby investors provide cash in exchange for equity interests that provide the holder a right to the majority of tax benefits associated with a renewable energy project. The Company accounts for a portion of the proceeds from the transaction as debt under ASC 470. Given that a portion of these transactions is structured as a purchase of an equity interest the Company also classifies a portion as noncontrolling interest consistent with guidance in ASC 810. The portion recorded to noncontrolling interest is initially measured as the fair value of the discounted tax attributes and cash distributions which represents the partner's residual economic interest. The residual proceeds are recognized as the initial carrying value of the debt which is classified as a liability associated with the sale of tax benefits. The Company applies the effective interest rate method to the liability associated with the tax monetization transaction component as described by ASC 835 and CON 7. The tax benefits and cash distributions realized by the partner each period are treated as the debt servicing amounts, with the tax benefit amounts giving rise to income attributable to the sale of tax benefits. The deferred transaction costs are capitalized and amortized using the effective interest method.

Income taxes

Income taxes are accounted for using the asset and liability approach, which requires the recognition of taxes payable or refundable for the current year and deferred tax assets and liabilities for the future tax consequences of events that have been recognized in the Company's financial statements or tax returns. The measurement of current and deferred tax assets and liabilities are based on provisions of the enacted tax law. The Company accounts for investment tax credits and production tax credits as a reduction to income taxes in the year in which the credit arises. The measurement of deferred tax assets is reduced, if necessary, by the amount of any tax benefits that, based on available evidence, are more likely than not expected to be realized. A partial valuation allowance has been established to offset the Company's U.S. deferred tax assets. Tax benefits from uncertain tax positions are recognized only if it is more likely than not that the tax position will be sustained on examination by the taxing authorities, based on the technical merits of the position. Interest and penalties assessed by taxing authorities on an underpayment of income taxes are included as a component of income tax provision in the consolidated statements of operations and comprehensive income.

The FASB released guidance Staff Q&A, Topic 740, No. 5, that states a company can make an accounting policy election to either recognize deferred taxes related to GILTI or to provide for the GILTI tax expense in the year the tax is incurred as a period cost. The Company has elected to treat any GILTI inclusions as a period cost. The Company has elected and applied the tax law ordering approach when considering GILTI as part of its valuation allowance.

Earnings per share

Basic earnings per share attributable to the Company's stockholders ("earnings per share") is computed by dividing net income or loss attributable to the Company's stockholders by the weighted average number of shares of common stock outstanding for the period. The Company does not have any equity instruments that are dilutive, except for stock-based awards.

The table below shows the reconciliation of the number of shares used in the computation of basic and diluted earnings per share:

	Year Ended December 31,		
	2020	2019	2018
	(In thousands)		
Weighted average number of shares used in computation of basic earnings per share	51,567	50,867	50,643
Add:			
Additional shares from the assumed exercise of employee stock options	370	360	326
Weighted average number of shares used in computation of diluted earnings per share	51,937	51,227	50,969

The number of stock-based awards that could potentially dilute future earnings per share and were not included in the computation of diluted earnings per share because to do so would have been anti-dilutive was 369.7 thousand, 360.5 thousand, and 176.4 thousand, respectively, for the years ended December 31, 2020, 2019 and 2018.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Use of estimates in preparation of financial statements

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the dates of such financial statements and the reported amounts of revenues and expenses during the reporting periods. Actual results could differ from those estimates. The most significant estimates with regard to the Company's consolidated financial statements relate to the useful lives of property, plant and equipment, impairment of goodwill and long-lived assets, including intangible assets, revenue recognition of product sales using the percentage of completion method, asset retirement obligations, and the provision for income taxes.

Redeemable noncontrolling interest

Redeemable noncontrolling interest relates to a certain noncontrolling shareholder in a subsidiary having an option to sell its equity interest to the Company. Changes in the carrying amount of the Company's Redeemable noncontrolling interest were as follows:

	2020	2019
	(Dollars in thousands)	
Redeemable noncontrolling interest as of January 1,	\$ 9,250	\$ 8,603
Redeemable noncontrolling interest in results of operation of a consolidated subsidiary	1,330	1,132
Cash paid to noncontrolling interest	(1,779)	(252)
Currency translation adjustments	1,029	(233)
Redeemable noncontrolling interest as of December 31,	\$ 9,830	\$ 9,250

Cash dividends

During the years ended December 31, 2020, 2019 and 2018, the Company's Board of Directors (the "Board") declared, approved, and authorized the payment of cash dividends in the aggregate amount of \$22.5 million (\$0.44 per share), \$22.4 million (\$0.44 per share), and \$26.8 million (\$0.53 per share), respectively. Such dividends were paid in the years declared.

Stockholders' equity offering

On November 18, 2020, the Company entered into an underwriting agreement with J.P. Morgan Securities LLC and BofA Securities, Inc., as representatives of the several underwriters listed therein (the "Underwriters"), in connection with a public offering, pursuant to which the Company agreed to issue and sell 4,150,000 shares of common stock, par value \$0.001 per share at a public offering price of \$74.00 per share. In addition, the Company granted the Underwriters a 30-day option to purchase an additional 622,500 shares of common stock at the public offering price of \$74.00 per share which was fully exercised by the Underwriters on November 30, 2020. The total net proceeds from the offering were approximately \$339.5 million, after deducting underwriting discounts, commissions and offering expenses.

COVID-19 consideration

In March 2020, the World Health Organization declared the outbreak of the novel coronavirus ("COVID-19") a pandemic. The Company has implemented significant measures in order to meet government requirements and preserve the health and safety of its employees, including by working remotely and adopting separate shifts in its power plants, manufacturing facilities and other locations while at the same time trying to continue operations at close to full capacity in all locations. In addition, the Company focused efforts to adjusting its operations to mitigate the impact of COVID-19 including managing its global supply chain risks and enhancing its liquidity profile. The Company took prompt steps to manage its expenses including responsible cost cutting measures and in addition, in order to support its capital expenditure and growth plans, the Company raised more than \$400 million through long term loans as further described under Note 11, Long-term Debt to the consolidated financial statements and common stock issuance of approximately \$339.5 million as further described above. As most of the Company's Electricity revenues are generated under long term contracts, the majority of which are under a fixed energy rate, the impact of COVID-19 on Electricity revenues was limited. Nevertheless, the Company received notices declaring a force majeure event in Kenya from KPLC and in Honduras from ENEE, both of which had an immaterial impact and were ultimately removed during the year. In addition, the Company experienced a higher rate of curtailments during the first half of 2020 from KPLC in respect of its Olkaria complex that were reduced in the second half of 2020. In the Product segment, the company experienced delays and significant cost increases in one of the projects which adversely impacted its results of operations in 2020. In addition, the Company experienced a decline in product backlog, which it believes resulted mainly due to the impact of COVID-19 and the unwillingness of potential customers to enter into new commitments at this time. In the Energy Storage segment, revenues are generated primarily from participating in the energy and ancillary services markets and therefore are directly impacted by the prevailing energy prices in those markets.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

While the extent and duration of the economic downturn from the COVID-19 pandemic remains unclear, the Company has considered, among other things, whether the global operational disruptions indicate a change in circumstances that may trigger asset impairments and whether it needs to revisit accounting estimates and projections or its expectations about collectability of receivables. Additionally, the Company has considered the potential impact on its fair value disclosures and on its internal control over financial reporting and while significant uncertainty still exists concerning the magnitude of the impact and duration of the COVID-19 pandemic on the global economy, the Company has determined that there was no triggering event for an impairment with respect to any of its assets nor has there been an adverse change in the probability related to the collectability of its receivables. The Company continues to assess the potential impact of the global economic situation on its consolidated financial statements.

Puna Power Plant

On May 3, 2018, the Kilauea volcano located in close proximity to the Company's Puna 38 MW geothermal power plant in the Puna district of Hawaii's Big Island erupted following a significant increase in seismic activity in the area. Before it stopped flowing, the lava covered the wellheads of three geothermal wells, monitoring wells and the substation of the Puna complex and an adjacent warehouse that stored a drilling rig that was also consumed by the lava. The insurance policy coverage for property and business interruption is provided by a consortium of insurers some of which denied the full amount of our claim asserting that our insurance policy has coverage limitations. During 2020, the Company recognized business insurance income of \$28.6 million which was included in cost of revenues up to the amount covering the related costs and the remainder, totaling \$20.7 million, was included as a business interruption insurance income under operating expenses in the consolidated statements of operations and comprehensive income. Additionally, during 2020, the Company received \$4.7 million in property damage insurance proceeds of which \$0.6 was recorded in the statements of operations and comprehensive income under non-operating income. The Company has filed a lawsuit against the insurers that do not accept its claim.

As of February 2021, the Puna power plant that was shut down following the Kilauea volcano eruption in May 2018, has resumed operation and currently is operating at approximately 13 MW. On the field side, the Company connected one new production well to the power plant and the Company continues its field recovery work, which includes drilling new wells and expects a gradual increase in generation to full capacity by the middle of 2021, assuming field recovery is successfully achieved.

The Company continues to assess the accounting implications of this event on the assets and liabilities on its balance sheet and whether an impairment will be required. As of December 31, 2020, no impairment was required.

New Accounting Pronouncements

New accounting pronouncements effective in the year ended December 31, 2020

Financial Instruments—Credit Losses

In June 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standard Update ("ASU") 2016-13, Financial Instruments-Credit Losses (Topic 326) - Measurement of Credit Losses on Financial Instruments. This guidance replaces the current incurred loss impairment methodology. Under the new guidance, on initial recognition and at each reporting period, an entity is required to recognize an allowance that reflects its current estimate of credit losses expected to be incurred over the life of the financial instrument based on historical experience, current conditions and reasonable and supportable forecasts. In November 2018, the FASB issued ASU 2018-19, Codification Improvements to Topic 326, Financial Instruments - Credit Losses. ASU 2018-19 clarifies that receivables from operating leases are accounted for using the lease guidance and not as financial instruments. The guidance became effective on January 1, 2020, including interim periods within that year and requires a modified retrospective transition approach through a cumulative-effect adjustment to retained earnings as of the beginning of the period of adoption. Under the modified retrospective method of adoption, prior year reported results are not restated. The Company has performed its analysis of the impact on its financial instruments that are within the scope of this guidance, primarily cash and cash equivalents and restricted cash and cash equivalents, receivables (excluding those accounted under lease accounting) and costs and estimated earnings in excess of billings on uncompleted contracts, based on class of financing receivables which share the same or similar risk characteristics such as customer type and geographic location, among others. The Company has estimated the expected credit losses for each class of financing receivables by applying the related corporate default rate which corresponds to the credit rating of the specific customer or class of financing receivables. For trade receivables, the Company applied this methodology using aging schedules reflecting how long the receivables have been outstanding. The Company has also considered the existence of credit enhancement arrangements that may mitigate the credit risk of its financial receivables in estimating the applicable corporate default rate. The Company adopted this update effective January 1, 2020 and recorded a cumulative-effect adjustment to its retained earnings as of that date of approximately \$0.8 million. While significant uncertainty still exists concerning the magnitude of the impact and duration of the COVID-19 pandemic on the global economy, the Company considered the current and expected future economic and market conditions surrounding the COVID-19 pandemic and determined that the estimate of credit losses was not significantly impacted.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The following table describes the changes in the allowance for expected credit losses for the year ended December 31, 2020 (all related to trade receivables):

	Year Ended December 31, 2020
	(Dollars in thousands)
Beginning balance of the allowance for expected credit losses	\$ 755
Change in the provision for expected credit losses for the period	(158)
Ending balance of the allowance for expected credit losses	<u>\$ 597</u>

Reference Rate Reform

In March 2020, the FASB issued ASU 2020-04, Reference Rate Reform (Topic 848). The amendments in this update provide optional guidance for a limited period of time to ease the potential burden in accounting for (or recognizing the effects of) reference rate reform on financial reporting as the London Interbank Offered Rate ("LIBOR") reference rate is scheduled to be discontinued on December 31, 2021. The amendments in this update provide optional expedients and exceptions for applying generally accepted accounting principles to contracts, hedging relationships and other transactions affected by reference rate reform if certain criteria are met. The amendments in this update apply only to contracts, hedging relationships, and other transactions that reference LIBOR or another reference rate expected to be discontinued because of reference rate reform. Modifications of contracts within the scope of Topic 470, Debt, should be accounted for by prospectively adjusting the effective interest rate. The amendments in this Update are effective for all entities as of March 12, 2020 through December 31, 2022. An entity may elect to apply the amendments for contract modifications by Topic or Industry Subtopic as of any date from the beginning of an interim period that includes or is subsequent to March 12, 2020, or prospectively from a date within an interim period that includes or is subsequent to March 12, 2020, up to the date that the financial statements are available to be issued. Once elected for a Topic or an Industry Subtopic, the amendments in this Update must be applied prospectively for all eligible contract modifications for that Topic or Industry Subtopic. The Company evaluated the impact of the transition from LIBOR, and currently believes that the transition will not have a material impact on its consolidated financial statements.

New accounting pronouncements effective in future periods

Accounting for Income Taxes

In December 2019, the FASB issued ASU 2019-12, Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes. ASU 2019-12 is intended to simplify the accounting for income taxes by removing certain exceptions to the general principles in ASC 740. The standard is effective for annual periods beginning after December 15, 2020 and interim periods within. Early adoption is permitted. The Company has not early adopted ASU 2019-12 as of December 31, 2020 but does not anticipate the adoption of ASU 2019-12 to have a material impact on its consolidated financial statements.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 2 —BUSINESS ACQUISITIONS AND OTHERS

Energy storage assets portfolio purchase transaction

On July 20, 2020, the Company completed the acquisition of 100% of the 20MW/80MWh Pomona Energy Storage ("Pomona") facility in California from Alta Gas Power Holdings (U.S.) Inc. for a total consideration of \$43.4 million. The Pomona facility has been in commercial operation since December 2016 under a 10-year energy storage resource agreement with Southern California Edison Company ("SCE").

The Pomona facility is the Company's first battery storage asset in California. The purchase increases the Company's operating portfolio to 73MW/136MWh and adds to its other battery storage assets located in New Jersey, New England and Texas.

The Company accounted for the transaction in accordance with Accounting Standard Codification ("ASC") 805, Business Combinations and following the transaction close date, consolidated the results of Pomona in accordance with ASC 810, Consolidation in its consolidated financial statements.

The following table summarizes the purchase price allocation to the fair value of the assets acquired and liabilities assumed (in millions):

Trade and other receivables	\$ 1.0
Property, plant and equipment, net	20.1
Intangible assets (1)	20.4
Goodwill (2)	4.1
Total assets acquired	\$ 45.6
 Liabilities assumed	 \$ (2.2)
 Total assets acquired and liabilities assumed, net	 \$ 43.4

(1) Intangible assets of \$18.0 million are related to a long-term energy storage resource adequacy agreement with SCE and are depreciated over a period of approximately 6.5 years. The remaining \$2.4 million is related to certain other contract rights.

(2) Goodwill is primarily related to certain potential future economic benefits arising from assets acquired. Goodwill is allocated to the Energy Storage segment and is deductible for tax purposes.

The amounts of revenues and earnings related to Pomona that are included in the Company's consolidated statements of operations and comprehensive income for the year ended 2020 since the acquisition date are \$4.8 million and \$1.6 million respectively. Unaudited pro forma information is not included as the Company deemed the transaction to not qualify as a significant business combination.

Ijen transaction

On July 2, 2019, the Company agreed to acquire 49% in the Ijen geothermal project company from a subsidiary of Medco Power ("Medco"), which is party to a Power Purchase Agreement and holds a geothermal license to develop the Ijen project in East Java in Indonesia for a total consideration of approximately \$2.7 million. As part of the transaction, the Company committed to make additional funding for the exploration and development of the project, subject to specific conditions and during 2020 and 2019, the Company made additional cash investments of approximately \$21.0 million and \$7.4 million, respectively. Medco retains 51% ownership in the project company and the Company and Medco are developing the project jointly. The Company accounted for its investment in the Ijen geothermal project company under the equity method prescribed by ASC 323 - Investments - Equity Method and Joint Ventures.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
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USG transaction

On April 24, 2018, the Company completed the acquisition of USG. The total cash consideration (exclusive of transaction expenses) was approximately \$110 million, comprised of approximately \$106 million funded from available cash of Ormat Nevada Inc. (to acquire the outstanding shares of common stock of USG) and approximately \$4 million funded from available cash of USG (to cash-settle outstanding in-the-money options for common stock of USG). As a result of the acquisition, USG became an indirect wholly owned subsidiary of Ormat, and Ormat indirectly acquired, among other things, interests held by USG and its subsidiaries in:

- three operating power plants at Neal Hot Springs, Oregon; San Emidio, Nevada; and Raft River, Idaho with a total net generating capacity of approximately 38 MW; and
- development assets which include a project at the Geysers, California; a second phase project at San Emidio, Nevada; a greenfield project in Crescent Valley, Nevada; and the El Ceibillo project located near Guatemala City, Guatemala.

As a result of the acquisition, the Company expanded its overall generation capacity and improved the profitability of the purchased assets through cost reduction and synergies. The Company accounted for the transaction in accordance with Accounting Standard Codification ASC 805, Business Combinations and following the transaction, the Company consolidates USG, in accordance with Accounting Standard Codification ASC 810, Consolidation.

The following table summarizes the purchase price allocation to the fair value of the assets acquired and liabilities assumed (in millions):

Cash and cash equivalents and restricted cash	\$ 37.9
Property, plant and equipment and construction-in-process	77.3
Intangible assets (1)	127.0
Goodwill (2)	12.7
Deferred taxes	1.7
Total assets acquired	<u>\$ 256.6</u>
Other working capital	\$ (8.2)
Long-term term debt	(98.3)
Asset retirement obligation	(9.0)
Noncontrolling interest	(34.9)
Total liabilities assumed	<u>\$ (150.4)</u>
Total assets acquired, and liabilities assumed, net	<u>\$ 106.2</u>

(1) Intangible assets are primarily related to long-term electricity power purchase agreements and depreciated over an average of 19 years.

(2) Goodwill is primarily related to the expected synergies in operations as a result of the purchase transaction. The goodwill is allocated to the Electricity segment and not deductible for tax purposes.

The fair value of the noncontrolling interest of \$34.9 million reflects the 40% minority interests in the Neal Hot Springs project that was evaluated using the income approach. The fair value of the noncontrolling interest was based on the following significant inputs: (i) forecasted cash flows assumed to be generated in correspondence with the remaining life of the related power purchase agreement which is approximately 20 years; (ii) revenues were estimated in accordance with the price and generation capacity of the related power purchase agreement; (iii) assumed terminal value based on the realizable value of the project at the end of the power purchase agreement term; and (iv) assumed discount rate of approximately 9%.

Total Electricity revenues and operating profit related to the three USG power plants of approximately \$21.4 million and \$2.5 million, respectively, for the period started at the acquisition date to December 31, 2018 were included in the Company's consolidated statements of operations and comprehensive income for the year ended December 31, 2018. The following unaudited pro forma summary presents consolidated information of the Company as if the business combination had occurred on the beginning of the earliest year presented:

	Pro forma for the year ended December 31, 2018 (Dollars in thousands)
Electricity revenues	\$ 521,175
Total revenues	730,563
Income from continuing operations before income taxes and equity in losses of investees	134,142

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 3 — INVENTORIES

Inventories consist of the following:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Raw materials and purchased parts for assembly	\$ 14,835	\$ 21,942
Self-manufactured assembly parts and finished products	20,486	13,007
Total	<u>\$ 35,321</u>	<u>\$ 34,949</u>

NOTE 4 — COST AND ESTIMATED EARNINGS ON UNCOMPLETED CONTRACTS

Cost and estimated earnings on uncompleted contracts consist of the following:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Costs and estimated earnings incurred on uncompleted contracts	\$ 227,591	\$ 196,550
Less billings to date	(214,226)	(160,940)
Total	<u>\$ 13,365</u>	<u>\$ 35,610</u>

These amounts are included in the consolidated balance sheets under the following captions:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Costs and estimated earnings in excess of billings on uncompleted contracts	\$ 24,544	\$ 38,365
Billings in excess of costs and estimated earnings on uncompleted contracts	(11,179)	(2,755)
Total	<u>\$ 13,365</u>	<u>\$ 35,610</u>

The completion costs of the Company's construction contracts are subject to estimation. Due to uncertainties inherent in the estimation process, it is reasonably possible that estimated contract earnings will be further revised in the near term.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 5 — Investment in unconsolidated companies

Investment in unconsolidated companies mainly consists of the following:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Sarulla	\$ 67,451	\$ 70,589
Ijen	30,766	10,551
Total investment in unconsolidated companies	<u>\$ 98,217</u>	<u>\$ 81,140</u>

The Sarulla Complex

The Company holds a 12.75% equity interest in a consortium that developed the 330 MW Sarulla geothermal power plant project in Tapanuli Utara, North Sumatra, Indonesia. The Sarulla project is comprised of three separately constructed 110 MW units, the most recent of which, NIL 2, was completed in April 2018. The Sarulla project is owned and operated by the consortium members under the framework of a joint operating contract and energy sales contract that were both executed on April 4, 2013. Under the joint operating contract, PT Pertamina Geothermal Energy, the concession holder for the project, provided the consortium with the right to use the geothermal field, and under the energy sales contract, PT PLN, the state electric utility, is the off-taker at the Sarulla complex for a period of 30 years.

During the years ended December 31, 2020, 2019 and 2018, the Company made additional cash equity investments in the Sarulla complex of approximately \$0.0 million, \$0.0 million and \$3.8 million, respectively, for a total of \$62.0 million since inception.

The Sarulla consortium entered into interest rate swap agreements with various international banks, effective as of June 4, 2014, and accounted for the interest rate swap as a cash flow hedge upon which changes in the fair value of the hedging instrument, relative to the effective portion, are recorded in other comprehensive income. The Company's share of such gains (losses) recorded in other comprehensive income (loss) are as follows:

	Year Ended December 31,	
	2020	2019
	(Dollars in thousands)	
Change, net of deferred tax, in unrealized gains (losses) in respect of the Company's share in derivative instruments of unconsolidated investment	<u>\$ (3,975)</u>	<u>\$ (3,417)</u>

The related accumulated loss recorded by the Company under accumulated other comprehensive income (loss) as of December 31, 2020 and 2019 was \$10.3 million and \$6.3 million, respectively.

The Sarulla power plant complex has been experiencing a certain reduction in generation primarily due to well field issues at one of its power plants. To address this issue, the project is expected to implement a remediation plan in 2021. The Company determined that the reduction in generation is not considered "Other than temporary" and therefore no impairment testing was required.

The Ijen Project

For details on the Ijen project, please see Note 2 to the consolidated financial statements under the heading "Ijen transaction".

NOTE 6 — VARIABLE INTEREST ENTITIES

The Company's overall methodology for evaluating transactions and relationships under the variable interest entity ("VIE") accounting and disclosure requirements includes the following two steps: (i) determining whether the entity meets the criteria to qualify as a VIE; and (ii) determining whether the Company is the primary beneficiary of the VIE.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

In performing the first step, the significant factors and judgments that the Company considers in making the determination as to whether an entity is a VIE include:

- The design of the entity, including the nature of its risks and the purpose for which the entity was created, to determine the variability that the entity was designed to create and distribute to its interest holders;
- The nature of the Company's involvement with the entity;
- Whether control of the entity may be achieved through arrangements that do not involve voting equity;
- Whether there is sufficient equity investment at risk to finance the activities of the entity; and
- Whether parties other than the equity holders have the obligation to absorb expected losses or the right to receive residual returns.

If the Company identifies a VIE based on the above considerations, it then performs the second step and evaluates whether it is the primary beneficiary of the VIE by considering the following significant factors and judgments:

- Whether the Company has the power to direct the activities of the VIE that most significantly impact the entity's economic performance; and
- Whether the Company has the obligation to absorb losses of the entity that could potentially be significant to the VIE or the right to receive benefits from the entity that could potentially be significant to the VIE.

The Company's VIEs include certain of its wholly owned subsidiaries that own one or more power plants with long-term PPAs. In most cases, the PPAs require the utility to purchase substantially all of the plant's electrical output over a significant portion of its estimated useful life. Most of the VIEs have associated project financing debt that is non-recourse to the general creditors of the Company, is collateralized by substantially all of the assets of the VIE and those of its wholly owned subsidiaries (also VIEs) and is fully and unconditionally guaranteed by such subsidiaries. The Company has concluded that such entities are VIEs primarily because the entities do not have sufficient equity at risk and/or subordinated financial support is provided through the long-term PPAs. The Company has evaluated each of its VIEs to determine the primary beneficiary by considering the party that has the power to direct the most significant activities of the entity. Such activities include, among others, construction of the power plant, operations and maintenance, dispatch of electricity, financing and strategy. Except for power plants that it acquired, the Company is responsible for the construction of its power plants and generally provides operation and maintenance services. Primarily due to its involvement in these and other activities, the Company has concluded that it directs the most significant activities at each of its VIEs and, therefore, is considered the primary beneficiary. The Company performs an ongoing reassessment of the VIEs to determine the primary beneficiary and may be required to deconsolidate certain of its VIEs in the future. The Company has aggregated its consolidated VIEs into the following categories: (i) wholly owned subsidiaries with project debt; and (ii) wholly owned subsidiaries with PPAs.

The tables below detail the assets and liabilities (excluding intercompany balances which are eliminated in consolidation) for the Company's VIEs, combined by VIE classifications, that were included in the consolidated balance sheets as of December 31, 2020 and 2019:

	December 31, 2020	
	Project Debt	PPAs
	(Dollars in thousands)	
Assets:		
Restricted cash and cash equivalents	\$ 86,581	\$ —
Other current assets	133,017	30,917
Property, plant and equipment, net	1,208,165	770,055
Construction-in-process	27,440	171,372
Other long-term assets	156,000	60,143
Total assets	<u>\$ 1,611,203</u>	<u>\$ 1,032,487</u>
Liabilities:		
Accounts payable and accrued expenses	\$ 21,958	\$ 15,362
Long-term debt	730,177	—
Other long-term liabilities	143,985	39,486
Total liabilities	<u>\$ 896,120</u>	<u>\$ 54,848</u>

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	December 31, 2019	
	Project Debt	PPAs
	(Dollars in thousands)	
Assets:		
Restricted cash and cash equivalents	\$ 81,522	\$ 20
Other current assets	164,386	29,076
Property, plant and equipment, net	1,211,656	668,891
Construction-in-process	10,188	139,642
Other long-term assets	162,995	40,138
Total assets	<u>\$ 1,630,747</u>	<u>\$ 877,767</u>
Liabilities:		
Accounts payable and accrued expenses	\$ 25,361	\$ 13,201
Long-term debt	794,214	—
Other long-term liabilities	126,851	32,790
Total liabilities	<u>\$ 946,426</u>	<u>\$ 45,991</u>

NOTE 7— FAIR VALUE OF FINANCIAL INSTRUMENTS

The fair value measurement guidance clarifies that fair value represents the amount that would be received upon selling an asset or paid upon transferring a liability in an orderly transaction between market participants at the measurement date. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. The guidance establishes a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy under the fair value measurement guidance are described below:

Level 1 — Unadjusted quoted prices in active markets that are accessible at the measurement date for identical assets or liabilities;

Level 2 — Quoted prices in markets that are not active, or inputs that are observable, either directly or indirectly, for substantially the full term of the asset or liability;

Level 3 — Prices or valuation techniques that require inputs that are both significant to the fair value measurement and unobservable (supported by little or no market activity).

The following table sets forth certain fair value information at December 31, 2020 and 2019 for financial assets and liabilities measured at fair value by level within the fair value hierarchy, as well as cost or amortized cost. As required by the fair value measurement guidance, assets and liabilities are classified in their entirety based on the lowest level of inputs that is significant to the fair value measurement.

	Carrying Value at December 31, 2020	December 31, 2020				
		Fair Value				
		Total	Level 1	Level 2	Level 3	
(Dollars in thousands)						
Assets:						
Current assets:						
Cash equivalents (including restricted cash accounts)	\$ 28,653	\$ 28,653	\$ 28,653	\$ —	\$ —	
Derivatives:						
Contingent receivable (1)	111	111	—	—	111	
Currency forward contracts (2)	1,554	1,554	—	1,554	—	
Long-term assets:						
Cross currency swap (3)	27,829	27,829	—	27,829	—	
Liabilities:						
Current liabilities:						
Derivatives:						
Contingent payables (1)	(549)	(549)	—	—	(549)	
Cross currency swap (3)	(2,283)	(2,283)	—	(2,283)	—	
Long-term liabilities:						
Contingent payables (1)	(2,630)	(2,630)	—	—	(2,630)	
	\$ 52,685	\$ 52,685	\$ 28,653	\$ 27,100	\$ (3,068)	

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	Carrying Value at December 31, 2019	December 31, 2019			
		Fair Value			
		Total	Level 1	Level 2	Level 3
(Dollars in thousands)					
Assets					
Current assets:					
Cash equivalents (including restricted cash accounts)	\$ 28,316	\$ 28,316	\$ 28,316	\$ —	\$ —
Derivatives:					
Contingent receivable (1)	102	102	—	—	102
Currency forward contracts (2)	362	362	—	362	—
Liabilities:					
Current liabilities:					
Derivatives:					
Contingent payables (1)	(3,359)	(3,359)	—	—	(3,359)
	\$ 25,421	\$ 25,421	\$ 28,316	\$ 362	\$ (3,257)

(1) These amounts relate to contingent receivables and payables and warrants pertaining to the Guadeloupe power plant purchase transaction, valued primarily based on unobservable inputs and are included within "Prepaid expenses and other", "Accounts payable and accrued expenses" and "Other long-term liabilities" on December 31, 2020 and 2019 in the consolidated balance sheets with the corresponding gain or loss being recognized within "Derivatives and foreign currency transaction gains (losses)" in the consolidated statement of operations and comprehensive income.

(2) These amounts relate to currency forward contracts valued primarily based on observable inputs, including forward and spot prices for currencies, net of contracted rates and then multiplied by notional amounts, and are included within "Receivables, other" on December 31, 2020 and December 31, 2019, in the consolidated balance sheet with the corresponding gain or loss being recognized within "Derivatives and foreign currency transaction gains (losses)" in the consolidated statement of operations and comprehensive income.

(3) These amounts relate to cross currency swap contracts valued primarily based on the present value of the Cross Currency Swap future settlement prices for USD and NIS zero yield curves and the applicable exchange rate as of December 31, 2020. These amounts are included within "Deposits and other" and "Accounts payable and accrued expenses" on December 31, 2020 in the consolidated balance sheets. There are no cash collateral deposits on December 31, 2020.

The amounts set forth in the tables above include investments in money market funds (which are included in cash equivalents). Those securities and deposits are classified within Level 1 of the fair value hierarchy because they are valued using quoted market prices in an active market.

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The following table presents the amounts of gain (loss) recognized in the consolidated statements of operations and comprehensive income (loss):

Derivatives not designated as hedging instruments	Location of recognized gain (loss)	Amount of recognized gain (loss)		
		2020	2019	2018
		(Dollars in thousands)		
Contingent considerations	Derivative and foreign currency transaction gains (losses)	\$ —	\$ —	\$ 170
Contingent considerations	General and administrative expenses	—	—	10,322
Currency forward contracts (1)	Derivative and foreign currency transaction gains (losses)	5,175	2,556	(3,081)
		\$ 5,175	\$ 2,556	\$ 7,411

Derivatives designated as cash flow hedging instruments				
Cross currency swap (2)	Derivative and foreign currency transaction gains (losses)	<u>\$ 21,187</u>	<u>\$ —</u>	<u>\$ —</u>

(1) The foregoing forward and put options transactions have not been designated as hedge transactions and are marked to market with the corresponding gains or losses recognized within "Derivatives and foreign currency transaction gains (losses)" in the consolidated statements of operations and comprehensive income.

(2) The foregoing cross currency swap transactions were designated as a cash flow hedge as further described under note 11 to the consolidated financial statements. The changes in the cross currency swap fair value are initially recorded in "Other comprehensive income (loss)" and a corresponding amount is reclassified out of "Accumulated other comprehensive income (loss)" to "Derivatives and foreign currency transaction gains (losses)" to offset the remeasurement of the underlying hedged transaction which also impacts the same line item in the consolidated statements of operations and comprehensive income.

There were no transfers of assets or liabilities between Level 1, Level 2 and Level 3 during the year ended December 31, 2020.

The following table presents the effect of derivative instruments designated as cash flow hedges on the consolidated statements of operations and comprehensive income (loss) for the year ended December 31, 2020:

	Balance in Other comprehensive income (loss) beginning of period	Gain or (loss) recognized in Other comprehensive income (loss) (1)	Amount reclassified from Other comprehensive income (loss) into earnings	Balance in Other comprehensive income (loss) end of period
(Dollars in thousands)				
Cash flow hedge:				
Cross currency swap	<u>\$ —</u>	<u>\$ 24,553</u>	<u>\$ (21,187)</u>	<u>\$ 3,366</u>

(1) The amount of gain or (loss) recognized in Other comprehensive income (loss) is net of tax of \$1.1 million.

The estimated net amount of existing gain (loss) that is reported in "Accumulated other comprehensive income (loss)" as of December 31, 2020 that is expected to be reclassified into earnings within the next 12 months is immaterial. The maximum length of time over which the Company is hedging its exposure to the variability in future cash flow is from the transaction commencement date through June 2031.

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The fair value of the Company's long-term debt approximates its fair value, except for the following:

	Fair Value		Carrying Amount	
	2020	2019	2020	2019
	(Dollars in millions)		(Dollars in millions)	
Olkaria III Loan - DFC	\$ 192.5	\$ 202.1	\$ 174.7	\$ 192.6
Olkaria III plant 4 Loan - DEG 2	40.4	43.8	37.5	42.5
Olkaria III plant 1 Loan - DEG 3	35.8	38.8	32.8	37.1
Platanares Loan - DFC	112.1	115.3	96.3	104.5
Amatitlan Loan	23.5	26.4	22.8	26.3
Senior Secured Notes:				
OFC 2 LLC ("OFC 2")	207.9	210.9	188.2	203.0
Don A. Campbell 1 ("DAC 1")	78.5	78.5	73.1	78.2
USG Prudential - NV	31.8	30.6	27.6	28.4
USG Prudential - ID	18.3	18.6	18.4	19.6
USG DOE	45.1	45.0	38.2	40.8
Senior Unsecured Bonds	585.1	205.7	529.1	204.3
Senior Unsecured Loan	222.2	161.3	200.0	150.0
Plumstriker	18.1	21.7	18.1	21.6
Other long-term debt	17.4	16.3	17.6	17.4

The fair value of the long-term debt is determined by a valuation model, which is based on a conventional discounted cash flow methodology and utilizes assumptions of current borrowing rates. The fair value of revolving lines of credit is determined using a comparison of market-based price sources that are reflective of similar credit ratings to those of the Company.

As disclosed above under Note 1 to the consolidated financial statements, the outbreak of the COVID-19 pandemic has resulted in a global economic downturn and market volatility that may have an impact on the estimated fair value of the Company's long-term debt. While interest rates on U.S. Treasury securities have declined and may continue to decline as a result of the COVID-19 pandemic, other components of the Company's borrowing rates have increased and may continue to increase as the global economic situation evolves, all of which have a direct impact on the fair value of the Company's long-term debt.

The carrying value of other financial instruments, such as revolving lines of credit, commercial paper and deposits approximates fair value.

The following table presents the fair value of financial instruments as of December 31, 2020:

	Level 1	Level 2	Level 3	Total
	(Dollars in millions)			
Olkaria III - DFC	\$ —	\$ —	\$ 192.5	\$ 192.5
Olkaria III plant 4 - DEG 2	—	—	40.4	40.4
Olkaria III plant 1 - DEG 3	—	—	35.8	35.8
Platanares Loan - DFC	—	—	112.1	112.1
Amatitlan Loan	—	23.5	—	23.5
Senior Secured Notes:				
OFC 2 Senior Secured Notes	—	—	207.9	207.9
DAC 1 Senior Secured Notes	—	—	78.5	78.5
USG Prudential - NV	—	—	31.8	31.8
USG Prudential - ID	—	—	18.3	18.3
USG DOE	—	—	45.1	45.1
Senior Unsecured Bonds	—	—	585.1	585.1
Senior Unsecured Loan	—	—	222.2	222.2
Plumstriker	—	18.1	—	18.1
Other long-term debt	—	—	17.4	17.4
Deposits	14.8	—	—	14.8

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The following table presents the fair value of financial instruments as of December 31, 2019:

	Level 1	Level 2	Level 3	Total
	(Dollars in millions)			
Olkaria III Loan - DFC	\$ —	\$ —	\$ 202.1	\$ 202.1
Olkaria III plant 4 - DEG 2	—	—	43.8	43.8
Olkaria III plant 1 - DEG 3	—	—	38.8	38.8
Platanares Loan - DFC	—	—	115.3	115.3
Amatitlan Loan	—	26.4	—	26.4
Senior Secured Notes:				
OFC 2 Senior Secured Notes	—	—	210.9	210.9
DAC 1 Senior Secured Notes	—	—	78.5	78.5
USG Prudential - NV	—	—	30.6	30.6
USG Prudential - ID	—	—	18.6	18.6
USG DOE	—	—	45.0	45.0
Senior Unsecured Bonds	—	—	205.7	205.7
Senior Unsecured Loan	—	—	161.3	161.3
Plumstriker	—	21.7	—	21.7
Other long-term debt	—	—	16.3	16.3
Commercial paper	—	50.0	—	50.0
Revolving lines of credit	—	40.6	—	40.6
Deposits	12.2	—	—	12.2

NOTE 8 — PROPERTY, PLANT AND EQUIPMENT AND CONSTRUCTION-IN-PROCESS

Property, plant and equipment

Property, plant and equipment, net, consist of the following:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Land owned by the Company where the geothermal resource is located	\$ 40,157	\$ 38,049
Leasehold improvements	8,477	7,757
Machinery and equipment	271,981	230,465
Land, buildings and office equipment	43,555	39,099
Vehicles	8,960	8,021
Energy storage equipment	63,562	32,896
Geothermal and recovered energy generation power plants, including geothermal wells and exploration and resource development costs:		
United States of America, net of cash grants	2,296,415	2,128,014
Foreign countries	732,537	721,824
Asset retirement cost	28,946	19,824
	3,494,590	3,225,949
Less accumulated depreciation	(1,395,543)	(1,254,534)
Property, plant and equipment, net	<u>\$ 2,099,047</u>	<u>\$ 1,971,415</u>

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Depreciation expense for the years ended December 31, 2020, 2019 and 2018 amounted to \$133.5 million, \$126.7 million and \$114.4 million, respectively. Depreciation expense for the years ended December 31, 2020, 2019, and 2018 is net of the impact of the cash grant in the amount of \$7.3 million, \$7.3 million and \$6.4 million, respectively.

U.S. Operations

The net book value of the property, plant and equipment, including construction-in-process, located in the United States was approximately \$2,081.6 million and \$1,841.4 million as of December 31, 2020 and 2019, respectively. These amounts as of December 31, 2020 and 2019 are net of cash grants in the amount of \$155.0 million and \$162.3 million, respectively.

Foreign Operations

The net book value of property, plant and equipment, including construction-in-process, located outside of the United States was approximately \$496.8 million and \$506.6 million as of December 31, 2020 and 2019, respectively.

The Company, through its wholly owned subsidiary, OrPower 4, Inc. (“OrPower 4”), owns and operates geothermal power plants in Kenya. The net book value of assets associated with the power plants was \$289.3 million and \$284.5 million as of December 31, 2020 and 2019, respectively. The Company sells the electricity produced by the power plants to Kenya Power and Lighting Co. Ltd. (“KPLC”) under a 20-year PPA ending between 2033 and 2036.

The Company, through its wholly owned subsidiary, Orzunil I de Electricidad, Limitada (Orzunil), owns a power plant in Guatemala. On January 22, 2014, Orzunil signed an amendment to the PPA with INDE, a Guatemalan power company, for its Zunil geothermal power plant in Guatemala. The amendment extends the term of the PPA from 2019 to 2034. The PPA amendment also transfers operation and management responsibilities of the Zunil geothermal field from INDE to the Company for the term of the amended PPA in exchange for a tariff increase. Additionally, INDE exercised its right under the PPA to become a partner in the Zunil power plant with a 3% equity interest. The net book value of the assets related to the power plant was \$10.1 million and \$10.3 million at December 31, 2020 and 2019, respectively.

The Company, through its wholly owned subsidiary, Ortitlan, Limitada (“Ortitlan”), owns a power plant in Guatemala. The net book value of the assets related to the power plant was \$42.0 million and \$42.8 million at December 31, 2020 and 2019, respectively.

The Company, through its wholly owned subsidiary, GeoPlatanares, signed a BOT contract for the Platanares geothermal project in Honduras with ELCOSA, a privately owned Honduran energy company, for 15 years from the commercial operation date, which expires in 2047. Platanares sells the electricity produced by the power plants to ENEE, the national utility of Honduras under a 30-year PPA. The net book value of the assets related to the power plant was \$97.2 million and \$96.1 million at December 31, 2020 and 2019, respectively.

The Company, through its subsidiary, GB, owns a power plant in Guadeloupe. The net book value of the assets related to the power plant was \$32.0 million and \$24.5 million at December 31, 2020 and 2019, respectively. GB sells the electricity produced by the power plants to EDF, the French electric utility, under a 15-year PPA.

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Construction-in-process

Construction-in-process consists of the following:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Projects under exploration and development:		
Up-front bonus costs	\$ 5,347	\$ 17,018
Exploration and development costs	45,478	66,916
Interest capitalized	703	703
	51,528	84,637
Projects under construction:		
Up-front bonus costs	39,144	27,473
Drilling and construction costs	379,117	258,484
Interest capitalized	9,526	5,961
	427,787	291,918
Total	\$ 479,315	\$ 376,555

Projects under exploration and development				
	Up-front Bonus Costs	Exploration and Development Costs	Interest Capitalized	Total
	(Dollars in thousands)			
Balance at December 31, 2017	\$ 17,018	\$ 46,154	\$ 703	\$ 63,875
Cost incurred during the year	—	7,209	—	7,209
Write off of unsuccessful exploration costs	—	(126)	—	(126)
Balance at December 31, 2018	17,018	53,237	703	70,958
Cost incurred during the year	—	17,215	—	17,215
Transfer of projects under exploration and development to projects under construction	—	(3,536)	—	(3,536)
Balance at December 31, 2019	17,018	66,916	703	84,637
Cost incurred during the year	—	5,832	—	5,832
Transfer of projects under exploration and development to projects under construction	(11,671)	(27,270)	—	(38,941)
Balance at December 31, 2020	\$ 5,347	\$ 45,478	\$ 703	\$ 51,528

Projects under construction				
	Up-front Bonus Costs	Drilling and Construction Costs	Interest Capitalized	Total
	(Dollars in thousands)			
Balance at December 31, 2017	\$ 27,473	\$ 198,943	\$ 3,251	\$ 229,667
Cost incurred during the year	—	219,610	—	219,610
Cost write off	—	(1,380)	—	(1,380)
Fair value of projects under construction acquired in a business combination	—	4,668	—	4,668
Transfer of completed projects to property, plant and equipment	—	(261,443)	(390)	(261,833)
Balance at December 31, 2018	27,473	160,398	2,861	190,732
Cost incurred during the year	—	264,137	3,100	267,237
Transfer of projects under exploration and development to projects under construction	—	3,536	—	3,536
Insurance recoveries	—	(35,435)	—	(35,435)
Transfer of completed projects to property, plant and equipment	—	(134,152)	—	(134,152)
Balance at December 31, 2019	27,473	258,484	5,961	291,918
Cost incurred during the year	—	298,215	3,565	301,780
Transfer of projects under exploration and development to projects under construction	11,671	27,270	—	38,941
Transfer of completed projects to property, plant and equipment	—	(204,852)	—	(204,852)
Balance at December 31, 2020	\$ 39,144	\$ 379,117	\$ 9,526	\$ 427,787

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NOTE 9 — INTANGIBLE ASSETS AND GOODWILL

Intangible assets amounting to \$194.4 million and \$186.2 million consist mainly of the Company's PPAs acquired in business combinations and its energy storage activities, net of accumulated amortization of \$89.4 million and \$74.1 million as of December 31, 2020 and 2019, respectively. Intangible assets relating to the Company's energy storage activities as of December 31, 2020 and 2019 amounted to \$47.2 million and \$30.2 million, net of accumulated amortization of \$8.7 million and \$5.4 million, respectively. Amortization expense for the years ended December 31, 2020, 2019 and 2018 amounted to \$14.4 million, \$13.3 million and \$11.2 million, respectively. Additions to intangible assets for the years ended December 31, 2020, 2019 and 2018, amounted to \$20.4 million, \$0.0 million and \$127.0 million, respectively. The additions to intangible assets in 2020 and 2018 relate to the Pomona and USG acquisitions, respectively as further described in Note 2 to the consolidated financial statements. The Company tested the intangible assets for recoverability in December 2020, 2019 and 2018 and assessed whether there are events or change in circumstances which may indicate that the intangible assets are not recoverable. The Company's assessment resulted in that there were no write-offs of intangible assets in 2020, 2019 and 2018.

Estimated future amortization expense for the intangible assets as of December 31, 2020 is as follows:

	(Dollars in thousands)
Year ending December 31:	
2021	\$ 16,200
2022	15,947
2023	15,828
2024	14,613
2025	16,539
Thereafter	115,295
Total	<u>\$ 194,421</u>

Goodwill

Goodwill amounting to \$24.6 million and \$20.1 million as of December 31, 2020 and 2019, respectively, represents the excess of the fair value of consideration transferred in business combination transactions over the fair value of tangible and intangible assets acquired, net of the fair value of liabilities assumed and non-controlling interest (as applicable) in the acquisitions.

In 2018, as a result of the quantitative assessment of goodwill, the Company recorded an impairment charge of \$13.5 million to goodwill related to its Energy Storage segment in the consolidated statements of operations and comprehensive income (loss).

Except as noted above, for the years 2020, 2019 and 2018 the Company's impairment assessment of goodwill related to its reporting units resulted in no impairment.

Changes in the carrying amount of the Company's goodwill for the years ended December 31, 2020 and 2019 were as follows:

	2020	2019
	(Dollars in thousands)	
Goodwill as of January 1,	\$ 20,140	\$ 19,950
Goodwill acquired (1)	4,107	—
Translation differences	319	190
Goodwill as of December 31,	<u>\$ 24,566</u>	<u>\$ 20,140</u>

(1) Goodwill acquired is related to the purchase of the Pomona storage facility as further described in Note 2 to the consolidated financial statements.

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NOTE 10 — ACCOUNTS PAYABLE AND ACCRUED EXPENSES

Accounts payable and accrued expenses consist of the following:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Trade payable	\$ 75,779	\$ 73,271
Salaries and other payroll costs	29,271	24,364
Customer advances	1,197	2,092
Accrued interest	7,843	6,321
Income tax payable	19,913	11,344
Property tax payable	1,378	3,033
Scheduling and transmission	2,632	2,264
Royalty accrual	3,581	6,457
Warranty accrual	2,087	3,245
Other	9,082	9,466
Total	<u>\$ 152,763</u>	<u>\$ 141,857</u>

NOTE 11 — LONG-TERM DEBT, CREDIT AGREEMENTS AND COMMERCIAL PAPER

Long-term debt consists of notes payable under the following agreements:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Limited and non-recourse agreements:		
Loans:		
Non-recourse:		
Other loans	\$ 9,826	\$ 8,997
Limited recourse:		
Loan agreement with DFC (the Olkaria III power plant)	174,652	192,646
Loan agreement with DFC (the Platanares power plant)	96,266	104,459
Loan agreement with Banco Industrial S.A. and Westrust Bank (International) Limited	22,750	26,250
Loan agreement with a global industrial company (the Plumstriker battery energy storage projects)	18,081	21,615
Other loans	7,807	8,367
Senior Secured Notes:		
Non-recourse:		
DAC 1 Senior Secured Notes	73,121	78,247
Limited recourse:		
OFC 2 Senior Secured Notes	188,223	203,040
Other loans	84,118	88,840
Total limited and non-recourse agreements	<u>674,844</u>	<u>732,461</u>
Less current portion	(60,834)	(58,932)
Non current portion	<u>\$ 614,010</u>	<u>\$ 673,529</u>
Full recourse agreements:		
Senior Unsecured Bonds	529,066	204,332
Senior Unsecured Loan (Migdal)	200,000	150,000
Loan agreements with DEG (the Olkaria III and power plants 4 and 1 upgrade)	70,264	79,632
Revolving credit lines with banks	—	40,550
Total full recourse agreements	<u>799,330</u>	<u>474,514</u>
Less current portion	(17,768)	(117,122)
Non current portion	<u>\$ 781,562</u>	<u>\$ 357,392</u>

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Full-Recourse Third-Party Debt

Senior Unsecured Bonds - Series 4

On July 1, 2020, the Company concluded an auction tender and accepted subscriptions for New Israeli Shekels ("NIS") 1.0 billion aggregate principal amount of senior unsecured bonds (the "Senior Unsecured Bonds - Series 4"). The Senior Unsecured Bonds - Series 4 are denominated in NIS and were converted to approximately \$289.8 million using a cross-currency swap transaction shortly after the completion of such issuance as further detailed below. The Senior Unsecured Bonds - Series 4 are payable semi-annually in arrears starting December 2020 and will be repaid in 10 equal annual payments commencing June 2022 unless prepaid earlier by the Company pursuant to the terms and conditions of the trust instrument that governs the Senior Unsecured Bonds - Series 4. The proceeds from the Senior Unsecured Bonds - Series 4 were used to pay the total consideration of \$43.4 million in the Pomona purchase transaction as further detailed under Note 2 to the consolidated financial statements and to repay certain existing indebtedness with the balance being used to support the Company's growth plans.

Loan	Amount Issued	Amount Outstanding as of December 31, 2020	Annual Interest Rate	Maturity Date
	(Dollars in millions)			
Senior Unsecured Bonds - Series 4	\$ 289.8	\$ 311.0	3.35%	June 2031

Cross Currency Swap

Concurrently with the issuance of the Senior Unsecured Bonds - Series 4, the Company entered into a long-term cross currency swap with the objective of hedging the currency rate fluctuations related to the aggregated principal amount and interest of the Senior Unsecured Bonds - Series 4 at an average fixed rate of 4.34%. The terms of the Cross Currency Swap match those of the Senior Unsecured Bonds - Series 4, including the notional amount of the principal and interest payment dates. The Company designated the Cross Currency Swap as a cash flow hedge as per ASC 815, Derivatives and Hedging and accordingly measures the Cross Currency Swap instrument at fair value. The changes in the Cross Currency Swap fair value are initially recorded in Other Comprehensive Income (Loss) and reclassified to Derivatives and foreign currency transaction gains (losses) in the same period or periods during which the hedged transaction affects earnings and is presented in the same line item in the condensed consolidated statements of operations and comprehensive income as the earnings effect of the Senior Unsecured Bonds - Series 4.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Senior Unsecured Bonds

In September 2016, the Company concluded an auction tender and accepted subscriptions for two series of senior unsecured bonds comprised of approximately \$67.0 million aggregate principal amount of senior unsecured bonds (the "Series 2 Bonds") and approximately \$137.0 million aggregate principal amount of senior unsecured bonds (the "Series 3 Bonds" and together with the Series 2 Bonds, the "Senior Unsecured Bonds").

In September 2020, the Company fully repaid the Series 2 Bonds. The Series 3 Bonds will mature in September 2022 in a single bullet payment unless earlier prepaid by the Company pursuant to the terms and conditions of the trust instrument that governs such Senior Unsecured Bonds.

On April 6, 2020, the Company concluded an auction tender and accepted subscriptions for an additional aggregate principal amount of approximately \$51.1 million of its Series 3 Senior Unsecured Bonds (the "Additional Series 3 Bonds") for total consideration of \$50.0 million, representing an effective interest rate of 4.45%. The Additional Series 3 Bonds will mature in September 2022 and will be repaid at maturity in a single bullet payment, unless earlier prepaid by the Company pursuant to the terms and conditions of the trust instrument that governs such Senior Unsecured Bonds.

On April 20, 2020, the Company concluded an additional auction tender and accepted subscriptions for an aggregate principal amount of approximately \$14.5 million of its Series 3 Senior Unsecured Bonds (the "Second Addition to Series 3 Bonds"). The Second Addition to Series 3 Bonds will mature in September 2022 and will be repaid at maturity in a single bullet payment, unless earlier prepaid by the Company pursuant to the terms and conditions of the trust instrument that governs such Senior Unsecured Bonds.

On May 13, 2020, the Company concluded an additional auction tender and accepted subscriptions for an aggregate principal amount of approximately \$15.3 million under Series 3 Senior Unsecured Bonds (the "Third Addition to Series 3 Bonds"). The Third Addition to Series 3 Bonds will mature in September 2022 and will be repaid at maturity in a single bullet payment, unless earlier prepaid by the Company pursuant to the terms and conditions of the trust instrument that governs such Senior Unsecured Bonds.

Loan	Amount Issued	Amount Outstanding as of December 31, 2020	Annual Interest Rate	Maturity Date
	(Dollars in millions)			
Senior Unsecured Bonds - Series 3	\$ 218.0	\$ 218.0	4.45%	September 2022

Senior Unsecured Loan

On March 22, 2018 the Company entered into a definitive loan agreement (the "Migdal Loan Agreement") with Migdal Insurance Company Ltd., Migdal Makefet Pension and Provident Funds Ltd. and Yozma Pension Fund of Self-Employed Ltd., all entities within the Migdal Group, a leading Israeli insurance company and institutional investor in Israel. The Migdal Loan Agreement provides for a loan by the lenders to the Company in an aggregate principal amount of \$100.0 million (the "Migdal Loan"). The Migdal Loan will be repaid in 15 semi-annual payments of \$4.2 million each, commencing on September 15, 2021, with a final payment of \$37.0 million on March 15, 2029.

The Loan is subject to early redemption by the Company prior to maturity from time to time (but not more frequently than once per quarter) and at any time in whole or in part, at a redemption price set forth in the Migdal Loan Agreement. If the rating of the Company is downgraded to "iLA-" (or equivalent), of any of Standard and Poor's, Moody's or Fitch (whether in Israel or outside of Israel) (each a "Credit Rating Agency"), the interest rate applicable to the Migdal Loan will increase by 0.50%. If the rating of the Company is further downgraded to a lower level by any Credit Rating Agency, the interest rate applicable to the Migdal Loan will be increased by 0.25% for each additional downgrade. In no event will the cumulative increase in the interest rate applicable to the Loan exceed 1% regardless of the cumulative rating downgrade. A subsequent upgrade or reinstatement of a rating by any Credit Rating Agency will reduce the interest rate applicable to the Migdal Loan by 0.25% for each upgrade (but in no event will the interest rate applicable to the Migdal Loan fall below the base interest rate of 4.8%). Additionally, if the ratio between short-term and long-term debt to financial institutions and bondholders, deducting cash and cash equivalents to EBITDA is equal to or higher than 4.5, the interest rate on all amounts then outstanding under the Migdal Loan shall be increased by 0.5% per annum over the interest rate then-applicable to the Migdal Loan.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The Migdal Loan Agreement includes various affirmative and negative covenants, including a covenant that the Company maintain (i) a debt to adjusted EBITDA ratio below 6, (ii) a minimum equity amount (as shown on its consolidated financial statements, excluding noncontrolling interests) of not less than \$750 million, and (iii) an equity attributable to Company's stockholders to total assets ratio of not less than 25%. In addition, the Migdal Loan Agreement restricts the Company from making dividend payments if its equity falls below \$800 million and otherwise restricts dividend payments in any one year to not more than 50% of the net income of the Company of such year as shown on the Company's consolidated annual financial statements as long as any of the Company's bonds issued in Israel prior to March 27, 2018 remain outstanding. The Migdal Loan Agreement includes other customary affirmative and negative covenants and events of default. As of December 31, 2020, the covenants have been met.

On March 25, 2019, the Company entered into a first addendum ("First Addendum") to the Migdal Loan Agreement with the Migdal Group dated March 22, 2018. The First Addendum provides for an additional loan by the lenders to the Company in an aggregate principal amount of \$50.0 million (the "Additional Migdal Loan"). The Additional Migdal Loan will be repaid in 15 semi-annual payments of \$2.1 million each, commencing on September 15, 2021, with a final payment of \$18.5 million on March 15, 2029. The Additional Migdal Loan was entered into under substantially the same terms and conditions of the Migdal Loan Agreement as disclosed above.

In April 2020, the Company entered into a second addendum (the "Second Addendum") to the loan agreement with the Migdal Group dated March 22, 2018. The Second Addendum provides for an additional loan by the lenders to the Company in an aggregate principal amount of \$50.0 million (the "Second Addendum Migdal Loan"). The principal amount of \$31.5 million of the Second Addendum Migdal Loan will be repaid in 15 equal semi-annual payments commencing on September 15, 2021 and ending on September 15, 2028. The principal amount of \$18.5 million will be repaid in one bullet payment on March 15, 2029. The Second Addendum Migdal Loan was entered into under substantially the same terms and conditions of the Migdal Loan Agreement.

Loan	Amount		Annual Interest Rate (1)	Maturity Date
	Amount Issued	Outstanding as of December 31, 2020		
	(Dollars in millions)			
Migdal Loan	\$ 100.0	\$ 100.0	4.80%	March 2029
Additional Migdal Loan	50.0	50.0	4.60%	March 2029
Second Addendum Migdal Loan	50.0	50.0	5.44%	March 2029
Total Senior Unsecured Loan	\$ 200.0	\$ 200.0		

(1) payable semi-annually in arrears.

Loan Agreements with DEG (the Olkaria III Complex)

On October 20, 2016, OrPower 4 entered into a new \$50.0 million subordinated loan agreement with Deutsche Investitions-und Entwicklungsgesellschaft mbH ("DEG") (the "DEG 2 Loan Agreement") and on December 21, 2016, OrPower 4 completed a drawdown of the full loan amount of \$50 million, with a fixed interest rate of 6.28% for the duration of the loan (the "DEG 2 Loan"). The DEG 2 Loan is being repaid in 20 equal semi-annual principal installments which commenced on December 21, 2018, with a final maturity date of June 21, 2028. Proceeds of the DEG 2 Loan were used by OrPower 4 to refinance Plant 4 of the Olkaria III Complex, which was originally financed using equity. The DEG 2 Loan is subordinated to the senior loan provided by DFC for Plants 1-3 of the Olkaria III Complex. The DEG 2 Loan is guaranteed by the Company.

On January 4, 2019, OrPower 4 entered into an additional \$41.5 million subordinated loan agreement with DEG (the "DEG 3 Loan Agreement") and on February 28, 2019, OrPower 4 completed a drawdown of the full loan amount, with a fixed interest rate of 6.04% for the duration of the loan (the "DEG 3 Loan"). The DEG 3 Loan is being repaid in 19 equal semi-annual principal installments, which commenced on June 21, 2019, with a final maturity date of June 21, 2028. Proceeds of the DEG 3 Loan were used by OrPower 4 to refinance upgrades to Plant 1 of the Olkaria III Complex, which were originally financed using equity. The DEG 3 Loan is subordinated to the senior loan provided by DFC (formerly OPIC) for Plants 1-3 of the Olkaria III Complex. The DEG 3 Loan is guaranteed by the Company.

Loan	Amount Issued	Amount	Annual Interest Rate (1)	Maturity Date
		Outstanding as of December 31, 2020		
(Dollars in millions)				
DEG 2 Loan	\$ 50.0	\$ 37.5	6.28%	June 2028
DEG 3 Loan	41.5	32.8	6.04%	June 2028

(1) payable semi-annually

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Non-Recourse and Limited-Recourse Third-Party Debt

Finance Agreement with DFC (formerly OPIC) (the Olkaria III Complex)

On August 23, 2012, OrPower 4, the Company's wholly owned subsidiary, entered into a Finance Agreement with U.S. International Development Finance Corporation, an agency of the U.S. government, to provide limited-recourse senior secured debt financing in an aggregate principal amount of up to \$310.0 million (the "OPIC Loan") for the refinancing and financing of the Olkaria III geothermal power complex in Kenya.

The OPIC Loan is comprised of up to three tranches:

Loan	Amount Issued	Amount Outstanding as of December 31, 2020	Annual Interest Rate (1)	Maturity Date
	(Dollars in millions)			
OPIC Loan - Tranch I	\$ 85.0	\$ 47.2	6.34%	December 2030
OPIC Loan - Tranch II	180.0	100.6	6.29%	June 2030
OPIC Loan - Tranch III	45.0	26.9	6.12%	December 2030
Total OPIC Loan	<u>\$ 310.0</u>	<u>\$ 174.7</u>		

(1) payable quarterly

The OPIC Loan is collateralized by substantially all of OrPower 4's assets and by a pledge of all of the equity interests in OrPower 4. There are various restrictive covenants under the OPIC Loan, which include a required historical and projected 12-month DSCR. As of December 31, 2020, the covenants have been met.

Finance Agreement with DFC (the Platanares power plant)

On April 30, 2018, Geotérmica Platanares, S.A. de C.V. ("Platanares"), a Honduran sociedad anónima de capital variable and an indirect subsidiary of Ormat Technologies, Inc., entered into a Finance Agreement (the "Finance Agreement") with DFC, pursuant to which DFC will provide to Platanares senior secured non-recourse debt financing in an aggregate principal amount of up to \$114.7 million (the "Platanares Loan"), the proceeds of which will be used principally for the refinancing and financing of the Platanares 35 MW geothermal power plant located in western Honduras. The finance agreement was amended and closed in October of 2018.

Loan	Amount Issued	Amount Outstanding as of December 31, 2020	Annual Interest Rate (1)	Maturity Date
	(Dollars in millions)			
DFC - Platanares Loan	\$ 114.7	\$ 96.3	7.02%	September 2032

(1) payable quarterly

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The Platanares Loan is secured by a first priority lien on all of the assets and ordinary shares of Platanares. The Finance Agreement contains various restrictive covenants applicable to Platanares, among others (i) to maintain a projected and historic debt service coverage ratio; (ii) to maintain on deposit in a debt service reserve account and well reserve account funds or assets with a value in excess of a minimum threshold and (iii) covenants that restrict Platanares from making certain payments or other distributions to its equity holders. As of December 31, 2020, the covenants have been met.

Loan Agreement with Banco Industrial S.A. and Westrust Bank (International) Limited

On July 31, 2015, Ortitlan, Limitada, the Company's wholly owned subsidiary, obtained a 12-year secured term loan in the principal amount of \$42.0 million (the "Amatitlan Loan") for the 20 MW Amatitlan power plant in Guatemala. Under the credit agreement with Banco Industrial S.A. and Westrust Bank (International) Limited, the Company can expand the Amatitlan power plant with financing to be provided either via equity, additional debt from Banco Industrial S.A. or from other lenders, subject to certain limitations on expansion financing in the credit agreement.

The loan is payable in 48 quarterly payments commencing September 30, 2015. The loan bears interest at a rate *per annum* equal to the sum of LIBOR (which cannot be lower than 1.25%) plus a margin of (i) 4.35% as long as the Company's guaranty of the loan (as described below) is outstanding or (ii) 4.75% otherwise.

Loan	Amount Issued	Amount	Annual Interest Rate (1)	Maturity Date
		Outstanding as of December 31, 2020		
(Dollars in millions)				
Amatitlan Loan	\$ 42.0	\$ 22.8	LIBOR+4.35%	June 2027

(1) payable quarterly

There are various restrictive covenants under the Amatitlan credit agreement. These include, among other things, (i) a financial covenant to maintain a Debt Service Coverage Ratio (as defined in the credit agreement) and (ii) limitations on Restricted Payments (as defined in the credit agreement) that among other things would limit dividends that could be paid. As of December 31, 2020, the covenants have been met. The loan is collateralized by substantially all the assets of the borrower and a pledge of all of the membership interests of the borrower.

Plumstriker Loan

On May 4, 2019, a wholly owned indirect subsidiary of the Company ("Plumstriker") and its two subsidiaries entered into a \$23.5 million loan agreement with a United States ("U.S.") financing division of a leading global industrial company for the financing of two 20 MW battery energy storage projects located in New Jersey.

On May 30, 2019, Plumstriker completed the drawdown of the full loan amount, bearing interest of three months U.S. Libor plus a 3.5% margin. The loan is being repaid in 29 equal quarterly principal installments of 1.25% of the loan, and additional 14 unequal semi-annual principal payments, which commenced on June 30, 2019. Proceeds of the loan were used to refinance investments in the Plumsted and Stryker projects. The debt repayment of the loan is not guaranteed by the Company or any of its subsidiaries.

Loan	Amount Issued	Amount	Annual Interest Rate (1)	Maturity Date
		Outstanding as of December 31, 2020		
(Dollars in millions)				
Plumstriker Loan	\$ 23.5	\$ 18.1	LIBOR+3.5%	May 2026

(1) payable quarterly

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Don A. Campbell Senior Secured Notes — Non-Recourse

On November 29, 2016, ORNI 47 LLC (“ORNI 47”), the Company’s subsidiary, entered into a note purchase agreement (the “ORNI 47 Note Purchase Agreement”) with MUFG Union Bank, N.A., as collateral agent, Munich Reinsurance America, Inc. and Munich American Reassurance Company (the “Purchasers”) pursuant to which ORNI 47 issued and sold to the Purchasers \$92.5 million aggregate principal amount of its Senior Secured Notes (the “DAC 1 Senior Secured Notes”) in a private placement exempt from the registration requirements of the Securities Act of 1933, as amended. ORNI 47 is the owner of the first phase of the Don A. Campbell geothermal power plant (“DAC 1”), and part of the ORPD LLC (“ORPD”) portfolio.

The net proceeds from the sale of the DAC 1 Senior Secured Notes, were used to refinance the development and construction costs of the DAC 1 geothermal power plant, which were originally financed using equity.

The DAC 1 Senior Secured Notes constitute senior secured obligations of ORNI 47 and are secured by all of the assets of ORNI 47. The ORNI 47 Note Purchase Agreement requires ORNI 47 to comply with certain covenants, including, among others, restrictions on the incurrence of indebtedness or liens, amendment or modification of material project documents, the ability of ORNI 47 to merge or consolidate with another entity. In addition, there are restrictions on the ability of ORNI 47 to make distributions to its shareholders, which include a required historical and projected DSCR. As of December 31, 2020, the covenants have been met.

Loan	Amount Issued	Amount	Annual Interest Rate (1)	Maturity Date
		Outstanding as of December 31, 2020		
	(Dollars in millions)			
DAC 1 Senior Secured Notes	\$ 92.5	\$ 73.1	4.03%	September 2033

(1) payable quarterly

OFC 2 Senior Secured Notes

In September 2011, OFC 2, the Company’s wholly owned subsidiary and OFC 2’s wholly owned project subsidiaries (collectively, the “OFC 2 Issuers”) entered into a note purchase agreement (the “Note Purchase Agreement”) with OFC 2 Noteholder Trust, as purchaser, John Hancock Life Insurance Company (U.S.A.), as administrative agent, and the DOE, as guarantor, in connection with the offer and sale of up to \$350.0 million aggregate principal amount of OFC 2 Senior Secured Notes (“OFC 2 Senior Secured Notes”) due December 31, 2034. The DOE will guarantee payment of 80% of principal and interest on the OFC 2 Senior Secured Notes pursuant to Section 1705 of Title XVII of the Energy Policy Act of 2005, as amended. The conditions precedent to the issuance of the OFC 2 Senior Secured Notes includes certain specified conditions required by the DOE in connection with its guarantee of the OFC 2 Senior Secured Notes.

On October 31, 2011, the OFC 2 Issuers completed the sale of \$151.7 million in aggregate principal amount Series A Notes due 2032 (the “Series A Notes”). The net proceeds from the sale of the Series A Notes were used to finance a portion of the construction costs of Phase I of the McGinness Hills and Tuscarora power plants and to fund certain reserves.

On August 29, 2014, OFC 2 sold \$140.0 million of OFC 2 Senior Secured Notes (the “Series C Notes”) to finance the construction of the second phase of the McGinness Hills project. The Series C Notes are the last tranche under the Note Purchase Agreement with John Hancock Life Insurance Company and are guaranteed by the DOE’s Loan Programs Office in accordance with and subject to the DOE’s Loan Guarantee Program under Section 1705 of Title XVII of the Energy Policy Act of 2005.

The OFC 2 Senior Secured Notes are collateralized by substantially all of the assets of OFC 2 and those of its wholly owned subsidiaries and are fully and unconditionally guaranteed by all of the wholly owned subsidiaries of OFC 2. There are various restrictive covenants under the OFC 2 Senior Secured Notes, which include limitations on additional indebtedness of OFC 2 and its wholly owned subsidiaries. Failure to comply with these and other covenants will, subject to customary cure rights, constitute an event of default by OFC 2. In addition, there are restrictions on the ability of OFC 2 to make distributions to its shareholders. Among other things, the distribution restrictions include a historical debt service coverage ratio requirement and a projected future DSCR requirement. As of December 31, 2020, the covenants have been met.

Loan	Amount Issued	Amount	Annual Interest Rate (1)	Maturity Date
		Outstanding as of December 31, 2020		
(Dollars in millions)				
OFC 2 Senior Secured Notes - Series A	\$ 151.7	\$ 86.9	4.69%	December 2032
OFC 2 Senior Secured Notes - Series C	140.0	101.3	4.61%	December 2032
Total OFC 2 Senior Secured Notes	\$ 291.7	\$ 188.2		

(1) payable quarterly in arrears

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The Company provided a guaranty in connection with the issuance of the Series A Notes and Series C Notes. The guaranty may be drawn in the event of, among other things, the failure of any facility financed by the relevant series of OFC 2 Senior Secured Notes to reach completion and meet certain operational performance levels (the “non-performance trigger”) which gives rise to a prepayment obligation on the OFC 2 Senior Secured Notes. The guaranty may also be drawn if there is a payment default on the OFC 2 Senior Secured Notes or upon the occurrence of certain fundamental defaults that result in the acceleration of the OFC 2 Senior Secured Notes, in each case, prior to the date that the relevant facility(ies) financed by such OFC 2 Senior Secured Notes reaches completion and meets the applicable operational performance levels. The Company’s liability under the guaranty with respect to the non-performance trigger is limited to an amount equal to the prepayment amount on the OFC 2 Senior Secured Notes necessary to bring the OFC 2 Issuers into compliance with certain coverage ratios. The Company’s liability under the guaranty with respect to the other trigger event described above is not so limited.

Other Limited Recourse Loans

On April 24, 2018, the Company completed the acquisition of USG. As part of the acquisition the Company assumed the following non-recourse loans:

Prudential Capital Group – Idaho non-recourse

In May 2016, USG’s wholly owned subsidiary (Idaho USG Holdings LLC) entered into a loan agreement with the Prudential Capital Group to finance its development activities. The original principal totaled \$20.0 million. The principal and interest payments are due semi-annually and the principal is partially repaid through 2023 and the remaining balance of \$16.0 million is due in full in March 2023. The loan is secured by the Company’s ownership interests in the Neal Hot Springs and the Raft River projects.

U.S. Department of Energy – non-recourse

On August 31, 2011, USG’s wholly owned subsidiary, USG Oregon LLC (“USG Oregon”), completed the first funding drawdown associated with the U.S. Department of Energy (“DOE”) of \$96.8 million loan guarantee (“Loan Guarantee”) to construct its power plant at Neal Hot Springs project in Eastern Oregon. In connection with the Loan Guarantee, the DOE has been granted a security interest in all of the equity interests of USG Oregon, as well as in the assets of USG Oregon, including a mortgage on real property interests relating to the Neal Hot Springs site.

Prudential Capital Group – Nevada non-recourse

On September 26, 2013, USG’s wholly owned subsidiary (“USG Nevada LLC”), entered into a note purchase agreement with the Prudential Capital Group to finance Phase I of the San Emidio geothermal project located in northwest Nevada. Principal payments are due quarterly based upon minimum debt service coverage ratios established according to projected operating results made at the loan origination date and available cash balances. The loan agreement is secured by USG Nevada LLC’s right, title and interest in and to its real and personal property, including the San Emidio project and the equity interests in USG Nevada LLC.

Loan	Amount Issued	Amount	Annual Interest Rate (1)	Maturity Date
		Outstanding as of December 31, 2020		
(Dollars in millions)				
Prudential Capital Group – Idaho non-recourse	\$ 20.0	\$ 17.5	5.80%	March 2023
U.S. Department of Energy – non-recourse	96.8	42.0	2.60%	February 2035
Prudential Capital Group – Nevada non-recourse	30.7	26.3	6.75%	December 2037
Total	\$ 147.5	\$ 85.8		

(1) payable semi-annually, except for Nevada non-recourse which is payable quarterly

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Bpifrance Loan - Non Recourse

On April 4, 2019, an indirect subsidiary of the Company (“Guadeloupe”), entered into a \$8.9 million loan agreement with Banque Publique d’Investissement (“Bpifrance”). On April 29, 2019, Guadeloupe completed the drawdown of the full loan amount, bearing a fixed interest rate of 1.93%. The loan will be repaid in 20 equal quarterly principal installments, commencing June 30, 2021. The final maturity date of the loan is March 31, 2026. The loan is not guaranteed by the Company or any of its other subsidiaries. As of December 31, 2020, \$9.8 million is outstanding under the Bpifrance Loan.

Société Générale Loan - Limited Recourse

On April 9, 2019, Guadeloupe, entered into a \$8.9 million loan agreement with Société Général. On April 29, 2019, Guadeloupe completed the drawdown of the full loan amount of the loan, bearing a fixed interest rate of 1.52%. The loan is being repaid in 28 quarterly principal installments, which commenced on July 29, 2019. The final maturity date of the loan is April 29, 2026. The loan has a limited guarantee by one of the Company’s subsidiaries. As of December 31, 2020, \$7.8 million was outstanding under the Société Générale Loan.

Revolving credit lines with commercial banks

As of December 31, 2020, the Company has credit agreements with a number of financial institutions for an aggregate amount of \$623.0 million (including \$60.0 million from Union Bank, N.A. (“Union Bank”) and \$35.0 million from HSBC Bank USA N.A. as described below). Under the terms of these credit agreements, the Company, or its Israeli subsidiary, Ormat Systems Ltd. (“Ormat Systems”), can request: (i) extensions of credit in the form of loans and/or the issuance of one or more letters of credit in the amount of up to \$408.0 million; and (ii) the issuance of one or more letters of credit in the amount of up to \$120.0 million. The credit agreements mature between March 2021 and July 2022. Loans and draws under the credit agreements or under any letters of credit will bear interest at the respective bank’s cost of funds plus a margin.

As of December 31, 2020, no loans were outstanding and letters of credit with an aggregate amount of \$94.4 million were issued and outstanding under such credit agreements.

Credit Agreements

Credit agreement with Union Bank

Ormat Nevada has a credit agreement with Union Bank under which it has an aggregate available credit of up to \$60.0 million as of December 31, 2020. The credit termination date is June 30, 2021.

The facility is limited to the issuance, extension, modification or amendment of letters of credit. Union Bank is currently the sole lender and issuing bank under the credit agreement, but is also designated as an administrative agent on behalf of banks that may, from time to time in the future, join the credit agreement as lenders. In connection with this transaction, the Company entered into a guarantee in favor of the administrative agent for the benefit of the banks, pursuant to which the Company agreed to guarantee Ormat Nevada’s obligations under the credit agreement. Ormat Nevada’s obligations under the credit agreement are otherwise unsecured.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

There are various restrictive covenants under the credit agreement, which include a requirement to comply with the following financial ratios, which are measured quarterly: (i) a 12-month debt to EBITDA ratio not to exceed 4.5; (ii) 12-month DSCR of not less than 1.35; and (iii) distribution leverage ratio not to exceed 2.0. As of December 31, 2020: (i) the actual 12-month debt to EBITDA ratio was 1.64; (ii) the 12-month DSCR was 5.05; and (iii) the distribution leverage ratio was 0.61. In addition, there are restrictions on dividend distributions in the event of a payment default or noncompliance with such ratios, and subject to specified carve-outs and exceptions, a negative pledge on the assets of Ormat Nevada in favor of Union Bank.

As of December 31, 2020, letters of credit in the aggregate amount of \$57.9 million were issued and outstanding under this credit agreement.

Credit agreement with HSBC Bank USA N.A.

Ormat Nevada has a credit agreement with HSBC Bank USA, N.A for one year with annual renewals. The current expiration date of the facility under this credit agreement is October 31, 2021. On December 31, 2020, the aggregate amount available under the credit agreement was \$35.0 million. Other than \$10.0 million of this credit facility which may be drawn for the Company's working capital needs, this credit line is limited to the issuance, extension, modification or amendment of letters of credit. HSBC is currently the sole lender and issuing bank under the credit agreement, but is also designated as an administrative agent on behalf of banks that may, from time to time in the future, join the credit agreement as parties thereto. In connection with this transaction, the Company entered into a guarantee in favor of the administrative agent for the benefit of the banks, pursuant to which the Company agreed to guarantee Ormat Nevada's obligations under the credit agreement. Ormat Nevada's obligations under the credit agreement are otherwise unsecured.

There are various restrictive covenants under the credit agreement, including a requirement to comply with the following financial ratios, which are measured quarterly: (i) a 12-month debt to EBITDA ratio not to exceed 4.5; (ii) 12-month DSCR of not less than 1.35; and (iii) distribution leverage ratio not to exceed 2.0. As of December 31, 2020: (i) the actual 12-month debt to EBITDA ratio was 1.64; (ii) the 12-month DSCR was 5.05; and (iii) the distribution leverage ratio was 0.61. In addition, there are restrictions on dividend distributions in the event of a payment default or noncompliance with such ratios, and subject to specified carve-outs and exceptions, a negative pledge on the assets of Ormat Nevada in favor of HSBC.

As of December 31, 2020, letters of credit in the aggregate amount of \$27.9 million were issued and outstanding under this credit agreement.

Chubb Surety Bond

In May 2017, the Company entered into a surety bond agreement (the "Surety Agreement") with Chubb Limited ("Chubb") pursuant to which the Company may request that Chubb issue up to an aggregate \$200.0 million of surety bonds with respect to the contractual obligations of the Company and its subsidiaries in exchange for bank letters of credit or as otherwise may be required. There is no expiration date for the Surety Agreement, but it may be terminated by the Company at any time upon twenty days' prior written notice to Chubb. Delivery of such termination notice will not affect any surety bonds issued and outstanding prior to the date on which such notice is delivered. As of December 31, 2020, Chubb issued a surety bond in the amount of \$153.7 million under the Surety Agreement.

Short-term commercial paper

On June 27, 2019, the Company entered into a framework agreement for participation in the issuance of commercial paper (the "Agreement") with Discount Capital Underwriting Ltd. under which the Company allowed the participants to submit proposals for purchasing and to purchase the Company's commercial paper ("Commercial Paper") in accordance with the provisions of the Agreement. On July 3, 2019, the Company completed the issuance of the Commercial Paper in the aggregate amount of \$50.0 million. The Commercial Paper was issued for a period of 90 days and extended automatically for additional 90 day periods for up to five years, unless the Company notifies the participants otherwise or a notice of termination is provided by the participants in accordance with the provisions of the Agreement. The Commercial Paper bore an annual interest of three months LIBOR +0.75% which was paid at the end of each 90 day period. The Commercial Paper was fully repaid during 2020.

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Restrictive covenants

The Company's obligations under the credit agreements, the loan agreements, and the trust instrument governing the bonds, described above, are unsecured, but are subject to a negative pledge in favor of the banks and the other lenders and certain other restrictive covenants. These include, among other things, a prohibition on: (i) creating any floating charge or any permanent pledge, charge or lien over the Company's assets without obtaining the prior written approval of the lender; (ii) guaranteeing the liabilities of any third party without obtaining the prior written approval of the lender; and (iii) selling, assigning, transferring, conveying or disposing of all or substantially all of the Company's assets, or a change of control in the Company's ownership structure. Some of the credit agreements, the term loan agreements, as well as the trust instrument contain cross-default provisions with respect to other material indebtedness owed by us to any third party. In some cases, the Company has agreed to maintain certain financial ratios, which are measured quarterly, such as: (i) equity of at least \$750 million and in no event less than 25% of total assets; (ii) 12-month debt, net of cash, cash equivalents marketable securities and short-term bank deposits to Adjusted EBITDA ratio not to exceed 6; and (iii) dividend distribution not to exceed 50% of net income for that year. As of December 31, 2020: (i) total equity was \$1,941.4 million and the actual equity to total assets ratio was 49.9%, and (ii) the 12-month debt, net of cash, cash equivalents marketable securities and short-term bank deposits to Adjusted EBITDA ratio was 2.36. During the year ended December 31, 2020, the Company distributed interim dividends in an aggregate amount of \$22.5 million.

Future minimum payments

Future minimum payments under long-term debt as of December 31, 2020 are as follows:

	(Dollars in thousands)
Year ending December 31:	
2021	\$ 78,429
2022	336,997
2023	135,124
2024	118,168
2025	118,621
Thereafter	686,835
Total	\$ 1,474,174

NOTE 12 — PUNA POWER PLANT TRANSACTIONS

In 2005, the Company's wholly owned subsidiary in Hawaii, Puna Geothermal Ventures ("PGV"), entered into lease transactions involving the original geothermal power plant of the Puna complex located on the Big Island (the "Puna Power Plant"). In December 2019, PGV and HELCO executed an amended and restated PPA for power sold from the Puna complex power plant. The new PPA extends the term until 2052 with an increased contract capacity of 46 MW and a fixed price of \$70 per MWh with no escalation for all energy purchased during any contract year up to 227,000 MWh and \$40 per MWh above 227,000 MWh. In addition, annual capacity payments under the contract are expected to be approximately \$19.5 million. The amended and restated PPA was filed with the Public Utilities Commission on December 31, 2019. The existing PPA remains in effect with its current terms until the expansion of the power plant is completed and the new power plant reaches commercial operation.

In connection with the execution of the amended and restated PPA, the Company paid \$20.5 million to effectively terminate the lease transactions involving the original power plant which gives the Company the ability to satisfy its obligations under the new PPA. The Company recorded this payment under Deposits and other in its consolidated balance sheets as an incremental cost in obtaining the new amended and restated PPA as described above.

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Prior to the amended and restated PPA, PGV leased the Puna Power Plant to an unrelated company under a 31-year head lease (the “Head Lease”) in return for prepaid lease payments in the total amount of \$83.0 million (the “Deferred Lease Income”). The unrelated company (the “Lessor”) simultaneously leased back the Puna Power Plant to PGV under a 23-year lease (the “Project Lease”). PGV’s rent obligations under the Project Lease were paid solely from revenues generated by the Puna Power Plant under a PPA that PGV had with HELCO. The Head Lease and the Project Lease were non-recourse lease obligations to the Company. PGV’s rights in the geothermal resource and the related PPA were not leased to the Lessor as part of the Head Lease but are part of the Lessor’s security package.

NOTE 13 — TAX MONETIZATION TRANSACTIONS

McGinness Hills 3 tax monetization transaction

On August 14, 2019, one of the Company’s wholly-owned subsidiaries that indirectly owns the 48 MW McGinness Hills phase 3 geothermal power plant entered into a partnership agreement with a private investor. Under the transaction documents, the private investor acquired membership interests in the McGinness Hills phase 3 geothermal power plant for an initial purchase price of approximately \$59.3 million and for which it will pay additional installments that are expected to amount to approximately \$9 million and can reach up to \$22 million based on the actual generation. The Company will continue to consolidate, operate and maintain the power plant and will receive substantially all the distributable cash flow generated by the power plant and the private investor will receive substantially all of the tax attributes, as described below.

Pursuant to the transaction documents, prior to December 31, 2027 (“Target Flip Date”), one of the Company’s wholly owned subsidiaries receives substantially all of the distributable cash flow generated by the McGinness Hills phase 3 power plant, while the private investor receives substantially all of the tax attributes of the project. Following the later of the Target Flip Date and the date on which the private investor reaches its target return, the Company will receive 97.5% of the distributable cash generated by the power plant and 95.0% of the tax attributes, on a go forward basis. In the event that the private investor will not reach its target return by the Target Flip Date, then for the period between the Target Flip Date and the date on which the private investor reaches its target return, the private investor will receive 100% of the distributable cash generated by the power plant and 99% of the tax attributes as long as the project is generating PTCs (and 5% of the tax attributes afterwards).

On the Target Flip Date, the Company, through one of its wholly-owned subsidiaries, has the option to purchase the private investor’s interests at the then-current fair market value, plus an amount that causes the private investor to reach its target return, if needed. If the Company exercises this purchase option, it will become the sole owner of the project again.

Tungsten Mountain partnership transaction

On May 17, 2018, one of the Company’s wholly-owned subsidiaries that indirectly owns the 26 MW Tungsten Mountain Geothermal power plant entered into a partnership agreement with a private investor. Under the transaction documents, the private investor acquired membership interests in the Tungsten Mountain Geothermal power plant project for an initial purchase price of approximately \$33.4 million and for which it will pay additional installments that are expected to amount to approximately \$13 million. The Company will continue to operate and maintain the power plant and will receive substantially all the distributable cash flow generated by the power plant, as described below.

Under the transaction documents, prior to December 31, 2026 (“Target Flip Date”), the Company’s wholly-owned subsidiary, Ormat Nevada Inc. (“Ormat Nevada”), receives substantially all of the distributable cash flow generated by the project, while the private investor receives substantially all of the tax attributes of the project. Following the later of the Target Flip Date and the date on which the private investor reaches its target return, Ormat Nevada will receive 97.5% of the distributable cash and 95.0% of the taxable income, on a go forward basis. In the event that the private investor will not reach its target return by the Target Flip Date, then for the period between the Target Flip Date and the date on which the private investor reaches its target return, the private investor will receive 100% of the distributable cash generated by the power plant and 99% of the tax attributes as long as the project is generating PTCs (and 5% of the tax attributes afterwards).

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On the Target Flip Date, Ormat Nevada has the option to purchase the private investor’s interests at the then-current fair market value, plus an amount that causes the private investor to reach its target return, if needed. If Ormat Nevada exercises this purchase option, it will become the sole owner of the project again.

Opal Geo Transaction

On December 16, 2016, Ormat Nevada entered into an equity contribution agreement (the “Equity Contribution Agreement”) with OrLeaf LLC (“OrLeaf”) and JPM with respect to Opal Geo. Also on December 16, 2016, OrLeaf, a newly formed limited liability company formed by Ormat Nevada and ORPD LLC, entered into an amended and restated limited liability company agreement of Opal Geo (the “LLC Agreement”) with JPM. The transactions contemplated by the Equity Contribution Agreement and LLC Agreement will allow the Company to monetize federal PTCs and certain other tax benefits relating to the operation of five geothermal power plants located in Nevada.

In connection with the transactions contemplated by the Equity Contribution Agreement and the LLC Agreement, Ormat Nevada transferred its indirect ownership interest in the McGinness Hills (Phase I and Phase II), Tuscarora, Jersey Valley and second phase of the Don A. Campbell (“DAC 2”) geothermal power

plants to Opal Geo. Prior to such transfer, Ormat Nevada held an approximately 63.25% indirect ownership interest in DAC 2 through ORPD LLC, a joint venture between Ormat Nevada and Northleaf Geothermal Holdings LLC (“Northleaf”), an affiliate of Northleaf Capital Partners, and held, directly or indirectly, a 100% ownership interest in the remaining geothermal power plants that were transferred to Opal Geo.

Pursuant to the Equity Contribution Agreement, JPM contributed approximately \$62.1 million to Opal Geo in exchange for 100% of the Class B Membership Interests of Opal Geo. JPM also agreed to make deferred capital contributions to Opal Geo based on the amount of electricity generated by the DAC 2 and McGinness Hills Phase II power plants which are eligible for the federal PTC. The Company expects the aggregate amount of JPM’s deferred capital contributions to equal approximately \$21 million and to be paid over time covering the period through December 31, 2022.

Under the LLC Agreement, until December 31, 2022, OrLeaf will receive distributions of 97.5% of any distributable cash generated by operation of the power plants while JPM will receive distributions of 2.5% of any distributable cash generated by operation of the power plants. Unless JPM has already achieved its target internal rate of return on its investment in Opal Geo, from December 31, 2022 until JPM has achieved its target internal rate of return, JPM will receive 100% of any distributable cash generated by operation of the power plants. Thereafter, OrLeaf will receive distributions of 97.5%, and JPM will receive 2.5%, of any distributable cash generated by operation of the power plants.

Under the LLC Agreement, all items of Opal Geo income and loss, gain, deduction and credit (including the federal production tax credits relating to the operation of the two PTC eligible power plants) will be allocated, until JPM has achieved its target internal rate of return on its investment in Opal Geo (and for so long as the two PTC eligible power plants are generating PTCs), 99% to JPM and 1% to OrLeaf, or 5% to JPM and 95% to OrLeaf if PTCs are no longer available to either of the two PTC eligible power plants. Once JPM achieves its target internal rate of return, all items of Opal Geo income and loss, gain, deduction and credit will be allocated 5% to JPM and 95% to OrLeaf.

Under the LLC Agreement, OrLeaf, which owns 100% of the Class A Membership Interests in Opal Geo, will serve as the managing member of Opal Geo and control the day-to-day management of Opal Geo and its portfolio of five power plants. However, in certain limited circumstances (such as bankruptcy of Orleaf, fraud or gross negligence by OrLeaf) JPM may remove OrLeaf as the managing member of Opal Geo. JPM, as the Class B Member of Opal Geo, has consent and approval rights with respect to certain items that are designated as major decisions for Opal Geo and the five power plants. In addition, by virtue of certain provisions in OrLeaf’s own limited liability company agreement, and consistent with the ORPD LLC formation documents, Northleaf has similar consent and approval rights with respect to OrLeaf’s determination of major decisions pertaining to the DAC 2 power plant. In both cases, these major decisions are generally equivalent to customary minority protection rights. As a result, the Company’s wholly owned subsidiary, Ormat Nevada, which serves as the managing member of OrLeaf and as the managing member of ORPD LLC, will effectively retain the day-to-day control and management of Opal Geo and its portfolio of five power plants.

The LLC Agreement contains certain customary restrictions on transfer applicable to both OrLeaf and JPM with respect to their respective Membership Interests in Opal Geo, and also provides OrLeaf with a right of first offer in the event JPM desires to transfer any of its Class B Membership Interests, pursuant to which OrLeaf may purchase such Class B Membership Interests. The LLC Agreement also provides OrLeaf with the option to purchase all of the Class B Membership Interests on either December 31, 2022 or the date that is 9 years after the closing date under the Equity Contribution Agreement at a price equal to the greater of (i) the fair market value of the Class B Membership Interests as of the date of purchase (subject to certain adjustments) and (ii) \$3 million.

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Pursuant to the Equity Contribution Agreement, the Company has provided a guaranty for the benefit of JPM of certain of OrLeaf’s indemnification obligations to JPM under the LLC Agreement. In addition, Ormat Nevada also provided a guaranty for the benefit of JPM of all present and future payment and performance obligations of OrLeaf under the LLC Agreement and each ancillary document to which OrLeaf is a party.

JPM’s approximately \$62.1 million capital contribution to Opal Geo was recorded as a \$3.7 million allocation to noncontrolling interests and a \$58.5 million allocation to liability associated with sale of tax benefits as described in Note 1. JPM also agreed to make deferred capital contributions to Opal Geo based on the amount of electricity generated by the DAC 2 and McGinness Hills Phase II power plants which are eligible for the federal PTC.

NOTE 14 — ASSET RETIREMENT OBLIGATION

The following table presents a reconciliation of the beginning and ending aggregate carrying amount of asset retirement obligation for the years presented below:

	Year Ended December 31,	
	2020	2019
	(Dollars in thousands)	
Balance at beginning of year	\$ 50,183	\$ 39,475
Revision in estimated cash flows	(165)	(335)
Liabilities incurred and acquired	10,207	8,334
Accretion expense	3,232	2,709
Balance at end of year	<u>\$ 63,457</u>	<u>\$ 50,183</u>

NOTE 15 — STOCK-BASED COMPENSATION

The Company makes an estimate of expected forfeitures and recognizes compensation costs only for those stock-based awards expected to vest. As of December 31, 2020, the total future compensation cost related to unvested stock-based awards that are expected to vest is \$18.0 million, which will be recognized over a weighted average period of 1.3 years.

During the years ended December 31, 2020, 2019 and 2018, the Company recorded compensation related to stock-based awards as follows:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Cost of revenues	\$ 4,435	\$ 3,633	\$ 3,488
Selling and marketing expenses	1,081	916	792
General and administrative expenses	4,314	4,810	5,938
Total stock-based compensation expense	9,830	9,359	10,218
Tax effect on stock-based compensation expense	858	736	668
Net effect of stock-based compensation expense	<u>\$ 8,972</u>	<u>\$ 8,623</u>	<u>\$ 9,550</u>

During the fourth quarter of 2020, 2019 and 2018, the Company evaluated the trends the employees stock-based award forfeiture rate and determined that the actual rates are 10.8%, 10.7% and 5.3%, respectively. This represents an increase of 0.7%, an increase of 101.9%, and an increase of 381.8%, respectively, from prior estimates. As a result of the change in the estimated forfeiture rate, there was an immaterial impact on stock-based compensation expense for each of the respective periods.

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Valuation assumptions

The Company estimates the fair value of the stock-based awards using the Complex Lattice, Tree-based option-pricing model. The dividend yield forecast is expected to be at least 20% of the Company's yearly net profit, which is equivalent to a 0.6% yearly weighted average dividend rate in the year ended December 31, 2020. The risk-free interest rate was based on the yield from U.S. constant treasury maturities bonds with an equivalent term. The forfeiture rate is based on trends in actual stock-based awards forfeitures.

The Company calculated the fair value of each stock-based award on the date of grant based on the following assumptions:

	Year Ended December 31,		
	2020	2019	2018
For stock based awards issued by the Company:			
Risk-free interest rates	0.4%	1.8%	2.8%
Expected lives (in weighted average years)	5.8	3.5	3.5
Dividend yield	0.6%	0.7%	0.9%
Expected volatility (weighted average)	28.8%	25.1%	25.5%

The Company estimated the forfeiture rate (on a weighted average basis) as follows:

	Year Ended December 31,		
	2020	2019	2018
Weighted average forfeiture rate	8.2%	8.6%	3.1%

Stock-based awards

The 2012 Incentive Compensation Plan

In May 2012, the Company's shareholders adopted the 2012 Incentive Plan, which provides for the grant of the following types of awards: incentive stock options, non-qualified stock options, restricted stock units ("RSUs"), stock appreciation rights ("SARs"), stock units, performance awards, phantom stock, incentive bonuses, and other possible related dividend equivalents to employees of the Company, directors and independent contractors. Under the 2012 Incentive Plan, a total of 4,000,000 shares of the Company's common stock were reserved for issuance, all of which could be issued as options or as other forms of awards. Options and SARs granted to employees under the 2012 Incentive Plan typically vest and become exercisable as follows: 50% on the second anniversary of the grant date and 25% on each of the third and fourth anniversaries of the grant date. Options granted to non-employee directors under the 2012 Incentive Plan will vest and become exercisable one year after the grant date. Restricted stock units granted to directors and members of senior management vest according to a vesting schedule as follows: for the directors, 100% on the first anniversary of the grant date and for members of senior management, 25% on each of the first, second, third and fourth anniversaries of the grant date. The term of stock-based awards typically ranges from six to ten years from the grant date. The shares of common stock issued in respect of awards under the 2012 Incentive Plan are issued from the Company's authorized share capital upon exercise of options or SARs. The 2012 Incentive Plan expired in May 2018 upon adoption of the 2018 Incentive Compensation Plan ("2018 Incentive Plan"), except as to stock-based awards outstanding under the 2012 Incentive Plan on that date.

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The 2018 Incentive Compensation Plan

In May 2018, the Company held its 2018 Annual Meeting of Stockholders at which the Company's stockholders approved the 2018 Incentive Plan. The 2018 Incentive Plan provides for the grant of the following types of awards: incentive stock options, RSUs, SARs, Performance Stock Units ("PSUs"), stock units, performance awards, phantom stock, incentive bonuses and other possible related dividend equivalents to employees of the Company, directors and independent contractors. Under the 2018 Incentive Plan, a total of 5,000,000 shares of the Company's common stock were authorized and reserved for issuance, all of which could be issued as options or as other forms of awards. SARs, RSUs and PSUs granted to employees under the 2018 Incentive Plan typically vest and become exercisable as follows: 50% on the second anniversary of the grant date and 25% on each of the third and fourth anniversaries of the grant date. SARs, RSUs and PSUs granted to directors under the 2018 Incentive Plan typically vest and become exercisable (100%) on the first anniversary of the grant date. The term of stock-based awards typically ranges from six to ten years from the grant date. The shares of common stock issued in respect of awards under the 2018 Incentive Plan are issued from the Company's authorized share capital upon exercise of options or SARs.

On December 31, 2020, the Company granted certain members of its management an aggregate of 573 Stock Appreciation Rights ("SARs"), 2,103 Restricted Stock Units ("RSUs") and 1,952 Performance Stock Units ("PSUs") under the Company's 2018 Incentive Plan. The exercise price of each SAR was \$90.28 which represented the fair market value of the Company's common stock on the grant date. The SARs will expire six years from date of the grant and the SARs, RSUs and PSUs have a vesting period of between 2 to 4 years from the grant date.

The average fair value of each SAR, RSU and PSU on the grant date was \$25.50, \$89.15 and \$96.10, respectively. The Company calculated the fair value of each SAR on the grant date using the complex lattice, tree-based option-pricing model based on the following assumptions:

Risk-free interest rates	0.13%	-	0.51%
Expected life (in years)	2	-	6
Dividend yield	0.61%		
Expected volatility (weighted average)	37.68%	-	30.15%

On November 3, 2020, the Company granted some of its directors an aggregate of 11,835 SARs and 10,010 RSUs under the Company's 2018 Incentive Plan. The exercise price of each SAR was \$67.54 which represented the fair market value of the Company's common stock on the grant date. The SARs will expire in six years from date of the grant and the SARs and RSUs have a vesting period one year from the grant date.

The average fair value of each SAR and RSU on the grant date was \$18.25 and \$67.13, respectively. The Company calculated the fair value of each SAR on the grant date using the complex lattice, tree-based option-pricing model based on the following assumptions:

Risk-free interest rates	0.12%	-	0.44%
Expected life (in years)	1	-	6
Dividend yield	0.61%		
Expected volatility (weighted average)	45.2%	-	29.4%

On May 12, 2020, the Company granted certain members of its management an aggregate of 46,795 SARs, 6,142 RSUs and 5,637 PSUs under the Company's 2018 Incentive Plan. The exercise price of each SAR was \$68.34 which represented the fair market value of the Company's common stock on the grant date. The SARs will expire six years from date of grant and the SARs, RSUs and PSUs have a vesting period of between 2 to 4 years from the grant date.

The fair value of each SAR, RSU and PSU on the grant date was \$17.6, \$67.2 and \$73.2, respectively. The Company calculated the fair value of each SAR on the grant date using the complex lattice, tree-based option-pricing model based on the following assumptions:

Risk-free interest rates	0.44%		
Expected life (in years)	2	-	6
Dividend yield	0.63%		
Expected volatility (weighted average)	28.14%		

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On June 15, 2020, the Company granted certain directors, members of its management and employees an aggregate of 852,475 SARs, 11,068 RSUs and 10,962 PSUs under the Company's 2018 Incentive Plan. The exercise price of each SAR was \$69.14 which represented the fair market value of the Company's common stock on the grant date. The SARs will expire six years from date of grant, except for 1,156 SARs which will expire in 5 months from the grant date, and the SARs, RSUs and PSUs have a vesting period of between 2 to 4 years from the grant date.

The fair value of each SAR, RSU and PSU on the grant date was \$18.0, \$68.0 and \$65.0, respectively. The Company calculated the fair value of each SAR on the grant date using the complex lattice, tree-based option-pricing model based on the following assumptions:

Risk-free interest rates	0.44%	-	0.28%
Expected life (in years)	2	-	6
Dividend yield	0.64%		
Expected volatility (weighted average)	28.5%	-	35.2%

On July 1, 2020, the Company granted its newly appointed CEO an aggregate of 45,365 SARs, 6,020 RSUs and 6,540 PSUs under the Company's 2018 Incentive Plan. The exercise price of each SAR was \$63.40 which represented the fair market value of the Company's common stock on the grant date. The SARs will expire six years from date of grant and the SARs, RSUs and PSUs have a vesting period of between 2 to 4 years from the grant date.

The fair value of each SAR, RSU and PSU on the grant date was \$16.5, \$62.3 and \$57.3, respectively. The Company calculated the fair value of each SAR on the grant date using the complex lattice, tree-based option-pricing model based on the following assumptions:

Risk-free interest rates	0.41%	-	0.17%
Expected life (in years)	2	-	6
Dividend yield	0.64%		
Expected volatility (weighted average)	28.5%	-	35.7%

On November 7, 2019, the Company granted its directors an aggregate of 11,495 SARs and 9,420 RSUs under the Company's 2018 Incentive Plan. The exercise price of each SAR was \$76.87 which represented the fair market value of the Company's common stock on the grant date. The SARs will expire six years from date of grant and both the SARs and RSUs will fully vest on the first anniversary of the grant date.

The fair value of each SAR and RSU for the directors on the grant date was \$19.8 and \$76.4, respectively. The Company calculated the fair value of each SAR on the grant date using the Exercise Multiple-Based Lattice Pricing model based on the following assumptions:

Risk-free interest rate	1.79%		
Expected life (in years)	1	-	6
Dividend yield	0.57%		
Expected volatility	24.80%		

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Information on the awards outstanding and the related weighted average exercise price as of and for the years ended December 31, 2020, 2019 and 2018 are presented in the table below:

	Year Ended December 31,					
	2020		2019		2018	
	Awards (In thousands)	Weighted Average Exercise Price	Awards (In thousands)	Weighted Average Exercise Price	Awards (In thousands)	Weighted Average Exercise Price
Outstanding at beginning of year	1,792	\$ 50.39	2,527	\$ 46.77	1,548	\$ 41.35
Granted, at fair value:						
SARs (1)	957	68.82	38	69.13	1,172	53.87
RSUs (2)	35	—	9	—	74	—
PSUs (3)	25	—	—	—	—	—
Exercised	(469)	45.71	(711)	37.83	(203)	29.75
Forfeited	(100)	55.05	(71)	50.59	(64)	45.73
Expired	—	—	—	—	—	—
Outstanding at end of year	2,240	57.68	1,792	50.39	2,527	46.77
Options and SARs exercisable at end of year	704	51.64	479	48.35	846	42.06
Weighted-average fair value of awards granted during the year		\$ 20.84		\$ 29.24		\$ 16.45

- (1) Upon exercise, SARs entitle the recipient to receive shares of common stock equal to the increase in value of the award between the grant date and the exercise date.
- (2) An RSU represents the right to receive one share of common stock once certain vesting conditions are met. The value of an RSU is identical to the value of the underlying stock.
- (3) The Performance shares units shall be paid out based on achievement of three-year relative total stockholder return compared to other companies in S&P 500 index.

As of December 31, 2020, 2,516,498 shares of the Company's common stock are available for future grants under the 2018 Incentive Plan. No shares of the Company's common stock are available for future grants under the 2012 Incentive Plan as of such date.

The following table summarizes information about stock-based awards outstanding at December 31, 2020 (shares in thousands):

Exercise Price	Awards Outstanding			Awards Exercisable		
	Number of Stock-based Awards Outstanding	Weighted Average Remaining Contractual Life in Years	Aggregate Intrinsic Value	Number of Stock-based Awards Exercisable	Weighted Average Remaining Contractual Life in Years	Aggregate Intrinsic Value
\$ —	85	2.1	\$ 7,677	—	—	\$ —
42.87	235	1.5	11,129	235	1.5	11,129
47.46	15	2.9	642	15	2.9	642
51.71	8	4.0	309	—	4.0	—
53.16	31	3.9	1,164	21	3.9	792
53.44	486	3.5	17,893	129	3.5	4,719
55.16	296	2.9	10,384	213	2.9	7,484
57.97	15	3.6	485	15	3.6	485
58.79	1	1.5	33	—	1.5	—
63.35	94	2.9	2,525	68	2.9	1,843
63.40	45	5.5	1,219	—	5.5	—
67.54	12	5.9	269	—	5.9	—
68.34	47	5.4	1,027	—	5.4	—
69.14	842	5.4	17,820	—	5.4	—
71.71	4	4.6	74	—	4.6	—
72.14	15	4.7	272	—	4.7	—
76.43	8	4.9	117	8	4.9	117
90.28	1	2.8	—	—	2.8	—
	2,240	3.9	\$ 73,039	704	2.6	\$ 27,211

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The following table summarizes information about stock-based awards outstanding at December 31, 2019 (shares in thousands):

Exercise Price	Awards Outstanding			Awards Exercisable		
	Number of Stock-based Awards Outstanding	Weighted Average Remaining Contractual Life in Years	Aggregate Intrinsic Value	Number of Stock-based Awards Exercisable	Weighted Average Remaining Contractual Life in Years	Aggregate Intrinsic Value
\$ —	59	1.5	\$ 4,369	—	—	\$ —
42.87	427	2.5	13,517	230	2.5	7,295
47.46	15	3.9	406	15	3.9	406
51.71	8	5.0	182	0	0.0	0
53.16	35	4.9	756	15	4.9	329
53.44	783	4.5	16,498	0	0.0	0
55.16	296	3.9	5,724	131	3.9	2,527
57.97	30	4.6	497	30	4.6	497
58.79	12	2.5	187	6	2.5	94
63.35	98	3.9	1,094	52	3.9	581
71.71	4	5.6	11	—	—	—
72.14	15	5.7	36	—	—	—
76.43	10	5.9	—	—	—	—
	1,792	3.8	\$ 43,277	479	3.2	\$ 11,729

The aggregate intrinsic value in the above tables represents the total pretax intrinsic value, based on the Company's stock price of \$90.28 and \$74.52 as of December 31, 2020 and 2019, respectively, which would have potentially been received by the stock-based award holders had all stock-based award holders exercised their stock-based award as of those dates. The total number of in-the-money stock-based awards exercisable as of December 31, 2020 and 2019 was 704,169 and 479,402, respectively.

The total pretax intrinsic value of options exercised during the year ended December 31, 2020 and 2019 was \$11.0 million and \$19.3 million, respectively, based on the average stock price of \$69.2 and \$65.04 during the years ended December 31, 2020 and 2019, respectively.

NOTE 16 — INTEREST EXPENSE, NET

The components of interest expense are as follows:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Interest related to sale of tax benefits	\$ 9,344	\$ 11,786	\$ 11,284
Interest expense	79,018	71,883	63,368
Less — amount capitalized	(10,409)	(3,285)	(3,728)
	\$ 77,953	\$ 80,384	\$ 70,924

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NOTE 17 — INCOME TAXES

U.S. and foreign components of income from continuing operations, before income taxes and equity in income (losses) of investees consisted of:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
U.S.	\$ 43,273	\$ 14,187	\$ 14,097
Non-U.S. (foreign)	125,444	123,116	123,084
Total income from continuing operations, before income taxes and equity in losses	<u>\$ 168,717</u>	<u>\$ 137,303</u>	<u>\$ 137,181</u>

The components of the provision (benefit) for income taxes, net are as follows:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Current:			
Federal	\$ —	\$ 0	\$ —
State	363	172	381
Foreign	61,574	16,969	14,992
Total current income tax expense	<u>\$ 61,937</u>	<u>\$ 17,141</u>	<u>\$ 15,373</u>
Deferred:			
Federal	22,682	(12,179)	(6,886)
State	7,277	4,671	(2,595)
Foreign	(24,893)	35,980	28,841
Total deferred tax provision (benefit)	<u>5,066</u>	<u>28,472</u>	<u>19,360</u>
Total Income tax provision	<u>\$ 67,003</u>	<u>\$ 45,613</u>	<u>\$ 34,733</u>

Reconciliation of the U.S. federal statutory tax rate to the Company's effective income tax rate is as follows:

	Year Ended December 31,		
	2020	2019	2018
U.S. federal statutory tax rate	21.0%	21.0%	21.0%
Impact of federal tax reform	—	—	2.6
Transition tax inclusion	—	—	(5.7)
Foreign tax credits	(0.3)	(22.8)	(4.2)
Withholding tax	4.4	10.4	5.9
Valuation allowance - U.S.	3.0	(3.7)	(17.2)
State income tax, net of federal benefit	3.8	3.7	1.0
Uncertain tax positions	(7.5)	2.1	2.1
Effect of foreign income tax, net	8.5	9.7	5.6
Production tax credits	(1.8)	(5.0)	(3.1)
Subpart F income	0.2	0.5	0.5
Tax on global intangible low-tax income	11.1	16.9	18.6
Intra-entity transfers of assets other than inventory	(0.4)	0.3	(2.1)
Noncontrolling interest	(1.6)	(0.4)	(1.5)
Other, net	(0.7)	0.5	1.8
Effective tax rate	<u>39.7%</u>	<u>33.2%</u>	<u>25.3%</u>

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The net deferred tax assets and liabilities consist of the following:

	December 31,	
	2020	2019
	(Dollars in thousands)	
Deferred tax assets (liabilities):		
Net foreign deferred taxes, primarily depreciation	\$ (66,452)	\$ (88,508)
Depreciation	(23,835)	(21,958)
Intangible drilling costs	(6,689)	(1,405)
Net operating loss carryforward - U.S.	35,346	45,307
Tax monetization transaction	(46,449)	(30,964)
Right-of-use assets	(3,753)	(3,715)
Lease liabilities	3,846	3,755
State and Investment tax credits	813	813
Production tax credits	103,592	100,524
Foreign tax credits	92,077	92,497
Withholding tax	(12,416)	(15,539)
Stock options amortization	1,510	1,409
Basis difference in partnership interest	(41,818)	(39,622)
Excess business interest	10,971	6,189
Accrued liabilities and other	6,777	1,013
Total	53,520	49,796
Less - valuation allowance	(22,193)	(17,412)
Total, net	\$ 31,327	\$ 32,384

The following table presents a reconciliation of the beginning and ending valuation allowance:

	2020	2019
	(Dollars in thousands)	
Balance at beginning of the year	\$ 17,412	\$ 22,441
Additions to valuation allowance	20,214	15,437
Release of valuation allowance	(15,433)	(20,466)
Balance at end of the year	\$ 22,193	\$ 17,412

At December 31, 2020, the Company had U.S. federal net operating loss ("NOL") carryforwards of approximately \$72.7 million, of this amount, \$67.9 million was generated before 2018 and expires between 2032 and 2037. The remaining \$4.8 million was generated after 2017 and is available to be carried forward for an indefinite period.

At December 31, 2020, the Company had production tax credits ("PTCs") in the amount of \$103.6 million. These PTCs are available for a 20-year period and expire between 2022 and 2039. At December 31, 2020, the Company had U.S. foreign tax credits ("FTCs") in the amount of \$92.1 million. These FTCs are available for a 10-year period and begin to expire in 2022.

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At December 31, 2020, the Company had state NOL carryforwards of approximately \$289.9 million, \$287.3 million which expire between 2025 and 2040 and \$2.6 million are available to be carried forward for an indefinite period. At December 31, 2020, the Company had state tax credits in the amount of \$1.0 million. These state tax credits are available to be carried forward for an indefinite period.

The Company has recorded deferred tax assets for net operating losses, foreign tax credits, and production tax credits. Realization of the deferred tax assets and tax credits is dependent on generating sufficient taxable income in appropriate jurisdictions prior to expiration of the NOL carryforwards and tax credits. Based upon available evidence of the Company's ability to generate additional taxable income in the future and historical losses in prior years, a valuation allowance in the amount of \$22.2 million and \$17.4 million is recorded against the U.S. deferred tax assets as of December 31, 2020 and 2019, respectively, as it is more likely than not that the deferred tax assets will not be realized. The overall increase in the valuation allowance of \$4.8 million is due to an increased valuation allowance related to foreign tax credits and capital loss carryover, partially offset by a valuation allowance release related to expected full utilization of U.S. production tax credits. The Company is maintaining a valuation allowance of \$22.2 million against a portion of the U.S. foreign tax credit, capital loss carryforward, and state NOLs that are expected to expire before they can be utilized in future periods.

On April 24, 2018, the Company acquired 100% of stock of USG for approximately \$110 million. Under the acquisition method of accounting, the Company recorded a net deferred tax asset of \$1.7 million comprised primarily of federal and state NOLs netted against deferred tax liabilities for partnership basis differences and fixed assets. The total amount of acquired federal and state NOLs, which are subject to limitations under Section 382, were \$115.2 million and \$49.9 million, respectively. A valuation allowance of \$2.1 million has been recorded against such acquired state NOLs, as it is more likely than not that the deferred tax asset will not be realized.

The FASB released guidance Staff Q&A, Topic 740, No. 5, that states a company can make an accounting policy election to either recognize deferred taxes related to GILTI or to provide for the GILTI tax expense in the year the tax is incurred as a period cost. The Company has elected to treat any GILTI inclusions as a period cost. We have elected and applied the tax law ordering approach when considering GILTI as part of our valuation allowance.

The following table presents the deferred taxes on the balance sheet as of the dates indicated:

	Year Ended December 31,	
	2020	2019
	(Dollars in thousands)	
Non-current deferred tax assets	\$ 119,299	\$ 129,510
Non-current deferred tax liabilities	(87,972)	(97,126)
Non-current deferred tax assets, net	31,327	32,384
Uncertain tax benefit offset (1)	(95)	(95)
	<u>\$ 31,232</u>	<u>\$ 32,289</u>

(1) The non-current deferred tax asset has been reduced by the uncertain tax benefit of \$0.1 million in accordance with ASU 2013-11, Income Taxes.

At December 31, 2020, the Company is no indefinitely reinvested with respect to the earnings of its foreign subsidiaries due to forecasted changes in cash needs and the impact of U.S. tax reform. The Company has accrued withholding taxes that would be owed upon future distributions of such earnings, with the exception of a certain balance of earnings held in Israel. Accordingly, during 2020, the Company has accrued \$10.5 million of foreign withholding taxes on future distributions of foreign earnings.

At December 31, 2019, the Company is no longer indefinitely reinvested with respect to the earnings of its foreign subsidiaries due to forecasted changes in cash needs and the impact of U.S. tax reform. The Company has accrued withholding taxes that would be owed upon future distributions of such earnings, with the exception of a certain balance of earnings held in Israel. Accordingly, during 2019, the Company has accrued \$13.9 million of foreign withholding taxes on future distributions of foreign earnings.

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Uncertain tax positions

The Company is subject to income taxes in the United States (federal and state) and numerous foreign jurisdictions. Significant judgment is required in evaluating the Company's tax positions and determining its provision for income taxes. During the ordinary course of business, there are many transactions and calculations for which the ultimate tax determination is uncertain. The Company establishes reserves for tax-related uncertainties based on estimates of whether, and the extent to which additional taxes will be due. These reserves are established when the Company believes that certain positions might be challenged despite evidence supporting the position. The Company adjusts these reserves in light of changing facts and circumstances, such as the outcome of tax audits. The provision for income taxes includes the impact of reserve positions and changes to reserves that are considered probable.

At December 31, 2020 and 2019, there are \$2.0 million and \$14.6 million of unrecognized tax benefits, respectively, that if recognized would reduce the effective tax rate. Interest and penalties assessed by taxing authorities on an underpayment of income taxes are included as a component of income tax provision in the consolidated statements of operations and comprehensive income.

A reconciliation of the Company's unrecognized tax benefits is as follows:

	Year Ended December 31,	
	2020	2019
	(Dollars in thousands)	
Balance at beginning of year	\$ 10,623	\$ 8,820
Additions based on tax positions taken in prior years	283	104
Additions based on tax positions taken in the current year	1,570	2,314
Reduction based on tax positions taken in prior years	(10,803)	(615)
Balance at end of year	<u>\$ 1,673</u>	<u>\$ 10,623</u>

The Company and its U.S. subsidiaries file consolidated income tax returns for federal and state (where applicable) purposes. As of December 31, 2020, the Company has not been subject to U.S. federal or state income tax examinations.

The Company remains open to examination by the Internal Revenue Service for the years 2002-2019 and by local state jurisdictions for the years 2004-2019. These examinations may lead to ordinary course adjustments or proposed adjustments to the Company's taxes or the Company's net operating losses with respect to years under examination as well as subsequent periods.

The Company's foreign subsidiaries remain open to examination by the local income tax authorities in the following countries for the years indicated:

Israel	2019 - 2020
Kenya	2015 - 2020
Guatemala	2016 - 2020
Honduras	2015 - 2020
Guadeloupe	2017 - 2020

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Management believes that the liability for unrecognized tax benefits is adequate for all open tax years based on its assessment of many factors, including among others, past experience and interpretations of local income tax regulations. This assessment relies on estimates and assumptions and may involve a series of complex judgments about future events. As a result, it is possible that federal, state and foreign tax examinations will result in assessments in future periods. To the extent any such assessments occur, the Company will adjust its liability for unrecognized tax benefits. The Company is not able to reasonably estimate the amount of unrecognized tax benefits that will be reduced within the next twelve months.

Tax benefits in the United States

The U.S. government encourages production of electricity from geothermal resources through certain tax subsidies. On February 9, 2018 the Bipartisan Budget Act of 2018 was enacted extending the PTC and ITC in lieu of PTCs for geothermal projects that began construction before 2018. On December 20, 2019, the Tax Extenders Bill was enacted, further extending the PTC and ITC in lieu of PTCs. Therefore, geothermal projects that begin construction before 2021 and meet certain other “beginning of construction” rules qualify for PTCs for their first 10-years of operations; alternatively, the owner of the project may elect to claim the ITC in lieu of PTCs. In either case, under current tax rules for tax credits, any unused tax credit has a 1-year carry back and a 20-year carry forward.

If the Company claims the ITC, the Company’s “tax basis” in the plant that it can recover through bonus or accelerated depreciation (if elected) must be reduced by half of the ITC. If the Company claims the PTC, there is no reduction in the tax basis for depreciation. Whether the Company claims the PTC or the ITC in lieu of PTC, for assets acquired and placed in service after September 27, 2017, the Company is eligible to expense 100% of the cost of qualified property (“bonus depreciation”). In later years, the first-year bonus depreciation deduction phases down, as follows:

- 80% for property placed in service after Dec. 31, 2022 and before Jan. 1, 2024.
- 60% for property placed in service after Dec. 31, 2023 and before Jan. 1, 2025.
- 40% for property placed in service after Dec. 31, 2024 and before Jan. 1, 2026.
- 20% for property placed in service after Dec. 31, 2025 and before Jan. 1, 2027.

The Company could also elect in lieu of bonus depreciation to depreciate most of its “tax basis” in the plant for tax purposes over five years on an accelerated basis, meaning that more of the cost may be deducted in the first few years than during the remainder of the depreciation period.

Income taxes related to foreign operations

Guadeloupe - The Company’s operations in Guadeloupe are taxed at a maximum rate of 33.3% in 2018, a maximum rate 31% in 2019, a rate of 28% in 2020, 26.5% in 2021 and 25% in 2022. In October 2020, Geothermie Bouillante received a notice from the tax authority regarding an audit for the years 2017-2019. The audit is in its early stages and as such, no adjustment has been assessed or recorded as of the balance sheet date.

Guatemala — The enacted tax rate is 25%. Orzunil, a wholly owned subsidiary, was granted a benefit under a law which promotes development of renewable power sources. The law allows Orzunil to reduce the investment made in its geothermal power plant from income tax payable, which currently reduces the effective tax rate to zero. Ortitlan, another wholly owned subsidiary, was granted a tax exemption for a period of ten years ending August 2017. Starting August 2017, Ortitlan pays income tax of 7% on its Electricity revenues.

Honduras - The Company’s operations in Honduras are exempt from income taxes for the first ten years starting at the commercial operation date of the power plant, which was in September 2017.

Israel — The Company’s operations in Israel through its wholly owned Israeli subsidiary, Ormat Systems Ltd. (“Ormat Systems”), are taxed at the regular corporate tax rate of 24% in 2017 and 23% in 2018 and 16%, thereafter. Ormat Systems received “Benefited Enterprise” status under Israel’s Law for Encouragement of Capital Investments, 1959 (the “Investment Law”), with respect to two of its investment programs. In January 2011, new legislation amending the Investment Law was enacted. Under the new legislation, a uniform rate of corporate tax would apply to all qualified income of certain industrial companies, as opposed to the current law’s incentives that are limited to income from a “Benefited Enterprise” during their benefits period. According to the amendment, the uniform tax rate applicable to the zone where the production facilities of Ormat Systems are located would be 16% in 2014 and thereafter. Ormat Systems decided to irrevocably comply with the new law starting in 2011.

In the event of distribution of a cash dividend out of retained earnings which were tax exempt due to prior benefits, Ormat Systems would have to pay tax in respect of the amount distributed. Since the exemptions are contingent upon nondistribution of dividends and since upon liquidation the Company will have to pay a 25% tax on exempt income, Ormat Systems recorded deferred tax liability at the rate of 25% in respect of the tax exempt income in 2004-2008. In the event that Ormat Systems fails to comply with the program terms, the tax benefits may be canceled and it may be required to refund the amount of the benefits utilized, in whole or in part, with the addition of linkage differences and interest.

Kenya - The Company’s operations in Kenya are taxed at the rate of 37.5%.

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Tax audit in Israel

On December 28, 2020 the Company entered into a settlement agreement with the Israel Tax Authority ("ITA") in relation to a tax audit for the income tax years 2015 to 2018. The settlement amount for the audit period was \$4.3 million and was paid on January 7, 2021. This settlement closes and concludes all years within the audit period.

Tax audit in Kenya

The Company was audited by the Kenya Revenue Authority ("KRA") for income tax years 2013 to 2017 for which it had received during 2019 and 2020 three separate Notices of Assessments ("NoA") detailing different issues relating to certain findings in respect of the KRA review of such years.

On October 19, 2020, the Company entered into a settlement agreement in relation to the second NoA that was issued by the KRA on December 4, 2019 totaling approximately \$190 million of proposed adjustments, including interest and penalties. The settlement agreement extended the audit period for the issues addressed within the assessment, to cover the period from 2013 through 2019 and resulted in a total settlement payment of approximately \$28 million, including interest and penalties, related to late payment in respect of 2019 taxable income. Additionally, the settlement included a deferral of tax benefits to be utilized in years subsequent to 2019 in an amount of approximately \$28 million. The assessment was paid on October 27, 2020.

On December 21, 2020, the Company entered into a settlement agreement with the KRA in relation to the first and third NoA's that were issued by the KRA on June 28, 2019 and May 12, 2020, respectively, totaling approximately \$9 million, including interest and penalties. The total settlement amount reflected in the agreement was \$1.5 million, which was paid on December 28, 2020. This concluded all open audits and NoAs with the KRA.

NOTE 18 — BUSINESS SEGMENTS

The Company has three reporting segments: the Electricity segment, the Product segment and the Energy Storage segment (previously named "Energy Storage and Management Services"). These segments are managed and reported separately as each offers different products and serves different markets.

- Under the Electricity segment, the Company builds, owns and operates geothermal, solar PV and recovered energy-based power plants in the United States and geothermal power plants in other countries around the world and sell the electricity they generate.
- Under the Product segment, the Company designs, manufactures and sells equipment for geothermal and recovered energy-based electricity generation and remote power units and provide services relating to the engineering, procurement and construction of geothermal and recovered energy-based power plants.
- Under the Energy Storage segment, the Company provides energy storage and related services as well as services relating to the engineering, procurement, construction, operation and maintenance of energy storage units. To better reflect the significant business activities under this reporting segment, the Company has renamed this reporting segment to be "Energy Storage". There is no change to the business units reported under this segment.

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Transfer prices between the operating segments were determined on current market values or cost plus markup of the seller's business segment.

Summarized financial information concerning the Company's reportable segments is shown in the following tables, including, as further described under Note 1 to the consolidated financial statements, the Company's disaggregated revenues from contracts with customers as required by ASC 606:

	Electricity	Product	Energy Storage	Consolidated
	(Dollars in thousands)			
Year Ended December 31, 2020:				
Revenues from external customers:				
United States (1)	\$ 341,399	\$ 5,800	\$ 15,824	\$ 363,023
Foreign (2)	199,994	142,325	—	342,319
Net revenues from external customers	541,393	148,125	15,824	705,342
Intersegment revenues	—	113,200	—	—
Depreciation and amortization expense	144,357	6,010	6,245	156,612
Operating income (loss)	205,256	13,145	(4,388)	214,013
Segment assets at period end (3) (*)	3,607,384	145,911	135,692	3,888,987
Expenditures for long-lived assets	267,843	18,011	34,884	320,738
* Including unconsolidated investments	98,217	—	—	98,217
Year Ended December 31, 2019:				
Revenues from external customers:				
United States (1)	333,797	30,562	13,597	377,956
Foreign (2)	206,536	160,447	1,105	368,088
Net revenues from external customers	\$ 540,333	\$ 191,009	\$ 14,702	\$ 746,044
Intersegment revenues	—	84,614	—	—
Depreciation and amortization expense	138,426	5,308	5,027	148,761
Operating income (loss)	177,192	23,180	(6,576)	193,796
Segment assets at period end (3) (*)	3,044,909	126,018	79,567	3,250,494
Expenditures for long-lived assets	259,898	9,156	10,932	279,986
* Including unconsolidated investments	81,140	—	—	81,140
Year Ended December 31, 2018:				
Revenues from external customers:				
United States (1)	305,962	14,999	7,645	328,606
Foreign (2)	203,917	186,744	—	390,661
Net revenues from external customers	509,879	201,743	7,645	719,267
Intersegment revenues	—	48,817	—	—
Depreciation and amortization expense	126,181	4,311	1,741	132,233
Operating income (loss)	155,546	38,083	(8,519)	185,110
Segment assets at period end (3) (*)	2,896,938	156,942	67,470	3,121,350
Expenditures for long-lived assets	219,803	9,993	28,725	258,521
* Including unconsolidated investments	71,983	—	—	71,983

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- (1) Electricity segment revenues in the United States are all accounted under lease accounting, except for \$68.1 million, \$61.3 million and \$26.9 million for the years 2020, 2019 and 2018 which are accounted under ASC 606. Product and Energy Storage segment revenues in the United States are accounted under ASC 606, as further described under Note 1 to the consolidated financial statements.
- (2) Electricity segment revenues in foreign countries are all accounted under lease accounting. Product and Energy Storage segment revenues in foreign countries are accounted under ASC 606 as further described under Note 1 to the consolidated financial statements.
- (3) Electricity segment assets include goodwill in the amount of \$20.5 million, \$20.1 million and \$20.0 million as of December 31, 2020, 2019 and 2018, respectively. Energy Storage segment assets include goodwill in the amount of \$4.1 million as of December 31, 2020. No goodwill is included in the Product segment assets as of December 31, 2020, 2019 and 2018.

Reconciling information between reportable segments and the Company's consolidated totals is shown in the following table:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Revenues:			
Total segment revenues	\$ 705,342	\$ 746,044	\$ 719,267
Intersegment revenues	113,200	84,614	48,817
Elimination of intersegment revenues	(113,200)	(84,614)	(48,817)
Total consolidated revenues	\$ 705,342	\$ 746,044	\$ 719,267
Operating income (expense):			
Operating income	\$ 214,013	\$ 193,796	\$ 185,110
Interest income	1,717	1,515	974
Interest expense, net	(77,953)	(80,384)	(70,924)
Derivatives and foreign currency transaction gains (losses)	3,802	624	(4,761)
Income attributable to sale of tax benefits	25,720	20,872	19,003
Other non-operating income (expense), net	1,418	880	7,779
Total consolidated income before income taxes and equity in earnings (losses) of investees	\$ 168,717	\$ 137,303	\$ 137,181

The Company sells electricity, products and energy storage services mainly to the geographical areas set forth below based on the location of the customer. The following tables present certain data by geographic area:

	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Revenues from external customers attributable to:			
United States	\$ 363,023	\$ 377,956	\$ 328,606
Indonesia	—	—	4,379
Kenya	115,474	121,661	119,094
Turkey	65,535	88,938	168,699
Chile	32,418	25,540	980
Guatemala	27,391	28,624	27,975
New Zealand	34,985	31,222	10,451
Honduras	35,197	34,446	34,355
Other foreign countries	31,319	37,657	24,728
Consolidated total	\$ 705,342	\$ 746,044	\$ 719,267

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	Year Ended December 31,		
	2020	2019	2018
	(Dollars in thousands)		
Long-lived assets (primarily power plants and related assets) located in:			
United States	\$ 2,084,021	\$ 1,870,335	\$ 1,696,439
Kenya	289,266	284,526	301,956
Other foreign countries	232,953	224,676	222,872
Consolidated total	<u>\$ 2,606,240</u>	<u>\$ 2,379,537</u>	<u>\$ 2,221,267</u>

The following table presents revenues from major customers:

	Year Ended December 31,					
	2020		2019		2018	
	Revenues	%	Revenues	%	Revenues	%
	(Dollars in thousands)		(Dollars in thousands)		(Dollars in thousands)	
Southern California Public Power (1)	\$ 145,450	20.6	\$ 133,725	17.9	\$ 109,208	15.2
Sierra Pacific Power Company and Nevada Power Company (1)(2)	123,734	17.5	125,486	16.8	116,149	16.1
KPLC (1)	115,474	16.4	121,661	16.3	119,094	16.6

(1) Revenues reported in Electricity segment.

(2) Subsidiaries of NV Energy, Inc.

NOTE 19 — TRANSACTIONS WITH RELATED ENTITIES

There were no transactions between the Company and related entities, other than those disclosed elsewhere in these financial statements.

NOTE 20 — EMPLOYEE BENEFIT PLAN

401(k) Plan

The Company has a 401(k) Plan (the “Plan”) for the benefit of its U.S. employees. Employees of the Company and its U.S. subsidiaries who have completed 60 days of employment are eligible to participate in the Plan. Contributions are made by employees through pre- and post-tax deductions up to 60% of their annual salary. In 2020, 2019 and 2018, the Company matched employee contributions, after completion of one year of service, up to a maximum of 4%, 4% and 4% of the employee’s annual salary, respectively. The Company’s contributions to the Plan were \$1.6 million, \$1.6 million and \$1.6 million for the years ended December 31, 2020, 2019 and 2018, respectively.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Severance plan

The Company, through Ormat Systems, provides limited non-pension benefits to all current employees in Israel who are entitled to benefits in the event of termination or retirement in accordance with the Israeli Government sponsored programs. These plans generally obligate the Company to pay one month's salary per year of service to employees in the event of involuntary termination. There is no limit on the number of years of service in the calculation of the benefit obligation. The liabilities for these plans are recorded at each balance sheet date by determining the undiscounted obligation as if it were payable at that point in time. Such liabilities have been presented in the consolidated balance sheets as "liabilities for severance pay". The Company has an obligation to partially fund the liabilities through regular deposits in pension funds and severance pay funds. The amounts funded amounted to \$10.7 million and \$10.8 million at December 31, 2020 and 2019, respectively, and have been presented in the consolidated balance sheets as part of "Deposits and other". The severance pay liability covered by the pension funds is not reflected in the financial statements as the severance pay risks have been irrevocably transferred to the pension funds. Under the Israeli severance pay law, restricted funds may not be withdrawn or pledged until the respective severance pay obligations have been met. As allowed under the program, earnings from the investment are used to offset severance pay costs. Severance pay expenses for the years ended December 31, 2020, 2019 and 2018 were \$3.0 million, \$3.5 million and \$3.0 million, respectively, which are net of income (including loss) amounting to \$0.9 million, \$1.0 million, and \$(1.1) million, respectively, generated from the regular deposits and amounts accrued in severance funds.

The Company expects to pay the following future benefits to its employees upon their reaching normal retirement age:

	(Dollars in thousands)
Year ending December 31:	
2021	\$ 4,968
2022	1,910
2023	148
2024	686
2025	1,160
2026-2043	11,582
Total	\$ 20,454

The above amounts were determined based on the employees' current salary rates and the number of years' service that will have been accumulated at their retirement date. These amounts do not include amounts that might be paid to employees that will cease working with the Company before reaching their normal retirement age.

NOTE 21 — COMMITMENTS AND CONTINGENCIES

Geothermal resources

The Company, through its project subsidiaries in the United States and other foreign locations, controls certain rights to geothermal fluids through certain leases with the BLM or through private leases. Royalties on the utilization of the geothermal resources are computed and paid to the lessors as defined in the respective agreements. Royalty expense under the geothermal resource agreements were \$20.8 million, \$21.7 million and \$21.6 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Letters of credit

In the ordinary course of business with customers, vendors, and lenders, the Company is contingently liable for performance under letters of credit totaling \$190.3 million at December 31, 2020. Management does not expect any material losses to result from these letters of credit because performance is not expected to be required.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Purchase commitments

The Company purchases raw materials for inventories, construction-in-process and services from a variety of vendors. During the normal course of business, in order to manage manufacturing lead times and help assure adequate supply, the Company enters into agreements with contract manufacturers and suppliers that either allow them to procure goods and services based upon specifications defined by the Company, or that establish parameters defining the Company's requirements. At December 31, 2020, total obligations related to such supplier agreements were approximately \$159.9 million (out of which approximately \$77.8 million relate to construction-in-process). All such obligations are payable in 2021.

Grants and royalties

The Company, through Ormat Systems, had historically, through December 31, 2003, requested and received grants for research and development from the Office of the Chief Scientist of the Israeli Government. Ormat Systems is required to pay royalties to the Israeli Government at a rate of 3.5% to 5.0% of the revenues derived from products and services developed using these grants. No royalties were paid for the years ended December 31, 2020, 2019 and 2018. The Company is not liable for royalties if the Company does not sell such products and services. Such royalties are capped at the amount of the grants received plus interest at LIBOR. The cap at December 31, 2020 and 2019, amounted to \$2.1 million every year, of which approximately \$1.1 million represents interest based on the LIBOR rate, as defined above.

Lease commitments

The Company's lease commitments are detailed under Note 22, Leases to the consolidated financial statements.

Contingencies

- On May 21, 2018, a motion to certify a class action was filed in Tel Aviv District Court against Ormat Technologies, Inc. and 11 officers and directors. The alleged class is defined as "All persons who purchased Ormat shares on the Tel Aviv Stock Exchange between August 3, 2017 and May 13, 2018". The motion alleges that the Company and other respondents violated Sections 31(a)(1) and 38C of the Israeli Securities Law, and Section 10(b) of the Exchange Act and Rule 10b-5 thereunder, because they allegedly: (1) misled investors by stating in the Company's financial statements that it maintains effective internal controls over its accounting policies and procedures, even though the Company's internal controls had material weaknesses which led to erroneous accounting in its 2017 unaudited quarterly reports that had to be restated, including adjustments to the Company's net income and shareholders' equity; and (2) failed to issue an immediate report in Israel until May 16, 2018, analogous to the report that was released in the United States on May 11, 2018 stating, inter alia, that the errors in its financial reports affected its balance sheet and would be remedied in its 2017 annual report. Agreed motions were filed from time to time with, and granted by, the Tel Aviv District Court to stay the proceedings in Israel in light of the United States case (Mac Costas). On June 30, 2020, pursuant to the execution and submission of a settlement agreement to the United States court for approval, which resolves the matters raised with respect to the entire class of shareholders (whether traded on the Tel Aviv Stock Exchange or U.S. stock exchange), the Company filed a motion informing the Tel Aviv court of the settlement. On January 4, 2021, the Tel Aviv District Court approved the parties' joint motion for withdrawal and dismissal of the plaintiff's July 2, 2020 motion for an Anti-Suit Injunction.

- On June 11, 2018, a putative class action filed by Mac Costas on behalf of alleged shareholders that purchased or acquired the Company's ordinary shares between August 8, 2017 and May 15, 2018 was commenced in the United States District Court for the District of Nevada against the Company and its Chief Executive Officer and Chief Financial Officer, which was subsequently amended by a consolidated complaint filed by lead plaintiff Phoenix Insurance in May 13, 2019. The complaint asserts claim against all defendants pursuant to Section 10(b) of the Exchange Act, as amended, and Rule 10b-5 thereunder and against its officers pursuant to Section 20(a) of the Exchange Act. The complaint alleges that the Company's Form 10-K for the years ended December 31, 2016 and 2017, and Form 10-Qs for each of the quarters in the nine months ended September 30, 2017 contained material misstatements or omissions, among other things, with respect to the Company's tax provisions and the effectiveness of its internal control over financial reporting, and that, as a result of such alleged misstatements and omissions, the plaintiffs suffered damages. On December 6, 2019 the Company's motion to dismiss was denied by the court. On March 23, 2020, pursuant to out of court mediation, a term sheet for a proposed settlement of the action without admission of liability or wrongdoing, was signed between the parties and on June 10, 2020, a joint stipulation and motion for preliminary approval of the comprehensive executed settlement documentation was filed for the court for approval. On January 21, 2020, the Court issued its Order and Final Judgement certifying the Class, approving the method of notification of the settlement pursued, and approving the final settlement and proposed Plan of Allocation as well as the plaintiff attorneys' and plaintiff's awards. The final settlement was concluded with an immaterial amount for the Company.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

- On September 11, 2018, the Klein derivative action (Klein Action) was filed against the Company, our board and its Chief Executive Officer and Chief Financial Officer in the United States District Court for the District of Nevada, and on October 22, 2018, the Matthew derivative action (Matthew Action) was filed against the Company, certain named present and former board members (Barniv, Beck, Boehm, Clark, Falk, Freeland, Granot, Joyal, Nishigori, Sharir, Stern and Wong) in the United States District Court, District of Nevada. The Klein complaint asserts four derivative causes of action generally arising from Ormat's restatement of its financial statements: (i) the individual defendants allegedly breached their fiduciary duties by allowing the Company to improperly report its financials; (ii) the individual defendants allegedly were unjustly enriched by being compensated while breaching their fiduciary duties; (iii) the individual defendants allegedly committed corporate waste in paying officers and directors and by incurring legal costs and potential liability; and (iv) the director defendants allegedly breached Section 14(a) of the Exchange Act in connection with the issuance of the 2018 proxy. The Matthew complaint similarly alleges derivatively a breach of fiduciary duties, abuse of control, gross mismanagement, and corporate waste by the named directors. On January 24, 2019, the Nevada Court entered an order consolidating the Klein Action and Matthew Action. On July 10, 2020, a comprehensive settlement package and derivative stipulation of settlement was submitted to the court, and on October 12, 2020, Plaintiff filed an unopposed motion to the Nevada Court requesting preliminary approval of the corporate governance enhancement settlement. On November 24, 2020, the Court issued its order preliminarily approving the derivative settlement and providing notice for a final settlement hearing on March 22, 2021 for its final decision for review of the settlement and of the request to dismiss the consolidated derivation action with prejudice. The sum the Company will bear for implementation is not material.

- Following the announcement of the Company's acquisition of U.S. Geothermal Inc. ("USG"), a number of putative shareholder class action complaints were initially filed on behalf of USG shareholders between March 8, 2018 and March 30, 2018 against USG and the individual members of the USG board of directors. All of the purported class action suits filed in Federal Court in Idaho have been voluntarily dismissed. The single remaining class action complaint is a purported class action filed in the Delaware Chancery Court, entitled *Riche v. Pappas, et al.*, Case No. 2018-0177 (Del. Ch., Mar. 12, 2018). An amended complaint was filed on May 24, 2018 under seal, under a confidentiality agreement that was executed by plaintiff. The amended Riche complaint alleges state law claims for breach of fiduciary duty against former USG directors and seeks post-closing damages. On March 27, 2020, pursuant to out of court mediation, a term sheet for a proposed settlement of the action, without admission of liability or wrongdoing, was signed between the parties. On June 3, 2020, a comprehensive settlement package and stipulation of settlement was filed with the court for approval, and on September 16, 2020 the Delaware Chancery Court approved the settlement. Plaintiff's revised motion requesting the court to approve Plaintiff's proposed allocation plan was filed on October 6, 2020. The sum the Company will bear in this context is not material.

- On March 29, 2016, a former local sales representative in Chile, Aquavant, S.A., filed a claim on the basis of unjust enrichment against Ormat's subsidiaries in the 27th Civil Court of Santiago, Chile. The claim requests that the court order Ormat to pay Aquavant \$4.6 million in connection with its activities in Chile, including the EPC contract for the Cerro Pabellon project and various geothermal concessions, plus 3.75% of Ormat geothermal products sales in Chile over the next 10 years. Pursuant to various motions submitted by the defendants and the plaintiffs to various courts, including the Court of Appeals, the case was removed from the original court and then refiled before the 11th Civil Court of Santiago. On April 16, 2020, the 11th Civil Court of Santiago issued its order rejecting Plaintiff's principal claim of unjust enrichment, as an improper cause of action, rejecting Plaintiff's secondary claim for declaratory judgment, which the Court associates with the principal claim of unjust enrichment and not relating to a number of defenses raised by the Company. In May 2020, each of the parties filed separately to the court of appeals, which are pending. On October 19, 2020, the Court of Appeals dismissed all ancillary appeals on procedural issues filed by Aquavant as well as two ancillary appeals on procedural issues filed by the Company. The Company considers it has strong legal defenses and the probability of the claimant receiving an award is low. The potential amount that the Company may bear in this context cannot be reasonably estimated at this time.

In addition, from time to time, the Company is named as a party to various other lawsuits, claims and other legal and regulatory proceedings that arise in the ordinary course of the Company's business. These actions typically seek, among other things, compensation for alleged personal injury, breach of contract, property damage, punitive damages, civil penalties or other losses, or injunctive or declaratory relief. With respect to such lawsuits, claims and proceedings, the Company accrues reserves when a loss is probable, and the amount of such loss can be reasonably estimated. It is the opinion of the Company's management that the outcome of these proceedings, individually and collectively, will not be material to the Company's consolidated financial statements as a whole.

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 22 — LEASES

The Company is a lessee in operating lease transactions primarily consisting of land leases for its exploration and development activities. Additionally, the Company was a lessee under an operating lease in relation to the Puna power plant transaction which was terminated in December 2019 as further described under Note 12 to the consolidated financial statements. The Company is a lessee in finance lease transactions primarily consisting of fleet vehicles and office rentals. The Company is a lessor in PPAs that are accounted under lease accounting, as further described under Note 1 to the consolidated financial statements under "Revenues and cost of revenues" and "Leases".

A. Leases in which the Company is a lessee

The table below presents the effects on the amounts relating to total lease cost:

	Year Ended December 31, 2020	Year Ended December 31, 2019
	(Dollars in thousands)	
Lease cost		
Finance lease cost:		
Amortization of right-of-use assets	\$ 3,422	\$ 3,273
Interest on lease liabilities	1,226	1,330
Operating lease cost	3,303	8,057
Variable lease cost	1,891	1,647
Short-term lease cost	—	—
Total lease cost	<u>\$ 9,842</u>	<u>\$ 14,307</u>
Other information		
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows for finance leases	\$ 1,226	\$ 1,330
Operating cash flows for operating leases	3,213	9,004
Financing cash flows for finance leases	2,890	3,164
Right-of-use assets obtained in exchange for new finance lease liabilities	1,028	5,262
Right-of-use assets obtained in exchange for new operating lease liabilities	2,614	6,364
	December 31, 2020	December 31, 2019
Additional information as of the end of the year:		
Weighted-average remaining lease term — finance leases (in years)	5.2	4.0
Weighted-average remaining lease term — operating leases (in years)	10.7	7.3
Weighted-average discount rate (in percentage)	5%	5%

Future minimum lease payments under non-cancellable leases as of December 31, 2020 were as follows:

	Operating Leases	Finance Leases
	(Dollars in thousands)	
Year ending December 31,		
2021	\$ 3,255	\$ 4,177
2022	2,539	4,116
2023	1,902	3,015
2024	1,625	1,156
2025	1,440	565
Thereafter	9,559	3,694
Total future minimum lease payments	20,320	16,723
Less imputed interest	4,501	4,450
Total	<u>\$ 15,819</u>	<u>\$ 12,273</u>

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

B. Leases in which the Company is a lessor

The table below presents the lease income recognized for lessors:

	Year Ended December 31, 2020	Year Ended December 31, 2019
	(Dollars in thousands)	
Lease income relating to lease payments of operating leases	\$ 473,260	\$ 479,059

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 23 — QUARTERLY FINANCIAL INFORMATION (UNAUDITED)

	Three Months Ended							
	Mar. 31,2019	June 30,2019	Sept. 30,2019	Dec. 31,2019	Mar. 31,2020	June 30,2020	Sept. 30,2020	Dec. 31,2020
(Dollars in thousands, except per share amounts)								
Revenues:								
Electricity	\$ 142,908	\$ 129,079	\$ 123,978	\$ 144,368	\$ 142,856	\$ 128,685	\$ 123,660	\$ 146,192
Product	52,128	52,030	43,037	43,814	47,411	43,701	29,625	27,388
Energy storage	4,002	2,956	3,484	4,260	1,846	2,514	5,662	5,802
Total revenues	199,038	184,065	170,499	192,442	192,113	174,900	158,947	179,382
Cost of revenues:								
Electricity	77,543	73,775	80,124	81,393	71,368	71,950	76,670	80,071
Product	42,106	41,316	31,073	31,479	36,978	34,709	24,037	19,224
Energy storage	5,210	3,827	3,807	5,068	1,949	2,855	4,210	5,046
Total cost of revenues	124,859	118,918	115,004	117,940	110,295	109,514	104,917	104,341
Gross profit	74,179	65,147	55,495	74,502	81,818	65,386	54,030	75,041
Operating expenses:								
Research and development expenses	900	810	1,062	1,875	1,619	1,172	1,490	1,114
Selling and marketing expenses	3,865	3,276	3,783	4,123	4,794	4,854	4,076	3,660
General and administrative expenses	15,689	14,181	11,931	14,032	16,745	11,870	14,539	17,072
Business interruption insurance income	—	—	—	—	(2,397)	(585)	(17,761)	—
Operating income	53,725	46,880	38,719	54,472	61,057	48,075	51,686	53,195
Other income (expense):								
Interest income	293	420	482	320	402	441	626	248
Interest expense, net	(21,223)	(21,517)	(20,076)	(17,568)	(17,273)	(19,785)	(21,756)	(19,139)
Derivatives and foreign currency transaction gains (losses)	472	19	205	(72)	393	671	1,047	1,691
Income attributable to sale of tax benefits	7,764	4,637	4,056	4,415	4,132	5,672	7,014	8,902
Other non-operating income (expense), net	91	1,027	244	(482)	78	304	961	75
Income from operations before income tax and equity in earnings (losses) of investees	41,122	31,466	23,630	41,085	48,789	35,378	39,578	44,972
Income tax (provision) benefit	(14,039)	3,529	(9,626)	(25,477)	(18,148)	(11,766)	(15,361)	(21,728)
Equity in earnings (losses) of investees, net	1,047	1,202	1,085	(1,481)	(735)	1,658	(1,119)	288
Net income	28,130	36,197	15,089	14,127	29,906	25,270	23,098	23,532
Net loss (income) attributable to noncontrolling interest	(2,184)	(2,259)	516	(1,521)	(3,873)	(2,224)	(7,419)	(2,834)
Net income (loss) attributable to the Company's stockholders	\$ 25,946	\$ 33,938	\$ 15,605	\$ 12,606	\$ 26,033	\$ 23,046	\$ 15,679	\$ 20,698
Earnings (loss) per share attributable to the Company's stockholders								
Basic	\$ 0.51	\$ 0.67	\$ 0.31	\$ 0.25	\$ 0.51	\$ 0.45	\$ 0.31	\$ 0.39
Diluted	\$ 0.51	\$ 0.66	\$ 0.30	\$ 0.24	\$ 0.51	\$ 0.45	\$ 0.31	\$ 0.39
Weighted average number of shares used in computation of earnings per share attributable to the Company's stockholders:								
Basic	50,709	50,800	50,933	51,017	51,036	51,043	51,072	53,106
Diluted	51,012	51,094	51,334	51,511	51,526	51,362	51,282	53,551

ORMAT TECHNOLOGIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 24 — SUBSEQUENT EVENTS**Cash dividend**

On February 24, 2021, the Company's Board of Directors declared, approved and authorized payment of a quarterly dividend of \$6.7 million (\$0.12 per share) to all holders of the Company's issued and outstanding shares of common stock on March 11, 2021, payable on March 29, 2021.

Weather conditions

In February 2021, extreme weather conditions in the area of Georgetown Texas, resulted in a significant increase in demand for electricity on the one hand and decrease in the electricity supply in the region on the other hand. On February 15, the Electricity Reliability Council of Texas ("ERCOT") issued an Energy Emergency Alert level 3 ("EEA 3") prompting rotating outages in Texas. Eventually, this led to a significant increase in the Responsive Reserve Service ("RRS") market prices, where the Company operates its Rabbit Hill battery energy storage facility which provides ancillary services and energy optimization to the wholesale markets managed by ERCOT. Due to the electricity supply shortage, ERCOT restricted battery charging in the Rabbit Hill facility starting February 16, 2021 to February 19, 2021 resulting in a limited ability of the Rabbit Hill storage facility to provide RRS. As a result, the Company incurred losses of up to approximately \$11 million from a hedge transaction in relation to its inability to provide RRS during that period that it does not expect to recover from the market. Starting February 19, 2021, the Rabbit Hill energy storage facility resumed operation in full capacity.

In addition, as the event is still unfolding, the Company may incur additional losses related to imbalance charges from the grid operator in respect of its demand response operation as it may not be able to collect such charges from its customers.

Tax law amendment

In January 2017, the Encouragement Law was amended (the "Amendment" or "Amendment 73"). The Amendment includes, inter alia, new tax incentives track: Preferred Technological Enterprise ("PTE"). The new tax incentives include incentives with respect to income generated from intellectual property, such as patents and software ("Technological Income"), subject to meeting certain conditions. In order to qualify for the PTE tax regime, a company is required to meet certain mandatory conditions. Companies that do not meet the mandatory conditions are required to receive an approval from the Israeli Innovation Authority ("IIA") for owning "Innovation Promoting Enterprise" in order to be eligible for a reduced corporate income tax rate of 12% related to the Preferred Technological Income stream under PTE.

Ormat Systems applied for a ruling from the IIA in order to qualify as an "Innovation Promoting Enterprise", that will allow the company to bypass the quantitative pre-conditions and be eligible for the tax benefits of a PTE. On January 20, 2021, Ormat Systems received the IIA approval that it owns an "Innovation Promoting Enterprise" and therefore is eligible for a reduced corporate tax rate of 12% on its "Preferred Technological Income" for the tax years 2019 and 2020 (effective tax rate of approximately 13% for 2019 and 2020). This impact will be recorded in the first quarter of 2021.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES**Disclosure Controls and Procedures**

We maintain disclosure controls and procedures that are designed to provide reasonable assurance that information required to be disclosed by us in reports that we file or submit under the Securities Exchange Act of 1934, as amended (the "Exchange Act") is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our CEO (principal executive officer) and CFO (principal financial officer), as appropriate, to allow for timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

As required by SEC Rule 13a-15(e), we carried out an evaluation, under the supervision and with the participation of our management, including our CEO and CFO, of the effectiveness of our disclosure controls and procedures as of December 31, 2020. Based on this evaluation, our CEO and CFO concluded that our disclosure controls and procedures were effective as of December 31, 2020 to provide the reasonable assurance described above.

Changes in Internal Control Over Financial Reporting

Other than steps taken in connection with the completion of the remediation process described below, there were no changes in our internal control over financial reporting that occurred during the quarter ended December 31, 2020 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

During the year ended December 31, 2020, we completed our internal control procedures to address the previously identified material weakness as described in more detail under “Remediation Efforts” below.

Management’s Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rule 13a-15(f) of the Exchange Act. Under the supervision and with the participation of our management, including the CEO and the CFO, we carried out an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2020 using the criteria established in “Internal Control-Integrated Framework” (2013), issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on that evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2020.

Our internal control over financial reporting as of December 31, 2020 has been audited by Kesselman & Kesselman, Certified Public Accountants (Isr.), an independent registered public accounting firm and a member of PricewaterhouseCoopers International Limited (“PwC”), as stated in their report which is included under “Item 8—Financial Statements.”

Previously Identified Material Weaknesses in Internal Control Over Financial Reporting

We previously identified and disclosed in our Annual Report on Form 10-K for the years ended December 31, 2017, 2018 and 2019, as well as in our Quarterly Reports on Form 10-Q for each interim period in fiscal 2020, material weaknesses in our internal control over financial reporting relating to the following:

Material weakness. In connection with the change in our repatriation strategy and the related release of the US income tax valuation allowance in the second quarter of 2017, we did not perform an effective risk assessment related to our internal controls over the accounting for income taxes. As a result, we identified a deficiency in the design of our internal control over financial reporting related to our accounting for income taxes, which resulted in the restatements of the Company’s unaudited condensed consolidated financial statements for the three and six months ended June 30, 2017, the three and nine months ended September 30, 2017, and the restatement of the Company’s consolidated financial statements for the year ended December 31, 2017. Our management concluded that this deficiency constitutes a material weakness in our internal control over financial reporting.

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In Management’s Report on Internal Control Over Financial Reporting included in our original Annual Report on Form 10-K for the year ended December 31, 2017, our management concluded that we did not maintain effective internal control over financial reporting as of December 31, 2017 because of the material weakness described above. As a result, we concluded that we did not maintain an effective internal control over financial reporting as of December 31, 2017, based on the criteria in Internal Control-Integrated Framework (2013) issued by the COSO.

Remediation Efforts of Previously Disclosed Material Weaknesses

Subsequent to the evaluation made in connection with filing our Amended Annual Report on Form 10-K for the year ended December 31, 2017, our management, with the oversight of the Audit Committee of the Board of Directors, has continued the process of remediating the material weakness. In connection with the remediation process, we have:

- performed an enhanced risk assessment related to our internal controls over the accounting for income taxes;
- recruited additional tax personnel throughout the years, including a VP of Tax in January 2019;
- engaged an external tax and accounting firm to prepare and review our annual and quarterly income tax provision;
- implemented specific control procedures for the review, analysis and reporting of our income tax accounts, including control procedures of projections that support the deferred tax assets and liabilities;
- strengthened our income tax controls with improved documentation, communication and oversight.

As a result of these remediation activities and based on testing of the new and modified controls for operating effectiveness, our management concluded that we remediated the previously reported material weakness as of December 31, 2020.

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ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Information required by this item and not set forth below is incorporated herein by reference to our definitive proxy statement for the 2021 annual meeting.

Audit Committee

Information required by this Item and not set forth below is incorporated herein by reference to our definitive proxy statement for the 2021 annual meeting.

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ITEM 11. EXECUTIVE COMPENSATION

Information required by this item and not set forth below is incorporated herein by reference to our definitive proxy statement for the 2021 annual meeting.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information required by this item and not set forth below is incorporated herein by reference to our definitive proxy statement for the 2021 annual meeting.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information required by this item and not set forth below is incorporated herein by reference to our definitive proxy statement for the 2021 annual meeting.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Information required by this item is incorporated herein by reference to our definitive proxy statement for the 2021 annual meeting.

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PART IV**ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES***(a) (1) List of Financial Statements*

See Index to Financial Statements in Part II, Item 8 of this annual report.

(2) List of Financial Statement Schedules

All applicable schedule information is included in our Financial Statements in Part II, Item 8 of this annual report.

(b) Exhibit Index. We hereby file, as exhibits to this Annual Report, those exhibits listed on the Exhibit Index immediately following the signature page hereto.

Exhibit**No.****Document****(C) EXHIBIT INDEX**

2.1	Agreement and Plan of Merger, dated January 24, 2018, by and among Ormat Nevada Inc., OGP Holding Corp. and U.S. Geothermal Inc., incorporated by reference to Exhibit 2.1 to Ormat Technologies, Inc.'s Form 10-K filed with the Securities and Exchange Commission on March 16, 2018. [^]
3.1	Fourth Amended and Restated Certificate of Incorporation, incorporated by reference to Exhibit 3.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on November 12, 2019.
3.2	Fifth Amended and Restated By-laws, incorporated by reference to Exhibit 3.3 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on November 12, 2019.
3.3	Amended and Restated Limited Liability Company Agreement of ORPD LLC, dated April 30, 2015, by and among Ormat Nevada Inc., Northleaf Geothermal Holdings LLC, and ORPD Holding LLC incorporated by reference to Exhibit 3.5 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 7, 2015.
4.1	Form of Common Share Stock Certificate, incorporated by reference to Exhibit 4.1 to Ormat Technologies, Inc.'s Registration Statement on Form S-1 (File No. 333-117527) filed with the Securities and Exchange Commission on July 21, 2004.
4.2	Form of Preferred Share Stock Certificate, incorporated by reference to Exhibit 4.2 to Ormat Technologies, Inc.'s Registration Statement on Form S-1 (File No. 333-117527) filed with the Securities and Exchange Commission on July 21, 2004.
4.3	Indenture of Trust and Security Agreement, dated September 23, 2011, among OFC 2 LLC, ORNI 15 LLC, ORNI 39 LLC, ORNI 42 LLC, HSS II, LLC, and Wilmington Trust Company, as Trustee and Depository, incorporated by reference to Exhibit 4.8 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on November 4, 2011.
4.4+	Description of Securities Registered under Section 12 of the Securities Exchange Act of 1934.

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- 4.5 [Deed of Trust, dated as of June 25, 2020, by and between Ormat Technologies, Inc. and Mishmeret Trust Services Company Ltd., as trustee, and a Form of Bonds \(included in Schedule One to the Deed of Trust\), incorporated by reference to Exhibit 4.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on July 1, 2020.](#)
- 10.1 [Agreement for Purchase of Membership Interests in ORPD LLC, dated as of February 5, 2015, by and between Ormat Nevada Inc. and Northleaf Geothermal Holdings LLC is incorporated by reference to Exhibit 3.5 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 7, 2015.](#)
- 10.2 [Agreement for Purchase of Membership Interests in ORNI 37 LLC, dated as of November 22, 2016, by and between Northleaf Geothermal Holdings LLC and Ormat Nevada Inc., incorporated by reference to Exhibit 10.1.13 to Ormat Technologies, Inc.'s Form 10-K filed with the Securities and Exchange Commission on March 1, 2017.](#)
- 10.3 [Amended and Restated Limited Liability Company Agreement of Opal Geo LLC, dated as of December 16, 2016, by and between OrLeaf LLC and JPM Capital Corporation, incorporated by reference to Exhibit 10.1.14 to Ormat Technologies, Inc.'s Form 10-K filed with the Securities and Exchange Commission on March 1, 2017.](#)
- 10.4 [Equity Contribution Agreement, dated as of December 16, 2016, by and among JPM Capital Corporation, Ormat Nevada Inc. and OrLeaf LLC, incorporated by reference to Exhibit 10.1.15 to Ormat Technologies, Inc.'s Form 10-K filed with the Securities and Exchange Commission on March 1, 2017.](#)
- 10.5 [Purchase Power Contract, dated March 24, 1986, by and between Hawaii Electric Light Company and Thermal Power Company incorporated by reference to Exhibit 10.3.44 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)
- 10.6 [Firm Capacity Amendment to Purchase Power Contract, dated July 28, 1989, by and between Hawaii Electric Light Company and Puna Geothermal Venture incorporated by reference to Exhibit 10.3.45 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)
- 10.7 [Amendment to Purchase Power Contract, dated October 19, 1993, by and between Hawaii Electric Light Company and Puna Geothermal Venture incorporated by reference to Exhibit 10.3.46 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)
- 10.8 [Third Amendment to the Purchase Power Contract, dated March 7, 1995, by and between Hawaii Electric Light Company and Puna Geothermal Venture incorporated by reference to Exhibit 10.3.47 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)
- 10.9 [Performance Agreement and Fourth Amendment to the Purchase Power Contract, dated February 12, 1996, by and between Hawaii Electric Light Company and Puna Geothermal Venture incorporated by reference to Exhibit 10.3.48 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)

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- 10.10+ [Fifth Amendment to the Purchase Power Contract, dated February 7, 2011, by and between Hawaii Electric Light Company and Puna Geothermal Venture.](#)
- 10.11 [Power Purchase Agreement, dated October 20, 2016, between ONGP, LLC and Southern California Public Power Authority, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities Exchange Commission on June 1, 2017.](#)
- 10.12 [Geothermal Resources Mining Lease, dated February 20, 1981, by and between the State of Hawaii, as Lessor, and Kapoho Land Partnership, as Lessee incorporated by reference to Exhibit 10.4.3 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)
- 10.13+ [Supplement to Geothermal Resources Mining Lease, dated July 9, 1990, by and between the State of Hawaii, as Lessor, and Kapoho Land Partnership, as Lessee.](#)
- 10.14 [KLP Lease and Agreement, dated March 1, 1981, by and between Kapoho Land Partnership, as Lessor, and Thermal Power Company, as Lessee incorporated by reference to Exhibit 10.4.30 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)
- 10.15 [Amendment to KLP Lease and Agreement, dated July 9, 1990, by and between Kapoho Land Partnership, as Lessor, and Puna Geothermal Venture, as Lessee incorporated by reference to Exhibit 10.4.31 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)

- 10.16 [Second Amendment to KLP Lease and Agreement, dated December 31, 1996, by and between Kapoho Land Partnership, as Lessor, and Puna Geothermal Venture, as Lessee incorporated by reference to Exhibit 10.4.32 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 1 on Form S-1/A \(File No. 333-117527\) filed with the Securities and Exchange Commission on September 28, 2004.](#)
- 10.17* [Amended and Restated Ormat Technologies, Inc. 2012 Incentive Compensation Plan, incorporated by reference to Exhibit 10.2 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on February 11, 2014.](#)
- 10.18* [Form of Incentive Stock Option Agreement to Ormat Technologies, Inc.'s 2012 Incentive Compensation Plan, incorporated by reference to Exhibit 10.31.2 to Ormat Technologies, Inc.'s Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 28, 2014](#)
- 10.19* [Form of Freestanding Stock Appreciation Right Agreement to Amended and Restated Ormat Technologies, Inc.'s 2012 Incentive Compensation Plan, incorporated by reference to Exhibit 10.31.3 to Ormat Technologies, Inc.'s Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 28, 2014.](#)
- 10.20* [Ormat Technologies, Inc.'s Annual Management Incentive Plan, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on February 29, 2016.](#)
- 10.21* [Form of Restricted Stock Unit Agreement under the Amended and Restated Ormat Technologies, Inc. 2012 Incentive Compensation Plan, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities Exchange Commission on November 9, 2017.](#)

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- 10.22* [Ormat Technologies, Inc. 2018 Incentive Compensation Plan, incorporated by reference to Appendix A to Ormat Technologies, Inc.'s Definitive Proxy Statement on Schedule 14A filed on March 27, 2018.](#)
- 10.23* [Form of Stock Appreciation Right Agreement under the Company's 2018 Incentive Compensation Plan for stock appreciation rights awarded to Mr. Isaac Angel, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed on May 9, 2018.](#)
- 10.24* [Form of Restricted Stock Unit Agreement under the Company's 2018 Incentive Compensation Plan for restricted stock units awarded to Mr. Isaac Angel, incorporated by reference to Exhibit 10.2 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed on May 9, 2018.](#)
- 10.25* [Form of Restricted Stock Unit Grant Notice and Terms and Conditions \(Employees-Time Based Units\), incorporated by reference to Exhibit 10.5 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed on August 8, 2018.](#)
- 10.26* [Form of Stock Appreciation Right Grant Notice and Terms and Conditions \(Employees\), incorporated by reference to Exhibit 10.6 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed on August 8, 2018.](#)
- 10.27* [Form of Restricted Stock Unit Grant Notice and Terms and Conditions \(Directors\) to Ormat Technologies, Inc.'s 2018 Incentive Compensation Plan, incorporated by reference to Exhibit 10.4.11 to Ormat Technologies, Inc.'s Annual Report on Form 10-K filed with the Securities and Exchange Commission on March 01, 2019](#)
- 10.28* [Form of Stock Appreciation Right Grant Notice and Terms and Conditions \(Directors\) to Ormat Technologies, Inc.'s 2018 Incentive Compensation Plan.1, incorporated by reference to Exhibit 10.4.12 to Ormat Technologies, Inc.'s Annual Report on Form 10-K filed with the Securities and Exchange Commission on March 01, 2019](#)
- 10.29* [Form of Stock Appreciation Right Agreement and Terms and Conditions under the Company's 2018 Incentive Compensation Plan for stock appreciation rights awarded to NEO's, incorporated by reference to Exhibit 10.4.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on August 6, 2020.](#)
- 10.30* [Form of Restricted Stock Unit Agreement and Terms and Conditions under the Company's 2018 Incentive Compensation Plan for restricted stock units awarded to NEO's, incorporated by reference to Exhibit 10.4.2 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on August 6, 2020.](#)
- 10.31* [Form of Performance Stock Unit Grant Notice and Terms and Conditions under the Company's 2018 Incentive Compensation Plan for restricted stock units awarded to NEO's, incorporated by reference to Exhibit 10.4.3 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on August 6, 2020.](#)
- 10.32* [Form of Indemnification Agreement incorporated by reference to Exhibit 10.11 to Ormat Technologies, Inc.'s Registration Statement Amendment No. 2 on Form S-1 \(File No. 333-117527\) filed with the Securities and Exchange Commission on October 20, 2004.](#)
- 10.33 [Note Purchase Agreement, dated November 29, 2016, among ORNI 47 LLC, MUFG Union Bank, N.A., Munich Reinsurance America, Inc. and Munich American Reassurance Company, incorporated by reference to Exhibit 4.1 to Ormat Technologies Inc.'s Current Report on Form 8-K/A filed with the Securities and Exchange Commission on December 6, 2016.](#)
- 10.34+ [Third Amended and Restated Power Purchase Agreement for Olkaria III Geothermal Plants, dated November 26, 2014, between OrPower 4 Inc.](#)

- 10.35+ [Amendment of the Third Amended and Restated Power Purchase Agreement and Termination of Amended and Restated Olkaria III Project Security Agreement, dated October 30, 2015, between The Kenya Power and Lighting Company Limited and OrPower 4 Inc.](#)

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- 10.36+ [Second Amendment of the Third Amended and Restated Power Purchase Agreement, dated December 20, 2016, between The Kenya Power and Lighting Company Limited and OrPower 4 Inc.](#)
- 10.37 [Note Purchase Agreement, dated September 23, 2011, among OFC 2 LLC, ORNI 15 LLC, ORNI 39 LLC, ORNI 42 LLC, and HSS II, LLC, as Issuers, OFC 2 Noteholder Trust, as Purchaser, John Hancock Life Insurance Company \(U.S.A.\), as Administrative Agent, and the United States Department of Energy \(DOE\), as Guarantor, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on November 4, 2011.](#)
- 10.38 [Finance Agreement, dated as of August 23, 2012, between OrPower 4, Inc., an indirect wholly-owned subsidiary of Ormat Technologies, Inc., and Overseas Private Investment Corporation, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on November 8, 2012.](#)
- 10.39 [Amendment No. 1 to the Finance Agreement, dated as of August 23, 2012, between OrPower 4, Inc., an indirect wholly-owned subsidiary of Ormat Technologies, Inc., and Overseas Private Investment Corporation, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on November 8, 2012.](#)
- 10.40 [Loan Agreement, dated March 22, 2018, by and among Ormat Technologies, Inc. and Migdal Insurance Company Ltd., Migdal's Makefet Pension and Provident Funds Ltd. and Yozma Pension Fund of Self Employed Ltd., incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on June 19, 2018.](#)
- 10.41 [First Addendum to Loan Agreement, dated March 25, 2019, by and among Ormat Technologies, Inc. and Migdal Insurance Company Ltd., Migdal Makefet Pension and Provident Funds Ltd. and Yozma Pension Fund of Self Employed Ltd., incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 8, 2019.](#)
- 10.42 [Second Addendum to Loan Agreement, dated April 13, 2020, between and among Ormat Technologies, Inc. and Migdal Insurance Company Ltd., Migdal Makefet Pension and Provident Funds Ltd. And Yozma Pension Fund of Self-Employed Ltd., incorporated by reference to Exhibit 10.2 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on August 6, 2020.](#)
- 10.43 [Finance Agreement, dated April 30, 2018 between Geotermica Platanares, S.A. DE C.V. and Overseas Private Investment Corporation incorporated by reference to Exhibit 10.2 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on June 19, 2018.](#)
- 10.44 [Amendment to Finance Agreement, dated October 17, 2018 between Geotermica Platanares, S.A. DE C.V. and Overseas Private Investment Corporation, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed on November 8, 2018.](#)
- 10.45* [Employment Agreement, dated as of February 11, 2014, between Ormat Technologies, Inc. and Isaac Angel, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on February 11, 2014.](#)
- 10.46* [Amendment to Employment Agreement dated as of December 1, 2017 between Ormat Technologies, Inc. and Isaac Angel, incorporated by reference to Exhibit 10.2 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 8, 2019.](#)
- 10.47* [Employment Agreement, dated as of January 6, 2013, between Ormat Systems, Ltd. and Doron Blachar, incorporated by reference to Exhibit 10.30.2 to Ormat Technologies, Inc.'s Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 28, 2014.](#)
- 10.48* [Amended and Restated Employment Agreement, dated July 2, 2020, between Ormat Technologies, Inc., Ormat Systems, Ltd. and Doron Blachar incorporated by reference to Exhibit 10.1 and to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2020.](#)

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- 10.49* [Retirement Agreement, dated as of December 16, 2020, between Zvi Krieger, and Ormat Systems Ltd., incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 8-K filed with the Securities and Exchange Commission on December 21, 2020.](#)
- 10.50* [Employment Agreement, dated as of November 1, 2017, between Ormat Systems, Ltd. and Shlomi Argas, incorporated by reference to Exhibit 10.3 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 8, 2019.](#)
- 10.51* [Employment Agreement dated as of December 2017 between Ormat Systems Ltd and Hezi Kattan, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 11, 2020.](#)

10.52*	<u>Employment Agreement dated as of May 10, 2020 between Ormat Systems Ltd and Assaf Ginzburg, incorporated by reference to Exhibit 10.2 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 11, 2020.</u>
10.53	<u>JBIC Facility Agreement, dated March 28, 2014, by and among Kyuden Sarulla Pte. Ltd., OrSarulla Inc., PT Medco Geopower Sarulla, Sarulla Operations Ltd, Sarulla Power Asset Limited, Japan Bank for International Cooperation and Mizuho Bank, Ltd., dated March 28, 2014, incorporated by reference to Exhibit 10.7 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 9, 2014.</u>
10.54	<u>Common Terms Agreement, dated March 28, 2014, by and among Kyuden Sarulla Pte. Ltd., OrSarulla Inc., PT Medco Geopower Sarulla, Sarulla Operations Ltd, Sarulla Power Asset Limited, Japan Bank for International Cooperation, Asian Development Bank, The Bank of Tokyo-Mitsubishi UFJ, Ltd., ING Bank N.V., Tokyo Branch, National Australia Bank Limited, Mizuho Bank, Ltd., Mizuho Bank (USA), Pt. Bank Mizuho Indonesia, Société Générale, Société Générale Tokyo Branch, and Sumitomo Mitsui Banking Corporation, dated March 28, 2014, incorporated by reference to Exhibit 10.8 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 9, 2014.</u>
10.55	<u>Covered Lenders Facility Agreement, dated March 28, 2014, by and among Kyuden Sarulla Pte. Ltd., Orsarulla Inc., PT Medco Geopower Sarulla, Sarulla Operations Ltd, Sarulla Power Asset Limited, The Bank of Tokyo-Mitsubishi UFJ, Ltd., ING Bank N.V., Tokyo Branch, National Australia Bank Limited, Société Générale, Tokyo Branch, and Sumitomo Mitsui Banking Corporation, dated March 28, 2014, incorporated by reference to Exhibit 10.9 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 9, 2014.</u>
10.56	<u>ADB Facility Agreement, dated March 28, 2014, by and among Kyuden Sarulla Pte. Ltd., OrSarulla Inc., PT Medco Geopower Sarulla, Sarulla Operations Ltd, Sarulla Power Asset Limited and Asian Development Bank, dated March 28, 2014, incorporated by reference to Exhibit 10.10 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 9, 2014.</u>
10.57	<u>Ormat Equity Support Deed, dated March 28, 2014, by and among Ormat International, Inc., Ormat Holding Corp., OrPower 11 Inc., OrSarulla Inc., Sarulla Operations Ltd, Mizuho Bank, Ltd. and Mizuho Bank (USA), dated March 28, 2014, incorporated by reference to Exhibit 10.11 to Ormat Technologies, Inc.'s Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on May 9, 2014.</u>
10.58	<u>Commercial Cooperation Agreement, dated May 4, 2017, between Ormat Technologies, Inc. and ORIX Corporation, incorporated by reference to Exhibit 10.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on May 4, 2017.</u>
10.59	<u>Governance Agreement, dated May 4, 2017, between Ormat Technologies, Inc. and ORIX Corporation, incorporated by reference to Exhibit 10.2 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on May 4, 2017.</u>
10.60	<u>Registration Rights Agreement, dated May 4, 2017, between Ormat Technologies, Inc. and ORIX Corporation, incorporated by reference to Exhibit 10.3 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on May 4, 2017.</u>
10.61	<u>Governance Amendment Agreement, dated April 14, 2020, by and between Ormat Technologies, Inc. and ORIX Corporation, incorporated by reference to Exhibit 99.1 to Ormat Technologies, Inc.'s Current Report on Form 8-K filed with the Securities and Exchange Commission on April 14, 2020.</u>
21.1+	<u>Subsidiaries of Ormat Technologies, Inc.</u>
23.1+	<u>Consent of Kesselman & Kesselman, Certified Public Accountants (Isr.), a member firm of PricewaterhouseCoopers International Limited, Independent Registered Public Accounting Firm.</u>

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31.1+	<u>Certification of the Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
31.2+	<u>Certification of the Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
32.1+	<u>Certification of the Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>
32.2+	<u>Certification of the Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>
101.INS+	Inline XBRL Instance Document.
101.SCH+	Inline XBRL Taxonomy Extension Schema Document.
101.CAL+	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF+	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB+	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE+	Inline XBRL Taxonomy Extension Presentation Linkbase Document.

* Management contract or compensatory plan in which directors and/or executive officers are eligible to participate.

+ Filed herewith.

^ Schedules have been omitted pursuant to Item 601(b)(2) of Regulation S-K. We will furnish the omitted schedules to the SEC upon request.

ITEM 16. FORM 10-K SUMMARY

None.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ORMAT TECHNOLOGIES, INC.

By: /s/ Doron Blachar
 Name: Doron Blachar
 Title: Chief Executive Officer

Date: February 26, 2021

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, on February 26, 2021.

<u>Signature</u>	<u>Capacity</u>
<u>/s/ Doron Blachar</u> Doron Blachar	Chief Executive Officer (Principal Executive Officer)
<u>/s/ Assi Ginzburg</u> Assi Ginzburg	Chief Financial Officer (Principal Financial and Accounting Officer)
<u>/s/ Isaac Angel</u> Isaac Angel	Chairman of the Board of Directors
<u>/s/ Dan Falk</u> Dan Falk	Director
<u>/s/ Stan Koyanagi</u> Stan Koyanagi	Director
<u>/s/ David Granot</u> David Granot	Director
<u>/s/ Ravit Bar Niv</u> Ravit Bar Niv	Director
<u>/s/ Hidetake Takahashi</u> Hidetake Takahashi	Director
<u>/s/ Dafna Sharir</u> Dafna Sharir	Director
<u>/s/ Stanley B. Stern</u> Stanley B. Stern	Director

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<u>/s/ Byron Wong</u> Byron Wong	Director

**DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12
OF THE SECURITIES EXCHANGE ACT OF 1934**

The following is a description of the common stock, par value \$0.001 per share, of Ormat Technologies, Inc. (the "Company," "we" or "us") registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). This description is a summary and is qualified in its entirety by reference to the amended and restated certificate of incorporation and amended and restated by-laws, copies of which are filed as Exhibits 3.1 and 3.3, respectively, to the Current Report on Form 8-K of the Company filed on November 12, 2019. We refer in this exhibit to our amended and restated certificate of incorporation as our certificate of incorporation, and we refer to our amended and restated by-laws as our by-laws.

General

Our authorized capital stock consists of 200 million shares of common stock, par value \$0.001 per share, and 5 million shares of preferred stock, par value \$0.001 per share, of which our board of directors has designated 500,000 shares as Series A Junior Participatory Preferred Stock.

As of February 24, 2021, 55,983,259 shares of our common stock were outstanding and no shares of preferred stock were outstanding.

Common Stock

Voting Rights. The holders of our common stock are entitled to one vote for each outstanding share of common stock owned by that stockholder on every matter properly submitted to the stockholders for their vote.

Directors shall be elected by a majority of all votes cast for each of the director nominees at each annual meeting, except for contested elections (*i.e.*, elections in which there are a greater number of candidates than there are seats to be filled), in which case the directors shall be elected by a plurality vote of all votes cast for the election of directors at such meeting. Subject to the rights of the holders of any series of preferred stock or any other series or class of stock, as provided in the certificate of incorporation or in any preferred stock designation, to elect additional directors under specific circumstances, at a meeting of stockholders called expressly for that purpose, one or more members of the Board of Directors (including the entire Board) may be removed, with or without cause, by a vote of the holders of a majority of the shares then entitled to vote on the election of directors. For all other matters, if a quorum is present, the affirmative vote of the majority of the outstanding shares present in person or represented by proxy at the meeting and entitled to vote on the subject matter shall be the act of the stockholders, unless the vote of a greater number is required by the by-laws, the certificate of incorporation or the DGCL.

Written Consent of Stockholders. Our certificate of incorporation and by-laws permit our stockholders to act by written consent without a meeting.

Dividend Rights and Liquidation Rights. Subject to the dividend rights of the holders of any outstanding series of preferred stock, holders of our common stock are entitled to receive ratably such dividends and other distributions of cash or any other right or property as may be declared by our board of directors out of our assets or funds legally available for such dividends or distributions.

In the event of any voluntary or involuntary liquidation, dissolution or winding up of our affairs, holders of our common stock would be entitled to share ratably in our assets that are legally available for distribution to stockholders after payment of liabilities. If we have any preferred stock outstanding at such time, holders of the preferred stock may be entitled to distribution and/or liquidation preferences. In either such case, we must pay the applicable distribution to the holders of our preferred stock before we may pay distributions to the holders of our common stock.

Other Rights and Preferences. Holders of our common stock have no conversion, redemption, preemptive, subscription or similar rights pursuant to our certificate of incorporation or by-laws.

Preferred Stock

Our board of directors is authorized, subject to any limitations prescribed by law, to issue up to 5,000,000 shares of preferred stock in one or more series without further stockholder approval. The board has discretion to determine the rights, preferences, privileges and restrictions of, including, without limitation, voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences of, and to fix the number of shares of, each series of our preferred stock. Our board of directors has designated 500,000 shares of our preferred stock as Series A Junior Participatory Preferred Stock. Our board of directors could authorize the issuance of shares of preferred stock with terms and conditions that could have the effect of delaying, deferring or preventing a transaction or a change in control that might involve a premium price for holders of our common stock or otherwise be in their best interest.

The rights, preferences and privileges of holders of our common stock may be affected by the rights, preferences and privileges granted to holders of preferred stock.

Anti-Takeover Effects of our Certificate of Incorporation and By-laws and Delaware Law

Certain provisions in our certificate of incorporation and by-laws may be deemed to have an anti-takeover effect and may delay, deter or prevent a tender offer or takeover attempt that a stockholder might consider to be in its best interests, including attempts that might result in a premium being paid over the market price for the shares held by stockholders. These provisions include the items described below.

Special Meetings. Our certificate of incorporation and by-laws provide that a special meeting of stockholders may be called only by the Chairman of the Board, the President, our board of directors, the holders of not less than a majority of all of the outstanding shares of the corporation entitled to vote at the meeting or, at any time that Ormat Industries (or a certain transferee of Ormat Industries) owns at least 20% of the then outstanding shares of our common stock, by Ormat Industries (or such transferee). Stockholders are not permitted to call, or to require that the board of directors call, a special meeting of stockholders. Moreover, the business permitted to be conducted at any special meeting of stockholders is limited to the business brought before the meeting pursuant to the notice of the meeting given by us. Our by-laws establish an advance notice procedure for stockholders to nominate candidates for election as directors or to bring other business before meetings of our stockholders.

Section 203 of the Delaware General Corporation Law. We are subject to Section 203 of the Delaware General Corporation Law, which, subject to certain exceptions, prohibits a Delaware corporation from engaging in any “business combination” (as defined below) with any “interested stockholder” (as defined below) for a period of three years following the date that such stockholder became an interested stockholder, unless: (1) prior to such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder; (2) on consummation of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding those shares owned (x) by persons who are directors and also officers and (y) by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or (3) on or subsequent to such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66⅔% of the outstanding voting stock that is not owned by the interested stockholder.

Section 203 of the Delaware General Corporation Law defines “business combination” to include: (1) any merger or consolidation involving the corporation and the interested stockholder; (2) any sale, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder; (3) subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder; (4) any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; or (5) the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation. In general, Section 203 defines an “interested stockholder” as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by such entity or person.

Additional Authorized Shares of Capital Stock. The additional shares of authorized common stock and preferred stock available for issuance our certificate of incorporation could be issued at such times, under such circumstances and with such terms and conditions as to impede a change in control.

Advance Notice Requirements. Our bylaws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or other business to be brought before meetings of the stockholders. These procedures provide that notice of stockholder proposals of these kinds must be timely given in writing before the meeting at which the action is to be taken. Generally, to be timely, notice of stockholder proposals must be received at the principal executive offices of the corporation not later than the close of business on the 90th day nor earlier than the close of business on the 120th day prior to the first anniversary of the preceding year's annual meeting; provided, however, that in the event that the date of the annual meeting is more than 30 days before or more than 60 days after such anniversary date, notice by the stockholder to be timely must be so delivered not earlier than the close of business on the 120th day prior to such annual meeting and not later than the close of business on the later of the 90th day prior to such annual meeting or, if the first public announcement of the date of such annual meeting is less than 100 days prior to the date of such annual meeting, the 10th day following the day on which public announcement of the date of such meeting is first made by the corporation. The notice must contain certain information specified in the bylaws.

**FIFTH AMENDMENT TO THE PURCHASE POWER CONTRACT FOR
UNSCHEDULED ENERGY MADE AVAILABLE FROM A QUALIFYING FACILITY
DATED MARCH 24, 1986 AS AMENDED**

This **FIFTH AMENDMENT TO THE PURCHASE POWER CONTRACT FOR UNSCHEDULED ENERGY MADE AVAILABLE FROM A QUALIFYING FACILITY DATED MARCH 24, 1986 AS AMENDED** ("Fifth Amendment") is made as of this 7th day of February, 2011 ("Execution Date"), by and between **HAWAII ELECTRIC LIGHT COMPANY, INC.** ("HELCO" or the "Company"), a Hawaii corporation with principal offices in Hilo, County of Hawaii, State of Hawaii, and **PUNA GEOTHERMAL VENTURE** ("PGV" or the "Seller"), a Hawaii general partnership, doing business in Honoulauli, Puna, County of Hawaii, State of Hawaii (PGV and HELCO are collectively referred to as the "Parties" or individually as a "Party").

WITNESSETH:

WHEREAS, the Company is an operating electric public utility subject to the Hawaii Public Utilities Law (Hawaii Revised Statutes, Chapter 269) and the rules and regulations of the Hawaii Public Utilities Commission (the "PUC" or "Commission");

WHEREAS, HELCO and Thermal Power Company, a California corporation ("TPC"), entered into (i) the Purchase Power Contract for Unscheduled Energy Made Available from a Qualifying Facility on March 24, 1986 ("Unscheduled Energy Contract"), approved by the Commission by Decision and Order No. 8692, filed on March 25, 1986, in Docket No. 5525;

- (ii) a side letter agreement, dated March 21, 1986, regarding the Unscheduled Energy Contract;
- (iii) an agreement, dated June 27, 1986, regarding Phase I work on interconnection facilities; and
- (iv) a letter agreement, dated January 9, 1987, regarding installation of line extension to Kapoho drillsite (collectively, the "TPC Agreements");

WHEREAS, By Assignment, Conveyance and Bill of Sale, dated July 1, 1988, TPC assigned all of its right, title and interest in and to the TPC Agreements to AMOR VIII, a Delaware corporation;

WHEREAS, on July 28, 1989, HELCO, PGV, and AMOR VIII as assignor, entered into the Firm Capacity Amendment to Purchase Power Contract Dated March 24, 1986 ("Firm Capacity Amendment"), which amended the Unscheduled Energy Contract, and was approved by the PUC by Decision and Order No. 10519, filed on February 14, 1990, in Docket No. 6498. In addition, the Firm Capacity Amendment assigned AMOR VIII interest in the Unscheduled Energy Contract to PGV;

WHEREAS, HELCO and PGV entered into the Amendment to Purchase Power Contract, As Amended ("Second Amendment"), which amended the Unscheduled Energy Contract and Firm Capacity Amendment;

WHEREAS, a number of issues arose between the Company and the Seller which they settled in a Settlement Agreement dated March 7, 1995 ("Settlement Agreement");

WHEREAS, as part of the Settlement Agreement, the Company and the Seller entered into the Third Amendment to the Purchase Power Contract dated March 24, 1986, As Amended by The Firm Capacity Amendment dated July 28, 1989 ("Third Amendment"), on March 7, 1995, which was initially approved by the Commission in Interim Decision and Order No. 13876, filed on May 5, 1995, in Docket No. 95-0074 and finally approved by the Commission in Decision and Order No. 15036 filed on September 27, 1996;

WHEREAS, on February 12, 1996, the Company and the Seller entered into the Performance Agreement and Fourth Amendment to the Purchase Power Contract dated March 24, 1986, As Amended (“Performance Agreement”) under which PGV would sell to HELCO an additional five (5) megawatts (“MW”) of firm capacity (in addition to the twenty-five (25) MW it already provided for a total of thirty (30) MW of firm capacity). The Performance Agreement was approved by the Commission by Decision and Order No. 14840, filed on August 2, 1996, in Docket No. 96-0042;

WHEREAS, HELCO and PGV have entered into a number of letters of understanding (“Letter Agreements”) clarifying some of the terms of the agreements previously entered into such as the adjustments to the Gross Domestic Product Implicit Price Deflator base value, and satisfaction of certain obligations under various agreements;

WHEREAS, HELCO and PGV entered into a Confirmation of Purchase Power Contract and Agreement (“Confirmation Agreement”) with SE Puna, L.L.C., and Union Bank of California, N.A. dated April 7, 2005, which, among other items, documented several ongoing agreements between the Parties with regard to a voluntary derating, the provision to HELCO of certain information on an annual basis, and priority and curtailment protocols during off-peak periods;

WHEREAS, pursuant to the Unscheduled Energy Contract as amended by the Firm Capacity Amendment, Second Amendment, Third Amendment, Performance Agreement, Letter Agreements and Confirmation Agreement (collectively referred to as the “Current PPA”), the Seller has a contract to provide through its existing geothermal electric generating plant facility (“Existing Facility”) firm capacity of thirty (30) MW on-peak and twenty-two (22) MW off-peak, and an additional five (5) MW off-peak on an as-available basis to the Company;

WHEREAS, the Seller desires to augment the energy produced by the Existing Facility by developing, constructing, owning and operating additional electrical generating equipment (“Expansion Facility”) that is separate from the Existing Facility which will provide to the Company an additional eight (8) MW of energy above the 30 MW presently provided under the Current PPA, and the Company desires to obtain such additional eight (8) MW of energy;

WHEREAS, the Seller further desires to be able to use the Expansion Facility to partially supplement, from time to time, some of the Seller’s obligations under the Current PPA and to meet certain other operational requirements to the Company;

WHEREAS, the Company is amenable to such use of the Expansion Facility provided that, among other items, (1) the rate paid for such energy from the Expansion Facility is delinked from the price of petroleum, and (2) the Company is provided remote dispatch control on the Existing Facility in the range of twenty-two (22) to thirty (30) MW;

WHEREAS, the Seller and the Company desire to enter into an arrangement under which (1) the Seller will provide an additional eight (8) MW of dispatchable firm capacity to the Company (for a total aggregated amount of thirty-eight (38) MW from the Existing Facility and Expansion Facility), (2) the Parties shall revise certain pricing provisions and other terms of the Current PPA, and (3) the Seller will meet certain operational requirements and dispatch rights to the Company (collectively the “PPA Transactions”);

WHEREAS, the PPA Transactions will be implemented through (1) this Fifth Amendment, and (2) a new purchase power agreement for the additional eight (8) MW of firm capacity (“New PPA”) that will be a separate agreement to be entered into by the Parties immediately after this Fifth Amendment;

WHEREAS, the Company’s willingness to enter into this Fifth Amendment and to purchase electricity at the rate set forth in this Fifth Amendment is based upon the expectation that the Company will recover capacity and energy payments made to the Seller through electric rates paid by its customers and adjusted to reflect changing purchased energy costs by means of a periodic rate adjustment mechanism such as the Energy Cost Adjustment Clause authorized by the Commission;

WHEREAS, the Company’s willingness to enter into this Fifth Amendment is based on the Seller’s assurances that the Seller can and will perform all of its obligations hereunder in a manner that will ensure no degradation in the quality of service provided to the Company’s customers because of the Seller’s construction, ownership, operation, and maintenance of the Existing Facility and the Expansion Facility or in any other manner;

WHEREAS, the Existing Facility and the Expansion Facility will continue to be throughout the term of this Fifth Amendment a qualifying, small power production facility under Subchapter 2 of the PUC’s Standards for Small Power Production and Cogeneration in the State of Hawaii, Chapter 74 of Title 6 of the Administrative Rules of the State of Hawaii, and/or a “non-fossil fuel producer” within the meaning of Section 269-27.2, Hawaii Revised Statutes; and

WHEREAS, the Seller is not, and will continue not to be throughout the term of this Fifth Amendment, an “Affiliated Interest” within the meaning of Section 269-19.5, Hawaii Revised Statutes.

NOW, THEREFORE, in consideration of these premises and of the mutual promises contained herein, the Parties agree as follows:

I. APPROVALS REQUIRED PRIOR TO EFFECTIVE DATE

A. The Parties acknowledge and agree that this Fifth Amendment is subject to approval by the PUC and the Parties’ respective obligations hereunder are conditioned upon receipt of such approval, except as specifically provided otherwise herein. Upon execution of this Fifth Amendment, the Parties will use their best efforts, including without limitation, participation in any PUC proceeding at the request of the other Party, to obtain a final non-appealable appropriate decision and order satisfactory to the Company in its sole and absolute discretion (“PUC Approval Order”) that:

1. approves this Fifth Amendment;
 2. finds that the purchased power costs (which costs include without limitation the capacity charge payments and energy charge payments) to be incurred by the Company as a result of this Fifth Amendment are reasonable;
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3. finds that the Company's purchased power arrangements under this Fifth Amendment, pursuant to which the Company will purchase energy and Firm Capacity from the Seller, are prudent and in the public interest;

4. approves, effective as of or prior to the date of the order, the inclusion of the purchased power costs (and applicable revenue taxes) and increases and decreases in the purchased power costs (and applicable revenue taxes) to be incurred by the Company pursuant to this Fifth Amendment in the Company's Energy Cost Adjustment Clause and Firm Capacity Surcharge, and/or Purchased Power Adjustment Clause (if applicable), during the Term of the Fifth Amendment; and

5. approves of the Company including the purchased power costs (and applicable revenue taxes) incurred by the Company pursuant to this Fifth Amendment, including capacity charge payments and energy charge payments, in the Company's revenue requirements for ratemaking purposes and for the purposes of determining the reasonableness of the Company's rates during the Term of this Fifth Amendment.

B. The Company shall be responsible for submitting the application for PUC approval. The Seller shall reimburse the Company for its documented, reasonable out-of-pocket legal, consulting and administrative costs incurred by the Company in the course of securing PUC approval of this Fifth Amendment. These costs shall be paid thirty (30) days after the PUC Approval Date, to the extent then accrued, with any additional costs to be paid on or before the Commercial Operation Date as defined in and provided for in the New PPA, and for all of the Company's costs associated thereto. The Seller shall cooperate with the Company in any reasonable manner as requested by the Company to assist the Company in the application for PUC approval and the Seller shall be responsible for its costs in providing such cooperation and assistance.

C. Notwithstanding anything in this Fifth Amendment to the contrary, in the event that the PUC denies the Company's application to include all payments to the Seller hereunder in the Company's Energy Cost Adjustment Clause pursuant to Rule 6-60-6, Standards For Electric and Gas Utility Service, Title 6, Chapter 60, of the Hawaii Administrative Rules, and the Company's firm capacity surcharge pursuant to Section 269-27.2(d), Hawaii Revised Statutes, or in the Company's base rates pursuant to Section 269-16(b), Hawaii Revised Statutes, then this Fifth Amendment, at the Company's option and in the Company's sole and absolute discretion, shall be null and void and of no further force and effect. The Company shall have thirty (30) days from the date that the PUC decision and order denying the Company's application becomes final and non-appealable, to terminate this Fifth Amendment pursuant to this Section I.

D. The term "Final Non-appealable Order from the PUC" means a PUC Approval Order (a) that is considered to be final by the Company, in its sole discretion, because the Company is satisfied that no party to the subject Public Utilities Commission proceeding intends to seek a change in such PUC Approval Order through motion or appeal, or (b) that is not subject to appeal to any Circuit Court of the State of Hawaii, Intermediate Court of Appeals of the State of Hawaii, or the Supreme Court of the State of Hawaii, because the period permitted for such an appeal (the "Appeal Period") has passed without the filing of notice of such an appeal, or (c) that was affirmed on appeal to any Circuit Court of the State of Hawaii, Intermediate Court of Appeals of the State of Hawaii, or the Supreme Court of the State of Hawaii, or was affirmed upon further appeal or appellate process, and that is not subject to further appeal, because the jurisdictional time permitted for such an appeal and/or further appellate process such as a motion for reconsideration or an application for writ of certiorari has passed without the filing of notice of such an appeal or the filing for further appellate process.

E. Notwithstanding any other provisions of this Fifth Amendment to the contrary, the Company's obligations under this Fifth Amendment to purchase power and pay for such power delivered by the Seller, and any and all obligations of the Company which are ancillary to that purchase and that payment, are all contingent upon obtaining the Final Non-appealable Order from the PUC.

F. Promptly after the issuance of a PUC Approval Order, the Company shall provide the Seller with a copy of such PUC Approval Order together with a written statement as to whether the conditions set forth in (i) Section I.A., above, and (ii) Section I.D(a) of the definition of Final Non-appealable Order from the PUC, have been satisfied.

G. As used in this Fifth Amendment, the term "PUC Approval Date" shall be defined as the date of issuance of the PUC Approval Order if the Company provides the written statement referred to in Section I.F to the effect that the condition referred to in clause (a) of the definition of Final Non-appealable Order from the PUC has been satisfied or in the absence of such a written statement:

1. If a PUC Approval Order is issued and is not made subject to a motion for reconsideration filed with the PUC or an appeal, the PUC Approval Date shall be the date one Day after the expiration of the Appeal Period permitted for filing of an appeal following the issuance of the PUC Approval Order.

2. If the PUC Approval Order became subject to a motion for reconsideration, and the motion for reconsideration is denied or the PUC Approval Order is affirmed after reconsideration, and such order is not made subject to an appeal, the PUC Approval Date shall be deemed to be the date one Day after the expiration of the Appeal Period permitted for filing of an appeal following the order denying reconsideration of or affirming the PUC Approval Order.

3. If the PUC Approval Order, or an order denying reconsideration of the PUC Approval Order or affirming approval of the PUC Approval Order after reconsideration, becomes subject to an appeal, then the PUC Approval Date shall be the date upon which the PUC Approval Order becomes a non-appealable order within the meaning of the definition of a Final Non-appealable Order from the PUC.

H. As used in this Fifth Amendment, the following terms shall have the meaning as set forth below:

1. Energy Cost Adjustment Clause - The Company's cost recovery mechanism for fuel and purchased energy costs approved by the PUC in conformance with the Hawaii Administrative Rules §6-60-6 whereby the base electric energy rates charged to retail customers are adjusted to account for fluctuations in the costs of fuel and purchased energy, or such successor provision that may be established from time to time.

2. Firm Capacity Surcharge - The cost recovery mechanism established by Hawaii Revised Statutes §269-27.2, that allows the Company to recover certain purchased power costs for nonfossil fuel generated electricity.

3. Purchased Power Adjustment Clause - The Purchased Power Adjustment Clause proposed by the Company in Docket No. 2009-0164, provided that said clause has been approved by the PUC as proposed by the Company or as modified and provided that the Company is allowed to recover the additional purchased power costs (including the costs incurred as a result of the capacity charge and energy charge) incurred by the Company pursuant to this Fifth Amendment through said clause as approved by the PUC.

II. EFFECTIVE DATE/CONDITIONS PRECEDENT

A. Effective Date. The obligations of the Parties under Sections I and IV.D of this Fifth Amendment shall become effective on the Execution Date. The remaining provisions of this Fifth Amendment (excluding Sections I and IV.D) shall not become effective until the PUC Approval Date (the "Effective Date"); provided, however, that if the PUC Approval Order is not obtained, then this Fifth Amendment shall be deemed to be null and void and of no further force and effect, effective as of the earliest of (i) the date that the Company declares this Fifth Amendment to be null and void pursuant to Section I.C, or (ii) the date that the New PPA is terminated pursuant to Section 2.2 of the New PPA, or (iii) the date of termination of this Fifth Amendment that is mutually agreed upon by the Parties.

B. Conditions Precedent In addition to Section II A., except for the obligations of the Parties under Section I and IV.D of this Fifth Amendment, in no event shall the Parties be obligated under this Fifth Amendment until the fulfillment of the following conditions:

1. The Company obtains a Final Non-appealable Order from the PUC with respect to this Fifth Amendment;
2. The Company obtains a Final Non-appealable Order from the PUC with respect to the New PPA;
3. The occurrence of the Commercial Operation Date as defined in and provided for in the New PPA; and
4. Each Party shall have delivered or cause to be delivered to the other Party, such documents which may be reasonably required pursuant to this Fifth Amendment

III. AMENDMENT OF THE CURRENT PPA

A. Upon the fulfillment of the conditions precedent set forth in Section II above, the Current PPA shall be amended as follows:

1. "Appendix D, POWER PURCHASES BY COMPANY (For 30 MW)" of the Current PPA is deleted in its entirety and replaced by a new appendix entitled "Appendix D, POWER PURCHASES BY THE COMPANY (For Thirty (30) Megawatts)" which is attached hereto as Exhibit A, and incorporated herein by reference.
 2. "Appendix F, Definitions" of the Current PPA is deleted in its entirety and replaced by a new appendix entitled "Appendix F, Definitions", which is attached hereto as Exhibit B and incorporated herein by reference.
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B. Upon the fulfillment of the conditions precedent set forth in Section II.B. above and the amendment of the Current PPA as specified in Section III.A. above, the energy generated by the Expansion Facility may be applied to Seller's obligations under the Current PPA to the extent allowed by the Current PPA as amended by this Fifth Amendment and the New PPA. The ability of PGV to have the energy generated by the Expansion Facility apply to Seller's obligations under the Current PPA (as amended by this Fifth Amendment) shall (1) not apply during any period in which the Seller is in breach or default under the New PPA, and (2) terminate upon the expiration or sooner termination of the term of the New PPA.

IV. MISCELLANEOUS

A. Modification or Amendment/Recovery of Payments. No modification, amendment or waiver of all or any part of this Fifth Amendment shall be valid unless it is reduced to writing and signed by both Parties. The Parties to this Fifth Amendment believe, and have entered this Fifth Amendment relying on the belief that, under and pursuant to PURPA and 18 C.F.R., Part 292, including, without limitation, 18 C.F.R. 292.304(b)(5) and (d)(2), after the PUC Order has become final and non-appealable: (i) no adjustment in the payments to be paid to the Seller under the provisions of this Fifth Amendment is either appropriate or lawful; and (ii) that, also in light of the foregoing, it is neither appropriate nor lawful for the PUC or any successor entity to deny the Company the recovery of any or all amounts paid to the Seller pursuant to the terms of this Fifth Amendment. Both Parties will extend commercially reasonable efforts to resist and appeal any PUC actions, decisions, or orders denying or having the effect of denying or otherwise preventing the Company from recovering any or all amounts paid to the Seller pursuant to the terms of the Fifth Amendment; provided that the Company shall reimburse the Seller for any and all reasonable out-of-pocket expenses incurred in assisting the Company in accordance with this Section IV.A.

B. Metering. The Metering Point of the Existing Facility is to be on the high side of the step up transformers at the Point of Interconnection.

C. Authority. All action on the part of the Parties to authorize the execution, delivery and performance of this Fifth Amendment and the consummation of the transactions contemplated herein, shall have been duly and validly taken by each Party and this Fifth Amendment constitutes a valid and binding obligation of each Party.

D. Confidential and Proprietary Information. If and to the extent any information or documents furnished by one Party to the other under this Fifth Amendment are confidential or proprietary to the furnishing Party, the receiving Party shall treat the same as such and shall take reasonable steps to protect against the unauthorized use or disclosure of the same; provided, however, that such information and documents are conspicuously marked or otherwise clearly identified as confidential or proprietary when furnished; and provided further that this sentence shall not apply to (i) any information or documents which are in the public domain, known to the receiving Party prior to receipt from the other Party, or acquired from a third Party without a requirement for protection or (ii) any use or disclosure required by any law, rule, regulation, order or other requirement of any governmental authority having jurisdiction. All other information and documents furnished under this Fifth Amendment shall be furnished on a non- confidential basis.

E. Electric Service Supplied By the Company. This Fifth Amendment and the Current PPA do not provide for any electric services by the Company to the Seller. If the Seller requires any electric services from the Company, the Seller shall receive such service in accordance with the Company's tariff.

F. Cross Default With New PPA. A breach of or default under this Fifth Amendment shall constitute a breach of or default under the New PPA.

G. Notices. Except as otherwise specified in this Fifth Amendment, any notice, demand or request required or authorized by this Fifth Amendment to be given in writing to a Party shall be either personally delivered or mailed by registered or certified mail (return receipt requested) postage prepaid to such Party at the following address:

If to Seller: PUNA GEOTHERMAL VENTURE
14-3860 Kapoho Pahoa Road
Pahoa, Hawaii 96778
ATTN: General Manager
FAX No.: (808) 965-7254

or

PUNA GEOTHERMAL VENTURE
P. O. Box 30
Pahoa, Hawaii 96778
ATTN: General Manager

If to the Company: HAWAII ELECTRIC LIGHT COMPANY, INC.
1200 Kilauea Avenue
Hilo, Hawaii 96720-4295
ATTN: President
FAX No.: (808) 969-0100

The designation of such person and/or address may be changed at any time by either Party upon written notice given pursuant to the requirements of this Section IV.G. A notice served by mail shall be effective upon receipt.

H. Computation of Time. In computing any period of time prescribed or allowed under this Fifth Amendment, the day of the act, event or default from which the designated period of time begins to run shall not be included. If the last day of the period so computed is a Saturday, a Sunday, or a legal holiday in Hawaii, then the period shall run until the end of the next day which is not a Saturday, a Sunday, or a legal holiday in Hawaii. When the period of time prescribed or allowed is less than seven (7) days, intermediate Saturdays, Sundays, and legal holidays shall be excluded in the computation.

I. Continuing Effect. To the extent not amended by this Fifth Amendment, the Current PPA shall remain in full force and effect.

J. Defined Terms. Capitalized terms not otherwise defined in this Fifth Amendment shall have the meaning ascribed to them in the Current PPA.

K. Entire Agreement. This Fifth Amendment, including all attachments, and the Current PPA constitute the entire understanding between the Parties with respect to the subject matter herein, supersedes any and all previous understandings between the Parties, and bind and inure to the benefit of the Parties, their successors and assigns. The Parties have entered into this Fifth Amendment in reliance upon the representations and mutual undertakings contained herein and not in reliance upon any oral or written representation or information provided to one Party by any representative of the other Party.

L. Further Assurances. If either Party determines in its reasonable discretion that any further instruments, assurances or other things are necessary or desirable to carry out the terms of this Fifth Amendment, the other Party will execute and deliver all such instruments and assurances and do all things reasonably necessary or desirable to carry out the terms of this Fifth Amendment.

M. Severability. After the requirements of Section II have been satisfied, if any term or provision of this Fifth Amendment or the application thereof to any person, entity or circumstance shall to any extent be invalid or unenforceable, the remainder of this Fifth Amendment, or the application of such term or provision to persons, entities or circumstances other than those as to which it is invalid or unenforceable, shall not be affected thereby, and each term and provision of this Fifth Amendment shall be valid and enforceable to the fullest extent permitted by law.

N. No Waiver. The failure of either Party to enforce at any time any of the provisions of this Fifth Amendment, or to require at any time performance by the other Party of any of the provisions hereof, shall in no way be construed to be a waiver of such provisions, nor in any way to affect the validity of this Fifth Amendment or any part hereof or the right of such Party thereafter to enforce every such provision.

O. No Party Deemed Drafter. No Party shall be deemed the drafter of this Fifth Amendment. If this Fifth Amendment is ever construed by a court of law, such court shall not construe this Fifth Amendment or any provision hereof against any Party as the drafter.

P. Headings. The paragraph headings of the various sections have been inserted in this Fifth Amendment as a matter of convenience for reference only and shall not modify, define or limit any of the terms or provisions hereof and shall not be used in the interpretation of any term or provision of this Fifth Amendment.

Q. Governing Law and Interpretation. Interpretation and performance of this Fifth Amendment shall be governed by, and construed and enforced in accordance with the laws of the State of Hawaii, without regard to choice of law provisions that would require the application and/or reference to the laws of any other jurisdiction.

R. Counterparts. This Fifth Amendment may be executed in several counterparts and all so executed counterparts shall constitute one agreement, binding on both Parties, notwithstanding that both Parties may not be signatories to the original or the same counterpart. Counterparts may be exchanged by facsimile or other electronic means, such as PDF, which facsimile and/or PDF (or electronic means) signatures shall be effective for all purposes and treated in the same manner as physical signatures. The Party using facsimile and/or PDF (or electronic means) signatures agrees (but not as a condition to the validity of this Fifth Amendment) that it will promptly forward physically signed copies of this Fifth Amendment to the other Party.

IN WITNESS WHEREOF, the Company and the Seller have caused this Fifth Amendment to be executed by their respective duly authorized officers as of the date first above written.

Company: Hawaii Electric Light Company, Inc

By: /s/ Jay Ignacio
Jay Ignacio
President

By: /s/ Tayne S. Y. Sekimura
Tayne S. Y. Sekimura
Financial Vice President

Seller: Puna Geothermal Venture

By ORNI 8 LLC and OrPuna, LLC, as general
partners of Puna Geothermal Venture

By Ormat Nevada Inc., as sole member of each
of ORNI 8 LLC and OrPuna, LLC

By: /s/ Connie Stechman
Connie Stechman
Assistant Secretary

APPENDIX D

POWER PURCHASES BY THE COMPANY
(For thirty (30) Megawatts)

A. ENERGY PURCHASES BY THE COMPANY

1. Subject to the other provisions of this Contract, including but not limited to Sections 6 and 7 of this Contract:
 - a. The Company shall accept and pay for the first twenty-five (25) MW of on-peak Energy and the first twenty-two (22) MW of off-peak Energy generated by the Seller's Facility and delivered by the Seller to the Company at the higher of: (a) the respective on-peak and off-peak energy rates set forth in Section A.3.a. of this APPENDIX D, or (b) \$0.0656/kilowatthour ("kwh") on-peak or \$0.0543/kwh off-peak; provided, however, that the rate of delivery of such Energy under this Section A.1.a shall not exceed twenty-five (25) MW on-peak and twenty-two (22) MW off-peak at any given time. The energy paid for under this section shall be generated only from the Existing Facility.
 - b. The Company shall accept and pay for an additional five (5) MW of on-peak Energy (above the twenty-five (25) MW delivered pursuant to Section A.1.a above) generated by the Existing Facility and/or the Expansion Facility and delivered by the Seller to the Company at 11.8 cents a kilowatthour (\$0.118/kWh) subject to the escalation provision in Section A.1.e below; provided, however, that the rate of delivery of such Energy under this Section A.1.b shall not exceed five (5) MW at any given time.
 - c. At the Company's sole discretion, (i) the Company may accept and pay for up to an additional five (5) MW of off-peak Energy (above the twenty-two (22) MW delivered pursuant to Section A.1.a above) generated by the Existing Facility and/or the Expansion Facility and delivered by the Seller to the Company at 11.8 cents a kilowatthour (\$0.118/kWh) subject to the escalation provision in Section A.1.e below; provided, however, that the rate of delivery of such Energy under this Section A.1.c(i) shall not exceed five (5) MW at any given time, and (ii) the Company may accept and pay for up to an additional three (3) MW of off-peak Energy above the twenty-seven (27) MW up to and including thirty (30) MW of off-peak Energy generated by the Existing Facility and/or the Expansion Facility and delivered by the Seller to the Company at six cents a kilowatthour (\$0.06/kWh) subject to the escalation provision in Section A.1.e below; provided, however, that the rate of delivery of such Energy under this Section A.1.c(ii) shall not exceed three (3) MW at any given time.
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Appendix D
(Revised February 2011)

- d. The Company agrees that it will not enter into any new contracts with independent power producers or amend any existing contracts with independent power producers that would obligate the Company to take any more off-peak As-Available Energy than the Company is presently obligated to take under an existing agreement without first agreeing to take an additional five (5) MW of off-peak Energy from the Seller pursuant to Section A.a.c. above. This provision shall not apply to the purchase, either in a new or existing contract with an independent power producer, of any additional amount of off-peak energy required in such contract because of the reasonable minimum operating requirements of an independent power producer. The Company and the Seller agree that Section A.l.d. means that the Company shall take from the Seller up to an additional five (5) MW of off-peak As-Available Energy (from twenty-two (22) MW to twenty-seven (27) MW) prior to taking any additional As-Available Energy (beyond any As-Available Energy with a curtailment chronological seniority date prior to August 2, 1996, the effective date of the Fourth Amendment) from any as-available independent power producer whose As-Available Purchase Power Agreement has a Non-appealable PUC Approval Order Date later than August 2, 1996 ("Subsequent As-Available Producer"), it being mutually understood that the Company's obligation to take up to an additional five (5) MW of off-peak As-Available Energy from the Seller arises only upon the facility of a Subsequent As-Available Producer being deemed by the Company to have successfully completed all required acceptance tests and having commenced export of As-Available Energy to the Company electrical system. In the event of a need to curtail As-Available Energy during the off-peak period, the Company shall curtail Subsequent As-Available Producers (except as to any As-Available Energy with a curtailment chronological seniority date prior to August 2, 1996) prior, to curtailing the additional five (5) MW of off-peak As-Available Energy from the Seller (provided that such curtailment order does not have an adverse affect on the Company's System) unless there are other conditions in any agreements between the Company and the independent power producers that would allow the Company to curtail the Seller sooner. This provision shall not apply to the purchase, either in a new or existing contract with an independent power producer, of any additional amount of off-peak energy required in such contract because of the reasonable minimum operating requirements of an independent power producer.
- e. The 11.8 cents a kilowatthour (\$0.118/kWh) in Section A.l.b and in Section A.l.c(i) and the six cents a kilowatthour (\$0.06/kWh) in Section A.l.c(ii) shall be escalated at a rate of one and one-half percent (1.5%) a year and the payment rates shall be rounded to four decimal places (e.g. \$0.0000). Escalation will begin starting on January 1 of the second full calendar year after the Commercial Operation Date as defined in the New PPA of the Expansion Facility; provided, however, that the escalation rate for the second full calendar year shall be determined by the following formula:

$$\text{Escalation Rate} = 0.015 * [\text{CD}/365]$$

Where "CD" is the number of calendar Days from the Commercial Operation Date as defined in the New PPA of the Expansion Facility through the end of the first complete calendar year. For example, if the Commercial Operation Date is September 1, 2010, then "CD" will equal the number of days from September 1, 2010 through December 31, 2011.

For Contract Years three (3) through the end of this Contract, the escalation rate shall be 1.5% a year.

2. Energy furnished by the Seller to the Company shall be metered by a time-of-day meter that measures Energy delivery on at least one (1) hour intervals. The Company shall not pay for any Energy that may be delivered by the Seller prior to installation and operation of the Company's meters. The on-peak hours shall be those between 7:00 a.m. and 9:00 p.m. daily, and the off-peak hours shall be those between 9:00 p.m. on one day and 7:00 a.m. on the following day.
 3. Energy Rates
 - a. The on-peak energy rate for the first twenty-five (25) MW of on-peak Energy and the off-peak energy rate for the first twenty-two (22) MW of off-peak Energy delivered pursuant to Section A.1.a. above shall be one hundred percent (100%) of the Company's respective on-peak and off-peak Avoided Energy Costs (including avoided costs of fuel and operation and maintenance) in cents per kilowatthour, calculated in accordance with the provisions of the PUC's Standards, on file with the PUC and in effect for the month in which such Energy is delivered.
 - b. The on-peak energy rate for the next five (5) MW of on-peak Energy (above twenty-five (25) MW) delivered pursuant to Section A.1.b. above shall be as set forth in Section A.1.b. above.
 - c. The off-peak energy rate for the next five (5) MW of off-peak Energy (above twenty-two (22) MW) and the next three (3) MW off-peak Energy (above twenty-seven (27) MW) delivered pursuant to Section A.1.c. above shall be as set forth in Section A.1.c. above.
 4. This section intentionally left blank.
 5. During each payment period the Seller shall be credited at the rate of \$0,002 per kilovarhour for each kilovarhour furnished by the Seller to the Company in excess of .62 x kwh. The kvarh meters shall be adjusted to prevent reversal in the event the power factor is leading.
 6. This section intentionally left blank.
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7. The Seller shall deliver Energy under Company Dispatch pursuant to a Legally Enforceable Obligation as follows:
 - a. On-Peak Period. During the fourteen (14) hour period from 7:00 a.m. to 9:00 p.m. each day, the Seller shall be obligated to deliver Energy under the Company's Dispatch at a rate equal to the Seller's Firm Capacity Obligation described in Section 3(a) of APPENDIX B of this Contract.
 - b. Off-Peak Period. During the ten (10) hour period from midnight to 7:00 a.m. and 9:00 p.m. to midnight each day, the Seller shall be obligated to deliver energy under the Company's Dispatch at a rate not greater than the Seller's Firm Capacity Obligation described in Section 3 (a) of APPENDIX B of this Contract and not less than the Minimum Delivery Guarantee.

B. CAPACITY PURCHASES BY THE COMPANY

1. As compensation for providing the Firm Capacity under Company Dispatch as described in Section 3(a) of APPENDIX B, the Company will pay the Seller a capacity payment, payable monthly in accordance with Article 6 of the New PPA, of one-twelfth (1/12) of the Annual Capacity Payment Rate.
 2. The Capacity Payment Rate shall be:
 - a. \$4,000,000 per year for the first twenty-five (25) MW of firm capacity under Company Dispatch as described in Section 3 of APPENDIX B beginning on June 26, 1993; and subject to the sanction provision of Section D.I. of APPENDIX D; and
 - b. \$504,750 per year for the next five (5) MW of firm capacity under Company Dispatch above the first twenty-five (25) MW of firm capacity in Subsection B.2.a. as described in Section 3 of APPENDIX B beginning on the date of the fulfillment of the conditions precedent set forth in Sections V.A. and V.B. of the Fourth Amendment; provided that the Seller has satisfied the Acceptance Test requirement of Section I.B. of the Fourth Amendment; and subject to the sanction provision of Section D.I. of APPENDIX D. If the first year of operation for the additional five (5) MW of firm capacity is a partial calendar year then the amount of the Capacity Payment (\$504,750) shall be prorated on a daily basis (\$1,380 per day) from the date of the fulfillment of the conditions precedent set forth in Sections V.A. and V.B. of the Fourth Amendment through December 31 of that year (the 1996 capacity payment rate is \$1,380/day).
 3. The Company shall not be required to pay any additional capacity payment for any additional power supplied by the Seller, either at the Company's or the Seller's request.
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Appendix D
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4. A failure by the Seller to provide the required Firm Capacity to the Company shall result in the reduction in the capacity payment due to the Seller from the Company in accordance with Section D of APPENDIX D of this Contract. The Company shall not have any obligation to pay capacity payments to the Seller for periods in excess of twenty-four hours in which the Seller is unable to fulfill its obligations under the Contract, including but not limited to (i) circumstances which are subject to Section 15 of this Contract relating to Force Majeure without fault, or (ii) for periods in which the Seller does not fulfill its obligations under Section 3 of APPENDIX B of this Contract due to the Seller's "default," as such term is defined in APPENDIX E of this Contract.
5. If the Seller does not satisfy its firm capacity obligations as described in Section 3 of APPENDIX B and Section C of this APPENDIX D of this Contract, it shall pay sanctions as described in Section D of this APPENDIX D.

C. PERFORMANCE STANDARDS

1. The Seller acknowledges and agrees that the Seller's Facility is expected to meet the following minimum standards for satisfactory day-to-day performance during each contract year: (i) an On-peak Availability (excluding the two annual two-week maintenance periods and downtime due to a catastrophic equipment failure) of ninety-five percent (95%) or better; (ii) not more than six (6) Plant Trips per year; and (iii) a forced outage rate of five percent (5%) or less.
 2. The "On-peak Availability" of the Existing Facility (in percent) is to be computed by adding the total on-peak Energy under Company's Dispatch subject to a Legally Enforceable Obligation available from the Existing Facility during the contract year, and dividing by the product of 4,718 on-peak hours per forty-eight (48) week year (4,732 for leap years) times the Firm Capacity Obligation (prorated on a daily basis, if necessary) and multiplying the total by one-hundred percent (100%).
 3. "Catastrophic Equipment Failure" means a sudden, unexpected failure of a major piece of equipment which (i) substantially reduces or eliminates the capability of the Existing Facility to produce power, (ii) is beyond the reasonable control of the Seller and could not have been prevented by the exercise of due diligence by the Seller, and (iii) despite the exercise of all reasonable efforts, requires more than sixty (60) days to repair.
 4. "Plant Trip" means the sudden and immediate removal of the Existing Facility from service as a result of an immediate mechanical/electrical/hydraulic control system trip or operator initiated trip/shutdown which requires the Company to take immediate steps to place an unscheduled generator on line to make up for the loss of output of the Existing Facility; provided, however, that a Plant Trip shall not include: (i) any such removal which occurs within forty-eight (48) hours of the time at which the Existing Facility is restarted following an outage; (ii) trips caused or initiated by the Company; or (iii) trips occurring during periods when the Seller has continued to furnish capacity to the Company at the request of the Company's Production Manager after the Seller has notified the Company's Production Manager that the Existing Facility is likely to trip.
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5. The "Forced Outage Rate" of the Existing Facility during a contract year is to be computed by totaling the average megawatts unavailable for service due to forced outages or deratings on an hourly basis, multiplying the total by 100, and dividing by the product of 8,760 hours per year times the weighted average of the Seller's firm capacity obligation (prorated on a daily basis, if necessary).

D. SANCTIONS

1. The capacity payment is to be made on the basis of the full availability of the Seller's Firm Capacity Obligation. When the Seller's full Firm Capacity Obligation is not available, the Seller shall pay the Company \$0.0214 per on-peak hour for each kilowatt of deficiency based on annual capacity payments of \$504,750 and 4,718 on-peak hours in a year for the first five (5) MW of deficiency and the Seller shall pay the Company \$0.0339 per on-peak hour for each kilowatt of deficiency in excess of five (5) MW of deficiency based on annual capacity payments of \$4 million and 4,718 on-peak hours in a year.
 2. For each contract year in which the On-peak Availability of the Existing Facility is less than ninety-five (95) percent, unless the shortfall is due to a catastrophic equipment failure, the Seller shall pay \$7,992 to the Company for each full percentage point of the shortfall less than ninety-five (95) percent to and including eighty (80) percent, and the Seller will pay \$11,875 to the Company for each full percentage point of the shortfall less than eighty (80) percent.
 3. For each Plant Trip in excess of six (6) per contract year, the Seller shall pay \$10,000 to the Company.
 4. The Company shall have the right to offset any payment due from the Seller under this Section against any payments due to the Seller.
 5. This Section intentionally left blank.
 6. Each Party may exercise whatever legal or equitable remedies may be available to enforce the obligations of this Contract in the event of a default by the other Party.
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E. FACILITIES USED TO PROVIDE ENERGY AND CAPACITY

Provided that the New PPA is in effect and has not been terminated and/or the Seller is not in default under the New PPA, the Seller may use the Expansion Facility to partially supplement, from time to time, some of the Seller's obligations to provide energy and capacity under this Contract from the Expansion Facility. Notwithstanding anything to the contrary in this Contract, the energy and capacity payments paid herein shall be limited to the extent the Existing Facility and Expansion Facility producing such energy do not conform to the following parameters:

1. The first (1st) twenty-five (25) MW on-peak block and first (1st) twenty-two (22) MW off-peak block of energy shall be provided from the Existing Facility under this Contract.
In no event shall the energy from the Expansion Facility be paid for under the energy rates for this block of energy in this Contract. To the extent that the first (1st) twenty-five (25) MW on-peak block and first (1st) twenty-two (22) MW off-peak block of energy is not available from the Existing Facility, any obligation of the Company to take energy under the first (1st) twenty-five (25) MW on-peak block and first (1st) twenty-two (22) MW off-peak block shall be reduced accordingly.
 2. The twenty-five to thirty (25-30) MW on-peak block of energy and the twenty-two to twenty-seven (22-27) MW off-peak block of energy may be provided by the Existing Facility and/or the Expansion Facility. Delivery of such energy shall be paid for as provided under this Contract.
 3. The off-peak energy above twenty-seven (27) MW and on-peak energy above thirty (30) MW will be paid for as set forth in the New PPA.
 4. Example - If the Seller provides twenty-one (21) MW from its Existing Facility and eight (8) MW from its Expansion Facility on-peak (total of twenty-nine (29) MW), then the Energy payments would be calculated as follows:
 - a. twenty-one (21) MW would be priced at the first (1st) twenty-five (25) MW block (based on avoided cost and minimum rate),
 - b. five (5) MW would be priced at the twenty-five to thirty (25-30) MW block (11.8 cents/kWh, escalated), and
 - c. three (3) MW would be priced at the thirty to thirty-eight (30-38) MW block under the New PPA.
 5. Capacity payments from the first thirty (30) MW from the Facility will be paid as provided in this Contract. Any Firm Capacity provided above thirty (30) MW will be paid as provided in the New PPA.
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APPENDIX F

DEFINITIONS

1. **Allowed Capacity:** The maximum Capacity agreed upon between the Company and the Seller that may be delivered to the Company at any one time by the Seller, unless the Company requests otherwise, which shall be thirty megawatts (30 MW).
 2. **As-Available Energy:** Energy provided to the Company on an unscheduled basis as it becomes available, rather than at prearranged times and in prearranged amounts, and which is not subject to a Legally Enforceable Obligation.
 3. **Avoided Energy Costs:** The energy costs that the Company avoids by purchasing Energy from the Seller, as defined in and calculated in accordance with the PUC's Standards.
 4. **Capacity:** Electric power expressed in kilowatts or megawatts.
 5. **Company's Dispatch:** The Company's sole and absolute right to control, from moment to moment, through supervisory equipment, or otherwise, and in accordance with good engineering practice in the electric utility industry, the rate of delivery of Energy offered by the Seller to the Company.
 6. **Company's Fuel Adjustment Clause:** The provision in the Company's rate schedules that allows the Company to pass through to its customers the Company's costs of fuel and purchased power.
 7. **Company's System:** The electric system owned and operated by the Company on the Island of Hawaii consisting of power plants, transmission and distribution lines, and related equipment for the production and delivery of electric power to the public.
 8. **Company's System Load Dispatcher:** The authorized representative of the Company who is responsible for carrying out the Company's Dispatch.
 9. **Commercial Operation:** For the first twenty-five (25) megawatts of Capacity, Commercial Operation is the date (June 26, 1993) on which the Seller's Facility was deemed by the Seller to be capable of reliable delivery of firm capacity. For the additional five (5) megawatts of capacity delivered under the Fourth Amendment, Commercial Operation is the date on which the Seller's Facility is deemed by the Seller to be capable of reliable delivery of an additional five (5) megawatts of firm capacity after the successful completion of the 100 hour Acceptance Test as stated in the Fourth Amendment.
 10. **Energy:** Electric power expressed in kilowatthours.
 11. **Energy Cost Adjustment Clause:** Same as the Company's Fuel Adjustment Clause.
 12. **Existing Facility:** Same meaning as the Seller's Facility.
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- 13. Expansion Facility:** All real estate, fixtures and property owned, controlled, operated or managed by the Seller in connection with, or to facilitate, the production, generation, transmission, delivery or furnishing of electricity by the Seller to the Company and required to interconnect with the Company's System over and above the Seller's Facility including, without limitation, two (2) eight (8) MW Ormat Energy Converter units with a gross megawatt output (normal operations) of thirteen (13) MW (the nameplate rating of the two new units is sixteen (16) MW total, while the nominal gross output is thirteen (13) MW total) to produce an additional eight (8) MW of energy above the thirty (30) MW required from the Existing Facility; except the Seller's geothermal wellfield, pipelines, and other equipment located upstream from the Seller's power plant.
- 14. Facility:** Existing Facility and Expansion Facility.
- 15. Firm Capacity:** Thirty megawatts (30 MW) of reliable electrical Capacity and 18,600 kvar of reactive which the Seller has agreed to make available to HELCO from the Seller's Facility at the Point of Interconnection under the Company's Dispatch.
- 16. Firm Capacity Obligation:** The Seller's Legally Enforceable Obligation to provide Firm Capacity as described in Section 3(a) of APPENDIX B of this Contract.
- 17. Fourth Amendment:** That certain PERFORMANCE AGREEMENT AND FOURTH AMENDMENT TO THE PURCHASE POWER CONTRACT DATED MARCH 24, 1986 AS AMENDED dated February 12, 1996, by and between Hawaii Electric Light Company, Inc. and Puna Geothermal Venture.
- 18. Fifth Amendment:** That certain FIFTH AMENDMENT TO THE PURCHASE POWER CONTRACT FOR UNSCHEDULED ENERGY MADE AVAILABLE FROM A QUALIFYING FACILITY DATED MARCH 24, 1986 AS AMENDED, by and between Hawaii Electric Light Company, Inc. and Puna Geothermal Venture.
- 19. Interconnection Facilities:** The equipment and devices required to permit the Seller's power plant to operate in parallel with and deliver electric power to the Company's System, such as, but not limited to, transmission lines, transformers, switches, and circuit breakers.
- 20. Legally Enforceable Obligation:** A binding commitment to supply Energy or Capacity at prearranged times and in prearranged amounts under the Company's Dispatch, with sanctions for noncompliance.
- 21. New PPA:** A new purchase power agreement for the additional eight (8) megawatts of firm capacity and energy produced by the Expansion Facility entered into by the Parties immediately after the Fifth Amendment.
- 22. Operational Date:** The date(s) on which the respective generating units of the Seller's Facility and Expansion Facility, as the case may be, are projected for planning purposes to begin parallel operation with the Company's System.
- 23. Point of Interconnection:** The point of delivery of Energy and/or Capacity supplied, by the Seller to the Company where the Seller's Facility interconnects with the Company's System.
- 24. PUC's Standards:** Standards for Small Power Production and Cogeneration in the State of Hawaii, issued by the Hawaii Public Utilities Commission, Chapter 74 of Title 6, Hawaii Administrative Rules, currently in effect and as may be amended from time to time.
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25. Seller's Facility: All real estate, fixtures and property owned, controlled, operated or managed by the Seller in connection with, or to facilitate, the production, generation, transmission, delivery or furnishing of up to thirty (30) MW of electricity by the Seller to the Company and required to interconnect with the Company's System, except the Seller's geothermal wellfield, pipelines, and other equipment located upstream from the Seller's power plant.

Return By ☒ Mail ☐ Pickup

To: REGULAR SYSTEM

Gibson, Dunn & Crutcher
800 Newport Center Drive
Newport Beach, California 92660
Attention: Claudia Kihano Parker, Esq.

SUPPLEMENT TO GEOTHERMAL RESOURCES
MINING LEASE NO. R-2

THIS SUPPLEMENT is made as of the 9th day of July, 1990, by the STATE OF HAWAII, acting by its Board of Land and Natural Resources, as Lessor, and KAPOHO LAND PARTNERSHIP, a Hawaii Limited partnership, whose business and mailing address is P.O. Box 374, Hilo, Hawaii 96720, as Lessee;

WITNESSETH:

WHEREAS, pursuant to that certain unrecorded Geothermal Resources Mining Lease No. R-2, dated February 20, 1981, a short form of which was recorded in the Bureau substantially concurrently herewith ("State Lease"), Lessor leased to Lessee certain rights with respect to geothermal resources and geothermal by-products in and under that certain real property described in Exhibit "A" thereto; and

WHEREAS, Lessee has recently caused an updated survey to be taken of such real property, which survey more accurately defines the boundaries of such real property; and

WHEREAS, Lessor and Lessee desire to supplement the State Lease as set forth herein.

NOW, THEREFORE, in consideration of the premises, the parties hereto agree as follows:

1. The State Lease is hereby supplemented by deleting the original Exhibit "A" thereto and substituting in lieu thereof the new Exhibit "A" attached hereto and hereby incorporated herein.
 2. This document may be executed in any number of counterparts, each of which shall be an original and all of which shall constitute one and the same instrument, with the same effect as if the signatures were upon the same instrument.
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3. Except as supplemented herein, the State Lease remains otherwise unmodified and in full force and effect.

IN WITNESS WHEREOF, the parties hereto have duly executed this instrument as of the date and year first above written.

STATE OF HAWAII

By its Board of Land and Natural Resources

Chairperson and Member of the Board of Land and
Natural Resources

KAPOHO LAND PARTNERSHIP, a Hawaii limited partnership

By: KAPOHO MANAGEMENT CO., INC.,
a Hawaii corporation,
Its General Partner

By: _____
Its: Chairman

By: _____
Its: President

By: _____
Its: Vice President

APPROVED AS TO FORM:

Deputy Attorney General

July 10, 1990
Approved by the Chairperson of
The Board of Land and Natural
Resources at Its Meeting Held
On _____, 1990
Dated: _____

STATE OF HAWAII)
) SS.
COUNT OF HONOLULU)

On this 9th day of July, 1990, before me personally appeared C. ARTHUR LYMAN, ALBERT LONO LYMAN and JANE T. K. LYMAN, to me known, who, being by me duly sworn, did say that they are the Chairman, President and Vice President, respectively, of KAPOHO MANAGEMENT CO., INC., a Hawaii corporation, the General Partner of KAPOHO LAND PARTNERSHIP, a Hawaii limited partnership; that the seal affixed to the foregoing instrument is the corporate seal of said corporation; that said instrument was signed and sealed on behalf of said corporation by authority of its Board of Directors; and said officers acknowledged said instrument to be the free act and deed of said corporation and said partnership.

Notary Public, State of Hawaii

My commission expires: 08-02-91

EXHIBIT "A"

(1) Lot 1 (Power Plant), Being a portion of L.P. 8177 and R.P. 4497 .

L.C. Aw. 8559, Apana 5 to C. Kanaina, Kapoho, Puna, Island of Hawaii, Hawaii, more particularly described as follows:

Beginning at the northwest corner of this parcel of land and on the southerly side of Kapoho-Pahoa Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "KALIU" being 11,468.94 feet North and 8,724.33 feet East and running by azimuths measured clockwise from True South:

1. 241° 46' 24" 71.21 feet along Kapoho-Pahoa Road; Thence along Lot 2, the remainder of L.P. 8177 and R.P. 4497, L.C. Aw. 8559, Apana 5 to C. Kanaina for the next thirty-five (35) courses, the azimuths and distances between points being:

2. Following along a curve to the left having a radius of 20.00 feet, the chord azimuth and distance being:

11° 28' 45"

30.77 feet;

3. 321° 11' 1234.51 feet;

4. Thence along a curve to the left having a radius of 1985.00 feet, the chord azimuth and distance being: 315° 53' 30" 366.14 feet;

5.	310°	36'		258.68	feet;
6.	302°	52'		413.75	feet;
7.	305°	20'	30'	29.52	feet;
8.	6°	11'	30"	149.78	feet;
9.	256°	34'	30**	173.94	feet;
10.	305°	20'	30"	45.58	feet;
11.	215°	20'	30'	35.00	feet;
12.	305°	20'	30"	208.56	feet;
13.	245°	48'		52.93	feet;
14.	335°	48'		186.32	feet;
15.	245°	48'		100.00	feet;
16.	335°	48'		288.68	feet;
17.	65°	48'		164.00	feet;
18.	335°	48'		150.00	feet;
19.	65°	48'		200.00	feet;
20.	155°	48'		150.00	feet;
21.	65°	48'		412.78	feet;
22.	67°	50'	04"	250.00	feet;
23.	155°	48'		49.10	feet;
24.	68°	18'	50'*	114.52	feet;
25.	155°	48'		50.00	feet;
26.	248°	18'	50"	296.32	feet;
27.	155°	48'		191.00	feet;
28.	245°	48'		124.00	feet;
29.	155°	48'		219.00	feet;
30.	245°	48'		28.81	feet;
31.	186°	11'	30"	412.91	feet;

32. 122° 52' 232.94 feet;
33. 130° 36' 409.32 feet;
34. Thence along a curve to the left having a radius of
2015.00 feet, the chord azimuth and distance being:
135° 53' 30" 371.67 feet;
35. 141° 11' 1247.59 feet;
36. Thence along a curve to the left having a radius of
20.00 feet, the chord azimuth and distance being:
101° 28' 42" 25.55 feet to
the point of beginning and containing an area of 13.709 acres.

- (2) Lot 2, being a portion of L.P. 8177 and R.P. 4497, L.C. Aw. 8559, Apana 5 to C. Kanaina, Kapoho, Puna, Island of Hawaii, Hawaii,

Beginning at a point at the southwest corner of this parcel of land on the east side of Pohoiki Road being also the northwest corner of Hawaii Geothermal Research Project Site, the coordinates of said point of beginning referred to Government Survey Triangulation Station "KALI" being 7,328.44 feet North and 8,606.67 feet East and running by azimuths measured clockwise from True South:

1. 160° 03' 24" 251.79 feet along the easterly side
of Pohoiki Road;
2. Thence along the easterly side of Pohoiki Road,
along a curve to the right having a radius of 432.00 feet, the chord
azimuth and distance being:
178° 16' 24" 270.10 feet;
3. 196° 29' 24" 249.92 feet along the easterly side
of Pohoiki Road;
4. Thence along the easterly side of Pohoiki Road,
along a curve to the left having a radius of 182.00 feet, the chord
azimuth and distance being:
158° 55' 64" 221.88 feet;
5. 121° 22' 24" 2031.38 feet along the easterly side
of Pohoiki Road;

6.	126°	06'	54"	1404.95	feet along the easterly side of Pohoiki Road;
7.	141°	35'	04"	113.00	feet along the easterly side of Pohoiki Road;
8.	211°	55'	54"	75.32	feet along the southerly side of Kapoho-Pahoa Road;
9.	256°	55'	54"	1010.01	feet along the southerly side of Kapoho-Pahoa Road;
10.	346°	55'	54"	100.00	feet along HELCO sub-station site;
11.	256°	55'	54"	150.00	feet along HELCO sub-station site;
12.	166°	55'	54"	100.00	feet along HELCO sub-station site;
13.	256°	55'	54"	303.02	feet along the southerly side of Kapoho-Pahoa Road (Proj. No. A-132-01-60);
14. Thence along the southerly side of Kapoho-Pahoa Road (Proj. No. A-132-01-60). along a curve to the left having a radius of 2321.83 feet, the chord azimuth and distance being: 249° 21' 09" 612.48 feet;
15. 241° 46' 24" 1273.36 feet along the southerly side of Kapoho-Pahoa Road (Proj. No. A-132-01-60);
16. Thence -along Lot 1, the remainder of L.P. 8177 and R.P. 4497. L.C. Aw. 8559, Apana 5 to C. Kanaina, along a curve to the right having a radius of 20.00 feet, the chord azimuth and distance being: 281° 28' 42" 25.55 feet;
- Thence along Lot 1. the remainder of L.P. 8177 and R.P. 4497. L.C. Aw. 8559. Apana 5 to C. Kanaina for the next thirty four (34) courses, the azimuths and distances being:

17.	321°	11'		1247.59	feet;
18.	Thence along a curve to the left having a radius of 2015.00 feet, the chord azimuth and distance being: 315° 53' 30" 371.67 feet;				
19.	310°	36'		409.32	feet;
20.	302°	52'		232.94	feet;
21.	6°	11'	30"	412.91	feet;
22.	65°	48'		28.81	feet;
23.	335°	48'		219.00	feet;
24.	65°	48'		124.00	feet;
25.	335°	48'		191.00	feet;
26.	68°	18'	50"	296.32	feet;
27.	335°	48'		50.00	feet;
28.	248°	18'	50"	114.52	feet;
29.	335°	48'		49.10	feet;
30.	247°	50'	04"	250.00	feet;
31.	245°	48'		412.78	feet;
32.	335°	48'		150.00	feet;
33.	245°	48'		200.00	feet;
34.	155°	48'		150.00	feet;
35.	245°	48'		164.00	feet;
36.	155°	48'		288.68	feet;
37.	65°	48'		100.00	feet;
38.	155°	48'		186.32	feet;
39.	65°	48'		52.93	feet;
40.	125°	20'	30"	208.56	feet;
41.	35°	20'	30"	35.00	feet;

42.	125°	20'	30"	45.58	feet;
43.	76	34'	30"	173.94	feet;
44.	186°	11'	30"	149.78	feet;
45.	125°	20'	30"	29.52	feet;
46.	122°	52'		413.75	feet;
47.	130°	36'		258.68	feet;
48.	Thence along a curve to the				right having a radius of 1985.00 feet, the chord azimuth and distance being: 135°53'30" 366.14 feet;
49.	141°	11'			1234.51 feet;
50.	Thence along a curve to the				right having a radius of 20.00 feet, the chord azimuth and distance being: 191°28'45"30.77 feet;
51.	241°	46'	24"	411.07	feet along Kapoho-Pahoa Road;
52.	331°	46'	24"	5.00	feet along a jog in Kapoho-Pahoa Road (Proj. No. A-132-01-60);
53.	241°	46'	24"	75.00	feet along the southerly side of Kapoho-Pahoa Road (Proj. No. A-132-01-60);
54.	151°	46'	24"	5.00	feet along a jog in Kapoho-Pahoa Road (Proj. No. A-132- 01-60);
55.	241°	46'	24"	105.65	feet along the southerly side of Kapoho-Pahoa Road (Proj. No. A-132-01-60);

56. Thence along the southerly side of Kapoho-Pahoa Road
(Proj. No. A-132-01-60), along a curve to the left having a radius of
2321.83 feet, the chord azimuth and distance being:
235° 16' 24" 525.68 feet;
57. 228° 46' 24" 224.35 feet along the southerly
side of Kapoho-Pahoa Road (Proj. No. A-132-01-60);
58. 228° 46' 24" 279.17 feet along the southerly
side of Kapoho-Pahoa Road (Proj. No. S-0132(1)).
59. Thence along the southerly side of Kapoho-Pahoa Road
(Proj. No. S-0132(1)), along a curve to the right having a radius of
1607.02 feet, the chord azimuth and distance being:
236° 46' 24" 447.31 feet;
60. 244° 46' 24" 2650.28 feet along the southerly
side of Kapoho-Pahoa Road (Proj. No. S-0132(1));
61. Thence along the southerly side of Kapoho-Pahoa Road
(Proj. No. S-0132(1)), along a curve to the right having a radius of
1498.15 feet the chord azimuth and distance being:
248° 31' 24" 195.97 feet;
62. Thence continuing along the southerly side of
Kapoho-Road (Proj. No. S-0132(1)), along a curve to the right
having a radius of 1115.92 feet, the chord azimuth and distance
being:
259° 35' 24" 284.23 feet;
63. Thence continuing along the southerly side of
Kapoho-Pahoa Road (Proj. No. S-0132(1)), along a curve to the right
having a radius of 1498.15 feet, the chord azimuth and distance
being:
269° 04' 13" 113.12 feet;
64. 277° 15' 54" 450.36 feet along the southerly
side of Kapoho-Pahoa Road (Proj. No. S-0132(1));

65. Thence along the remainder of L.P. 8177 and R.P.

4497, L.C. Aw. 8559, Apana 5 to C. Kanaina, along a curve to the right having a radius of 40.00 feet, the chord azimuth and distance being: 7° 20' 04" 34.24 feet;

Thence along the remainder of L.P. 8177 and R.P. 4497,

L.C. Aw. 8559. Apana 5 to C. Kanaina for the next thirty nine (39) courses, the azimuths and distances being:

66.	302°	40'	24"	5.00	feet;
67.	32°	40'	24"	26.67	feet;
68.	52°	37'	24"	135.95	feet;
69.	38°	26'	24"	225.17	feet;
70.	54°	45'	24"	36.60	feet;
71.	31°	45'	24"	252.93	feet;
72.	15°	05'	24"	6.79	feet;
73.	77°	02'	24"	350.29	feet;
74.	83°	45'	24"	132.20	feet;
75.	74°	49'	24"	97.93	feet;
76.	41°	26'	24"	65.32	feet;
77.	27°	14'	24"	546.76	feet;
78.	306°	32'	24"	343.25	feet;
79.	61°	23'	24"	958.61	feet;
80.	64°	54'	24"	354.14	feet;
81.	62°	49'	24"	285.05	feet;
82.	64°	32'	24"	197.17	feet;
83.	344°	04'	54"	816.37	feet;
84.	55°	17'	24"	68.36	feet;
85.	18°	50'	24"	23.76	feet;
86.	342°	23'	24"	428.66	feet;
87.	322°	39'	24"	121.88	feet;

88. 304° 14' 24" 180.13 feet;

89. 294° 18' 24" 291.64 feet;

90.	270°	59'	24"	235.52	feet;
91.	266°	59'	24"	234.48	feet;
92.	210°	11'	24"	209.22	feet;
93.	221°	37'	24"	75.90	feet;
94.	235°	37'	24"	84.79	feet;
95.	248°	41'	24"	92.41	feet;
96.	263°	16'	24"	164.85	feet;
97.	258°	40'	24"	240.44	feet;
98.	249°	45'	24"	154.26	feet;
99.	254°	20'	24"	124.75	feet;
100.	245°	20'	24"	119.50	feet;
101.	253°	52'	24"	114.86	feet;
102.	5°	26'	24"	157.53	feet;
103.	343°	45'	24"	196.61	feet;
104.	6°	20'	57"	1108.69	feet
105.	60°	30'	00"	700.65	feet along Lot 3-A-3, portion of Grant 3209 to Robert Rycroft;
106.	60°	42'	20"	2187.60	feet along Lots 8-2 and B-1 and Lanipuna Gardens, Increment 1 (File Plan 1340);
107.	73°	10'	00"	1942.14	feet along Lanipuna Gardens, Increment 1 (File Plan 1340);
108.	163°	10'	00"	342.45	feet along Hawaii Geothermal Research Project Site;
109.	73°	10'	00"	610.52	feet along Hawaii Geothermal Research Project Site to the point of beginning and containing an Area of 557.18 Acres.

- (3) Being a portion of L.P. 8177 and R.P. 4497, L.C. Aw. 8559. Apana 5 to C. Kanaina, Kapoho, Puna, Hawaii,

Beginning at the southwest corner of this parcel of land, being also the northeast corner of Grant 3209 to Robert Rycroft and the west corner of Grant 6845 to Robert Napalapalai, the coordinates of said point of beginning referred to Government Survey Triangulation Station "KALIU" being 9,155.29 feet North and 13,666.78 feet East and running by azimuths measured clockwise from True South:

1. 186° 20' 57" 1108.69 feet along the remainder of L.P. 8177 and R.P. 4497, Apana 5 to C. Kanaina;
2. 242° 04' 24" 694.21 feet along the southeasterly side of 20 feet road;
3. 235° 34' 24" 676.73 feet along the southeasterly side of 20 feet road;
- Thence along the remainder of L.P. 8177 and R.P. 4497. Apana 5 to C. Kanaina for the next ten (10) courses, the azimuths and distances being:
4. 296° 41' 24" 89.16 feet;
5. 290° 49' 24" 265.76 feet;
6. 264° 10' 24" 372.80 feet;
7. 198° 23' 54" 1150.00 feet;
8. 273° 29' 24" 451.14 feet;
9. 240° 22' 24" 240.00 feet;
10. 182° 02' 24" 100.00 feet;
11. 243° 53' 54" 483.40 feet;
12. 233° 48' 24" 226.80 feet;
13. 223° 02' 24" 648.90 feet;
14. 163° 07' 24" 259.15 feet along the northeast side of road;
15. 146° 57' 24" 415.75 feet along the northeast side of 20 feet road;
16. 121° 57' 54" 307.04 feet along the northeast side of 20 feet road;
17. Thence along the southeast side of Kapoho-Pahoa Road
(Project No. ERP ER 3(1)), along a curve to the left having a radius of 2894.79 feet, the chord azimuth and distance being:
256° 55' 48.2" 224.46 feet;

Thence along the remainder of L.P. 8177 and R.P. 4497,
Apana 5 to C. Kanaina for the next seven (7) courses, the
azimuths and distances being;

18.	289°	01'	24"	107.97	feet;
19.	281°	27'	24"	705.00	feet;
20.	302°	47'	24"	966.32	feet;
21.	354°	37'	24"	233.00	feet;
22.	328°	07'	24"	66.00	feet;
23.	281°	32'	24**	292.00	feet;
24.	263°	00'	24"	88.00	feet;
25.	34°	12'	24**	381.63	feet along the westerly side of 20 feet road;
26.	32°	08'	24"	120.81	feet along the westerly side of 20 feet road;
27.	25°	39'	24"	88.76	feet along the westerly side of 20 feet road;
28.	18°	18'	24"	82.03	feet along the westerly side of 20 feet road;

29. Thence along the westerly side of 20 feet road.
along a curve to the right having a radius of 20.00 feet, the
chord azimuth and distance being:
61° 27' 24" 27.36 feet;

30. 104° 36' 24" 250.78 feet along the northerly side of 20 feet road;

31.	90°	28'	54"	123.58 feet along the northerly side of 20 feet road;
32.	21°	44'	24"	71.08 feet along the westerly side of 20 feet road;
33.	359°	55'	24"	410.82 feet along the westerly side of 20 feet road;
34.	352°	32'	24"	137.09 feet along the westerly side of 20 feet road;
35.	318°	05'	24"	521.10 feet along the westerly side of 20 feet road;
36.	346°	25'	24"	93.15 feet along the westerly side of 20 feet road;
37.	9°	59'	24"	284.02 feet along the westerly side of 20 feet road;
38.	6°	43'	24"	140.76 feet along the westerly side of 20 feet road;
39.	73°	44'	04"	5556.04 feet along Grant 6845 to

Robert Napalapalai to the point of beginning and
containing an area of 240.76 Acres.

- (4) Being portions of L.P. 8177 and R.P. 4497, L.C. Aw. 8559, Apana 5 to C. Kanaina, Kapoho, Puna, Island of Hawaii, Hawaii,

Beginning at the northerly corner of this parcel of land on the southwest side of Pohoiki Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "KALIU" being 10,013.20 feet North and 5,757.20 feet East and running by azimuths measured clockwise from True South:

1.	306°	06'	54"	1086.26 feet along Pohoiki Road to a 1/2" pipe (found);
2.	36°	06'	54"	300.00 feet along the remainder of L.P. 8177 and R.P. 4497, L.C; Aw. 8559, Apana 5 to C. Kanaina;
3.	141°	33'	14"	1126.93 feet along Grant 13156 to Kapoho Land Development Company, Limited to the point of beginning and containing an area of 3.741 Acres.

Date: November 26, 2014

(1) ORPOWER 4 INC.

and

(2) THE KENYA POWER AND LIGHTING COMPANY LIMITED

THIRD AMENDED AND RESTATED POWER
PURCHASE AGREEMENT FOR
OLKARIA III GEOTHERMAL PLANTS

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**THIRD AMENDED AND RESTATED
POWER PURCHASE AGREEMENT**

THIS THIRD AMENDED AND RESTATED POWER PURCHASE AGREEMENT is made on November [26th], 2014

BETWEEN

- (1) **ORPOWER 4 INC.**, a company incorporated under the laws of the Cayman Islands, with its registered office in Grand Cayman, Cayman Islands, with an office at 6225 Neil Road, Reno, Nevada, USA and which will act through its branch at Off Moi South Lake Road, Hellsgate National Park, P.O. Box 1566-20117, Naivasha, Kenya (the “**Seller**” or “**OrPower**”); and
- (2) **THE KENYA POWER AND LIGHTING COMPANY LIMITED** a company incorporated in Kenya with its registered office at Stima Plaza, P.O. Box 30099-00100, Nairobi, Kenya (“**KPLC**”).

WHEREAS

- (A) KPLC is entitled to purchase electricity generating capacity and to transmit and distribute electricity in the Republic of Kenya;
- (B) Pursuant to a Request for Proposals (“**RFP**”) dated 5th July 1996 and issued by MOE, the Seller has submitted an offer which has been accepted following the due process of the RFP;
- (C) Pursuant to the RFP, the Seller, as the successful bidder, was required to and entered into a power purchase agreement with KPLC;
- (D) KPLC and OrPower 4 entered into the original Power Purchase Agreement dated 5 November 1998, and subsequently entered into the First Supplemental Agreement dated 21 July 2000 modifying the terms of the original Power Purchase Agreement, the Second Supplemental Agreement dated 17 April 2003 modifying the terms of the original Power Purchase Agreement and of the First Supplemental Agreement. the parties then entered into the Amended and Restated Power Purchase Agreement dated January 19, 2007 which superseded all prior agreements, and subsequently the parties entered into the Second Amended and Restated Power Purchase Agreement dated March 29, 2011, which superseded all prior agreements;
- (E) The Parties wish to amend the agreement further to enable the addition of capacity at the Olkaria III geothermal licence area;
- (F) This Agreement is the third amended and restated power purchase agreement agreed between the Parties, and which supersedes the Second Amended and Restated Power Purchase Agreement dated March 29, 2011.

IT IS HEREBY AGREED as follows:

Clause 1: Amendment and Restatement, Definitions and Interpretation

1.1 Amendment and Restatement

With effect from the Signature Date, the Second Amended and Restated Power Purchase Agreement dated March 29, 2011 between the Parties, inclusive of all schedules thereto, shall be amended and restated in its entirety by this Third Amended and Restated Power Purchase Agreement.

Defined terms:

In this Agreement, including the recitals, unless the context otherwise requires, the following words and expressions shall have the following meanings:

“Agreement” or **“PPA”**: this Third Amended and Restated Power Purchase Agreement together with all schedules hereto as the same may be supplemented or amended from time to time;

“Amended and Restated Olkaria III Project Security Agreement”: the agreement entered into by the Parties on providing securities to the Seller in respect of KPLC’s payment obligations under Clause 11 of this Agreement, as the same may be supplemented or amended from time to time;

“ANSI”: American National Standards Institute;

“API”: American Petroleum Institute;

“Applicable Engineering, Environmental, and Safety Codes and Standards”: the codes, practices, standards guidelines and requirements in existence as of the Determining Date with respect to a Plant or Geothermal Reservoir Development all as specified in Part A of Schedule 2;

“Appraisal Period”: the period specified in the Appraisal Programme for the conduct of the Appraisal Works;

“Appraisal Programme”: the programme for the drilling of wells and the conduct of other works to appraise the reserves and productivity of the Reservoir set out in Schedule 1, as from time to time adjusted by the Parties in accordance with this Agreement;

“Appraisal Works”: the drilling and other works specified in the Appraisal Programme;

“ASHRAE”: American Society of Heating, Refrigerating and Air-Conditioning Engineers;

“ASME”: American Society of Mechanical Engineers;

“Authorisations”: any approval, consent, licence, permit, authorisation or other permission granted by a Governmental Authority;

“Availability Failure”: for each Plant, its failure in any Settlement Period to deliver electricity in accordance with a valid Despatch Instruction which Despatch Instruction does not exceed the Declared Capacity of such Plant, other than as a result of an event on KPLC’s System which was not caused by the Seller or any event of Force Majeure;

“Available Early Generation Capacity”: the capacity of the Early Generation Facility assumed to be Available in any Settlement Period being the Declared Capacity unless there has been an Availability Failure in that Settlement Period in which event the Available Early Generation Capacity shall be the average Early Generation Availability achieved in response to Despatch Instructions for that Settlement Period;

“Available Plant Capacity”: the capacity of a Plant assumed to be Available in any Settlement Period being such Plant’s Declared Capacity unless there has been an Availability Failure in that Settlement Period, in which event the Available Plant Capacity for such Plant shall be the average Plant Availability achieved by such Plant in response to Despatch Instructions in respect of such Plant for that Settlement Period;

“Back-Up Metering Equipment”: prior to the Full Commercial Operation Date of the First Plant, back up equipment for metering and monitoring the operation and output of the Early Generation Facility, as may be supplied and installed by the Seller as specified in Part D of Schedule 2 and, with respect to each Plant from the Full Commercial Operation Date of such Plant, back up equipment for metering and monitoring the output of such Plant as supplied by KPLC and installed by the Seller as specified in Part D of Schedule 2;

“Bid Security”: an on-demand performance bond in the amount of two hundred and fifty thousand United States Dollars (US\$250,000) drawn on an internationally recognised bank;

“Capacity Payments”: the amounts payable by KPLC in respect of the Contracted Early Generation Capacity or Contracted Plant Capacity of each Plant (as the case may be) in accordance with Parts A and B of Schedule 5;

“Change in Law”: shall mean the adoption, promulgation, or modification after the Determining Date for the Plant or Geothermal Reservoir Development (as applicable) of any Legal Requirement or the imposition upon the Seller of any material condition in connection with the issuance, renewal, extension, replacement or modification of any Authorisation after the Determining Date that in either case establishes requirements for the design, construction, operation or maintenance of a Plant or of the Geothermal Reservoir Development that are materially more restrictive than the most restrictive requirements in effect as of the Determining Date for the Plant or Geothermal Reservoir Development (as applicable);

“Commissioning”: taking all steps necessary to put the Early Generation Facility, a Plant and the Transmission Interconnector, as appropriate, into operation, including carrying out tests prior to operation as specified in Part A of Schedule 4;

“Confidential Information”: has the meaning ascribed thereto in Clause 18.1;

“Connection Facilities”: the connection facilities to be installed by the Seller and KPLC, as specified in Part B of Schedule 2;

“Construction Bond”: for each Plant, an on-demand construction bond in the amount of one million United States Dollars (US\$1,000,000) drawn on an internationally recognised bank;

“Construction Programme”: the programme for the design, procurement, construction, installation and commissioning of the Early Generation Facility and each Plant set out in Schedule 7, as from time to time adjusted by agreement of the Parties;

“Consumer Prices Index or CPI”: the index known as “The Consumer Prices Index for All Urban Consumers (CPI-U) for the US City Average for All Items 1982-84 = 100”, as published by the United States Department of Labor, Bureau of Labor Statistics, or such other index as the Parties may agree pursuant to Part D of Schedule 5 or such replacement index as may be determined by an Expert which replacement index shall take effect from such date as the Expert shall determine;

“Contracted Early Generation Capacity”: the capacity of the Early Generation Facility at the reference conditions specified in paragraph 1.2(b)(ii) of Part A of Schedule 2 being at the Signature Date twelve (12) MW or such other amount as may be determined from time to time pursuant to Clauses 9.8, 9.10 and 9.11;

“Contracted Early Generation Capacity Test”: a test of the normal full-load capacity of the Early Generation Facility carried out in accordance with the requirements of paragraph 3(b)(ii) of Part A of Schedule 4;

“Contracted Plant Capacity” or **“Contracted Capacity”**: for each Plant, the capacity of such Plant at the reference conditions specified in paragraph 1.2(b)(ii) of Part A of Schedule 2 being at the Signature Date, (i) for the First Plant forty-eight (48) MW, for the Second Plant thirty-six (36) MW, for the Third Plant, sixteen (16) MW), and, for the Fourth Plant, the capacity stated in the Notice(s) of Fourth Plant Exercise (up to fifty (50) MW) or, (ii) such other amount as may be agreed or determined from time to time pursuant to Clauses 5.4, 9.8A, 9.8B, 9.8C, 9.10 and 9.11;

“Contracted Plant Capacity Test”: a test of the normal full load capacity of a Plant carried out in accordance with the requirements of paragraph 3(b)(ii) of Part A of Schedule 4;

“Daily Liquidated Damages Sum”: an amount of US\$0.50 per kW of Contracted Early Generation Capacity or, for each Plant, Contracted Plant Capacity of such Plant, as the case may be;

“Declared Capacity”: in respect of a Settlement Period, with respect to the Early Generation Facility, the Early Generation Capacity or, with respect to a Plant, its Plant Capacity (as the case may be) declared by the Seller to be Available for that Settlement Period in accordance with the Operating and Despatch Procedure;

“Default”: with respect to the Early Generation Facility or a Plant, any one or more of the events occurring with respect to the Early Generation Facility or such Plant, as the case may be, specified in Clauses 16.1 and 16.2;

“Default Rate”: two (2) percentage points above LIBOR;

“Delay Period of the Second Plant”: in circumstances where both (i) the Full Commercial Operation Date of the Second Plant occurs after the Required Full Commercial Operation Date of the Second Plant for reasons attributable to Seller, and (ii) the CPI of the third month prior to the month in which the Full Commercial Operation Date of the Second Plant occurs is greater than the CPI of the third month prior to the month in which the Required Full Commercial Operation Date of the Second Plant occurs, shall mean the period between the Required Full Commercial Operation Date of the Second Plant and the Full Commercial Operation Date of the Second Plant;

“Delay Period of the Third Plant”: in circumstances where both (i) the Full Commercial Operation Date of the Third Plant occurs after the Required Full Commercial Operation Date of the Third Plant for reasons attributable to Seller, and (ii) the CPI of the third month prior to the month in which the Full Commercial Operation Date of the Third Plant occurs is greater than the CPI of the third month prior to the month in which the Required Full Commercial Operation Date of the Second Plant occurs, shall mean the period between the Required Full Commercial Operation Date of the Third Plant and the Full Commercial Operation Date of the Third Plant;

“Delay Period of the Fourth Plant”: in circumstances where both (i) the Full Commercial Operation Date of the Fourth Plant occurs after the Required Full Commercial Operation Date of the Fourth Plant for reasons attributable to Seller, and (ii) the CPI of the third month prior to the month in which the Full Commercial Operation Date of the Fourth Plant occurs is greater than the CPI of the third month prior to the month in which the Required Full Commercial Operation Date of the Second Plant occurs, shall mean the period between the Required Full Commercial Operation Date of the Fourth Plant and the Full Commercial Operation Date of the Fourth Plant;

“Delivery Point”: each of the points of common coupling on KPLC’s System at which the Net Electrical Output from the Early Generation Facility or a Plant (as the case may be) is delivered and shall be the points specified in Part E of Schedule 2;

“Despatch Instruction”: prior to the Full Commercial Operation Date of the First Plant, an instruction given by KPLC to the Seller in relation to the operation of the Early Generation Facility in accordance with Clause 8.3 and from the Full Commercial Operation Date of a Plant, an instruction given by KPLC to the Seller in relation to the operation of such Plant in accordance with Clause 8.3;

“Determining Date”: shall mean, with respect to the Geothermal Reservoir Development and the First Plant, November 5, 1998, with respect to the Second and Third Plants, March 29, 2011, and, with respect to the Fourth Plant, the date of this Third Amended and Restated Power Purchase Agreement;

“DIN”: Deutsches Institut für Normung (German standards institute);

“Early Generation Availability”: the ability of the Early Generation Facility over a period of time, to deliver electricity to KPLC’s System at the Delivery Point and the terms “Available” and “Unavailable”, as used in the context of the Early Generation Facility, shall be construed accordingly;

“Early Generation Capacity”: the capacity of the Early Generation Facility, expressed in MW to generate and deliver electricity at the Delivery Point assuming the continued connection and proper operation of KPLC’s System;

“Early Generation Cessation Date”: has the meaning ascribed thereto in Clause 6.1A;

“Early Generation Commercial Operation Date”: the date specified as such by the Seller in accordance with Clause 7.9;

“Early Generation Commercial Operation Tests”: the respective tests to be carried out on the Early Generation Facility, as specified in paragraph 3 of Part A of Schedule 4;

“Early Generation Commissioning Date”: the date specified in the Construction Programme as the target date for the start of Commissioning of the Early Generation Facility, or such earlier date as the Seller may specify by notice to KPLC not less than thirty (30) days before such earlier date subject to KPLC’s agreement to such earlier date which agreement shall not be unreasonably withheld;

“Early Generation Facility”: the generating facility with the Contracted Early Generation Capacity described in paragraph 4 of Part A of Schedule 2, including the Seller’s 33 kV interconnection to the Early Generation Interconnection Point and all transformers and associated equipment, relay and switching equipment, and protective devices (adjusted to the settings agreed between KPLC and the Seller pursuant to paragraph 4 Part A of Schedule 4) and all safety equipment;

“Early Generation Facility Tests”: the Contracted Early Generation Capacity Test and Reliability Run Test;

“Early Generation Interconnection Point”: the physical point where the Early Generation Facility and KPLC’s transmission Interconnector are connected as specified in Part E of Schedule 2;

“Early Generation Long Stop Commercial Operation Date”: the date twenty-one (21) months after the Effective Date or such other date as may be determined pursuant to the provisions of this Agreement;

“Early Generation Site”: the land on which the Early Generation Facility shall be located prior to the Full Commercial Operation Date;

“Effective Date”: has the meaning ascribed thereto in Clause 3.1;

“Emergency”: a condition or situation that, in the sole but reasonable opinion of KPLC, does materially and adversely, or is likely to materially and adversely (i) affect the ability of KPLC to maintain a safe, adequate and continuous electrical service to its customers, having regard to the then current standard of electrical service provided to its customers, or (ii) present a physical threat to persons or property for the security, integrity or reliability of KPLC’s System;

“Energy Charges”: the amounts payable by KPLC in respect of the Net Electrical Output as specified in Parts A and B Schedule 5;

“Establishment Date of the First Plant”: the date by which the last of the following activities and events have occurred (except, with respect to subclauses (ii), (iii) and (iv), to the extent waived by the benefiting Party):

- (i) the Amended and Restated Power Purchase Agreement of January 19, 2007 and the Olkaria III Project Security Agreement of January 19, 2007 have been duly executed and delivered by the Parties after receipt of all necessary approvals;
- (ii) the initial Letter of Credit for the First Plant has been issued in its full amount in favour of and delivered to the Seller;
- (iii) the Construction Bond for the First Plant has been issued in its full amount in favour of and delivered to KPLC, as described in Clause 3.6 hereto; and
- (iv) the Electricity Regulatory Commission will have approved KPLC’s application for pass through of the component of the Capacity Charges provided under Parts A and B of Schedule 5, or as may be otherwise agreed by KPLC and approved by the Electricity Regulatory Commission.

“Establishment Date of the Second Plant”: the date by which the last of the following activities and events have occurred (except, with respect to subclauses (ii) through (iv), to the extent waived by the benefiting Party):

- (i) the Second Amended and Restated Power Purchase Agreement and the Amended and Restated Olkaria III Project Security Agreement have been duly executed and delivered by the Parties after receipt of all necessary approvals;
- (ii) the Energy Regulatory Commission, and any other necessary GOK Authority, will have issued an amendment and extension of the original term of the Seller’s Electricity Production License to June 30, 2040;
- (iii) the initial Letter of Credit for the Second Plant has been issued in its full amount in favour of and delivered to the Seller; and

(iv) the Construction Bond for the Second Plant has been issued in its full amount in favour of and delivered to KPLC, as described in Clause 3.6 hereto.

“Establishment Date of the Third Plant”: the date by which the last of the following activities and events have occurred (except, with respect to subclauses (ii) through (iv), to the extent waived by the benefiting Party):

(i) the Notice of Third Plant Exercise has been issued by Seller and delivered to KPLC;

(ii) the Establishment Date of the Second Plant has occurred;

(iii) the Securitization Milestone has been achieved with respect to the Third Plant; and

(iv) the Construction Bond for the Third Plant has been issued in its full amount in favour of and delivered to KPLC as described in Clause 3.6 hereto.

“Establishment Date of the Fourth Plant”: the date by which the last of the following activities and events have occurred (except, with respect to subclause (iv) and (vi), to the extent waived by the benefiting Party):

(i) the Initial Notice of Fourth Plant Exercise has been issued by Seller and delivered to KPLC;

(ii) the Energy Regulatory Commission has issued an amendment and extension of the Electric Power Generation License incorporating the Fourth Plant in a form agreed by the Seller;

(iii) NEMA and any other necessary Governmental Authorities have issued required approvals for the establishment of the Fourth Plant;

(iv) the GOK has issued an amendment to the GOK Letter incorporating the Fourth Plant in a form agreed by the Seller;

(v) Seller’s lenders have approved the Fourth Plant expansion, and

(vi) the Construction Bond for the Fourth Plant has been issued in its full amount in favour of and delivered to KPLC as described in Clause 3.6 hereto.

If a Subsequent Notice of Fourth Plant Exercise is issued to increase the Contracted Capacity in accordance with Section 9.8C, the Establishment Date of the Fourth Plant with respect to the additional Units of the reconfigured Fourth Plant as described under such Subsequent Notice of Fourth Plant Exercise shall be the date by which the last of the above activities and events have occurred with respect to the additional Units of the reconfigured Fourth Plant in order to incorporate such additional Unit(s) in the reconfigured Fourth Plant (except, with respect to subclauses (iv) and (vi), to the extent waived by the benefiting Party), and, with respect to such additional Units of the reconfigured Fourth Plant, the above references shall be considered to refer to the Subsequent Notice of Fourth Plant Exercise.

“Event”: has the meaning ascribed thereto in Part D of Schedule 5;

“Event of Default”: a failure by KPLC or the Seller to remedy a Default with respect to a Plant in accordance with Clause 16.4;

“Expert”: a person appointed in accordance with the provisions of Clause 19.3;

“Financing Agreements”: the agreements relating to the provision of finance for the construction of a Plant to be entered into between the Seller and banks or other financial institutions;

“Financial Projections”: means the financial model submitted to the Energy Regulatory Commission by the Seller;

“First Plant”: means the forty eight (48) MW plant described in Part A of Schedule 2 which was constructed prior to and is under operation as of the Signature Date;

“Force Majeure”: has the meaning ascribed thereto in Clause 15.1;

“Fourth Plant”: means the plant described in the Notice(s) of Fourth Plant Exercise (including its Metering System);

“Full Commercial Operation Date”: for a Plant, the date specified as such by the Seller with respect to such Plant ((including pursuant to an Initial Notice of Fourth Plant Exercise or a Subsequent Notice of Fourth Plant Exercise, according to the case) in accordance with Clause 7.10;

“Functional Specification”: the respective functional specifications for the Early Generation Facility and each Plant as set out in Part A of Schedule 2;

“Geothermal Reservoir Development”: the works and operations required to be carried out pursuant to Clauses 5.10 and 5.10A;

“GOK”: The Government of the Republic of Kenya;

“GOK Letter”: means the letter issued by the GOK dated as of June 18, 2012 and addressed to the Seller and its lenders and any amendment to, supplement to, or substitution of such letter as may be agreed by GOK and the Seller from time to time;

“Good Faith Dispute Procedure”: means the procedure for resolution of disputes or differences described in Clause 19.1;

“Governmental Authority”: GOK, GOK owned or controlled corporations or governmental agency, division or department or other authority including regional or local authorities of Kenya;

“GWh”: gigawatt hour being one thousand (1000) MWh;

“**IEC**”: International Electrotechnical Commission;

“**IEEE**”: Institute of Electrical and Electronic Engineers;

“**ISO**”: International Organisation for Standardisation;

“**Initial Notice of Fourth Plant Exercise**”: has the meaning ascribed thereto in Clause 9.8C;

“**Interconnection Point**”: the point of interconnection between the Transmission Interconnector and KPLC’s Connection Facilities as specified in Part E of Schedule 2;

“**KenGen**”: the Kenya Electricity Generating Company Limited;

“**KPLC’s Connection Facilities**”: the equipment and facilities relating to the 220 kV substation at Olkaria II specified in Part B of Schedule 2;

“**KPLC’s System**”: the high voltage transmission system operated by KPLC, and the distribution system(s) and ancillary electrical plant and equipment connected to such transmission system;

“**KPLC’s Transmission Interconnector**”: the 33 kV interconnector specified in Part A of Schedule 2 connecting the Early Generation Interconnection Point to KPLC’s System;

“**kV**”: kilovolt, one thousand (1000) Volts;

“**kW**”: kilowatts, one thousand (1000) Watts;

“**kWh**”: kilowatt hour, one thousand (1000) Watt hours;

“**Legal Requirement**”: any statute, law, regulation or other legislation, or any decree, order or directive of any Governmental Authority having jurisdiction in respect of this Agreement or either Party, or any Project Agreement;

“**Letter of Credit**”: has the meaning ascribed to each of the Letters of Credit for the First Plant, the Second Plant and the Third Plant in the Amended and Restated Olkaria III Project Security Agreement;

“**LIBOR**”: in respect of any day, the offered rate for Unites States Dollars quoted by Barclays Bank plc London or such other bank as the Parties shall from time to time agree, to prime banks in the London Interbank Market at 11:00 hours (London time) for a deposit of a principal sum equivalent to the sum in question for a period commencing on such day and ending seven (7) days later provided that if the said rate is not quoted on any day the rate last quoted shall be used;

“Licence Area”: that area marked on Figure 1 of Schedule 2 Part A for indicative purposes only being that area of land in the Universal Transverse Mercator (UTM) Grid Zone 37, located on Map Series Y731 (D.O.S 423) Sheets 133/3 and 133/4, Sakutiek and Longonot, published by GOK in 1975, enclosed by straight lines joining adjacent points having the following co-ordinates:

East (metres)	North (metres)
129 000	9 901 100
129 000	9 903 100
196 400	9 903 100
196 400	9 900 000
193 900	9 900 000

“Long Stop Appraisal Works Start Date”: the date three (3) months after the Effective Date;

“Long Stop Construction Start Date”: the date twenty-seven (27) months after the Effective Date or such other date as may be determined pursuant to the provisions of this Agreement;

“Long Stop Drilling Works Start Date”: the date by which the drilling rig has arrived at the License Area and its installation has commenced, which, for the Second Plant, is nine (9) months after the Establishment Date for the Second Plant, and, if additional drilling works are determined necessary for the Third Plant by Seller, for the Third Plant, is nine (9) months after the Establishment Date for the Third Plant, or, in each case, such other date as may be determined pursuant to the provisions of this Agreement;

“Long Stop Date”: any of the Early Generation Long Stop Commercial Operation Date, the Long Stop Appraisal Works Start Date, the Long Stop Construction Start Date, the Long Stop Effective Date, the Long Stop Drilling Works Start Date for the Second Plant, the Long Stop Drilling Works Start Date for the Third Plant, the Long Stop Full Commercial Operation Date for the First Plant, the Long Stop Full Commercial Operation Date for the Second Plant, the Long Stop Full Commercial Operation Date for the Third Plant, and the Long Stop Full Commercial Operation Date for the Fourth Plant;

“Long Stop Effective Date”: the date eighteen (18) months after November 5, 1998 being the signature date of the Original Power Purchase Agreement;

“Long Stop Full Commercial Operation Date”: for the First Plant the date falling thirty-six (36) months after the Establishment Date of the First Plant, for the Second Plant, the date falling fifty-four (54) months after the Establishment Date of the Second Plant, for the Third Plant, the date falling fifty-four (54) months after the Establishment Date of the Third Plant, and, for the Fourth Plant (or reconfigured Fourth Plant, according to the case) as described in a Notice of Fourth Plant Exercise, the date falling thirty-six (36) months after the Establishment Date of the Fourth Plant relevant to such notice, each subject to an extension, at the Seller’s option, on a day by day basis for each day of Force Majeure, and for each day to the extent by which a failure by (i) KPLC to perform any of its obligations under the PPA or (ii) GOK to perform any of its obligations under the GOK Letter, delays the Seller from achieving Full Commercial Operation prior to such date;

“Main Metering Equipment”: prior to the Full Commercial Operation Date of the First Plant, the main metering equipment for metering and monitoring the operation and output of the Early Generation Facility as supplied and installed by the Seller as specified in Part D of Schedule 2, and, with respect to each Plant, from the Full Commercial Operation Date of such Plant, the main metering equipment for metering the output of the Plant as supplied and installed by the Seller as specified in Part D of Schedule 2;

“Metering Party”: has the meaning ascribed thereto in Clause 12.1;

“Metering System”: prior to the Full Commercial Operation Date of the First Plant, equipment for metering and monitoring the operation and output of the Early Generation Facility, and, with respect to each Plant, from the Full Commercial Operation Date of such Plant, equipment for metering and monitoring the operation and output of such Plant as specified in Parts D and E of Schedule 2, which in all cases shall consist of the Main Metering Equipment, the Back-Up Metering Equipment and all associated equipment;

“MOE”: the Ministry of Energy of the Republic of Kenya;

“MW”: megawatt, one thousand (1000) kW;

“MWh”: megawatt hour, one thousand (1000) kWh;

“Net Electrical Output”: prior to the Full Commercial Operation Date of the First Plant, electricity generated by the Early Generation Facility and delivered to KPLC at the Delivery Point, and from the Full Commercial Operation Date of a Plant, for each Plant, electricity generated by such Plant and delivered to KPLC at the Delivery Point of such Plant, in all cases net of all consumption (including imports and the Seller’s Steam Field Facilities) and of losses before the relevant Delivery Point, or (where the context so requires) a quantity (in kWh) of electricity so delivered;

“Non-Default Rate”: LIBOR;

“Non-Metering Party”: has the meaning ascribed thereto in Clause 12.2;

“Notice of Limited Reservoir Capacity”: the notice that may be given by the Seller to KPLC pursuant to Clause 5.7;

“Notice of Third Plant Exercise”: has the meaning ascribed thereto in Clause 9.8B;

”Notice(s) of Fourth Plant Exercise”: shall mean each of the Initial Notice of Fourth Plant Exercise and any Subsequent Notice of Fourth Plant Exercise, as each is described in Clause 9.8C;

“Olkaria I”: the geothermal power station and site owned by KenGen and known as ‘Olkaria I’;

“Olkaria II”: the geothermal power station and site owned by KenGen and to be known as ‘Olkaria II’;

“Operating Characteristics”: the respective performance and operating characteristics of the Early Generation Facility or each Plant for which values are specified in the Functional Specification;

“Operating and Despatch Procedures”: the procedures set out in Part C of Schedule 4 and such further procedures as shall apply pursuant to Clauses 8.4 and 8.5;

“Operating and Maintenance Agreement”: the agreement entered into by the Seller for the operation and maintenance of the Early Generation Facility and the Plants;

“Operating Period”: for each Plant, the period from Full Commercial Operation Date of such Plant until the end of the Term with respect to such Plant;

“Operating Year”: for each Plant, a period of one (1) year beginning on the Full Commercial Operation Date of such Plant or any anniversary thereof;

“Parties”: KPLC and the Seller and **“Party”** means either of them;

“Planned Maintenance”: maintenance of the Early Generation Facility or the Plant (as the case may be), which has been planned in accordance with Clause 9.3, or where the context admits, the period allowed or the dates planned for such maintenance;

“Plant”: all or any of the First Plant, the Second Plant, the Third Plant and the Fourth Plant, as the context may require;

“Plant Availability”: for each Plant, the ability of such Plant over a particular period of time, to deliver electricity to KPLC’s System at the Plant’s Delivery Point, and the terms “Available” and “Unavailable” as used in the context of each Plant shall be construed accordingly;

“Plant Capacity”: the capacity of a Plant, expressed in MW, to generate and deliver electricity at the Delivery Point assuming the continued connection and proper operation of KPLC’s System;

“Plant Commercial Operations Tests”: the respective tests to be carried out on a Plant, as specified in paragraph 3 of Part A of Schedule 4;

“Plant Commissioning Date”: for each Plant, the date specified in its Construction Programme as the target date for the start of Commissioning of such Plant, or such earlier date as the Seller may specify by notice given to KPLC not less than thirty (30) days before such earlier date subject to KPLC’s agreement to such earlier date which agreement shall not be unreasonably withheld;

“Project Agreements”: the Operating and Maintenance Agreement, the Site Agreement, Steam Field Facilities Agreements, and the Turnkey Construction Agreements;

“Prudent Operating Practice”: in relation to either Party, standards of practice obtained by exercising that degree of skill, diligence, prudence and foresight which could reasonably be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances;

“Rated Capacity”: the respective electrical output ratings of the Early Generation Facility and of each Plant as set forth in Part F of Schedule 2;

“Reliability Run Test”: has the meaning ascribed thereto in paragraph 3(b)(I) and 3(b)(iii) Schedule 4;

“Remedial Programme”: has the meaning ascribed thereto in Clause 16.4(a)(ii);

“Required Early Generation Commercial Operation Date”: the date eighteen (18) months after the Effective Date or such other date as may be determined in accordance with this Agreement;

“Required Full Commercial Operation Date”: for the First Plant, the date twenty (20) months and two (2) weeks after the Establishment Date of the First Plant, for the Second Plant, the date thirty six (36) months after the Establishment Date of the Second Plant, for the Third Plant, the date which is forty two (42) months after the Establishment Date of the Third Plant, and, for the Fourth Plant, the date which is twenty (20) months and two (2) weeks after the relevant Establishment Date of the Fourth Plant, each subject to extension, at the Seller’s option, on a day by day basis for each day of Force Majeure, and for each day by the extent to which a failure by (i) KPLC to perform any of its obligations under the PPA or (ii) GOK to perform any of its obligations under the GOK Letter delays the Seller from achieving Full Commercial Operation prior to such date;

“Reservoir”: the subsurface body of hot water and steam located under the Licence Area;

“SCADA”: Supervisory Control and Data Acquisition;

“Second Plant”: means the thirty-six (36) MW plant described in Part A of Schedule 2 and including its Metering System;

“Securitization Milestone”: the execution and issuance to Seller of securities and guaranties (such as, but not limited to, International Development Association (IDA) backed letters of credit and Multilateral Investment Guaranty Agency (MIGA) risk guaranties providing satisfactory coverage of political and commercial risk at reasonable commercial rates) from entities and in a form and contents agreeable to Seller and its lenders, whose total cost to Seller, for the Second Plant, shall not exceed Seller’s costs with respect to the Letters of Credit for the First Plant, and, for the Third Plant (and, if applicable, the Fourth Plant), on a pro rata basis, and, as may be necessary, the execution of associated required changes to this Agreement and to the Amended and Restated Olkaria III Project Security Agreement;

“Seller’s Connection Facilities”: the Connection Facilities installed by the Seller in accordance with Parts B and C of Schedule 2;

“Seller’s Steam Field Facilities”: the Steam Field Facilities installed by the Seller pursuant to this Agreement;

“Settlement Period”: a period of thirty (30) minutes beginning on the hour or the half-hour;

“Signature Date”: the date of this Agreement;

“Site”: the land on which a Plant shall be installed by its Full Commercial Operation Date;

“Site Agreement”: the agreement dated November 5, 1998 between the GOK and the Seller permitting the Seller to acquire such rights in the Licence Area as shall enable the Seller to perform its obligations under this Agreement;

“Steam Field Facilities”: equipment, plant and facilities above ground and underground, including wells, used in connection with the exploration, appraisal, development and operation of geothermal reservoirs for electricity generation;

“Steam Field Facilities Agreements”: the agreements entered into by the Seller or its affiliated companies for the development, construction and maintenance of the Steam Field Facilities and for Geothermal Reservoir Development.

“Subsequent Notice of Fourth Plant Exercise”: has the meaning ascribed thereto in Clause 9.8C;

“System Characteristics”: has the meaning ascribed thereto in paragraph 4.3(a) of Part A of Schedule 2;

“Target Effective Date”: the date three (3) months after the date of the original Power Purchase Agreement of November 5, 1998 or such other date as the Parties may have agreed;

“Target Establishment Date”: For the First Plant, January 19, 2007, for the Second Plant, October 30, 2010, for the Third Plant, the date which is one month after the date of the Notice of Third Plant Exercise, and, for the Fourth Plant, the date which is one month after the date of the relevant Notice of Fourth Plant Exercise;

“Taxes and Duties”: all forms of taxation, impost, levy or duty (including without limitation, value added tax) imposed pursuant to the laws of the Republic of Kenya in respect of the sale of electricity or on the purchase, import and use or consumption of any real property, services, plant, equipment or materials used in connection therewith or in respect of the right or act of making capacity available or producing, delivering or transmitting electricity which result directly or indirectly in an increase or decrease in the construction, financing, operation or maintenance costs of the Seller in performing its obligations under this Agreement provided that for the avoidance of doubt Taxes and Duties do not include any form of taxation, impost, levy or duty imposed on the income of the Seller upon which income tax is chargeable under section 3(2) of the Income Tax Act CAP 470 as the same may be modified, amended or replaced from time to time;

“TEMA”: Tubular Exchanger Manufacturers Association;

“Term”: with respect to a Plant, the period from the Signature Date until expiry of this Agreement in accordance with Clause 2.2 or earlier termination of this Agreement in respect of such Plant;

“Third Plant”: means the plant described in the Notice of Third Plant Exercise and including its Metering System;

“Transfer Amount”: has the meaning ascribed thereto in Clause 16.9, ;

“Transfer Notice”: is defined in Clause 16.9;

“Transmission Interconnector”: the high voltage interconnector specified in Parts B and C of Schedule 2;

“Turnkey Construction Agreements”: the agreements entered into by the Seller or its affiliated companies for the construction of the Early Generation Facility and the Plants;

“Unit”: a binary energy converter, including associated equipment, as comprised in a Plant or the Early Generation Facility as specified in Part A of Schedule 2;

“United States Dollars” or US\$: the lawful currency of the United States of America for the time being and from time to time;

“Unit Commercial Operation Tests”: the tests to be carried out on each of the Units as specified in paragraph 2 of Part A of Schedule 4;

“Unit Tests”: the tests to be carried on each of the Units as specified in paragraph 1 of Part A of Schedule 4 and the Unit Commercial Operation Tests;

“Volt”: the unit of electrical potential as defined in the International Standards Organisation standard ISO 1000:1992 Specification for SI Units and Recommendations for Use of Their Multiples and of Certain Other Units;

“Watts”: the unit of electrical power defined as one (1) joule per second as defined in International Standards Organisation standard ISO 1000:1992 Specification for SI Units and Recommendations for Use of Their Multiples and of Certain Other Units;

“Watt Hours”: three thousand six hundred (3600) joules as defined in International Standards Organisation standard ISO 1000:1992 Specification for SI Units and Recommendations for Use of Their Multiples and of Certain Other Units;

“Week”: a period of seven (7) days beginning on a Monday;

1.2 Interpretation: In this Agreement, unless the context otherwise requires:

- (a) reference to a business day is a reference to any day which is not a Saturday, Sunday or recognised public holiday in the Republic of Kenya;
- (b) reference to a day or a month is a reference to a calendar day or calendar month;
- (c) references to Clauses, Schedules, Paragraphs and Figures are references to clauses, schedules, paragraphs and figures of and to this Agreement;
- (d) words in the singular shall be interpreted as referring to the plural and vice versa, and words denoting natural persons shall be interpreted as referring to corporations and any other legal entities and vice versa;
- (e) a requirement that a payment to be made on a day which is not a business day shall be construed as a requirement that the payment be made on the next business day;
- (f) in the event of a conflict between the Clauses and the Schedules, the Clauses shall prevail save for Schedule 10 which Schedule shall prevail;
- (g) the term “including” shall be construed without limitation;
- (h) headings are for convenience only and shall not affect the construction of the Agreement;

Clause 2: Scope and Duration

2.1 Scope: The Seller shall:

- (i) perform its obligations contained in the Appraisal Programme;
- (ii) conduct the Geothermal Reservoir Development;
- (iii) design, procure, construct, finance, test, and commission the Transmission Interconnector;
- (iv) design, procure, construct, finance, test, commission, operate and maintain the Early Generation Facility and the First Plant;

- (v) seek to make available the Contracted Early Generation Capacity in compliance with the Operating Characteristics;
- (vi) design, procure, construct, finance, test, commission, operate and maintain the Second and Third Plants and, pursuant to a Fourth Plant Exercise Notice, the Fourth Plant;
- (vii) seek to make available the Contracted Plant Capacity of each constructed Plant in compliance with the Operating Characteristics;
- (viii) sell the Net Electrical Output to KPLC in accordance with and subject to the terms and conditions of this Agreement.

The Parties hereby acknowledge that, as of the date hereof, all of the obligations, requirements and arrangements under Sub clauses (i) through (v) above have been satisfied in full.

KPLC shall purchase and pay for Available Early Generation Capacity and Available Plant Capacity and Net Electrical Output for each Plant, in accordance with and subject to the terms and conditions of this Agreement.

In the case of issuance of a Subsequent Notice of Fourth Plant Exercise for the addition of Unit(s), then, until such time (if any) that the Full Commercial Operation Date is achieved for the reconfigured Fourth Plant, the terms of this Agreement with respect to the original Fourth Plant shall remain unaffected, and each of the Party's respective obligations shall continue to be performed with respect to the then existing Fourth Plant and its Units. If the Full Commercial Operation Date is achieved for the reconfigured Fourth Plant, the performance of the Parties' respective obligations with respect to the Fourth Plant under the terms of this Agreement shall be with respect to the reconfigured Fourth Plant.

2.2 **Term of Agreement:** This Agreement shall come into force on the Signature Date and shall continue in force until the latter of the following dates, unless earlier terminated or extended in accordance with its terms:

- 2.2.1 the obligations of the Parties with respect to the First Plant, including the period for purchase by and sale of electricity to KPLC from the First Plant shall expire on December 31, 2033, provided, however, that if the Second Plant does not achieve Full Commercial Operation by the Long Stop Full Commercial Operation Date of the Second Plant, such obligations shall expire on January 8, 2029;
- 2.2.2 the obligations of the Parties with respect to the Second Plant, including the period for purchase by and sale of electricity to KPLC from the Second Plant shall expire twenty (20) years after the Full Commercial Operation Date of the Second Plant;
- 2.2.3 the obligations of the Parties with respect to the Third Plant, including the period for purchase by and sale of electricity to KPLC from the Third Plant shall expire twenty (20) years after the Full Commercial Operation Date of the Third Plant; and

2.2.4 the obligations of the Parties with respect to the Fourth Plant, including the period for purchase by and sale of electricity to KPLC from the Fourth Plant shall expire twenty (20) years after the Full Commercial Operation Date of the Fourth Plant which was achieved pursuant to the Initial Notice of Fourth Plant Exercise. For the avoidance of doubt, even if a Subsequent Notice of Fourth Plant Exercise is issued in accordance with Section 9.8C, the period for the purchase by and sale of electricity to KPLC from the Fourth Plant shall expire twenty (20) years after the Full Commercial Operation Date of the original Fourth Plant.

2.3 **Extension:** The Term may be extended, subject to agreement in writing by the Parties to such extension prior to its expiry, and on such terms as the Parties shall agree.

Without derogating from any of the requirements (as applicable) for governmental approvals, not later than 2031 Seller and KPLC shall negotiate the extension of one or more of the above periods for sales and purchase of electricity at terms to be agreed, including a reasonable tariff. The Parties shall conduct and conclude such negotiations within a period which shall end at the earlier of the conclusion of definitive documentation for such sales and purchase, or the end of the first quarter of 2032, in good faith and in a manner which shall provide preferential treatment for such extension, sales to and purchase by KPLC. If the Parties do not conclude definitive documentation by the end of the first quarter of 2032, or if they mutually agree not to do so prior, Seller shall have the right to conduct negotiations for sales to third parties.

2.4 **Regulatory Approvals:** The Parties acknowledge that the original Power Purchase Agreement dated 5 November 1998, the First Supplemental Agreement dated 21 July 2000, the Second Supplement Agreement dated 17 April 2003, the Amended and Restated Power Purchase Agreement dated January 19, 2007, the Second Amended and Restated Power Purchase Agreement dated March 29, 2011, and this Third Amended and Restated Power Purchase Agreement were each approved by the Energy Regulatory Commission in accordance with the legal requirements, on diverse dates, as per the approvals attached hereto as Schedule 11.

Clause 3: Conditions Precedent and Security

3.1 **Conditions:** Except for the Parties' respective obligations in Clauses 3.2, 14.3 and 16.7 or as otherwise provided herein, the Parties' obligations hereunder shall commence on the date (the "Effective Date") on which the last of the conditions in Parts A and B of Schedule 6 have been satisfied in accordance with Clause 3.2.

3.2 **Seller's Conditions:** The Seller shall use all reasonable endeavours to satisfy the conditions in Part A of Schedule 6 and to comply with the condition in Part B of Schedule 6 by the Target Effective Date and KPLC shall use all reasonable endeavours to assist the Seller in obtaining the Authorisations specified in paragraph (ii) of Part A of Schedule 6, provided that:

- 3.2.1 if the Seller fails to achieve the Target Effective Date the Seller shall continue to use all reasonable endeavours to satisfy the conditions in Part A of Schedule 6 and to comply with the condition in Part B of Schedule 6 by the Long Stop Effective Date.
- 3.2.2 the Seller shall diligently attempt to obtain all Authorisations which diligence shall include:
- (i) full and timely compliance with all procedural requirements relating to the issue of such Authorisation, and with all Legal Requirements which relate to the activities of the Seller within the Republic of Kenya; and
 - (ii) pursuing all reasonably available procedures for appealing against or challenging the grounds upon which such Authorisation is not issued; and
- 3.2.3 the Seller shall use all reasonable endeavours to enter into the Site Agreement.
- 3.3 **Non-satisfaction:** If any of the conditions referred to in Part A of Schedule 6 has not been satisfied, or the condition referred to in Part B of Schedule 6 has not been complied with by the Long Stop Effective Date, other than by reason of a breach by the Seller of its obligations under Clause 3.2, then either Party may terminate this Agreement.
- 3.4 **Non-satisfaction involving a breach:** If any of the conditions referred to in Part A of Schedule 6 has not been satisfied by the Long Stop Effective Date or any of the conditions referred to in Part B of Schedule 6 has not been complied with by reason of a breach by the Seller of its obligations under Clause 3.2, then KPLC may terminate this Agreement.
- 3.5 **Bid Security:**
- (a) On or around the Effective Date, the Seller shall provide to KPLC the Bid Security. The Bid Security shall be effective from the Signature Date to the earlier of the date on which the Seller provides to KPLC the Construction Bond and the date on which the Parties agree or an Expert determines, in accordance with Clause 5, that the Reservoir cannot support a Plant with a Contracted Plant Capacity of at least twenty-eight (28) MW.
 - (b) If the Effective Date does not occur on or before the Long Stop Effective Date:
 - (i) due to a failure under Clause 3.2 caused by the Seller not diligently attempting to obtain such Authorisation; or

- (ii) due to a failure by the Seller to use reasonable endeavours by the Long Stop Effective Date to satisfy the Conditions Precedent in Part A of Schedule 6,

then KPLC may take all steps necessary to obtain payment of the full amount of the Bid Security.

(c) If the Seller:

- (i) has not commenced the Appraisal Works by the Long Stop Appraisal Works Start Date; or
- (ii) has failed to achieve the Early Generation Commercial Operation Date by the Early Generation Long Stop Commercial Operation Date; or
- (iii) has failed to provide KPLC with the Construction Bond within twenty-eight (28) days of the Parties having agreed or an Expert having determined, in accordance with Clause 5, that the Reservoir can support a Plant with a Contracted Capacity of at least twenty-eight (28) MW,

then KPLC may take all steps necessary to obtain payment of the full amount of the Bid Security.

- (d) If KPLC does not claim payment of the full amount of the Bid Security pursuant to Clauses 3.4(b) and 4.5(c), the Bid Security will be returned by KPLC to the Seller on the later of the date on which the Seller provides to KPLC the Construction Bond and the date the Parties agree or an Expert determines, in accordance with Clause 5, that the Reservoir cannot support a Plant with a Contracted Plant Capacity of at least twenty-eight (28) MW.

3.6 Construction Bonds

- (a) Contemporaneous with, for the First Plant, the issuance of the initial Letter of Credit for the First Plant to the Seller, for the Second Plant, the issuance of the initial Letter of Credit for the Second Plant to the Seller, (as each Letter of Credit is defined in the Amended and Restated Olkaria III Project Security Agreement or as was agreed in writing otherwise by the Seller), and, for the Third Plant, the occurrence of the Securitization Milestone with respect to the Third Plant, as the case may be, the Seller shall provide to KPLC a Construction Bond with respect to such Plant.
- (b) Unless payment thereunder is earlier demanded by KPLC, the Construction Bond for a Plant shall continue in force until the issue by the independent engineer of a certificate under Clause 7.10 with respect to such Plant, in which event the Construction Bond shall lapse and shall be returned to the Seller and KPLC shall make no demand thereon.
- (c) If the Seller fails to achieve the Full Commercial Operation Date of a Plant by the Long Stop Full Commercial Operation Date of such Plant, then KPLC may take all steps necessary to obtain payment of the full amount of the Construction Bond provided with respect to such Plant.

(d) In the event that the Seller does not provide to KPLC the Construction Bond pursuant to Clause 3.6(a) with respect to the Third Plant, KPLC shall:

- (i) Be entitled to withhold the monthly Capacity Payments due to the Seller with respect to the Second Plant equal to a sum of seven hundred and fifty thousand United States Dollars (US\$750,000) ("Construction Security");
- (ii) Deposit the Construction Security in an interest bearing account at a bank agreed between the Parties acting reasonably where the Construction Security shall be held until either the issue by the independent engineer of a certificate under Clause 7.10 with respect to the Third Plant in which event the Construction Security shall be returned with any interest which has accrued on that account to the Seller, or if the Seller fails to achieve the Full Commercial Operation Date of the Third Plant by the Long Stop Full Commercial Operation Date of the Third Plant, KPLC shall be entitled to retain the Construction Security net of all interest received by KPLC.

3.7 Satisfaction of Requirements

The Parties hereby acknowledge that, as of the date hereof, all of the obligations, requirements and arrangements under Clauses 3.1 through 3.5 above and under Clause 3.6 with respect to the First, Second and Third Plants have been satisfied in full, and each of the Effective Date and the Full Commercial Operation Date of each of the First, Second and Third Plants has already occurred.

Clause 4: Site

4.1 **Site Agreement:** Prior to the Effective Date the Seller shall enter into the Site Agreement.

4.2 **Land owned by GOK:** Pursuant to the Site Agreement, the Seller shall procure from the Governmental Authority an interest in or over the land owned by the Governmental Authority within the Licence Area as is necessary for the Seller to meet its obligations under this Agreement including the construction of the Early Generation Facility and the Plants and the conduct of the Appraisal Works.

4.3 **Land not owned by GOK:** In the event that the Seller requires an interest in or over land not owned by the Governmental Authority within the Licence Area, the Seller shall first diligently attempt to procure such interest from the owner of the land. For the purposes of this Clause 4.3, "diligently" shall include pursuing all reasonably available procedures for obtaining such interest, including the offer of a rent or purchase price which a person carrying out the Seller's activities would reasonably expect to pay for such an interest. If the Seller can demonstrate to GOK that such interest cannot be so procured within one hundred and twenty (120) days, the Seller shall pursuant to the Site Agreement require GOK to acquire such land for the Seller at the Seller's cost. The Seller shall forthwith procure from the owner of the land an interest in or over the land as is necessary for it to meet its obligations under this Agreement.

4.4 **Seller's Obligations:** The Seller shall perform its obligations under and observe all the terms of all agreements entered into between the Seller and GOK or the Seller and other owners of land for the purposes of this Clause 4 (collectively referred to as "Land Agreements"). The Seller shall not:

- (i) terminate or permit the termination of the Land Agreements;
- (ii) in any material respect depart from, or waive or fail to enforce any rights it may have under the Land Agreements;
- (iii) enter into any agreement, document or arrangement which would materially affect the interpretation or application of the Land Agreements

unless the relevant document or proposed course of action has been notified in writing to KPLC and there has been no objection by KPLC. For the purposes of this Clause 4, the failure by the Seller to enter into a Land Agreement or the termination of a Land Agreement shall not constitute Force Majeure.

4.5 **Satisfaction of Requirements:**

The Parties hereby acknowledge that, as of the date hereof, all of the obligations, requirements and arrangements under Clauses 4.1 through 4.3 above have been satisfied in full.

Clause 5: Geothermal Reservoir Appraisal and Development

5.1 **The Seller's Obligation:** The Seller shall carry out the Appraisal Works in accordance with the Appraisal Programme and Prudent Operating Practice.

5.2 **Monitoring:** KPLC shall be entitled at its own cost to monitor the progress of the Appraisal Works and the Seller will provide such access, information and assistance to KPLC as KPLC reasonably requires for it to carry out such function, including, without limitation, providing reasonable notice of the spudding of wells, copies of geo-scientific and well log data (and interpretative work in relation thereto).

5.3 **Construction Programme:** The Seller may, before the end of the Appraisal Period, in the light of the results of the Appraisal Works, provide to KPLC a revised Construction Programme for the First Plant. Any such revised Construction Programme must provide for the Full Commercial Operation Date of the First Plant to occur on or before the Required Full Commercial Operation Date of such Plant.

5.4 Contracted Plant Capacity: The Seller may, in the light of the results of the Appraisal Works, at any time before the end of the Appraisal Period, by notice to KPLC increase the Contracted Plant Capacity to an amount, not exceeding one hundred (100) MW or decrease its Contracted Plant Capacity to an amount, not less than twenty-eight (28) MW, as can, subject to the installation of necessary Steam Field Facilities, be supported by the Reservoir on the basis that:

- (a) each Plant is operated at ninety-six per cent (96%) of its proposed revised Contracted Plant Capacity throughout the Term; and
- (b) at any time the Reservoir can sustain a continuous steam flow of at least one hundred and twenty per cent (120%) of the steam flow required for each Plant to operate continuously, subject to Planned Maintenance, at one hundred per cent (100%) of the revised Contracted Plant Capacity.

The Seller's notice under this Clause 5.4 shall be accompanied by a detailed report which provides the Seller's justification for the increased Contracted Plant Capacity and contains all relevant supporting evidence and data.

5.4A Co-ordinating Committee: The Parties acknowledge that it is in their interests to share information regarding the geothermal resource at Olkaria and recognising this interest the Parties shall participate in a co-ordinating committee to facilitate the exchange of information.

5.5 Dispute over revised Contracted Plant Capacity: If KPLC disputes the proposed revised Contracted Plant Capacity of the First Plant notified by the Seller pursuant to Clause 5.4 it may notify the Seller within twenty-eight (28) days of the Seller's notice of such dispute and thereafter the matter may be referred by either Party to an Expert who shall determine whether the proposed revised Contracted Plant Capacity of the First Plant can be supported on the basis specified in Clause 5.4. In the event that the matter is referred to an Expert, the Required Full Commercial Operation Date and the Long Stop Full Commercial Operation Date of the First Plant shall be extended by the period during which the Expert is making his determination.

5.6 Effective date of change: A change in the Contracted Plant Capacity of the First Plant shall take effect after the expiry of twenty-eight (28) days following the Seller's notice under Clause 5.4 provided that KPLC has not served a notice to the Seller pursuant to Clause 5.5. If KPLC so serves a notice a change in the Contracted Plant Capacity of the First Plant shall take effect from the date of the Expert's determination provided that the Expert determines that the Seller's proposed revised Contracted Plant Capacity of the First Plant can be supported as aforesaid.

5.7 Limited Reservoir Capacity: The Seller may, at any time after completion of the Appraisal Programme and before the end of the Appraisal Period, serve a notice of limited reservoir capacity ("Notice of Limited Reservoir Capacity") on KPLC if the Seller reasonably believes, in the light of the results of the Appraisal Works, that the Reservoir cannot, on the basis of the assumptions referred to in Clause 5.4, support a Contracted Plant Capacity of at least twenty-eight (28) MW throughout the Term. The Seller's notice under this Clause 5.7 shall be accompanied by a detailed report which provides the Seller's justification for its belief that the Reservoir cannot support a Contracted Plant Capacity of at least twenty-eight (28) MW and contains all relevant supporting evidence and data.

- 5.8 **Dispute over Notice of Limited Reservoir Capacity:** KPLC may within 2 months of receiving a notice from the Seller under Clause 5.7 serve a notice on the Seller if it disputes the Notice of Limited Reservoir Capacity, in which event the matter shall be referred to an Expert who shall determine the Contracted Plant Capacity which can be supported by the Reservoir throughout the Term. In the event that the matter is referred to an Expert, the Required Full Commercial Operation Date and the Long Stop Full Commercial Operation Date shall be extended by the period during which the Expert is making his determination.
- 5.9 **Failure to Agree:** If KPLC does not serve a notice under Clause 5.8 or, following such a notice, the Expert determines that the Reservoir cannot support a Contracted Plant Capacity of at least twenty-eight (28) MW throughout the Term, the Parties shall meet and discuss whether they can agree terms for the construction of a Plant with a Contracted Plant Capacity greater than the Contracted Early Generation Capacity but less than twenty-eight (28) MW. If the Parties have not reached agreement by the later of six (6) months after the service of the Seller's notice under Clause 5.7 and two (2) months after the date of the Expert's determination, the Seller shall continue to operate the Early Generation Facility and KPLC shall continue to meet its payment and other obligations in accordance with this Agreement.
- 5.10 **Geothermal Reservoir Development I:** The Seller shall, in accordance with Prudent Operating Practice, install, maintain and operate such Steam Field Facilities as are necessary to ensure that at any time, prior to the Early Generation Cessation Date or throughout the Term (as the case may be), the Reservoir can sustain a continuous steam flow of at least one hundred and twenty per cent (120%) of the steam required for the Early Generation Facility to operate continuously subject to Planned Maintenance, at one hundred per cent (100%) of the Contracted Early Generation Capacity.
- 5.10A **Geothermal Reservoir Development II:** The Seller shall, in accordance with Prudent Operating Practice, install, maintain and operate such Steam Field Facilities as are necessary to ensure that at any time, throughout the Term the Reservoir can sustain a continuous steam flow of at least one hundred and twenty per cent (120%) of the steam required for each Plant to operate continuously subject to Planned Maintenance, at one hundred per cent (100%) of its Contracted Plant Capacity provided that if the Reservoir cannot sustain such steam flow, the Seller shall forthwith notify KPLC and the Parties shall meet in good faith to agree new criteria of the steam flow required and in the absence of such agreement, the matter shall be referred to an Expert for determination.

5.11 Steamfield Appraisal Records: Any notice given by the Seller under Clause 5.4 or Clause 5.7 shall be accompanied by all records relating to the Appraisal Works.

5.12 Satisfaction of Requirements:

The Parties hereby acknowledge that, as of the date hereof, all of the obligations, requirements and arrangements under Clauses 5.1 through 5.10 and under Clause 5.11 above have been satisfied in full (aside from Clause 5.4A which is a continuing obligation), and that the Contracted Plant Capacity of the First Plant was determined pursuant to the Appraisal Works and the Appraisal Programme at 48 MW, the Contracted Plant Capacity of the Second Plant has been determined at 36 MW, the Contracted Plant Capacity of the Third Plant has been determined at 16 MW under the Notice of Third Plant Exercise, and the Contracted Plant Capacity of the Fourth Plant shall be determined (up to 50 MW) under the Notice(s) of Fourth Plant Exercise.

Clause 6: Construction

6.1 Seller's Responsibility: The Seller shall design, furnish, construct and install in accordance with the Construction Programme:

- (a) the Early Generation Facility and each Plant so as to comply in all material respects with the Functional Specification, the System Characteristics and the relevant provisions of Part B of Schedule 2; and
- (b) the Transmission Interconnector so as to comply in all material respects with the specification for such Transmission Interconnector in Part B of Schedule 2 and the System Characteristics.

6.1A Early Generation Cessation Date: Prior to commencement of the Plant Commercial Operations Test for the First Plant, the Seller shall notify KPLC of a date on which the Early Generation Facility shall cease to be operated at the Early Generation Site ("Early Generation Cessation Date"). From the Early Generation Cessation Date, the Seller shall keep KPLC informed of the Seller's progress in installing the Early Generation Facility at the Site. The Parties acknowledge that the Seller shall be unable to deliver electricity to KPLC for the period commencing from the Early Generation Cessation Date to the date of commencement of the Plant Commercial Operations Tests of the First Plant, Seller shall have no obligation to produce energy or make capacity available during this period, and KPLC shall not be required to make any payments to the Seller in respect to this period.

6.2 KPLC's Responsibility: KPLC shall design, furnish, construct and install KPLC's Connection Facilities in accordance with the Construction Programme and so as to comply in all material respects with the specification for such facilities as specified in Part B of Schedule 2.

6.3 Information: Each Party shall keep the other Party informed of the progress of the design, furnishing, construction and installation of the facilities to be installed by it pursuant to Clause 6.1 or 6.2, and every month shall provide a written progress report in respect thereof.

6.4 Local Contracts: The Seller shall, where possible, award contracts to contractors with existing operations in Kenya and suppliers of materials and services while existing operations in Kenya provided that the quality, delivery times, costs, reliability and other terms are comparable to those offered by foreign contractors and/or suppliers.

6.5 Monitor Progress: The Seller shall:

- (a) ensure that KPLC and any representative appointed by KPLC are afforded reasonable access to the Early Generation Site and the Site upon giving the Seller reasonable notice provided that such access does not materially interfere with the construction works or expose any person on the Early Generation Site or the Site to any danger;
- (b) make available for inspection at the Early Generation Site and the Site copies of all plans and designs other than any proprietary information of the Seller or any sub-contractor in relation to the construction or any part thereof; and
- (c) within six months of the Early Generation Commercial Operation Date and of a Full Commercial Operation Date, supply KPLC with one set of reproducible copies and five sets of white print copies (or equivalent) of all “as built” plans and designs required for the operation and maintenance of the Early Generation Facility and the relevant Plant.

6.6 Disclaimer: The Seller:

- (a) accepts that any engineering review or inspection conducted by KPLC pursuant to Clause 6.5 is solely for its own information and accordingly by conducting such review or inspection KPLC makes no representation as to the engineering soundness of the Early Generation Facility and any Plant;
- (b) shall in no way represent to any third party that, as a result of any review or inspection by KPLC, KPLC is responsible for the engineering soundness of the Early Generation Facility and any Plant; and
- (c) shall, subject to the other provisions of this Agreement, be solely responsible for the economic and technical feasibility, operational capacity and reliability of the Early Generation Facility and each Plant.

6.7 Failure to Achieve Full Commercial Operation Date by Required Full Commercial Operation Date: If the Full Commercial Operation Date of a Plant has not occurred by its Required Full Commercial Operation Date (otherwise than due to Force Majeure or default by KPLC or GOK pursuant to the GOK Letter) then:

- (a) for each day occurring after the date which is 14 (fourteen) days after the Required Full Commercial Operation Date for a Plant and before the Full Commercial Operation Date of such Plant, the Seller shall pay monthly, in arrears, to KPLC the Daily Liquidated Damages Sum up to a total aggregate sum of three million United States Dollars (US\$3,000,000); and

- (b) the Seller shall have no further liability to KPLC in respect of such delay and payment by the Seller to KPLC under this Clause 6.7 shall constitute KPLC's sole and exclusive remedy for the Seller's failure to achieve the Required Full Commercial Operation Date with respect to such Plant.

6.8 Long Stop Dates for the Early Generation Facility and the First Plant: If, other than by reason of Force Majeure or default by KPLC:

- (a) the Seller has not commenced the Appraisal Works by the Long Stop Appraisal Works Start Date; or
- (b) the Seller failed to achieve the Early Generation Commercial Operation Date by the Early Generation Long Stop Full Commercial Operation Date; or
- (c) where, pursuant to the results of the Appraisal Works under Clause 5, it has been determined that the Reservoir can support a Contracted Plant Capacity of at least twenty-eight (28) MW, the Seller has not commenced construction of the First Plant by the Long Stop Construction Date for the First Plant; or
- (d) where, pursuant to the results of the Appraisal Works under Clause 5, it has been determined that the Reservoir can support a Contracted Plant Capacity of at least twenty-eight (28) MW, the Full Commercial Operation Date of the First Plant has not occurred by the Long Stop Full Commercial Operation Date for the First Plant,

KPLC may terminate this Agreement by notice to the Seller within two (2) months of the occurrence of the relevant Long Stop Date. Such termination shall be without prejudice to any rights accrued due to either party at the date of termination.

6.8A Long Stop Dates for the Second Plant: If, other than by reason of Force Majeure or default by KPLC or GOK pursuant to the GOK Letter:

- (a) the Seller has not commenced drilling works for the Second Plant by the Long Stop Drilling Works Start Date for the Second Plant; or
- (b) the Seller failed to achieve the Full Commercial Operation Date for the Second Plant by the Long Stop Commercial Operation Date for the Second Plant,

KPLC may terminate the obligations of the Parties under this Agreement solely with respect to the Second Plant by notice to the Seller within two (2) months of the occurrence of the relevant Long Stop Date. Such termination shall be without prejudice to any rights accrued due to either party with respect to the Second Plant at the date of termination.

Such Seller failure shall not be a Seller Event of Default under Clause 16.1 or otherwise for the purposes of this Agreement and any such termination of the obligations of the Parties under this Agreement with respect to the Second Plant shall not affect the Parties' respective rights and obligations with respect to the First Plant, which shall continue to bind each of them.

6.8B Long Stop Dates for the Third Plant: If, other than by reason of Force Majeure or default by KPLC or GOK pursuant to the GOK Letter:

- (a) the Seller has not commenced drilling works for the Third Plant by the Long Stop Drilling Works Start Date for the Third Plant; or
- (b) the Seller failed to achieve the Full Commercial Operation Date for the Third Plant by the Long Stop Full Commercial Operation Date for the Third Plant,

KPLC may terminate the obligations of the Parties under this Agreement solely with respect to the Third Plant by notice to the Seller within two (2) months of the occurrence of the relevant Long Stop Date. Such termination shall be without prejudice to any rights accrued due to either party with respect to the Third Plant at the date of termination.

Such Seller failure shall not be a Seller Event of Default under Clause 16.1 or otherwise for the purposes of this Agreement and any such termination of the obligations of the Parties under this Agreement with respect to the Third Plant shall not affect the Parties' respective rights and obligations with respect to the First and Second Plants, which shall continue to bind each of them.

6.8C Long Stop Dates for the Fourth Plant:

- (a) If, other than by reason of Force Majeure or default by KPLC or GOK pursuant to the GOK Letter, the Seller failed to achieve the Full Commercial Operation Date for the Fourth Plant by the Long Stop Full Commercial Operation Date for the Fourth Plant, as described in the Initial Notice of Fourth Plant Exercise, KPLC may terminate the obligations of the Parties under this Agreement solely with respect to the Fourth Plant by notice to the Seller within two (2) months of the occurrence of the Fourth Plant Long Stop Full Commercial Operation Date.
- (b) If, other than by reason of Force Majeure or default by KPLC or GOK pursuant to the GOK Letter, the Seller failed to achieve the Full Commercial Operation Date for the reconfigured Fourth Plant by the Long Stop Full Commercial Operation Date relating to the additional Fourth Plant Units described in a Subsequent Notice of Fourth Plant Exercise (being such Units which were not described in the Initial Notice of Fourth Plant Exercise), if the reconfigured Fourth Plant inclusive of such additional Fourth Plant Units does not achieve the subsequent Fourth Plant Full Commercial Operation Date, KPLC may terminate the obligations of the Parties under this Agreement solely with respect to the additional, untested Fourth Plant Units. Any such termination of the additional Fourth Plant Units subject of the Subsequent Notice of Fourth Plant Exercise shall only affect such additional Units, and shall be without prejudice to any rights accrued due to either party with respect to the Fourth Plant described in the Initial Notice of Fourth Plant Exercise and its Units at the date of termination; and

- (c) Any such Seller failure as described in subsections (a) and (b) above shall not be a Seller Event of Default under Clause 16.1 or otherwise for the purposes of this Agreement, and any such termination of the obligations of the Parties under this Agreement with respect to the Fourth Plant or any of its Units shall not affect the Parties' respective rights and obligations with respect to the First, Second, and Third Plants, nor, in the case of a termination of additional Units described in a Subsequent Notice of Fourth Plant Exercise, shall it affect the Parties' respective rights and obligations with respect to the Fourth Plant and its Units described in the Initial Notice of Fourth Plant Exercise which have achieved the Full Commercial Operation Date, which shall continue to bind each of them.

6.9 **Satisfaction of Requirements:** The Parties hereby acknowledge that as of the date hereof, all of the obligations, requirements and arrangements under Clauses 6.1, through 6.5, 6.7, and 6.8 with respect to the Appraisal Works, the Early Generation Facility, the First Plant, the Second Plant, and the Third Plant have been satisfied in full.

Clause 7: Commissioning and Testing

- 7.1 **The Seller's Obligations:** The Seller shall, subject to Clause 7.2, test and Commission the Early Generation Facility and a Plant in accordance with the Commissioning and testing procedures (including test tolerances and criteria) set out in Part A of Schedule 4 and the further procedures agreed or determined pursuant to Clause 7.5 and 7.5A and in accordance with the Prudent Operating Practice.
- 7.2 **Transmission Interconnector Commissioning and Testing:** The Seller shall test and Commission the Transmission Interconnector and other facilities specified in Part B of Schedule 2 in accordance with the Commissioning and testing procedures (including test tolerances and criteria) set out in Part A of Schedule 4 and the further procedures agreed or determined pursuant to Clause 7.5 and 7.5A and in accordance with the Prudent Operating Practice. The Seller shall before Commissioning of the First Plant commences procure that the certificate of an independent engineer, approved by KPLC, is issued, addressed to KPLC and the Seller, certifying that the testing of the Transmission Interconnector has been satisfactorily completed and that it is available for commercial operation.
- 7.3 **Notifications:** The Seller will give KPLC not less than thirty (30) days' notice of the date of commencement of the respective Commissioning of the Transmission Interconnector, the Early Generation Facility and a Plant and not less than fifteen (15) days' notice of the date of the respective testing (except for routine construction tests) of the Transmission Interconnector, the Early Generation Facility and a Plant, provided that the Seller may postpone any such date by giving KPLC not less than the seven (7) days notice of the postponed date.

- 7.4 **KPLC attendance:** KPLC shall have the right to attend each occasion on which a test of the Transmission Interconnector, the Early Generation Facility and a Plant is being conducted, and to witness the test, and to receive within fifteen (15) days after the test a copy of the test reports which shall be prepared by the Seller.
- 7.5 **Detailed procedures I:** The Parties shall, not later than ninety (90) days before the Early Generation Commissioning Date, agree (or failing such agreement an Expert shall determine) detailed procedures consistent with best international practice for testing and Commissioning the Early Generation Facility in accordance with, and consistent with, Part A of Schedule 4.
- 7.5A **Detailed procedures II:** The Parties shall, not later than ninety (90) days before the Plant Commissioning Date of a Plant, agree (or failing such agreement an Expert shall determine) detailed procedures consistent with best international practice for testing and Commissioning the Transmission Interconnector and such Plant (and Units) in accordance with, and consistent with Schedules 2 and 4.
- 7.6 **KPLC's Transmission Interconnector and KPLC's Connection Facilities:** KPLC shall complete the installation, testing and Commissioning of KPLC's Transmission Interconnector no later than sixteen (16) months after the Effective Date. KPLC shall complete the installation, testing and Commissioning of KPLC's Connection Facilities for the First Plant no later than seventeen (17) months and two weeks after the Establishment Date for the First Plant. KPLC shall complete the installation or upgrading (as necessary), testing and Commissioning of KPLC's Connection Facilities to accommodate the additional capacity of the Second Plant and of the Third Plant (as applicable) no later than seventeen and a half (17.5) months of the respective Establishment Date of such Plant, provided, however, that, in case the Seller shall notify KPLC in writing that it anticipates to complete such Plant earlier than its then scheduled Full Commercial Operation Date, KPLC shall complete such works by the later of (i) 12 months from such Seller notice, and (ii) 17.5 months of the Establishment Date for such Plant. KPLC shall complete the installation or upgrading (as necessary), testing and Commissioning of KPLC's Connection Facilities to accommodate the additional capacity of the Fourth Plant no later than two (2) months prior to the Required Full Commercial Operation Date of such Plant, provided, however, that in case the Seller shall notify KPLC in writing that it anticipates to complete such Plant earlier than its then scheduled Full Commercial Operation Date, the parties shall mutually endeavour to accommodate such acceleration.
- 7.7 **KPLC Cooperation:** KPLC will cooperate with the Seller so as to enable the Seller to Commission and test the Transmission Interconnector and each Unit in accordance with this Clause 7 and in particular will authorise connection to KPLC's System and despatch the Unit to the extent reasonably required by the Seller for such purpose and in accordance with the procedures in Part A of Schedule 4 and agreed or determined under Clauses 7.5 and 7.5A.

- 7.8 **Retesting:** Where any test (including a test arranged under this Clause) of the Transmission Interconnector or of a Unit is not completed satisfactorily in accordance with Schedule 4, the Seller may arrange a further test by giving KPLC not less than seventy-two (72) hours notice and such test shall be conducted by the Seller in accordance with the foregoing provisions of this Clause.
- 7.9 **Early Generation Commercial Operations Tests:** Following completion of the Unit Commercial Operations Tests of the Early Generation Facility, the Seller shall conduct the Early Generation Commercial Operations Tests. Upon satisfactory completion of the Early Generation Facility Operations Tests, the Seller shall procure that the certificate of an independent engineer, approved by KPLC, is issued, addressed to KPLC and the Seller, certifying that the Early Generation Facility's testing has been so completed and that the Early Generation Facility is available for commercial operation. The Early Generation Commercial Operation Date shall be the date occurring immediately after the day on which the Early Generation Facility has passed the Early Generation Commercial Operations Tests.
- 7.10 **Plant Commercial Operations Tests:**
- (a) **First Plant:** Following completion of the Unit Commercial Operations Tests, conducted after the reinstallation of the Early Generation Facility Units at the Site (if necessary), the Seller shall conduct the Plant Commercial Operations Tests for the First Plant. Upon satisfactory completion of the Plant Commercial Operations Tests for the First Plant, the Seller shall procure that the certificate of an independent engineer, approved by KPLC, is issued, addressed to KPLC and the Seller, certifying that the Plant's testing has been so completed and that the Plant is available for full commercial operation. The Seller shall upon issue of the certificate notify KPLC of a date (the "Full Commercial Operation Date of the First Plant") being a date no later than twenty-one (21) days after the date of the notice. The Seller shall not notify KPLC of the Full Commercial Operation Date of the First Plant until such time as the Early Generation Facility has been reinstalled and the First Plant has passed the Plant Commercial Operations Tests.
 - (b) **Second Plant:** Following completion of the Unit Commercial Operations Tests, conducted after the reenergizing of the First Plant Units at the Site (if necessary), the Seller shall conduct the Plant Commercial Operations Tests for the Second Plant. Upon satisfactory completion of the Plant Commercial Operations Tests for the Second Plant, the Seller shall procure that the certificate of an independent engineer, approved by KPLC, is issued, addressed to KPLC and the Seller, certifying that the Second Plant's testing has been so completed and that the Second Plant is available for full commercial operation. The Seller shall upon issue of the certificate notify KPLC of a date (the "Full Commercial Operation Date of the Second Plant") being a date no later than twenty-one (21) days after the date of the notice. The Seller shall not notify KPLC of the Full Commercial Operation Date of the Second Plant until such time as the First Plant has been reenergized (as necessary) and the Second Plant has passed the Plant Commercial Operations Tests.

- (c) **Third Plant:** Following completion of the Unit Commercial Operations Tests, conducted after the reenergizing of the First and Second Plant Units at the Site (if necessary), the Seller shall conduct the Plant Commercial Operations Tests for the Third Plant. Upon satisfactory completion of the Plant Commercial Operations Tests for the Third Plant, the Seller shall procure that the certificate of an independent engineer, approved by KPLC, is issued, addressed to KPLC and the Seller, certifying that the Third Plant's testing has been so completed and that the Third Plant is available for full commercial operation. The Seller shall upon issue of the certificate notify KPLC of a date (the "Full Commercial Operation Date of the Third Plant") being a date no later than twenty-one (21) days after the date of the notice. The Seller shall not notify KPLC of the Full Commercial Operation Date of the Third Plant until such time as the First and Second Plants have been reenergized (as necessary) and the Third Plant has passed the Plant Commercial Operations Tests.
- (d) **Fourth Plant:** With respect to the Fourth Plant as described in the Initial Notice of Fourth Plant Exercise, following completion of the Unit Commercial Operations Tests, conducted after the reenergizing of the First, Second and Third Plant Units at the Site (if necessary), the Seller shall conduct the Plant Commercial Operations Tests for the Fourth Plant. Upon satisfactory completion of the Plant Commercial Operations Tests for the Fourth Plant, the Seller shall procure that the certificate of an independent engineer, approved by KPLC, is issued, addressed to KPLC and the Seller, certifying that the Fourth Plant's testing has been so completed and that the Fourth Plant is available for full commercial operation. The Seller shall upon issue of the certificate notify KPLC of a date (the "Full Commercial Operation Date of the Fourth Plant") being a date no later than twenty-one (21) days after the date of the notice. The Seller shall not notify KPLC of the Full Commercial Operation Date of the Fourth Plant until such time as the First, Second and Third Plants have been reenergized (as necessary) and the Fourth Plant has passed the Plant Commercial Operations Tests.

If a Subsequent Notice of Fourth Plant Exercise is issued, the above testing regime shall be performed for the reconfigured Fourth Plant, including the procurement of an independent engineer certificate certifying that the reconfigured Fourth Plant's testing has been completed and that the reconfigured Fourth Plant is available for full commercial operation, and Seller issuance of a certificate notifying KPLC of a revised Full Commercial Operation Date for the reconfigured Fourth Plant, being a date no later than twenty-one days after the date of such notice. The Seller shall not notify KPLC of the revised Full Commercial Operation Date of the reconfigured Fourth Plant until such time as the prior existing Units of the Fourth Plant have been reenergized and the reconfigured Fourth Plant has passed the Plant Commercial Operations Tests;

(e) **Plant Interruptions:** The Parties recognize that, for a limited period, Seller may not be able to deliver electricity to KPLC from all or some of the then existing Plant(s) at the time of Commissioning and Testing of a new Plant or, in the case of a Subsequent Notice of Fourth Plant Exercise, additional Units. The Seller shall keep KPLC informed of any need to disconnect or cease deliveries during the Commissioning and Testing period(s) of each new Plant or Units, which may occur for a period of up to no more than 14 days (or a longer period as may be mutually agreed) for each such Commissioning and Testing. In the case of such Plant(s) interruption, Seller shall have no obligation to produce energy or make capacity available during such period, nor shall the same be considered an Availability Failure or computed to the detriment of Seller with respect to meeting Availability requirements or as part of maintenance allowances described in Schedule 3 hereto, and KPLC shall not be required to make any payments to the Seller in respect to energy or capacity which is not provided by the interrupted Plant(s) during the interruption.

7.11 **Payment during Early Generation Facility Testing:** KPLC shall pay Energy Charges to the Seller in accordance with Part A of Schedule 5 for all Net Electrical Output supplied by the Early Generation Facility after the Early Generation Commissioning Date and prior to the Early Generation Commercial Operation Date.

7.11A **Payment during Plant testing:** KPLC shall pay Energy Charges to the Seller in accordance with Part B of Schedule 5 for all Net Electrical Output supplied by a Plant prior to its Full Commercial Operation Date.

7.12 **Transfer of Transmission Interconnector:** Upon the issue of the certificate of the independent engineer referred to in Clause 7.2 the Seller shall transfer to KPLC all right, title and interest in the Transmission Interconnector, all technical drawings, data and material related to it and all intellectual property rights (whether such rights be registered, unregistered or registrable) necessary for KPLC to enjoy free and unencumbered use of it, free of all charges and encumbrances together with the benefit of any designers' and manufacturers' warranties.

7.13 **KPLC failure to complete KPLC's Connection Facilities or KPLC's Transmission Interconnector:** In the event that the Seller is unable to undertake the Commissioning and/or testing of a Plant (including, pursuant to an Initial Notice of Fourth Plant Exercise or a Subsequent Notice of Fourth Plant Exercise, according to the case) solely due to a failure by KPLC to complete its facilities by, as applicable, the Required Early Generation Commercial Operation Date or with respect to each Plant, its respective Required Full Commercial Operation Date, KPLC shall pay to the Seller monthly (and pro-rated for any proportion of the month), in arrears, an amount, as applicable, which is equal, with respect to the Early Generation Facility, to the Capacity Payment based on the Contracted Early Generation Capacity or, with respect to the affected Plant, the Contracted Plant Capacity of such Plant (as the case may be).

7.14 Seller's failure to complete the Transmission Interconnector or the Interconnection of the Early Generation Facility: For the avoidance of doubt, in the event that the Seller does not undertake the Commissioning and/or testing of one or more Units due to its failure to complete the connection to the Early Generation Facility or the Transmission Interconnector in accordance with KPLC design standards and criteria, KPLC shall not be liable for the payment of the Capacity Payments and Energy Charges and Clauses 6.7 and 6.8 shall apply until such time as the Seller has completed the interconnection to the Early Generation Facility or the Transmission Interconnector (as the case may be).

7.15 Satisfaction of Requirements:

The Parties hereby acknowledge that as of the date hereof, all of the obligations, requirements and arrangements under Clauses 7.1 through 7.14 with respect to the Early Generation Facility, and the First, Second, and Third Plants, including KPLC's Transmission Interconnector, have been satisfied in full.

Clause 8: Operating and Despatch Procedures

- 8.1 Operation:** The Seller shall during the Term operate the Early Generation Facility and each Plant in a manner consistent with Prudent Operating Practice, in compliance with the Despatch Instructions and on the basis of the System Characteristics.
- 8.2 Notification:** In accordance with the Operating and Despatch Procedures and any procedures agreed or specified by KPLC under Clauses 8.4 and 8.5, the Seller shall keep KPLC informed by regular daily declarations, together with prompt declarations of any changes, of the Available Early Generation Capacity and Available Plant Capacity of each Plant (as the case may be) and any impairment of the Early Generation Facility's or of any Plant's Operating Characteristics (as the case may be) provided that during Planned Maintenance of the Early Generation Facility or of any Plant, the Early Generation Facility or such Plant (as the case may be) shall be deemed to be declared unavailable unless the Seller makes a contrary declaration.
- 8.3 Despatch Instructions:** KPLC shall issue Despatch Instructions consistent with the Functional Specification, including the System Characteristics, prevailing declarations of Availability and any impairment of Operating Characteristics and despatch constraints, and in accordance with the Operating and Despatch Procedures and any procedures agreed under Clause 8.4 and Clause 8.5, and shall seek to ensure that KPLC's System complies with and does not deviate from the System Characteristics.
- 8.4 Further procedures I:** The Parties shall not later than the Early Generation Commissioning Date, agree in respect of the Early Generation Facility (in accordance with and consistent with the Operating and Despatch Procedures and all other terms of this Agreement) such further procedures as shall be necessary in accordance with Prudent Operating Practice for the despatch of the Early Generation Facility and operational communications between the Parties. Any further procedures not agreed by the Parties by the Early Generation Commercial Operation Date shall be specified by KPLC in accordance with Prudent Operating Practice.

- 8.5 **Further procedures II:** The Parties shall, not later than the Plant Commissioning Date for the First Plant agree in respect of such Plant (in accordance with and consistent with the Operating and Despatch Procedures and all other terms of this Agreement) such further procedures (if any) as shall be necessary in accordance with Prudent Operating Practice for the despatch of the First Plant and operational communications between the Parties. Any further procedures not agreed by the Parties by the Full Commercial Operation Date of the First Plant shall be specified by KPLC in accordance with Prudent Operating Practice. The despatch procedures and procedures for operational communications established with respect to the First Plant shall be applied to each of the Second Plant, the Third Plant and the Fourth Plant, with modifications as may be required and mutually agreed.
- 8.6 **Over-generation:** For any Plant, in the event that the Seller over a period of four (4) or more successive Settlement Periods delivers to KPLC electricity in excess of the Despatch Instructions with respect to such Plant, KPLC may by notice require the Seller to comply with Despatch Instructions and if such excess delivery continues, the Seller shall notwithstanding the provisions of Clause 10.2 not be entitled to receive the Energy Charges in respect of any excess delivery.
- 8.7 **Under-generation:** For any Plant, in the event that the Seller fails to notify KPLC of a reduction in Declared Capacity for the Early Generation Facility or a Plant, and the Early Generation Facility or such Plant, as applicable, delivers to KPLC electricity over a period of four (4) or more successive Settlement Periods which is less than the quantity required by the Despatch Instructions for the Early Generation Facility or for such Plant (as applicable) ("Under-Generation"), KPLC may by notice require the Seller to remedy such under-generation within the following two (2) Settlement Periods (i.e. within one (1) hour) and to comply with the Despatch Instructions. If the Early Generation Facility or Plant (as applicable) continues such Under-Generation, for subsequent Settlement Periods in which under-generation is continuing the Seller's Declared Capacity with respect to the Early Generation Facility or such Plant (as applicable) shall be deemed to equal to twice the Net Electrical Output of the Early Generation Facility or such Plant (as applicable).
- 8.8 **Notice:** Any notice given by KPLC under Clauses 8.6 and 8.7 shall be given in writing and delivered by facsimile to the Seller at the address, and marked for the attention of the person, specified in Schedule 8 or such other address or person from time to time designated by the Seller and such notice shall be deemed to be received upon confirmation of uninterrupted transmission by a transmission report provided that such notice shall be confirmed by letter sent by hand or post, but without prejudice to the original facsimile notice.

Clause 9: Maintenance and Repair

- 9.1 **The Seller's obligation I:** The Seller shall maintain and repair each Plant in accordance with Prudent Operating Practice and the relevant Applicable Engineering, Environmental and Safety Codes and Standards during such Plant's Operating Period. Notwithstanding any other provisions of this Agreement, any changes to the Applicable Engineering, Environmental and Safety Codes and Standards after the relevant Determining Date shall not require the Seller to alter or amend the Plant, unless expressly requested to do so by KPLC and consented to by the Seller, or required pursuant to a Legal Requirement.
- 9.1A **The Seller's obligations II:** The Seller shall maintain and repair the Early Generation Facility in accordance with Prudent Operating Practice from the Early Generation Commissioning Date for the Term or until the Early Generation Cessation Date or the Full Commercial Operation Date, whichever is the earlier, unless this Agreement is terminated earlier.
- 9.2 **Planned Maintenance:** The Seller shall be entitled to withdraw each Plant from operation for maintenance and inspection each year for periods not exceeding those specified in Schedule 3.
- 9.3 **Planned Maintenance Programme:** The programme of Planned Maintenance for each Operating Year shall be established as follows with respect to each Plant:
- (a) the Seller shall not later than ninety (90) days before the start of each Operating Year submit to KPLC proposed dates for Planned Maintenance in that year;
 - (b) KPLC may, within thirty (30) days after receiving the Seller's proposed dates, notify the Seller of alternative dates which KPLC prefers, in which case the Parties shall consult and the Seller shall use reasonable endeavours to accommodate KPLC's proposal;
 - (c) not less than thirty (30) days before the start of the relevant Operating Year the Seller shall issue a final programme (including dates) for Planned Maintenance in accordance with the agreement reached by consultation under Clause 9.3(b) provided that where no agreement was reached then KPLC's alternative dates shall prevail, to the extent that such alternative dates do not result in the Seller incurring unreasonable costs;
 - (d) the scheduled maintenance allowance shall be calculated in accordance with Part A or Part B of Schedule 3 (as the case may be), using the Planned Maintenance schedule agreed pursuant to Clauses 9.3(a), (b) and (c).
- 9.4 **Changes to Programme:** The Parties shall cooperate and use their reasonable endeavours to accommodate any reasonable request by either Party to reschedule any Planned Maintenance for any Plant in any Operating Year.

- 9.5 **Maintenance Outages:** Without prejudice to Clause 9.1 and subject to applicable notification requirements under the Operating and Despatch Procedures, nothing in this Agreement shall oblige the Seller to take a Unit out of operation at the start of the relevant period specified in the relevant programme for Planned Maintenance nor prevent the Seller from returning a Unit to operation before the end of such period.
- 9.6 **Other Outages:** Nothing in this Agreement shall prevent the Seller from carrying out maintenance or repair of the Early Generation Facility or any Plant (and taking one or more Units out of operation for this purpose) at times other than during Planned Maintenance where such maintenance or repair cannot, in accordance with Prudent Operating Practice, be deferred to the next scheduled Planned Maintenance of such Unit or upon the occurrence of any outage.
- 9.7 **KPLC maintenance:** KPLC shall in accordance with Prudent Operating Practice maintain and repair KPLC's Connection Facilities, and shall seek to coordinate the timing of such maintenance or repair with the Seller's Planned Maintenance.
- 9.8 **Revision to Contracted Early Generation Capacity:** From the Early Generation Commercial Operation Date and prior to the Full Commercial Operation Date and not less than once in every period of twelve (12) months the Seller shall conduct a Contracted Early Generation Capacity Test on the Early Generation Facility. Following a Contracted Early Generation Capacity Test the Seller may revise the Contracted Early Generation Capacity to accord with the results of such test provided that the Contracted Early Generation Capacity of the Early Generation Facility may not be less than the Contracted Early Generation Capacity at the Signature Date.
- 9.8A **Revision to Contracted Plant Capacity:** After the Full Commercial Operation Date of each Plant and not less than once in every period of twelve (12) months the Seller shall conduct a Contracted Plant Capacity Test on each such Plant. Following a Contracted Plant Capacity Test of a Plant the Seller may revise the Contracted Plant Capacity of such Plant to accord with the results of such test provided that the Contracted Plant Capacity of a Plant may not be less than ninety per cent (90%) of, for the First Plant, the Contracted Plant Capacity agreed at the end of the Appraisal Period, for the Second Plant, 36 MW, for the Third Plant, 16 MW, and, for the Fourth Plant, the Contracted Plant Capacity stated in the Notice(s) of Fourth Plant Exercise, nor greater than one hundred and ten per cent (110%) of each such amount, provided that the Reservoir can sustain the required steam flow. If the Reservoir cannot sustain such steam flow, the Seller shall forthwith notify KPLC and the Parties shall meet in good faith to agree new criteria of the steam flow required and in the absence of such agreement the matter shall be referred to an Expert for determination.
- 9.8B **Notice of Third Plant Exercise:** At any time up to the date which is 54 months after the Establishment Date of the Second Plant, Seller shall determine if to undertake the performance of the Third Plant. If Seller chooses to undertake such works, it shall provide written notice to KPLC of its exercise of this option ("Notice of Third Plant Exercise"), as well as the Contracted Plant Capacity of such Third Plant (but not more than 16 MW), the type and sizing of each of its Units (including each Unit's Rated Capacity for the purposes of Part F to Schedule 2). Upon issuance of a Notice of Third Plant Exercise, the Parties shall immediately exercise their best endeavours to fulfil and cause the fulfilment of the conditions for the Establishment Date for the Third Plant.

9.8C **Notice of Fourth Plant Exercise:** At any time before the later of November 15, 2014 and 10 days after the Signature Date, Seller shall determine if to undertake the performance of the Fourth Plant. If Seller chooses to undertake such works, it shall provide written notice to KPLC of its exercise of this option ("**Notice of Fourth Plant Exercise**"), as well as the Contracted Plant Capacity of such Fourth Plant (but not more than 32 MW), the type and sizing of each of its Units (including each Unit's Rated Capacity for the purposes of Part F to Schedule 2) ("**Initial Notice of Fourth Plant Exercise**").

The Initial Notice of Fourth Plant Exercise may be replaced to increase the Contracted Plant Capacity of the Fourth Plant (but not more than a total aggregate, together with the Initial Notice of Fourth Plant Exercise, of 100 MW) by issuance of subsequent Notice(s) of Fourth Plant within one year of the original Establishment Date of the Fourth Plant ("**Subsequent Notice of Fourth Plant Exercise**"). Each Initial Notice of Fourth Plant Exercise and Subsequent Notice of Fourth Plant Exercise is a "**Notice of Fourth Plant Exercise**".

Upon issuance of a Notice of Fourth Plant Exercise, the Parties shall immediately exercise their best endeavours to fulfil and cause the fulfilment of the conditions for the Establishment Date for the Fourth Plant relevant to such notice. Pursuant to a Notice of Fourth Plant Exercise, KPLC shall ensure that KPLC's System is prepared and sufficient for the Commissioning, testing and operation of the Fourth Plant in accordance with the timetables included in such notice.

In the case of issuance of a Subsequent Notice of Fourth Plant Exercise for the addition of Unit(s), then, unless specifically agreed otherwise, the terms of this Agreement with respect to the original Fourth Plant configuration shall remain unaffected, and each of the Party's respective obligations shall continue to be performed with respect to the then existing Fourth Plant and its Units until the achievement of the Full Commercial Operation Date for the reconfigured Fourth Plant. From and after the Full Commercial Operation Date is achieved for the reconfigured Fourth Plant, the obligations of the Parties with respect to the Fourth Plant, including for the delivery of Net Electrical Output, the payment of Energy Charges and Capacity Payments, the computation of the Fourth Plant's Contracted Capacity, Declared Capacity, Operating and Despatch Procedures, maintenance allowances, and KPLC Despatch Instructions, shall relate to the reconfigured Fourth Plant.

9.9 **Attendance at Test:** The Seller shall give KPLC reasonable notice of its intention to conduct a Contracted Early Generation Capacity Test or a Contracted Plant Capacity Test (as the case may be) and KPLC shall be entitled to attend or send representatives to witness such test.

- 9.10 Additional Tests:** In addition to the tests provided for in Clauses 9.8 and 9.8A, and subject to the provision of reasonable advance notice, the Seller may at any time and from time to time conduct a further test and the provisions of Clauses 9.8, 9.8A and 9.9 shall apply thereto, mutatis mutandis. KPLC shall have the right to call for a Contracted Early Generation Capacity Test in the case of an Availability Failure of the Early Generation Facility, or a Contracted Plant Capacity Test for a Plant in the case of an Availability Failure of such Plant (as the case may be) which continues for eight (8) consecutive Settlement Periods. Without prejudice to such right, for each of the Early Generation Facility and for each Plant KPLC may call for a test no more frequently than one hundred eighty (180) days from the previous test, and the provisions of Clauses 9.8, 9.8A and 9.9 shall apply thereto, mutatis mutandis. Notwithstanding the provisions of Clauses 9.8, 9.8A, 9.9 and 9.10, the Seller may, in its sole discretion, repeat, as soon as practicable and in any event within six (6) hours any test when such test was unsuccessful due to mechanical or electrical failure of the equipment provided that the Seller gives notice to KPLC of the repetition of a Contracted Early Generation Test or Contracted Plant Capacity Test (as the case may be) before or within fifteen (15) minutes of the conclusion of the previous test.
- 9.11 Availability Failure:** If, within twenty-four (24) hours of an Availability Failure which continues for eight (8) consecutive Settlement Periods, KPLC calls for a Contracted Early Generation Capacity Test or Contracted Plant Capacity Test for the Plant which suffered the Availability Failure (as the case may be) pursuant to Clause 9.10 and such test demonstrates that the capacity available is less than the Contracted Early Generation Capacity or Contracted Plant Capacity of such Plant (as the case may be) then for the period beginning from the Settlement Period within which such Availability Failure occurred and ending when the Available capacity has been agreed or determined pursuant to the Contracted Early Generation Test or Contracted Plant Capacity Test for such Plant (as the case may be), the Contracted Early Generation Capacity or Contracted Plant Capacity of such Plant for such period shall be equal to the average Availability of the Early Generation Facility or of such Plant (as the case may be) achieved in response to Despatch Instructions for the Settlement Periods in which such Availability Failure occurred or the capacity demonstrated to be Available by such test, if greater.
- 9.12 Restoration of Capacity:** Notwithstanding the provisions of Clauses 9.8 or 9.8A, if in any period of three (3) months the average Contracted Early Generation Capacity or Contracted Plant Capacity of a Plant, demonstrated by tests conducted over that period, is less than sixty per cent (60%) of, for the Early Generation Facility, the Contracted Early Generation Capacity at the Signature Date or, for a Plant, the Contracted Plant Capacity for such Plant agreed or determined in accordance with Clause 5.12 (as the case may be), and provided that the Reservoir can sustain the required steam flow, the Parties shall forthwith meet and agree a programme to be implemented by the Seller during the next following six (6) month period for restoring the Contracted Early Generation Capacity or Contracted Plant Capacity for such Plant (as the case may be) to ninety-eight per cent (98%) (in the five (5) years immediately following the Early Generation Commercial Operation Date or the Full Commercial Operation Date of such Plant (as the case may be)) or otherwise to ninety-five per cent (95%) of the level at which it was on the Signature Date or agreed or determined in accordance with Clause 5.12 (as the case may be). If the Seller fails to so restore the Contracted Early Generation Capacity or Contracted Plant Capacity of such Plant during the said six (6) month period, the Capacity Payments with respect to the Early Generation Facility or such Plant (as the case may be) from the end of such six (6) month period until the date on which the capacity is restored in accordance with Clause 9.12 shall be multiplied by a factor of decimal five (0.5), the Parties hereby agreeing that such adjustment represents a genuine pre-estimate of the cost to KPLC for procuring alternative generating capacity which the Seller is unable to provide.

The reduction in Capacity Payments described above shall be applied solely with respect to payments associated with the capacity of the Plant(s) which suffers the above described failure.

9.13 **Disputes:** Any dispute as to the results of a Contracted Early Generation Capacity Test or a Contracted Plant Capacity Test (as the case may be) shall be referred to an Expert.

Clause 10: Sale and Purchase of Electricity

- 10.1 **Sale and Purchase I:** From the Early Generation Commercial Operation Date the Seller shall sell and KPLC shall purchase all the Net Electrical Output of the Early Generation Facility generated in accordance with Despatch Instructions.
- 10.1A **Sale and Purchase II:** From the Full Commercial Operation Date of each Plant the Seller shall sell and KPLC shall purchase all the Net Electrical Output of each Plant supplied in accordance with Despatch Instructions.
- 10.2 **Energy Charges:** KPLC shall pay the Seller Energy Charges ascertained in accordance with Parts A and B of Schedule 5 in respect of all Net Electrical Output sold and purchased in accordance with Clauses 10.1 and 10.1A respectively.
- 10.3 **Delivery Point:** Electricity sold and purchased under this Agreement shall be delivered at the Delivery Point(s) and all transmission losses before the Delivery Point(s) shall be for the Seller's account and all transmission losses beyond the Delivery Point(s) shall be for KPLC's account.
- 10.4 **Metered quantities:** The quantities of Net Electrical Output delivered at the Delivery Point(s) shall be metered and determined in accordance with the provisions of Clause 12.
- 10.5 **Capacity Payments:** KPLC shall in respect of the month in which the Early Generation Commercial Operation Date occurs and for each month thereafter during the Term pay the Seller for the Contracted Early Generation Capacity, and KPLC shall in respect of the month in which the Full Commercial Operation Date occurs for a Plant and for each month thereafter during the Term pay the Seller for the Contracted Plant Capacity with respect to each such Plant (each, as the case may be, with adjustments reflecting Availability), in accordance with Part A or B of Schedule 5.

- 10.6 Further provisions:** The further provisions of Parts A and B of Schedule 5 shall take effect for the purposes of determining the amounts from time to time payable by KPLC by way of Energy Charges and Capacity Payments.
- 10.7 Despatch:** KPLC intends to despatch the Early Generation Facility or each Plant (as the case may be) if it is declared Available provided that it shall have no liability under this Agreement (other than its obligations to make Capacity Payments) or otherwise if it fails to do so.
- 10.8 Taxes and Duties:** If at any time after the applicable Determining Date, there is a change in the rate of Taxes and Duties which gives rise to an increase or decrease in the level of costs incurred by the Seller in the design, construction or operation of the Early Generation Facility or of a Plant or the conduct of the Appraisal Works either Party may within 3 months of the change occurring by notice to the other seek an adjustment to the applicable Energy Charges and/or Capacity Payments which will have the effect of placing the Seller in the same financial position as it would have been in had the change not occurred. The Parties shall meet and endeavour to agree to the adjustment and if the Parties shall fail within thirty (30) days of a notice under this Clause 10.8 to agree upon such adjustment either Party may refer the matter to an Expert who shall be an internationally recognised public accounting firm and who shall be free to accept proposals for such adjustments or make such directions as to the appropriate adjustment as he shall deem fit.

Clause 11: Invoicing and Payment

- 11.1 Invoice I:** The Seller shall with respect to the Early Generation Facility, within thirty (30) days of the end of each month (beginning with the month in which the Early Generation Commercial Operation Date occurs until the Early Generation Cessation Date (if any)) prepare and issue to KPLC an invoice in respect of the payments due from KPLC for that month.
- 11.1A Invoice II:** The Seller shall with respect to the First Plant, within thirty (30) days of the end of each month (beginning with the month in which the Plant Commissioning Date of such Plant occurs until the expiry of the Term stated in Subclause 2.2.1) prepare and issue to KPLC an invoice in respect of the payments due from KPLC for that month.
- 11.1B Invoice III:** The Seller shall with respect to the Second Plant, within thirty (30) days of the end of each month (beginning with the month in which the Plant Commissioning Date of such Plant occurs until the expiry of the Term stated in Subclause 2.2.2) prepare and issue to KPLC an invoice in respect of the payments due from KPLC for that month.
- 11.1C Invoice IV:** The Seller shall with respect to the Third Plant, within thirty (30) days of the end of each month (beginning with the month in which the Plant Commissioning Date of such Plant occurs until the expiry of the Term stated in Subclause 2.2.3) prepare and issue to KPLC an invoice in respect of the payments due from KPLC for that month.

- 11.1 **Invoice V:** The Seller shall with respect to the Fourth Plant, within thirty (30) days of the end of each month (beginning with the month in which the Plant Commissioning Date of such Plant occurs until the expiry of the Term stated in Subclause 2.2.4) prepare and issue to KPLC an invoice in respect of the payments due from KPLC for that month.
- 11.2 **Content of invoice:** Each invoice prepared by the Seller shall be substantially in the form set out in Part C of Schedule 5 and shall contain the information specified in that Part determined on the basis of relevant quantities metered and recorded in accordance with Clause 12. KPLC shall be entitled, no later than five (5) days after receipt, to reject any invoice which does not materially conform to Part C of Schedule 5 or which is not accompanied by all the supporting documentation agreed by the Parties provided that no later than four (4) days after receipt of such invoice, KPLC shall notify the Seller of the information which it requires in accordance with Part C of Schedule 5, in order to process the invoice and the Seller shall have the right to furnish such information or documentation as KPLC may reasonably require. If KPLC so rejects an invoice the Seller shall be deemed not to have issued or delivered an invoice to KPLC and KPLC shall not be required to make any payments to the Seller. In such event, the provisions of this Clause 11.2 shall be repeated until such time as the Seller issues an invoice which conforms to Part C of Schedule 5 and which is accompanied by all the supporting documentation agreed by the Parties.
- 11.3 **Payment due date:** Energy Charges, Capacity Payments and any other amounts payable by KPLC hereunder shall be due and payable within thirty (30) days after the date of delivery of the invoice.
- 11.4 **Late payment interest:** Any amount properly due from KPLC to the Seller under this Agreement and remaining unpaid after the due date for payment shall bear interest at the Default Rate from and including the date when the amount in question was due until but excluding the date when it is received by the Seller, accruing from day to day and compounded quarterly.
- 11.5 **Disputed payments:** If any sum or part of any sum shown on an invoice rendered by the Seller is disputed in good faith by KPLC then the payment of the undisputed sums or parts shall not be withheld on those grounds and shall be paid to the Seller when due; and interest at the Non-Default Rate shall be payable on any disputed sum subsequently agreed or judged to be due from and including the date when the sum in question was due until but excluding the date when it is received by the Seller, accruing from day to day and compounded quarterly. Any disputed payment will be resolved in accordance with the Good Faith Dispute Procedure.
- 11.6 **Taxes, etc:** Except as otherwise provided, all payments under this Agreement shall be made free and clear from, and without set-off, deduction or withholding on account of, any form of Taxes and Duties, save to the extent that KPLC is duly appointed by the Commissioner for Income Tax as agent for the Seller under section 96 of the Income Tax Act and makes payments to the Commissioner of Income Tax as agent for the Seller pursuant to sub-section 96(3) as the same may be re-enacted, amended, replaced or modified.

11.7 **The Seller's account:** Payment of any sum payable under this Clause shall be effected through wire transfer to the account of the Seller at a bank located outside the Republic of Kenya or such other bank as may be notified by the Seller to KPLC from time to time provided that such payment shall be made on a business day and shall be net of all bank charges payable by KPLC in connection with such transfer.

11.8 **Currency for payments:** Unless otherwise agreed by the Parties in writing, all amounts falling due under this Agreement shall be payable in United States Dollars and the Seller shall not be obliged to accept payment in any other currency.

11.9.1 **Security:**

- (a) As security for the payment of sums payable by KPLC under this Agreement, the Parties have entered into the Amended and Restated Olkaria III Project Security Agreement, which describes, *inter alia*, the issuance of certain Letters of Credit, and, with respect to the Second Plant and, if a Notice of Third Plant Exercise is provided, with respect to the Third Plant, the achievement of the Securitization Milestone. The Parties shall also exercise reasonable commercial efforts to negotiate: (i) a substitution of the existing Letter of Credit for the First Plant by achievement of the Securitization Milestone with respect to the First Plant; and (ii) if any Notice(s) of Fourth Plant Exercise is provided, an extension to encompass the Fourth Plant within the scope of the securities and guaranties achieved under the Securitization Milestone, all subject to lenders approval at their sole discretion.
- (b) In the case one or more Letters of Credit are provided, the Seller will meet certain expenses with respect to each such Letter of Credit, all as provided under the Amended and Restated Olkaria III Project Security Agreement. If any such expenses which the Seller is liable to reimburse with respect to a Letter of Credit are due and owing despite KPLC's written demand to the Seller for payment of such amounts, KPLC may offset such amounts against payments owing by KPLC with respect to the specific Plant secured by such Letter of Credit under Clause 11 hereto.

11.9.2 **Deemed Payment:** No later than thirty (30) days after the date on which the Seller becomes entitled to make a demand under a Letter of Credit, the Seller shall take all steps necessary to make such a demand in writing of all moneys due and owing to the Seller (and not disputed by KPLC) under a Letter of Credit. If and to the extent that moneys are paid to the Seller under a Letter of Credit, the undisputed amounts due under an invoice which has not been paid in accordance with Clause 11.3 shall be deemed to that extent to have been paid by KPLC to the Seller on the date of actual payment and on and with effect from such date the provisions of Clauses 11.4 and 16.2(c) shall cease to apply in relation to the sums so paid.

11.9.3 **Failure to Demand:** If the Seller fails to take all steps necessary to demand moneys in writing under a Letter of Credit within the aforementioned thirty (30) days and to the extent that moneys are available to the Seller under a Letter of Credit, the provisions of Clauses 11.4 and 16.2(c) shall not apply following the thirtieth (30th) day after an invoice becomes due.

Clause 12: Metering

- 12.1 Metering Party's obligations:** Each Party (the "**Metering Party**") shall not later than, with respect to the Early Generation Facility and the First Plant, the Early Generation Commissioning Date, with respect to the Second Plant, the Plant Commissioning Date for the Second Plant, with respect to the Third Plant, the Plant Commissioning Date for the Third Plant, and, with respect to the Fourth Plant, the Plant Commissioning Date for the Fourth Plant, install (or procure the installation of) and shall maintain and operate that part of each Metering System for such Plant for which it is responsible in accordance with Part D of Schedule 2. Each of the First Plant, Second Plant, Third Plant and Fourth Plant, shall have a separate Metering System.
- 12.2 Non-Metering Party's rights:** With respect to all components of each Metering System for which the other Party is the Metering Party, each Party (the "Non-Metering Party") shall have the right to its own expense:
- (a) to inspect such parts of the Metering System upon reasonable notice;
 - (b) to attend and witness tests, adjustments and recalibration of such parts of the Metering System carried out by the Metering Party pursuant to Part B of Schedule 4; and
 - (c) to request the testing, adjustment for error and recalibration of such parts of the Metering System.
- 12.3 Specification, etc. of Metering System:** The specification and required limits of accuracy of each Metering System, and the metering point (the electrical point at which such Metering System is positioned) of each such Metering System, shall be as specified in Part D of Schedule 2, provided that where the metering point is not specified it shall be located as near as possible to the Delivery Point of the Plant whose output it meters.
- 12.4 Defective Metering System:** Where it is agreed or determined that any part of any Metering System is defective (including operating outside the relevant limit of accuracy in Part D of Schedule 2), then such part of such Metering System shall be repaired, adjusted or replaced at the cost of the Metering Party.
- 12.5 Meter error:** Where in the circumstances referred to in Clause 12.4 it is necessary to re-determine any quantity measured or recorded by the defective Metering System the provisions of paragraph 2(b) of Part B Schedule 4 shall apply.
- 12.6 Meter sealing:** Each Metering System shall comply with the specifications set out in Part D of Schedule 2 and shall be jointly sealed. Such seals shall be broken only by KPLC personnel. The Seller shall be given at least twenty-four (24) hours advance notice of the breaking of seals on any Metering System provided however that no such notice will be necessary when the breaking of a seal is necessitated by the occurrence of an Emergency.

12.7 Meter tampering: KPLC and the Seller undertake not to tamper or otherwise interfere with any Metering System in any way with the object of effect of distorting the quantity measured or recorded by such Metering System. Where it is established that a Metering System has been tampered or interfered with, the quantity measured or recorded shall be determined in accordance with paragraph 2(b) or Part B of Schedule 4.

12.8 Metering procedures: The Parties shall adopt and implement the procedures and arrangements set out in Part B of Schedule 4 for reading, testing, adjusting and recalibrating each Metering System.

12.9 Disputes: Any dispute arising under this Clause 12, Part D of Schedule 2 or Part B of Schedule 4 shall be referred to the determination of an Expert.

12.10 Satisfaction of Requirements: The Parties hereby acknowledge that as of the date hereof, all of the obligations, requirements and arrangements under Clause 12 with respect to the Metering System of the Early Generation Facility and of the First Plant have been satisfied in full.

Clause 13: Insurance

The Seller shall:

- (a) take out and maintain in full force and effect such policies of insurance as are specified in Schedule 9 with reputable insurance companies approved by KPLC (such approval not to be unreasonably withheld);
- (b) provide to KPLC copies of all policies effected by it and evidence that the premiums payable thereunder have been paid;
- (c) provide access to KPLC or its representatives to its offices to inspect the original policies;
- (d) subject to the Financing Agreements, apply the proceeds of claims against such policies, relating to damage to the Early Generation Facility or a Plant (as the case may be) in repairing and restoring the Early Generation Facility or a Plant (as the case may be) unless the damage is such as to make the Early Generation Facility or such Plant a total loss and the Parties deem the Early Generation Facility or such Plant to be irreparable; and
- (e) obtain waivers of rights of subrogation against KPLC.

Clause 14: Undertakings and Warranties of the Parties

14.1 Undertakings of the Seller: The Seller undertakes that:

- (a) it shall comply with all applicable Legal Requirements; and

- (b) it shall use all reasonable endeavours to keep in force all Authorisations required to be in the Seller's name for the operation of the Early Generation Facility and each Plant and any other of its obligations under this Agreement and that it will indemnify KPLC against all costs incurred by KPLC in the discharge of its obligations under Clause 14.3(c) below in accordance with any specific Seller requests;
- (c) the Early Generation Facility and each Plant shall be constructed, maintained and operated in accordance with the terms of this Agreement;
- (d) it shall issue such number of fully paid shared or other securities constituting shareholders funds on its balance sheet as shall in aggregate at the Early Generation Commercial Operation Date and at the Full Commercial Operation Date of each Plant equal to an amount not less than twenty-five per cent (25%) of the total investment made by the Seller for the purposes of this Agreement as at such date and for the purposes of this Clause 14.1(d), "total investment" shall in respect of the Early Generation Facility mean a sum equal to seventeen million five hundred thousand US Dollars (US\$17,500,000) and in respect of the Plants, "total investment" shall mean a sum that shall amount to not less than one hundred and thirty-three per cent (133%) of the aggregate sum borrowed by the Seller pursuant to the Financing Agreements; and
- (e) it will use commercially reasonable efforts to carry out its respective obligations for the Establishment Date of each Plant by its Target Establishment Date and, if not met, immediately thereafter, and to diligently pursue necessary approvals in a timely fashion.

14.2 Representations and Warranties of the Seller: The Seller represents and warrants that:

- (a) the Seller is a limited liability company duly organised and validly existing under the laws of the Cayman Islands and has all requisite legal power and authority to execute this Agreement and to carry out the terms, conditions and provisions hereof;
- (b) this Agreement constitutes the valid, legal and binding obligation of the Seller, enforceable in accordance with the terms hereof except as the enforceability may be limited by applicable laws affecting creditors' rights generally;
- (c) there are no actions, suits or proceedings pending or, to the Seller's knowledge, threatened, against or affecting the Seller before any court or administrative body or arbitral tribunal that might materially adversely affect the ability of the Seller to meet and carry out its obligations under this Agreement;
- (d) the execution, delivery and performance by the Seller of this Agreement have been duly authorised by all requisite corporate action, and will not contravene any provision of, or constitute a default under, any other agreement or instrument to which it is a party or by which it or its property may be bound.

14.3 Undertakings of KPLC: KPLC undertakes that it shall:

- (a) comply with all applicable Legal Requirements and will keep in force all Authorisations required for the performance of its obligations under this Agreement;
- (b) assist the Seller in obtaining on a timely basis (as required under Clause 3, and the Construction Programme) and to assist the Seller in maintaining until the first anniversary of the Full Commercial Operation Date of each Plant (to the extent that KPLC can so do) all Authorisations required by the Seller with respect to such Plant;
- (c) to the extent there is a Change in Law, use reasonable endeavours to assist the Seller to obtain all Authorisations necessary for the continued operation or maintenance of each Plant or for the Geothermal Reservoir Development in accordance with any specific Seller requests; and
- (d) it will use commercially reasonable efforts to carry out its respective obligations for the Establishment Date of each Plant by its Target Establishment Date and, if not met, immediately thereafter and to diligently pursue necessary approvals in a timely fashion.

14.4 Representations and Warranties of KPLC: KPLC represents and warrants that:

- (a) KPLC is a limited liability company duly organised and validly existing under the laws of Kenya and has all requisite legal power and authority to execute this Agreement and to carry out the terms, conditions and provisions hereof;
- (b) all legislative, administrative or other governmental action required to authorise the execution, delivery and performance by KPLC of this Agreement and the transactions contemplated hereby have been taken and are in full force and effect;
- (c) this Agreement constitutes the valid, legal and binding obligation of KPLC, enforceable in accordance with the terms hereof except as the enforceability may be limited by applicable laws affecting creditors' rights generally;
- (d) there are no actions, suits or proceedings pending or, to KPLC's knowledge, threatened, against or affecting KPLC before any court or administrative body or arbitral tribunal which might materially adversely affect the ability of KPLC to meet and carry out its obligations under this Agreement; and
- (e) the execution, delivery and performance by KPLC of this Agreement have been duly authorised by all requisite corporate action, and will not contravene any provision of, or constitute a default under, any other agreement or instrument to which it is a party or by which it or its proper may be bound.

Clause 15: Force Majeure

15.1 Events of Force Majeure: For the purposes of this Agreement “Force Majeure” means, subject to Clause 15.2, any event or circumstance which affects either Party and is not within the reasonable control (directly or indirectly) of the Party affected, to the extent that such event or circumstance or its effects cannot be prevented, avoided or removed by such Party acting in accordance with Prudent Operating Practice. “Force Majeure” shall (save as is provided in Paragraph 6 of Part A of Schedule 5 and Paragraph 7 of each of Parts B1, B2 and B3 of Schedule 5) include each of the following events and circumstances to the extent that they satisfy the foregoing requirements:

- (i) any act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, civil commotion, act of terrorism, or sabotage provided that any such event occurs within or directly involves the Republic of Kenya or any other country from which machinery, equipment and materials for the Early Generation Facility or any Plant are procured or transported through;
- (ii) an act of God including but not limited to lightning, fire, earthquakes, volcanic activity, floods, storms, cyclones, typhoons, or tornadoes;
- (iii) epidemics or plagues;
- (iv) explosions or chemical contamination (other than resulting from an act of war);
- (v) labour disputes including strikes, works to rule or go-slows or lockouts that extend beyond the Plant or are widespread or nationwide;
- (vi) Change in Law.

15.2 Exclusions from Force Majeure: The following events or circumstances shall not constitute Force Majeure:

- (a) late delivery to the Seller of machinery, equipment, materials, spare parts or consumables save where such late delivery is itself due to Force Majeure;
- (b) a delay in the performance of any contractor save where such delay is itself due to Force Majeure;
- (c) breakdowns in equipment save where such breakdown is itself due to Force Majeure;

- (d) normal wear and tear or random flaws in materials and equipment;
- (e) payment of monies due provided that relief under this Clause 15 shall extend to failure caused by circumstances or events of Force Majeure affecting all reasonable means of payment;
- (f) any failure to perform obligations under this Agreement to the extent that such failure results from or is caused by insufficient Steam Field Facilities or by adverse Reservoir conditions, including insufficiency of reserves, prevailing within the Geothermal Reservoir (including insufficient capacity in the Seller's Steam Field Facilities);
- (g) a Change in Law in the circumstances described in Clause 10.8.

15.3 Effect of Force Majeure: If a Party is prevented from or delayed in performing an obligation hereunder by reason of Force Majeure the affected Party shall:

- (a) be relieved from the consequences of its failure to perform that obligation;
- (b) promptly notify the other Party of the occurrence of the event; and
- (c) use all reasonable endeavours to overcome the consequences of the event.

15.4 Construction Force Majeure: Where the Seller is as a result of an event of Force Majeure (including a failure by KPLC to perform any of its obligations under this Agreement) delayed in or prevented from performing any of its obligations before the Long Stop Dates (or any of them) the Long Stop Dates which have not then occurred shall be revised to new dates which reflect the period of delay resulting from such Force Majeure or failure provided that no Long Stop Dates may be delayed by more than one hundred and eighty (180) days in aggregate.

15.5 Payments during Force Majeure: Save where a specific payment remedy is available to the Seller under this Agreement, upon the occurrence of any Force Majeure event after the Early Generation Commercial Operation Date, then during the Force Majeure event or KPLC failure to perform any of its obligations under this Agreement, KPLC shall pay to the Seller Energy Charges for the Net Electrical Output delivered in accordance with Despatch Instructions during such Force Majeure event or failure plus a Capacity Payment in accordance with Schedule 5.

Notwithstanding the above, the payments referred to under this Clause 15.5 shall not be paid during the period of actual construction of a Plant prior to the achievement of the Full Commercial Operation Date with respect to the anticipated capacity of such Plant, but shall be paid in full with respect to the Early Generation Facility and other existing Plant(s).

15.6 Force Majeure Termination: If an event of Force Majeure continues beyond a period of two hundred and seventy (270) days, the Parties shall meet in good faith to consult for a further period of not less than ninety (90) days to reach a solution acceptable to all Parties. If, at the end of such ninety (90) day period, no such solution is found, either Party shall be entitled to terminate the obligations of the Parties under this Agreement solely with respect to the Plant(s) which are affected by such Force Majeure by giving written notice of not less than seven (7) days to the other Party.

Clause 16: Termination and Default

16.1 The Seller's Events of Default: For the purposes of this Agreement an Event of Default of the Seller in respect of the Early Generation Facility or a Plant (as the case may be) shall be:

- (a) subject to the provisions of Clause 16.4, any of the following events:
 - (i) the wilful and unexcused failure by the Seller to operate the Early Generation Facility or such Plant in compliance with Despatch Instructions and in accordance with the provisions of this Agreement without the written consent of KPLC after the Early Generation Commercial Operation Date or the Full Commercial Operation Date of such Plant (as the case may be);
 - (ii) the breach by the Seller of any of its material obligations under this Agreement with respect to the Early Generation Facility or such Plant. However, the Seller's failure either in the event of Under-Generation under Clause 8.7, Availability Failure under Clause 9.11, or prolonged failure to achieve the required Contracted Capacity under Clause 9.12 shall not constitute a Default in respect of the Seller under this Clause unless and until
 - the period for restoring the Contracted Early Generation Capacity or Contracted Plant Capacity of such Plant (as the case may be) provided under Clause 9.12 has expired and
 - the capacity of such Plant combined with the capacities of all Plant(s) then in Commercial Operation, is less than 95% of the aggregate of the Contracted Plant Capacities specified in Clause 5.12 for all such Plants;
 - provided further that neither the failure by the Seller under Clause 14.1(e), nor, subject the Seller's obligation to install, maintain and operate the Steam Field Facilities in accordance with Prudent Operating Practice, a failure by the Seller to restore the Contracted Capacity due to the Reservoir's inability to sustain required steam flow shall constitute a Default of the Seller. Any dispute as to whether the Reservoir can sustain the steam flow required to restore the Contracted Capacity as required under Clause 9.12 shall be referred to an Expert for determination.
- (b) in relation to the Seller or its assets, the commencement of bankruptcy, insolvency, winding up, liquidation, or other similar proceeding, or the appointment of a trustee, liquidator, custodian, receiver of similar person, unless such proceeding or appointment is capable of being and is set aside or stayed within sixty (60) days,

provided however, that no such event shall be a Default by the Seller if it results from (i) a breach by KPLC of this Agreement, (ii) a breach by GOK of the GOK Letter or (iii) the occurrence of a Force Majeure Event.

16.2 KPLC Defaults: For the purposes of this Agreement a Default in respect of KPLC shall be:

- (a) subject to the provisions of Clause 16.4, the breach by KPLC of any of its material obligations under this Agreement other than the failure to make any payments under this Agreement when due and payable;
- (b) in relation to KPLC or its assets, the commencement of bankruptcy, insolvency, winding up, liquidation, or other similar proceeding, or the appointment of a trustee, liquidator, custodian, receiver or similar person, unless such proceeding or appointment is capable of being and is set aside or stayed within sixty (60) days; and
- (c) any failure to pay any sum of money due and owing for 90 days or more from the date when such sum was first due and demanded and which sum is not subject to a bona fide dispute,

provided however, that no such event shall be a Default by KPLC if it results from (i) a breach by the Seller of this Agreement or (ii) the occurrence of a Force Majeure Event.

16.3 Defaulting Party, etc: For the purposes of this Agreement the Seller is the defaulting Party in relation to the Defaults specified in Clause 16.1 and KPLC is the defaulting Party in relation to the Defaults specified in Clause 16.2, and (in each case) the other Party is the non-defaulting Party.

16.4 Remedial Procedures: Upon the occurrence of any Default, the non-defaulting party may give notice to the defaulting Party of the occurrence of such Default and (in the case of a Default capable of remedy) requiring the remedy thereof; and if after such notice has been given:

- (a) the defaulting Party does not, within thirty (30) days after receipt of the non-defaulting Party's notice:
 - (i) where such Default is capable of remedy within such thirty (30) day period, remedy the default; or
 - (ii) where such Default is capable of remedy but not within such thirty (30) day period, furnish to the non-defaulting Party a detailed programme ("**Remedial Programme**") for the remedy as promptly as is practicable of the Default; or
- (b) the defaulting Party fails to remedy the Default in accordance with the Remedial Programme, or such Default is not capable of remedy, then the non-defaulting Party may give notice to the defaulting Party that such Default is an "Event of Default", but no event specified in Clause 16.1(a) or 16.2(a) which is capable of remedy shall be an Event of Default except pursuant to the provisions of this Clause 16.4.

16.5 Termination: Subject to the provisions of Clause 16.4, upon the occurrence of an Event of Default the non-defaulting Party may upon not less than seven (7) days notice to the defaulting Party terminate this Agreement, provided that where the Event of Default is an Event of Default described in Clauses 16.1 (a) (ii) or 16.2(a) and occurs in respect of a Plant prior to the Full Commercial Operation Date for such Plant, then the non-defaulting Party may upon not less than seven (7) days notice to the defaulting Party terminate only the non-defaulting Party's obligations to the defaulting Party with respect to the Plant to which the Event of Default relates (or, where the Fourth Plant has achieved its Full Commercial Operation Date, with respect to the additional Fourth Plant Units contemplated under a revised Notice of Fourth Plant Exercise) and the remainder of the Parties' obligations under this Agreement shall remain in full force and effect.

16.6 Survival of Rights: The expiry or termination of this Agreement shall not affect any rights or obligations which may have accrued prior to such expiry or termination and shall not affect obligations of each of the Parties under this Agreement which are expressed to continue after such expiry or termination.

16.7 Termination Due to Non-Satisfaction of Conditions Precedent: Notwithstanding any provision contained herein to the contrary, if this Agreement is terminated in circumstances where any of the conditions referred to in Part A of Schedule 6 has not been satisfied by the Long Stop Effective Date other than by reason of a breach by the Seller of its obligations under Clause 3.2, KPLC shall pay the Seller for its costs and expenses incurred with respect to this Agreement, a lump sum amount of one million United States Dollars (US\$1,000,000) within thirty (30) days of such termination.

16.8 Satisfaction of Requirements:

The Parties hereby acknowledge that all of the Conditions Precedent referred to under Clause 16.7 have been fulfilled.

16.9 Effect of Termination due to KPLC Default:

Subject to Clause 16.5, if the Seller terminates this Agreement due to a Default by KPLC pursuant to Clause 16.2, the Seller may by notice in writing to KPLC demand and KPLC shall pay (in accordance with this Clause 16.9) a lump sum transfer amount for transferral of the Plant to KPLC in accordance with the provisions of this Clause 16.9 and Clause 16.10 (the "**Transfer Notice**"). The Transfer Amount shall be:

- (i) such amount which after deducting any Taxes and Duties which the Seller must pay on the lump sum received or which is withheld from such lump sum leaves a net amount equal to the aggregate of:

- (A) for such Plant(s) where the termination occurs after its Full Commercial Operation Date, the aggregate amount of the engineering, procuring and construction contract prices for the Plants as stated in the Turnkey Construction Agreements and the Steam Field Facilities Agreements as provided to KPLC pursuant to Clause 21.1(d), and, for such Plant(s) where such termination occurs prior to its Full Commercial Operation Date, the amount paid by the Seller to the applicable contractors pursuant to the Turnkey Construction Agreements and Steam Field Facilities Agreements to the date of termination;
- (B) an additional amount of 1.2% of the cost referred to in Clause 16.9(i)(A) above, representing the development costs incurred for the development of the Plants;
- (C) such sum representing the interest costs during construction which, assuming a similar financing structure as that applied by the lenders in the financing of the Project with the debt capped at 65% of the cost in Clause 16.9(i)(A) above. Items A, B and C above together shall be the "Plant Value". The "Economic Value" shall be the economic value of the Plant(s) subject of and as of the date of the Transfer Notice, which amount, if not agreed between the Parties within 60 days of the Transfer Notice, shall be determined by an Expert appointed in accordance with Clause 19.3 below. The Plant Value shall be reduced by deducting an assumed depreciation rate equivalent to 5% per annum (or pro rata for any part of a year) for each year (or part thereof) from the Full Commercial Operation Date to the date of the Termination, such revised Plant Value being the "Depreciated Plant Value", provided, however, that as of and following the tenth anniversary of the Full Commercial Operation Date, the Plant Value shall be reduced to the higher of the Depreciated Plant Value and the Economic Value; and
- (D) such sum as is agreed by the Parties or, if agreement is not reached within 60 days of the Transfer Notice, as determined by an Expert appointed in accordance with Clause 19.3 below to be a reasonable assessment of the losses incurred by the Seller as a result of the termination of this Agreement.

It is acknowledged and agreed by the Parties that the amount representing a return on equity for the Seller shall be calculated on the basis of distributions (including repayment of shareholder loans) to the Seller's direct and indirect shareholders, which shall be limited in aggregate to an amount equal to the audited profits of the Seller for the last complete two year period prior to the Transfer Notice provided that in respect of any Plant which has not been in operation for at least two Operating Years from its respective Full Commercial Operation Date an amount not exceeding the projected profit of the Seller for the third and fourth years following the scheduled Full Commercial Operation Date of the relevant Plant as reflected in the Financial Projections.

- (ii) If the amounts in either Clause 16.9(i)(C) or Clause 16.9(i)(D) are not agreed by KPLC at the time, they shall be determined by an Expert appointed in accordance with Clause 19.3 below to be a reasonable assessment of the losses incurred by the Seller as a result of the termination of the PPA.
- (iii) KPLC shall pay the Transfer Amount as agreed or determined pursuant to this Clause 16.9 to such account of the Seller as the Seller may notify KPLC within 120 days of determination or agreement of the Transfer Amount. Interest at the Default Rate shall accrue on the unpaid balance of the Transfer Amount determined or agreed under this Agreement for each day after 90 days after determination or agreement of the Transfer Amount, as the case may be. If there is a dispute in relation to the portions of the Transfer Amount referred to in Clauses 16.9(i)(C) or (D), then KPLC shall pay the amounts referred to in Clauses 16.9(i)(A) and (B) within 120 days of the Transfer Notice issued under Clause 16.9(a) and the remainder upon determination or agreement of the dispute.

16.10 Transfer of the Plant: Upon receipt by the Seller of the Transfer Amount in full and subject to Clause 16.6, this Agreement will terminate and the Seller shall promptly provide KPLC or any other transferee nominated by KPLC with all documents necessary to effect the transfer of legal title, free and clear of any liens (except those arising by operation of law) and without any warranties to the Plants to effectuate the transfer of ownership of the Plant to KPLC. At the request of KPLC or any other transferee, the Seller will additionally give KPLC or such transferee nominated by KPLC reasonable assistance in ensuring the transfer or re-execution on substantially similar terms, of any material contract relating to the Project to which it is party.

16.11 Seller Default consequences:

- (a) Subject to Clause 16.5, in the event that there is a termination due to a Seller Default under Clause 16.1, the Seller shall pay to KPLC in accordance with this Clause 16.11 within thirty (30) days after termination the sum in US Dollars equivalent to:
 - (i) the additional average direct costs (if any) to KPLC of procuring capacity for a period of two years following the termination due to a Seller Default equivalent to the terminated Contracted Plant Capacity at the date of such termination; and

- (ii) all sums due and owing from KPLC to KPLC's customers for failure to deliver electricity directly resulting from the Default by the Seller giving rise to such termination, pursuant to KPLC's standard terms and conditions of supply or under such customer's statutory rights,
- (b) The Parties agree that if the Parties are unable to agree on an amount payable pursuant to this Clause 16.11, the matter shall be determined by an Expert in accordance with Clause 19.3.

Clause 17: Indemnification and Liability

- 17.1 **Liability:** Subject to Clauses 17.2, 17.3 and 17.4, each Party shall be liable to the other Party for the loss directly and foreseeably resulting from any breach by the first Party of its obligations hereunder, provided that KPLC shall not be liable for any amount of losses over and above the agreed or determined Transfer Amount in the event of termination of this Agreement due to a Default by KPLC, and Seller shall not be liable for any amount of losses over and above the agreed or determined amounts described in Clause 16.11 in the event of termination of this Agreement due to a Default by Seller.
- 17.2 **Own loss:** Notwithstanding Clause 17.1, each Party shall be responsible for, and shall indemnify the other Party against claims in respect of, loss of or damage to persons or property incurred by the first Party and its contractors, employees and agents resulting from the act, omission or negligence of either Party in performance of or otherwise in connection with this Agreement.
- 17.3 **Excluded liability:** Except as provided in Clause 17.1, neither Party shall have any liability to the other for any loss or damage or other liability, whether arising in contract, tort or otherwise, in connection with this Agreement.
- 17.4 **Consequential Losses:** In no case shall either Party be liable to the other for any indirect or consequential losses or damages. The Parties agree that the amounts referred to in Clauses 16.9 and 16.11 are not indirect or consequential losses and damages.

Clause 18: Confidentiality

- 18.1 **Confidential information:** Each Party agrees that it will, and will ensure that its employees, officers and directors will, hold in confidence all information, documentation, data and know-how disclosed to it by the other Party and designated in writing as 'confidential' ("**Confidential Information**"), and will not disclose to any third party or use Confidential Information or any part thereof without the other Party's prior written approval, provided that:
- (a) this Clause shall not apply to Confidential Information which is in the public domain other than by reason of a breach of this Clause 18.1, or was already in the rightful possession of the recipient Party, or was obtained by the recipient Party in good faith from a third party entitled to disclose it; and

- (b) a Party may disclose Confidential Information in accordance with any legal requirement to do so, or to financial institutions, multi-lateral agencies, consultants and contractors whose duties reasonably require such disclosure.

18.2**Survival:** The provisions of this Clause 18 shall survive the termination or expiry of this Agreement.

Clause 19: Dispute Resolution

19.1 Good Faith Dispute Resolution Procedure

If either Party raises a dispute in good faith under or in connection with this Agreement or with the Amended and Restated Olkaria III Project Security Agreement, it shall be resolved according to the following procedure (“**Good Faith Dispute Resolution Procedure**”):

For 15 calendar days after receipt of notice of dispute, the Parties shall exercise their best efforts to resolve the dispute. If no resolution is achieved within such 15 day period, within two business days of the end of the 15 day period, the disputing Party has notified the other Party of its intention to contest and refer the dispute to arbitration or to an agreed Expert in accordance with the relevant terms of the Agreement or the Amended and Restated Olkaria III Project Security Agreement (as the case may be), and, within twenty-eight (28) days from the end of the above 15 day period, refers the dispute to and diligently pursues contestation of the dispute in arbitration proceedings or before an agreed Expert in accordance with the relevant terms of the Agreement or the Amended and Restated Olkaria III Project Security Agreement (as the case may be).

19.2**Arbitration:** Subject to Clauses 19.1 and 19.3 any dispute or difference of any kind between the Parties in connection with or arising out of this Agreement or the breach, termination or validity hereof (a “**Dispute**”) shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of Commerce in accordance with the said Rules which Rules are deemed to be incorporated by reference into this Clause 19.2. It is hereby agreed that:

- (a) The site of the arbitration shall be London, England;
- (b) There shall be a single arbitrator;
- (c) The language of the arbitration shall be English;
- (d) The award rendered shall apportion the costs of the arbitration;
- (e) The award shall be in writing and shall set forth in reasonable detail the facts of the Dispute and the reasons for the tribunal’s decision;

- (f) The award in such arbitration shall be final and binding upon the Parties and judgement thereon may be entered in any Court having jurisdiction for its enforcement; and the Parties renounce any right of appeal from the decision of the tribunal insofar as such renunciation can validly be made.

If there is a conflict between this Agreement and the said Rules, this Agreement shall prevail.

19.3 Expert: Where the Agreement provides that any Dispute or other matter shall be referred to an Expert or the Parties so agree:

- (a) The Expert shall be an independent person who is not of the same nationality as either of the Parties with relevant experience and willing to act agreed between the Parties or if not agreed within fourteen (14) days of a request in writing by either Party appointed by the President of the Geothermal Resource Council, P.O. Box 1350, Davis, California, CA 95617-1350 or by The Chairman of the International Geothermal Association c/o Samorka, Sudurlandsbraut 48, Reykjavik, Iceland;
- (b) For a period of forty-two (42) days after the appointment of the Expert of such other period as the Parties may agree, each Party may make such written submissions at it wishes to the Expert and shall simultaneously provide a copy to the other Party and at the end of such forty-two (42) day period each Party shall have a period of twenty-one (21) days to make counter-submissions to the Expert (with a copy to the other Party) in reply to the other Party's written submissions made during the aforementioned forty-two (42) day period provided that neither Party shall during such twenty-one (21) day period make any written counter-submission which purports to reply to raise or refer to any new matters not raised or referred to in any submission made during the aforementioned forty-two (42) day period;
- (c) At the end of the twenty-one (21) day period referred to in paragraph (b) above and no later than twenty-one (21) days thereafter, either Party may, with the consent of the Expert and at a time and place decided by the Expert, make an oral presentation to the Expert in the presence of the other Party commenting on or explaining matters previously submitted to the Expert in writing;
- (d) The Expert shall render his determination in writing within fourteen (14) days of the completion of the oral presentation given in accordance with Clause 19.3(c) and give reasonable details of the reasons for his determination;
- (e) The decision of the Expert shall be final and binding on the Parties save in the event of fraud or manifest error;
- (f) The Expert shall act as an expert and not as an arbitrator;
- (g) In the case of invoices disputed by KPLC in accordance with Clause 11.5 above, the periods stated in Clause 19.3(b) and (c) above shall be reduced respectively to ten (10) Business Days instead of forty-two (42) days and five (5) Business Days instead of twenty-one (21) days.

19.4 Exclusivity: Neither Party shall have any right to commence or maintain any legal proceeding concerning a Dispute relating to this agreement until the Dispute has been resolved in accordance with Clauses 19.1 through 19.3, and then only to enforce or execute the award under such procedure.

19.5 Confidentiality: The Parties shall each secure that all Experts and Arbitrators shall agree to be bound by the provisions of Clause 18 of this Agreement as a condition of appointment.

19.6 Continuance of Obligations: KPLC shall continue to perform its obligations under this Agreement during any Expert or arbitration proceeding and, provided that all undisputed sums invoiced by the Seller have been and continue to be paid, the Seller shall continue to perform its obligations under this Agreement during any Expert or arbitration proceeding provided that the right to terminate the Agreement pursuant to Clause 16 is not restricted by this Clause 19.6.

Clause 20: Maintenance and Operating Records

(a) Each party shall keep complete and accurate records and all other data required by each of them for the purposes of proper administration of this Agreement. Among other records and data required hereby or elsewhere in this Agreement, the Seller shall maintain an accurate and up-to-date operating log, in a format reasonably acceptable to KPLC, records for each Plant of:

- (i) real and reactive power production for each clock hour and 220 kV, 33 kV bus voltage (as the case may be) at all times;
- (ii) changes in operating status, scheduled outages, forced outages and partial forced outages;
- (iii) any unusual conditions found during inspections; and

all such records and data shall be maintained for a minimum of sixty (60) months after the creation of such records or data provided that each Party shall not dispose of or destroy any such records or data after such sixty (60) month period unless the Party desiring to dispose of or destroy any such records or data give thirty (30) days prior written notice to the other Party, generally describing the records or data to be destroyed or disposed of, and the Party receiving such notice does not object thereto in writing within ten (10) days. If a written objection is received within such ten (10) day period, the objecting Party shall have a period of sixty (60) days after the date of such written objection within which to inspect and copy the records or data proposed to be disposed of or destroyed, which records and data shall be made available within such sixty (60) day period by KPLC or the Seller as the case may be, at such Party's offices in Nairobi. After the expiration of such sixty (60) day period, the Party desiring to dispose of or destroy such records or data shall be permitted to do so.

- (b) Either Party shall have the right, upon ten (10) days prior written notice to the other Party, to examine the records and data of the other Party relating to this Agreement or the operation and despatch of the Early Generation Facility and a Plant at any time during normal office hours during the period such records and data are required hereunder to be maintained.

Clause 21: Miscellaneous Provisions

21.1 Project Agreements and Financing Agreements:

- (a) Prior to the execution of this Agreement the Seller has provided to KPLC a copy of the articles of association of the Seller, which copy has been initialled by the Seller for the purposes of identification.
- (b) As soon as possible after the Establishment Date of the Second, Third and Fourth Plants and, with respect to them, prior to the award of the Turnkey Construction Agreements and the Operating and Maintenance Agreement and prior to the signature of the Financing Agreements and any Site Agreement, the Seller shall provide KPLC with draft copies of each such contract. The Seller shall have the right to delete numerical information and formulae from such draft contracts. The Seller shall not enter into any Project Agreement or Financing Agreement unless KPLC has been provided with draft copies and KPLC has had an opportunity to comment on the draft contracts to the Seller, provided, however, that contracts executed prior to the Signature Date may be provided in an executed form (with appropriate deletions as mentioned above) after the Signature Date.
- (c) Within fourteen (14) days of receipt of the draft contracts, KPLC shall have the right to provide comments to the Seller on the draft contracts if KPLC is of the reasonable opinion that:
 - (i) the terms of such Project Agreement or Financing Agreement shall be incompatible with or conflict with the provisions of this Agreement or materially impair the performance or implementation of this Agreement; or
 - (ii) any costs which are passed through to or borne by KPLC under the terms of this Agreement are or may reasonably be expected to be increased.

On receipt of KPLC's comments, the Seller shall try to remove the concerns of KPLC.

- (d) Forthwith upon execution of any of the documents referred to in Clause 21.1(b) the Seller shall provide to KPLC a copy thereof initialled by the Seller for the purposes of identification.

- (e) If at any time any Project Agreement or Financing Agreement is terminated, an amendment or variation is made to any Project Agreement or Financing Agreement then the Seller shall deliver to KPLC a conformed copy of each such document or (so far as such complete document is not in writing) a true and complete record thereof within twenty-one (21) days of the date of its execution or creation, certified as a true copy by an officer of the Seller.
- (f) Any comments or lack thereof by KPLC shall be without any liability whatsoever on the part of KPLC and shall not lessen, diminish or affect in any way the obligations of the Seller under this Agreement.

21.1A Satisfaction of Requirements

The Parties hereby acknowledge that, as of the date hereof, all of the obligations, requirements and arrangements under Clauses 21.1 (a) through (e) above have been satisfied in full, with respect to the First, Second and Third Plants.

21.2 Assignment:

- 21.2.1 Without prejudice to any of KPLC's rights under Clause 21.1, any assignment by a Party of all (but not part only) of its rights and obligations under this Agreement is permitted but only with the prior written consent of the other Party and of the Energy Regulatory Commission, provided that:
 - (a) such consent shall not be unreasonably withheld or delayed if the Party wishing to assign can satisfy the other Party of such proposed assignee's financial, technical and legal status and ability to observe and perform this Agreement; and
 - (b) the Party wishing to assign shall be given notice to that effect to the other Party and such notice shall have given sufficient information to show the status and ability of the proposed assignee to carry out the terms of this Agreement.
- 21.2.2 The provisions of Clause 21.2.1 do not apply to the collateral assignment by way of security of the Seller's right, title and interest in, to and under this Agreement and the Amended and Restated Olkaria III Project Security Agreement, including all of the Seller's rights to payments thereunder, and including any assignment pursuant to the Direct Agreement dated November 5, 2012 among KPLC, OPIC and OrPower 4, as such agreement may be amended, novated or supplemented from time to time.
- 21.2.3 No assignment pursuant to Clause 21.2.1 shall be effective unless and until the assigning Party has:

- (a) procured the proposed assignee to covenant directly with the other Party (in a form reasonably satisfactory to such Party) to observe and perform all the terms and conditions of this Agreement and if reasonably required by the other Party arrange for a guaranty or other equivalent security in favour of such other Party in respect of all obligations or liabilities to be assigned; and
- (b) provided to the other Party a certified copy of the assignment (excluding the consideration paid or payable for such assignment).

21.3 Sub-Contractors: The Seller shall be entitled to engage third parties as contractors for the performance of its obligations hereunder provided that no such engagement shall relieve the Seller of its obligations under this Agreement.

21.4 Variation: This Agreement may not be varied nor any of its provisions waived except by an agreement in writing signed by the Parties.

21.5 Waivers of Rights: No delay or forbearance by either Party in exercising any right, power, privilege or remedy under this Agreement shall operate to impair or be construed as a waiver of such right, power, privilege or remedy.

21.6 Notices: Except for communications in accordance with the Operating and Despatch Procedures, any notice of other communication to be given by one Party to the other under or in connection with this Agreement shall be given in writing and may be delivered or sent by prepaid airmail or facsimile or to the recipient at the address, and marked for the attention of the person, specified in Schedule 8 or such other address or person from time to time designated by notice to the other in accordance with this Clause; and any such notice or communication shall be deemed to be received upon delivery, or five (5) days after posting, or on confirmation of transmission when sent by facsimile.

21.7 Effect of Illegality, etc: If for any reason whatever any provision of this Agreement is or becomes or is declared by any court of competent jurisdiction to be invalid, illegal or unenforceable, then in any such case the Parties will negotiate in good faith with a view to agreeing one or more provisions to be substituted therefore which are not invalid, illegal or unenforceable and produce as nearly as is practicable in all the circumstances the appropriate balance of the commercial interests of the Parties.

21.8 Entire Agreement: This Agreement contains or expressly refers to the entire agreement between the Parties with respect to its subject matter and expressly excludes any warranty, condition or other undertaking implied at law or by custom and supersedes all previous agreements and understandings between the Parties with respect to its subject matter and each of the Parties acknowledges and confirms that it does not enter into this Agreement in reliance on any representation, warranty or other undertaking by the other Party not fully reflected in the terms of this Agreement.

21.9 Counterparts: This Agreement may be executed in two counterparts and by each Party on a separate counterpart, each of which when executed and delivered shall constitute an original, but both counterparts shall together constitute but one and the same instrument.

21.10**Waiver of Sovereign Immunity:** KPLC agrees that the execution, delivery and performance by it of this Agreement and the obligations hereunder, constitute private and commercial acts. In furtherance of the foregoing, KPLC agrees that:

- (a) should any proceedings be brought against KPLC or its assets in any jurisdiction in connection with this Agreement, or in connection with any of KPLC's obligations or any of the transactions contemplated by this Agreement, no claim of immunity from such proceeding will be claimed by or on behalf of itself or any of its assets;
- (b) it waives any right of immunity which KPLC or any of its assets has or may have in the future in any jurisdiction in connection with any such proceedings.

Clause 22: Governing Law

22.1 This Agreement shall be governed by and construed in all respects in accordance with the laws of Kenya.

AS WITNESS the hands of the duly authorised representatives of the Parties the day and year first above written.

Signed and Sealed)
for and on behalf of)
The Kenya Power &)
Lighting Company Limited)

Director

Secretary

Signed for and on behalf of _____)
OrPower 4 Inc.: by Ernest Mabwa _____

Authorised Signatory

List of Abbreviations

To promote clarity the following is a listing of the definitions used within these schedules. Where there is a conflict between this list and a definition within the schedules then the definition in the schedules shall be used.

P1AE	=	the non escalable component of portion of the Capacity Charge Rate of the First Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P1AF	=	the non escalable component of portion of the Capacity Charge Rate of the First Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P2A	=	the non escalable component of the Capacity Charge Rate of the Second Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P3A	=	the non escalable component of the Capacity Charge Rate of the Third Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P4A	=	the non escalable component of the Capacity Charge Rate of the Fourth Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P1ACP _{tp}	=	the total of the Actual Capacity Payments of the First Plant received in the Operating Year for each month up to and including month m;
P2ACP _{tp}	=	the total of the Actual Capacity Payments of the Second Plant received in the Operating Year for each month up to and including month m;
P3ACP _{tp}	=	the total of the Actual Capacity Payments of the Third Plant received in the Operating Year for each month up to and including month m;
P4ACP _{tp}	=	the total of the Actual Capacity Payments of the Fourth Plant received in the Operating Year for each month up to and including month m;
P1AC _y	=	the Available Capacity of the First Plant in Settlement Period y (expressed in kW);
P2AC _y	=	the Available Capacity of the Second Plant in Settlement Period y (expressed in kW);
P3AC _y	=	the Available Capacity of the Third Plant in Settlement Period y (expressed in kW);
P4AC _y	=	the Available Capacity of the Fourth Plant in Settlement Period y (expressed in kW);
P1AMA _p	=	the Actual Monthly Availability of the First Plant in month p (expressed in kWh);
P2AMA _p	=	the Actual Monthly Availability of the Second Plant in month p (expressed in kWh);
P3AMA _p	=	the Actual Monthly Availability of the Third Plant in month p (expressed in kWh);
P4AMA _p	=	the Actual Monthly Availability of the Fourth Plant in month p (expressed in kWh);
bara	=	the unit of measurement of pressure with respect to absolute zero pressure as defined in the International Standards Organisation Standard ISO 1000:1992 Specification for SI Units and Recommendations for Use of Their Multiples and Certain Other Units;

P1C	=	the percentage of P1VE and of P1VF represented by the fixed Capacity Charge Rate;
P2C	=	the percentage of P2V represented by the fixed Capacity Charge Rate;
P3C	=	the percentage of P3V represented by the fixed Capacity Charge Rate;
P4C	=	the percentage of P4V represented by the fixed Capacity Charge Rate;
P1CC	=	the Contracted Capacity (expressed in kW) of the First Plant;
P2CC	=	the Contracted Capacity (expressed in kW) of the Second Plant;
P3CC	=	the Contracted Capacity (expressed in kW) of the Third Plant;
P4CC	=	the Contracted Capacity (expressed in kW) of the Fourth Plant;
P1CCRE _p	=	Portion of the Capacity Charge Rate of the First Plant for month p (expressed in US \$/kW);
P1CCRF _p	=	Portion of the Capacity Charge Rate of the First Plant for month p (expressed in US \$/kW);
P2CCR _p	=	the Capacity Charge Rate of the Second Plant for month p (expressed in US \$/kW);
P3CCR _p	=	the Capacity Charge Rate of the Third Plant for month p (expressed in US \$/kW);
P4CCR _p	=	the Capacity Charge Rate of the Fourth Plant for month p (expressed in US \$/kW);
CC _y	=	the Contracted Capacity (expressed in kW) for Settlement Period y;
CPI _b	=	with respect to the Early Generation Facility, the United States Consumer Price Index for June 1996 or as otherwise described in Schedule 5, Part B ("Plant Tariff");
P1CPI _b	=	with respect to the First Plant, the United States Consumer Price Index for March 2005 (= 193.30) or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
P2CPI _b	=	with respect to the Second Plant, the United States Consumer Price Index for July 2009 = 215.35 or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
P3CPI _b	=	with respect to the Third Plant, the United States Consumer Price Index for July 2009 = 215.35 or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
P4CPI _b	=	with respect to the Fourth Plant, the United States Consumer Price Index for July 2009 = 215.35 or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
CPI _{p-I}	=	the United States Consumer Price Index for the month 3 months prior to month p;
P1CP _p	=	the Capacity Payment of the First Plant for month p (expressed in US \$);
P2CP _p	=	the Capacity Payment of the Second Plant for month p (expressed in US \$);
P3CP _p	=	the Capacity Payment of the Third Plant for month p (expressed in US \$);
P4CP _p	=	the Capacity Payment of the Fourth Plant for month p (expressed in US \$);
P1ECR _b	=	the Base Energy Charge Rate of the First Plant;
P2ECR _b	=	the Base Energy Charge Rate of the Second Plant;
P3ECR _b	=	the Base Energy Charge Rate of the Third Plant;
P4ECR _b	=	the Base Energy Charge Rate of the Fourth Plant;
P1ECR _p	=	the Energy Charge Rate of the First Plant (expressed in US\$/kWh) in month p;

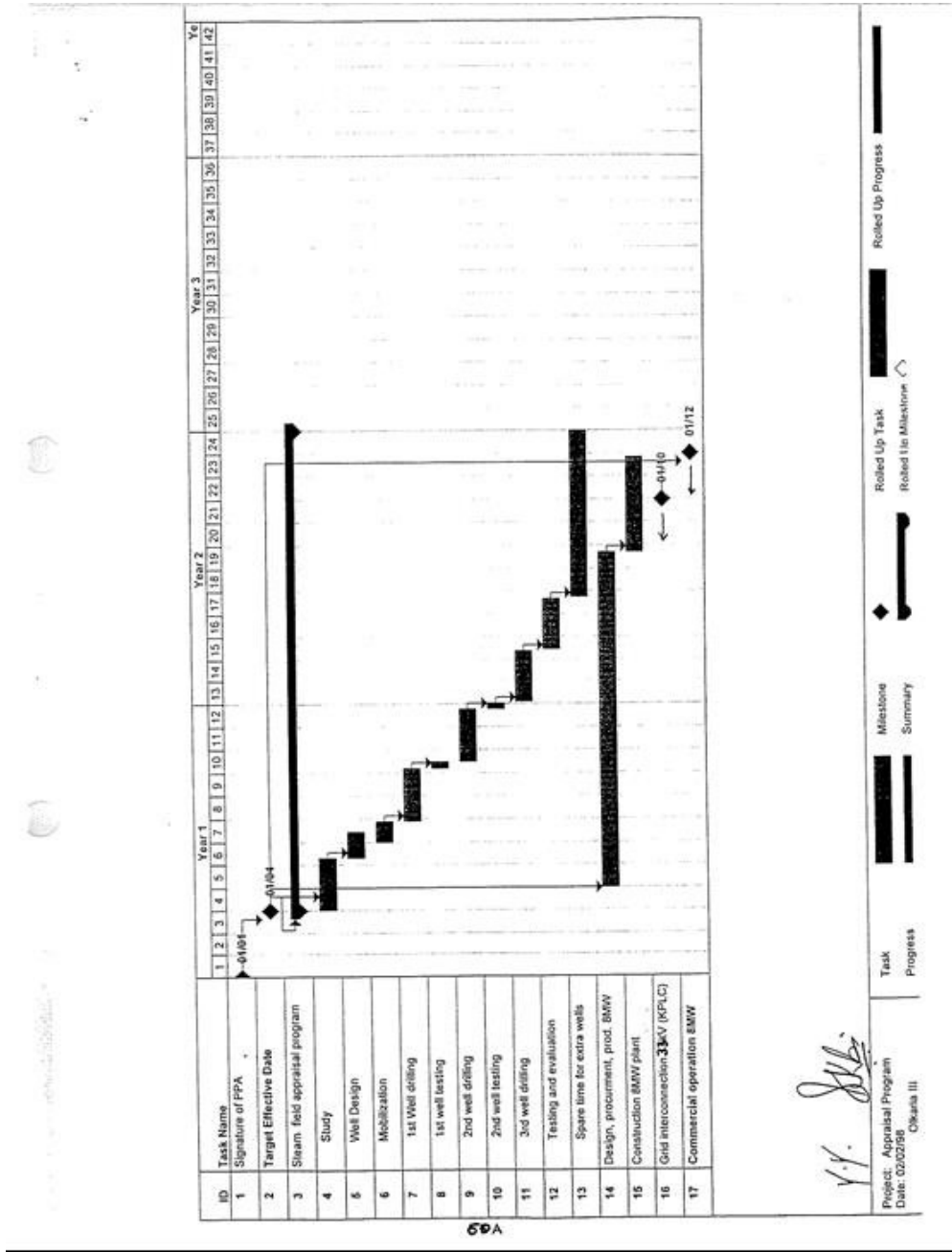
P2ECR _p	=	the Energy Charge Rate of the Second Plant (expressed in US\$/kWh) in month p;
P3ECR _p	=	the Energy Charge Rate of the Third Plant (expressed in US\$/kWh) in month p;
P4ECR _p	=	the Energy Charge Rate of the Fourth Plant (expressed in US\$/kWh) in month p;
EGAC _y	=	the Early Generation Available Capacity in Settlement Period y (expressed in kW);
EGACP _{tp}	=	the total of the Actual Capacity Payments of the Early Generation Facility received in the Operating Year for each month up to and including month m;
EGCC	=	the Contracted Capacity of the Early Generation Facility (expressed in kW);
EGCCR _p	=	the Capacity Charge Rate of the Early Generation Facility for month p (expressed in US\$/kW/month)
EGCP _p	=	the Capacity Payment of the Early Generation Facility for month p (expressed in US\$);
EGD	=	the duration in years between the Early Generation Commercial Operation Date and the planned date of the Early Generation Cessation Date;
EGEC _p	=	the aggregate amount of Energy Charges (US\$) of the Early Generation Facility payable in respect of month p;
EGECR _b	=	the Base Energy Charge Rate of the Early Generation Facility;
EGECR _p	=	the Energy Charge Rate (expressed in US\$/kWh) of the Early Generation Facility prevailing in month p;
EGLC	=	the Capacity of the Early Generation Facility not Available as a result of the event of Force Majeure (expressed in kW);
EGMTA _p	=	the Monthly Target Availability of the Early Generation Facility (expressed in kWh);
EGNEO _p	=	the aggregate Net Electrical Output (kWh) of the Early Generation Facility in month p;
EGOA	=	Annual Outage Allowance of the Early Generation Facility – as described in Schedule 3;
EGSMA _p	=	the Scheduled Maintenance Allowance of the Early Generation Facility in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the Early Generation Capacity would otherwise have been dispatched at its Contracted Capacity calculated using the values of EGSMA set forth in Schedule 3;
EGUSMA _p	=	the Unscheduled Maintenance allowance of the Early Generation Facility in month p (expressed in kWh);
P1DE	=	the percentage of P1VE represented by escalable costs;
P1DF	=	the percentage of P1VF represented by escalable costs;
P2D	=	the percentage of P2V represented by escalable costs;
P3D	=	the percentage of P3V represented by escalable costs;
P4D	=	the percentage of P4V represented by escalable costs;
H _p	=	the hours in month p;
H _r	=	the enthalpy of the geothermal fluid expressed in kJ/kg at each well head at the instant that a reading of MF, is taken;
H _y	=	the number of hours in a year being eight thousand seven hundred and sixty (8760);

Hz	=	the unit of measurement of frequency as defined in the International Standards Organisation Standard ISO 1000:1992 Specification for SI Units and Recommendations for Use of Their Multiples and Certain Other Units;
P1LC	=	the Capacity of the First Plant not Available as a result of the event of Force Majeure (expressed in kW);
P2LC	=	the Capacity of the Second Plant not Available as a result of the event of Force Majeure (expressed in kW);
P3LC	=	the Capacity of the Third Plant not Available as a result of the event of Force Majeure (expressed in kW);
P4LC	=	the Capacity of the Fourth Plant not Available as a result of the event of Force Majeure (expressed in kW);
P1MEC _p	=	the aggregate amount of Energy Charges (US\$) of the First Plant payable in respect of month p;
P2MEC _p	=	the aggregate amount of Energy Charges (US\$) of the Second Plant payable in respect of month p;
P3MEC _p	=	the aggregate amount of Energy Charges (US\$) of the Third Plant payable in respect of month p;
P4MEC _p	=	the aggregate amount of Energy Charges (US\$) of the Fourth Plant payable in respect of month p;
MF _r	=	the mass flow rate of geothermal fluid at each well head expressed in kg/s;
P1MTA _p	=	the Monthly Target Availability of the First Plant (expressed in kWh);
P2MTA _p	=	the Monthly Target Availability of the Second Plant (expressed in kWh);
P3MTA _p	=	the Monthly Target Availability of the Third Plant (expressed in kWh);
P4MTA _p	=	the Monthly Target Availability of the Fourth Plant (expressed in kWh);
M _y	=	the number of months in a year being twelve (12);
P1NEO _p	=	the aggregate Net Electrical Output (kWh) of the First Plant in month p;
P2NEO _p	=	the aggregate Net Electrical Output (kWh) of the Second Plant in month p;
P3NEO _p	=	the aggregate Net Electrical Output (kWh) of the Third Plant in month p;
P4NEO _p	=	the aggregate Net Electrical Output (kWh) of the Fourth Plant in month p;
NEO _T	=	the Net Electrical Output delivered during the test expressed in kWh;
P1OA	=	the Annual Outage Allowance of the First Plant – as set forth in Schedule 3;
P2OA	=	the Annual Outage Allowance of the Second Plant – as set forth in Schedule 3;
P3OA	=	the Annual Outage Allowance of the Third Plant – as set forth in Schedule 3;
P4OA	=	the Annual Outage Allowance of the Fourth Plant – as set forth in Schedule 3;
P1PPA _t	=	the number of years between the Full Commercial Date of the First Plant and end of the end of the Term;
P2PPA _t	=	the number of years between the Full Commercial Date of the Second Plant and end of the end of the Term;
P3PPA _t	=	the number of years between the Full Commercial Date of the Third Plant and end of the end of the Term;
P4PPA _t	= _t	the number of years between the Full Commercial Date of the Fourth Plant and end of the end of the Term;

P1SMA _p	=	the Scheduled Maintenance Allowance of the First Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the First Plant would otherwise have been dispatched at its Contracted Capacity;
P2SMA _p	=	the Scheduled Maintenance Allowance of the Second Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the Second Plant would otherwise have been dispatched at its Contracted Capacity;
P3SMA _p	=	the Scheduled Maintenance Allowance of the Third Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the Third Plant would otherwise have been dispatched at its Contracted Capacity;
P4SMA _p	=	the Scheduled Maintenance Allowance of the Fourth Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the Fourth Plant would otherwise have been dispatched at its Contracted Capacity;
SP	=	the number of Settlement Periods in the year;
P1USMA _p	=	the Unscheduled Maintenance allowance of the First Plant in month p (expressed in kWh);
P2USMA _p	=	the Unscheduled Maintenance allowance of the Second Plant in month p (expressed in kWh);
P3USMA _p	=	the Unscheduled Maintenance allowance of the Third Plant in month p (expressed in kWh);
P4USMA _p	=	the Unscheduled Maintenance allowance of the Fourth Plant in month p (expressed in kWh);
P1VE	=	Portion of the Base Capacity Charge Rate of the First Plant;
P1VF	=	Portion of the Base Capacity Charge Rate of the First Plant;
P2V	=	the Base Capacity Charge Rate of the Second Plant;
P3V	=	the Base Capacity Charge Rate of the Third Plant; and
P4V	=	the Base Capacity Charge Rate of the Fourth Plant.

Schedule 1: Appraisal Programme

(See Page 72)



Schedule 2: Facilities to be installed by KPLC and the Seller

Part A

1 Functional Specification of the Early Generation Facility and each Plant

A. General

1.1 Project Description:

(a) Introduction

With respect to the Early Generation Facility and the First Plant, the Seller has completed as it was required to:

- conduct a detailed Appraisal Programme and to evaluate the existing geothermal resources at the Site and to develop wells and the geothermal steam field for the supply of steam to the First Plant;
- design, build and commission the Early Generation Facility and subsequently, as determined by the appraisal, the First Plant;
- connect the Early Generation Facility to the Early Generation Interconnection Point; and
- connect the First Plant to KPLC's System via a high voltage connection leading to the Interconnection Point.

With respect to the Second Plant, the Seller is required to design, build and commission the Second Plant and to connect the Second Plant to KPLC's System via the high voltage connection leading to the Interconnection Point.

With respect to the Third Plant, following a Notice of Third Plant Exercise, the Seller will be required to design, build and commission the Third Plant and to connect the Third Plant to KPLC's System via the high voltage connection leading to the Interconnection Point.

- (b) With respect to the Fourth Plant, following a Notice of Fourth Plant Exercise, the Seller will be required to design, build and commission the Fourth Plant and to connect the Fourth Plant to KPLC's System via the high voltage connection leading to the Interconnection Point.

(c) General Description

As shown in Figure 1, the Olkaria geothermal resource lies about five (5) km to the south-east of Lake Naivasha and covers an area estimated to be over seventy five (75) square kilometres.

Except by specific agreement, all of the Early Generation Facility and each Plant will be located within the Licence Area indicated on the map in Figure 2 in the western area of the resource. KPLC had earlier drilled and tested 8 deep wells in the area and these are assigned to the Seller for fluid production, reinjection, monitoring and/or maintenance.

The Seller has carried out an appraisal of the geothermal resource to establish the capacity of the geothermal resource for power generation. An Early Generation Facility of 8 MW Contracted Capacity was later increased to approximately 12 MW in the year 2000, and was constructed at the Site by the Seller as required, before the completion of the appraisal of the geothermal resource utilising the completed exploration wells for power generation. The Early Generation Facility consisted of three binary energy converters, two of approximately 5 MW gross output each and the third of approximately 3 MW output. The converters are air cooled and run on the heat energy from geothermal fluid extracted from the existing wells drilled by KPLC within the Licence Area. The Early Generation Facility supplied electrical energy to KPLC's System at an agreed voltage through an interconnector constructed by KPLC ("**KPLC's Transmission Interconnection**").

The First Plant was then constructed, and is located at a single Site within the geothermal Licence Area connected to the wells by pipelines conveying single or dual phase steam and water. The First Plant consists of three (3) binary energy converter Units of the Early Generation Facility (Units 1, 2 and 3) and three (3) additional binary energy converter Units (Units 4, 5 and 6).

The First Plant supplies electrical energy to KPLC's System through an interconnector linking the Plant to a 220 kV substation built by KPLC at Olkaria II. Following expiry of the Term the First Plant may remain fit for further service.

The Second Plant will be located at a single Site within the geothermal Licence Area connected to the wells by pipelines conveying single or dual phase steam and water. The Second Plant will consist of three (3) binary energy converter Units (Units 7, 8 and 9).

The Third Plant is also located at a single Site within the geothermal Licence Area connected to the wells by pipelines conveying single or dual phase steam and water. The Third Plant consists of two (2) binary energy converter Units (Units 10 and 11).

The Fourth Plant (if applicable) will also be located within the geothermal Licence Area and connected to the wells by pipelines conveying single or dual phase steam and water. The Fourth Plant will be constructed utilizing similar and compatible technologies and configuration to those incorporated in the First, Second and Third Plants.

The Seller shall not drill any wells at any point within 100 metres of the boundary of the Licence Area. Drilling may not be directed under the area excluded by the licence boundary and the line 100 metres from the boundary.

Subject to any legislative or licensing constraints affecting this functional specification, the siting of new wells, steam field facilities, the Early Generation Facility and each Plant will be the responsibility of the Seller who will be expected to conduct its operations in accordance with Prudent Operating Practice. GOK will make available to the Seller that part of the Site which may be on public land. Access to private land will be the responsibility of the Seller.

(d) Scope

The Seller shall extract geothermal energy from beneath the Licence Area in compliance with its geothermal resources licence and electric power production license and with this Agreement and shall convert the energy efficiently into electricity for sale to KPLC at the Early Generation Interconnection Point/Interconnection Point. The Early Generation Facility and each Plant shall be designed to enable the Seller to meet the obligations of this Agreement.

The scope of the Seller's duties shall include but not be limited to:

- design, procurement, construction, operation and maintenance of the existing and additional wells, the steam collection and water disposal systems, the Early Generation Facility and each Plant;
- design, procurement, and construction of the 220 kV Transmission Interconnector;
- compliance with the provisions of the geothermal resources licence including:
- measurement and monthly reporting of the geothermal energy extracted and of the electricity available and supplied; and
- monitoring, reporting, and participating in field management of the geothermal reservoir.

1.2 General Information:

(a) Geothermal Considerations

The Seller will follow good geothermal engineering practice in all aspects of design drilling and construction operation and maintenance particularly including, but not limited to, the effects of:

- hot and/or unstable ground;
- elevated temperatures on material properties, equipment requirements, well control and other practices;
- hydrogen sulphide and other gases affecting personal safety and corrosion of copper-bearing materials;

- earthquakes.

(b) Ambient Conditions

Each Plant shall be designed and constructed to take account of the following ambient conditions:

(i) General

Maximum ambient air temperature	35°C
Minimum ambient air temperature	1°C
Average ambient air temperature in any one year	18°C
Average relative humidity at midday	57%
Minimum relative humidity	70%
Average annual rainfall	714mm
Isokeraunic level	60-70 days/annum
Design maximum wind speed	35 m/s
Ambient pressure	0.8 bara

(ii) Reference Conditions

Atmospheric pressure	0.8 bara
Ambient air temperature	16.5°C
Wet bulb temperature	13.3°C

1.3 Generally Applicable Codes and Standards

Each Plant shall comply with the requirements of all applicable legislation, orders, decrees, instruments, etc. of the Republic of Kenya including but not limited to:

Health and safety in employment;

Codes of practice for the design and safety, operation, maintenance and servicing of pressure vessels;

Noise;

Electricity regulations/codes of practice;

Public works;

Fire Protection;

Environmental Protection

Where appropriate legislation is not available, the latest version of national or international standards will be used to define the minimum requirements. The mixing of various national and international standards shall only be permitted with the prior approval of KPLC or its representative. This Functional Specification is based on the use of one set of standards for each discipline:

Civil Works – Kenyan Standards with supplementary requirements for seismic design as given in Unified Building Code of USA;

Mechanical Works – ASME/ANSI, API and ASHRAE;

Electrical Control and Instrumentation – IEC, IEEE, ANSI;

Quality Systems – International Standards Organisation standard ISO 9000 series;

Deviations from the referenced standards or substitution by equivalent ones shall be subject to the approval of KPLC or its appointed representative.

The references to codes and standards set out in this paragraph 1.3 shall be references to those codes and standards fixed as at the relevant Determining Date.

1.4 Environmental Aspects

The project and all of the plant therein shall comply with the environmental guidelines contained within the “Geothermal Energy” section of the latest version of the “Industrial Pollution Preventions and Abatement Handbook” published by the World Bank Environment Department in collaboration with the United Nations Industrial Development Organisation and United Nations Environmental Programme current at the relevant Determining Date of this Agreement, except where KPLC provides written agreement to variations or where other more onerous environmental requirements are imposed within this Agreement pursuant to a Change in Law.

All equipment will be designed and constructed to minimise the environmental impact.

The Seller shall give consideration to visual impact, wildlife habitat and temporary disturbance during construction, maintenance and operation. The Seller will produce and abide by a detailed statement on the manner in which the construction and operation will avoid or mitigate adverse effects on the environment including the aspects listed below which have been identified as requiring specific attention. Seller shall be especially sensitive to the National Park status of the land within which the Licence Area is located.

(a) Air Quality

Water vapour and gases (especially hydrogen sulphide) will be dispersed so as to avoid concentrations at ground level which are unacceptable as to personal safety, smell and condensate spray.

(b) Liquid and Solid Wastes

Liquid drilling wastes will be ponded. Residual quantities of liquid and solid wastes will be treated and/or removed to allow Site restoration. Drainage of surface water will be arranged to avoid the risk of erosion of the light volcanic soils.

Spent geothermal water shall be re-injected into the ground at points which cause minimal disturbance to the geothermal reservoir and which comply with the geothermal licence.

(c) Land Disturbance

Earthworks shall be kept to a minimum and so managed as to avoid soil erosion and to achieve permanent restoration.

Well sites and each Plant shall be fenced but pipelines shall be designed to allow easy movement of animals including giraffes and other wildlife across the Licence Area.

(d) Visual Aspects

As far as practicable, visual changes to the landscape shall be minimised. Consistent with safety and other engineering needs, Seller shall select locations, shapes and colours which merge into or enhance the appearance of the area including the growing of trees to soften the effect of the Plant structures.

(e) Noise

In addition to limiting steady and intermittent levels of noise to recognised safety levels for humans, Seller shall ensure that the unusually quiet nature of the National Park and the susceptibility of wildlife to high noise levels are recognised in the design of the Plant and its facilities and the operating procedures.

The noise limits at the Early Generation Facility and Plants' boundary fencing shall be in accordance with the Environmental Impact Assessment.

1.5 Project Programming

The Seller shall submit a detailed schedule showing key activities and the timetable necessary to achieve completion of the programme of work. The programme of work will include the design, manufacture, construction, commissioning and any planned maintenance for the complete development. During the Appraisal Period the Seller shall submit a report every two (2) months to KPLC or its appointed representative detailing the progress of the appraisal process and an estimated completion date. During the construction period of both the Early Generation Facility and of each Plant the Seller will submit monthly reports to KPLC or its appointed representative to give the best estimated time to completion and demonstrate that all reasonable measures are being taken to maintain that schedule.

1.6 Quality Assurance Requirements:

(a) Quality System

Seller shall have a certified Quality System that meets the requirements of the International Standards Organisation standard ISO 9000 series of standard or equivalent.

The Seller shall provide details to KPLC of a programme to ensure that the Early Generation Facility and each Plant operates to the standards, which programme shall include details of measures to monitor performance against such standards under surveillance, at least three (3) months prior to the start of construction.

At least three (3) months prior to the Early Generation Commissioning Date and again three (3) month prior to the Plant Commissioning Date for a Plant a plan containing the applicable procedures, design, verification, plans and inspection test plans for the Early Generation Facility and for such Plant, as the case may be, shall be submitted to KPLC. KPLC reserves the right to examine any procedures referred to in the plan and to audit the Seller against the requirements of the plan at any time.

Three (3) copies of all appropriate quality records as required by applicable codes and standards shall be submitted to KPLC or its appointed representative for review prior to or concurrent with the arrival in Kenya of all materials and equipment required for the Project.

(b) Inspection and Testing

The Early Generation Facility and each Plant shall undergo inspection and testing during manufacture, erection and on completion for verification that the components satisfy all the requirements as specified. All inspection and testing shall be conducted in accordance with the applicable codes and standards. The Seller shall consider the provisions specified as minimum requirements and also use its own experience in determining requirements for additional inspection and testing that it considers necessary. KPLC shall have the right to inspect any records of this inspection or testing.

2 Civil Engineering and Construction

2.1 General

Where a building, detail, material or other item is not covered by this specification, then it shall be based on accepted building practice using appropriate high quality materials.

2.2 Site Preparation

The Seller will conduct a pre-construction survey of the Licence Area. The survey shall demonstrate that all work for the Early Generation Facility, each Plant and the steam field, including construction requirements, lies within the Licence Area.

2.3 Dwellings

The Seller will provide all accommodation or dwellings required for the construction and operation phases. Dwellings are not permitted within the National Park.

3 Steamfield

3.1 Drilling, Well Control, Abandonment

Well design materials and drilling practices shall comply generally with relevant petroleum industry standards including API codes modified for geothermal conditions as contained in NZSI 2403:1991 Code of Practice for Deep Geothermal Wells and with the requirements of the Seller's geothermal licence.

At all times during its life each well shall be so operated, worked over or repaired externally as to mitigate the effects of corrosion, erosion and other weaknesses. Downhole and surface inspections shall be made as required in the geothermal licence to ensure safety for persons, surface property and reservoir competence.

Before drilling or workovers commence the Seller shall provide to and have agreed by the KPLC detailed programmes of work. Wells which are no longer useful or safe shall be cemented and abandoned in the manner specified in New Zealand Standard NZSI 2402 or as otherwise agreed with the KPLC.

Unproductive wells shall be sealed and left in a condition agreed with KPLC.

If following the Appraisal Works no further development is to be undertaken all wells shall be left in a safe condition as agreed by KPLC at the time.

3.2 Steam and Water Systems

The layout, sizing and optimisation of the pipework and associated equipment will be undertaken by the Seller. For overland piping thermal insulation complete with cladding shall be installed to limit the surface temperature to 50°C.

The following standards shall be used:

Pressure Vessel	American Society of Mechanical Engineers standard ASME VIII;
Piping	American National Standards Institute standard ANSI B31.1;
Valves	SME 16.4

The geothermal fluid extracted from the resource shall be quantified for the purpose of resource monitoring and commercial reasons. The pressures, temperatures and flows for both steam and separated water shall be logged on a continuous basis. Regular chemical analyses shall also be conducted and logged.

4 Early Generation Facility and each Plant

4.1 General Requirements

(a) General

The design and construction of the Early Generation Facility and each Plant shall meet the performance requirements set out herein. Adequate design margins shall be included to allow for normal deterioration of plant performance between overhauls and de-scaling. All equipment used shall be new plant of proven design suitable for operation under the environmental conditions found at the geothermal site.

(b) Design Life and Availability

The Early Generation Facility, each Plant and all components shall be designed for the following minimums:

Design Life: 25 years

Average Annual Unit Availability Factor over the Term – for the Early Generation Facility - 92%, and for each Plant – 96%

where:

Availability Factor	=	$\frac{\text{Available Hours} \times 100}{\text{Period Hours}}$
Period Hours	=	8,760
Available Hours	=	Period hours minus planned and unplanned outage hours

The high availability specified above shall be achieved with the use of standby equipment (redundancy) and design measures to give extended periods of operation between cleaning/planned maintenance shut-downs.

4.2 Mechanical Equipment

(a) Rotating Equipment

Steam turbines shall be designed manufactured and tested to International Electrotechnical Commission standard IEC 45 or equivalent applicable code and all referenced standards. The turbines shall be capable of operating for at least 15 minutes at no load. The turbines shall be capable of stable automatic transition to no load operation following disconnection from KPLC’s System. Turbines shall be designed to operate under all variations of chemical and physical characteristics of geothermal steam.

For the evaluation of the performance test ASME steam tables shall be used.

For turbines using motive fluids other than steam the design principles for steam turbines as defined in the referenced standards shall be adopted where appropriate. These turbines shall comply with the performance requirements specified for the steam turbine, i.e. capability of operating for at least 15 minutes at no load and stable automatic transition to no load operation following disconnection from KPLC's System.

Pumps shall be designed, manufactured and tested to Hydraulic Institute Standards or AWWA as applicable.

(b) Pressure Vessels and Piping

The following standards shall be used:

Pressure Vessel	American Society of Mechanical Engineers standard ASME VIII;
Piping	American National Standards Institute standard ANSI B31.1;
Valves	American Society of Mechanical Engineers standard ASME 16.4

(c) Heat Exchangers

The following standards shall be used:

Condenser	Heat Exchanger Institute;
Cooling Tower	CTI Codes/Civil building codes;
Tubular Heat Exchangers	Tubular Exchangers Manufacturers Association Standard TEMA class C

4.3 Control, Instrumentation and Electrical Equipment

(a) Outline of Electrical Requirements

The generators of the Early Generation Facility shall be connected to KPLC's System at the Early Generation Interconnection Point. The interconnector shall consist of a single overhead transmission line at an agreed voltage to be built by KPLC to transfer the full output from the Early Generation Facility. The Seller may propose suitable designs for the interconnection including arrangements for generators, auxiliary supplies and interconnector switching. The design shall comply with existing KPLC design standards and criteria and enable the output of each generator to be controlled. A single line diagram is given in Figure 4.

The characteristics of the KPLC system are as follows:

Nominal rated voltage	33 kV;
Operating voltage range	+ 10%;
Nominal frequency	50 Hz;
Operating frequency range	+ 2.0 Hz
Max prospective short-circuit current	40 kA (rms, symmetrical)

The main generators of each Plant shall be connected via individual step up transformers, with on load tap changers, to a high voltage interconnector to the Olkaria II substation (the substation to be constructed by KPLC).

The interconnector shall consist of a single circuit rated to transfer the full output from such Plant. The interconnector shall be constructed at 220 kV.

One bay will be provided at the 220 kV Olkaria II substation by KPLC and the Seller will propose suitable designs for the interconnection including arrangements for voltage transformation and interconnector switching. A single line diagram is given in Figure 3.

The characteristics of the KPLC 220kV system (“**System Characteristics**”) are as follows:

Nominal rated voltage	220 kV;
Operating voltage range	+10%;
Nominal frequency	50 Hz;
Operating frequency range	+ 2.0 Hz;
Maximum prospective short-circuit current	40 kA (rms, symmetrical)

(b) Generators and Associated Control Equipment

Each generator of the Early Generation Facility shall be rated on a continuous running duty basis, duty Type SI, for a design power factor of 0.85 lagging to 0.9 leading. The maximum continuous rating of the Early Generation Facility after completion of the third energy converter unit is approximately 12 MW and shall be the output available at the Delivery Point at rated voltage, frequency and power factor.

Each generator of each Plant shall be rated on a continuous running duty basis, duty Type SI, for a design power factor of 0.8 lagging to 0.9 leading. The maximum continuous rating of the First Plant was originally expected to be 64 MW but, was determined to be 48 MW pursuant to the completion of the Appraisal Works. All references to 64 MW from now on in these Schedules shall be taken to mean, with respect to the First Plant, the Second Plant, the Third Plant and the Fourth Plant (as applicable) the relevant capacity value described in Section 5.12 of the General Terms and Conditions of the Agreement and shall be that output available at the Delivery Point at rated voltage, frequency and power factor.

All generators shall be equipped with a continuously acting fast response automatic excitation system of either brushless or static type with a high initial response characteristic (excitation system voltage response time of 0.1 second or less).

The generator automatic voltage regulators shall be capable of maintaining terminal voltage to an accuracy of + 0.5%, relative to a constant reference value, adjustable over the range + 10%, to ensure adequate steady state stability.

The generator short circuit ratio at rated MVA shall not be less than 0.5.

Automatic synchronising equipment shall be provided for the generator circuit breakers. Manual synchronising, complete with check synchronising facilities relays shall be provided for the generators/step up transformers.

(c) Power Transformers

The generator step up transformers of each Plant shall be rated for maximum duty. They shall be fitted with on load tap changers with a tapping range such as to permit maximum export with the generator at rated voltage and 0.85 lagging power factor, with KPLC's System operating at a voltage of 220kV.

(d) Emergency and Maintained Power Supplies

The Seller shall ensure that sufficient and reliable standby power supplies are available during loss of normal power supplies, such that continuous operation of all equipment which may be required during such periods can be maintained.

(e) Earthing and Lighting Protection

The Seller shall include a complete and integrated earthing and lightning protection system for the overall Site.

(f) Communications

Communications with KPLC shall be via telephone line to Olkaria I in accordance with its requirements. The Seller shall provide one telephone extension and one fax extension on each of KPLC's control networks. These telephones shall not be interconnected to any system which is connected to the public telephone system.

Provisions shall be made by the Seller for data interconnections to KPLC's SCADA system.

The Seller will install a dedicated computerised system for acquisition of plant data and calculation of all plant characteristics which are related to power generation and efficiency of conversion, to enable payments from KPLC to the Seller to be calculated. The Seller shall also log all dispatch requirements. A remote visual display unit, terminal and printer capable of interrogating the computer system shall be provided to KPLC's premises at Juja Road Substation, Nairobi, communicating via telephone modem.

4.4 Operating Characteristics

4.4.1 Early Generation Facility

(a) Unit Starts

The notice required by the Seller to start up a binary energy converter Unit (BEC) of the Early Generation Facility will vary according to the length of time that the turbine generator of the binary energy Converter has been shut down. The Early Generation Facility shall be able to start up the various components within the following time periods:

Scope of Shutdown	Notice required to synchronise
Early Generation Facility	BEC 1 hour
Steam Field	6 hours
Wells	12 hours

(b) Unit Load Ramping Rate

The maximum Unit load ramping rate during synchronisation and a load to full load under normal conditions shall be no more than 10% of Unit rated capacity per minute.

(c) Step Loading

Any Unit shall be able to accept an instantaneous load variation of 5% of rated capacity.

(d) Load Rejection

Any Unit and the Early Generation Facility must remain in a safe condition following a sudden full load rejection and must be capable of re-synchronisation within 30 minutes.

(e) Frequency Limitation

The frequency limitation of the Early Generation Facility for continuous operation is between the range 48.0 and 52.0 Hz.

(f) Power Factor

Each unit is capable of operating at Rated Capacity with a generation power factor measured at the generator terminals in the range of 0.85 lagging to 0.90 leading.

(g) Voltage Limits

The Early Generation Facility shall be capable of operating with the variation of $\pm$ ten percent (10%) at the generator terminals. The Early Generation Facility will automatically trip if the voltage exceeds this range.

4.4.2 Each Plant

(a) Unit Starts

The notice required by the Seller to start up a binary energy converter unit will vary according to the length of time that the binary energy converter unit has been shut down. The Plant shall be able to start up the various components within the following time periods:

Scope of Shutdown	Notice required to synchronise
Generating Plant	3 hours from cold, 1 hour from hot
Steam Field System	6 hours
Wells	12 hours

(b) Unit Load Ramping Rate

The maximum Unit Load ramping rate during synchronisation and loading to full load under normal conditions shall be no more than ten percent (10%) of Rated Capacity per minute.

(c) Step Loading

Any unit shall be able to accept an instantaneous load variation of five percent (5%) of rated capacity.

(d) Load Rejection

Any Unit and the Plant must remain in a safe condition following a sudden full load rejection and must be capable of re-synchronisation within thirty (30) minutes.

(e) Frequency Limitation

The frequency limitation of the Plant for continuous operation is between the range forty eight (48.0) and fifty two (52.0) Hz.

(f) Power Factor

Each unit is capable of operating at Rated Capacity with a generation power factor measured at the generator terminals in the range 0.85 lagging to 0.90 leading.

(g) Voltage Limits

The Plant shall be capable of operating with variation of $\pm$ ten percent (10%) of the voltage on the high voltage terminals of the step up transformers with no-load tap changer in operation. The Plant will automatically trip if the voltage exceeds this range.

Part B: The Seller's Connection Facilities including the Transmission Interconnector and KPLC's Connection Facilities

1 Transmission Interconnector

Prior to the construction of the First Plant, the Seller has constructed a single circuit Transmission Interconnector between the First Plant and the KPLC's Connection Facilities which are located at the Olkaria II power station 220 kV switchyard. The Transmission Interconnector is designed in accordance with existing KPLC design standards and criteria. The design criteria considering line design basis, protection and communication requirements, including inter-tripping requirements are set out in Part C of this Schedule 2.

2 Generating Unit Protection Devices

The Units shall be equipped with the following protection devices and KPLC and the Seller shall agree the necessary settings for these:

- (i) Stator Earth Fault;
- (ii) Negative Phase Sequence;
- (iii) Step up transformer over current and earth fault; and
- (iv) High voltage busbar protection (if appropriate).

Part C: Design Criteria – Transmission Interconnector

1 Temperature Limits and Wind Loadings

Item	Description	Detail	
1.	Temperatures		
1.1	Minimum temperature of conductors	°C	-1
1.2	Maximum temperature of conductors	°C	75
1.3	“Everyday” temperature of conductors	°C	25
2.	Wind Pressure		
2.1	Wind pressure on projected area of conductors, earth wires and insulators	N/m ²	383
2.2	Wind pressure on projected area of members of one face of tower	N/m ²	690

2 Factors of Safety

Item	Detail	Minimum Factor
Conductors		
1.	Conductors and earth wire at final maximum working tension based on ultimate nominal breaking load.	3.0
2.	Conductors and earth wire in still air at everyday temperature final tension based on ultimate nominal breaking load.	5.0
3.	Anchor clamps and mid-span joints based on conductor or earth wire ultimate nominal breaking load.	0.95
Insulators and Fittings		
4.	Tension set failing load based on conductor maximum working tension	3.0
5.	Suspension set failing load based on the resultant of maximum vertical and transverse loadings under normal working conditions.	3.0
Supports		
6.	Steel towers under normal working conditions.	2.5
7.	Steel towers under broken wire conditions.	1.25
8.	Foundations under normal working conditions.	2.5
9.	Foundations under broken wire conditions.	1.5

3 Minimum Clearances

The following are the minimum clearances between live conductors and other objects, which correspond to the condition of maximum sag of conductor either in still air or at maximum swing condition.

Item	Description	Clearance
		220 kV
3.1	Minimum clearances from Conductor in m:	
(i)	to normal ground	7.5
(ii)	to metal clad or roofed buildings, or other buildings or structures upon which a man may occasionally stand	5.2
(iii)	to electric power line wires (line or earth)	4.0
(iv)	to telephone lines	4.0
(v)	to paved roads	8.5

(vi)	to railways	8.5
(vii)	to be added to the above clearances to allow for conductor creep (at mid span)	0.6
3.2	Minimum clearance from live metal to support steelwork on suspension supports in mm:	
(i)	from 0-25° swing	2200
(ii)	from 25° to 45° swing	2100
3.3	Assumed maximum transverse swing from the vertical of suspension insulator strings on straight line supports	45°
3.4	Minimum clearance from live metal to earthed metal at tension supports in mm:	
(i)	in still air	2200
(ii)	jumper loops under 25° swing	2100
3.5	Assumed maximum angle of swing from the vertical of jumper loops	25°
3.6	Maximum shielding angle of earth wire (in still air) on conductor at tower	0°

4 Broken Wire Conditions

Item	Tower Type	Maximum number of complete phase or earth conductors broken
4.1	Suspension, Single Circuit	Any one phase or one earth wire (tension reduced to 70% of maximum working tension for broken phase only).
4.2	Suspension, Double Circuit	Any one phase and one earth wire or any two phases (tension reduced to 70% of maximum working tension for broken phases only)
4.3	All other tower types	Any two wires, phase or earth, at maximum working tension

5 Span Lengths

Item	Description	Span Lengths (m)
5.1	Basic (design) span	370
5.2	Wind span (Suspension and Angle Tension towers)	(i) Normal condition 410 (ii) Broken wire 310
	Wind span (Terminal towers)	Normal condition 220
5.3	Weight span for Suspension towers	(i) Normal condition 740 (ii) Broken wire 560
	Angle Tension towers	(i) Normal condition 1110 (ii) Broken wire 840
	Terminal towers	Normal condition 840

6 Support and Foundation Design Data

Item	Description	22.2	Detail
6.1	SUPPORTS		

6.1.1	Maximum ratio of unsupported length of steel compression members to their least radius of gyration (L/R):	
(a)	Main members	120
(b)	Bracings	200
(c)	Redundants	250
(d)	Bracings Loading in tension only	350

7 Support and Foundation Design Data

Item	Description	Light Concrete Block	Heavy Concrete Block	Soft Rock	Water-logged Soil	Rock Anchor
7.2	FOUNDATIONS					
7.2.1	Assumed mass of earth resisting uplift (kg/m ³)	1600	1350	1900	750	20
7.2.2	Assumed angle to vertical of frustum of 30° earth resisting uplift		30°	20°	30°	15°
7.2.3	Assumed mass of concrete resisting uplift (kg/m ³)	2300	1850	2300	1350	2300
7.2.4	Assumed ultimate earth pressure for standard foundation under specified loadings, including factors of safety (kN/m ²)	370	185	1100	150	2000
7.2.5	Ultimate adhesion value between galvanised steel and concrete, including factor of safety (N/mm ²)	0.7	0.7	0.7	0.7	0.7
7.2.6	Ultimate lateral earth pressure, including factor of safety (for chimney design) (kN/m ² /m)	100	100	100	--	100
7.2.7	Ultimate plain concrete bearing stress (N/mm ²)	13.8	13.8	13.8	13.8	13.8
7.2.8	Minimum portion of sub loads to be allowed for in the design of sub cleats	50%	50%	50%	50%	50%
7.2.9	Shear stress in rock (kN/m ²)	--	--	--	--	50

8 Insulators 220 kV Lines

Item	Description	Detail
		Suspension Tension
8.1	Insulator Type	Cap & Pin Cap & Pin
8.2	Insulator Material	Glass or Porcelain Glass or Porcelain
8.3	Minimum No. of units per string	15 16
8.4	Minimum Spacing	146 mm 146 mm

8.5	Lightning Impulse Withstand voltage of complete string (minimum sea level value)	1050 kV	1050 kV
8.6	Minimum creepage distance of String (normal) (in quarry areas)	5664 6124	5664 mm* 6125

* Tension strings shall achieve those values with one unit removed from the string.

9 220 kV Circuit Breaker

A Circuit Breaker shall be installed on the outgoing 220 kV line and dedicated for Protection and Control of the Line.

9.1 Type

The Circuit breaker shall be of the SF6 type with individual self contained spring operated mechanism.

Emphasis is placed on the need for reliability of design in order to give long continuous service with low maintenance costs. In this respect, spring operated mechanisms are the preferred type.

9.2 Ratings

1200 A continuous rating and 31.5 kA, 3 sec. Circuit Breaker.

9.3 Operating Duty and Performance

(i) General

The requirements of IEC 60056 in respect of type tests service operation and the making and breaking of faulty currents shall apply to all types of circuit breakers. Designs shall be suitable for interrupting three-phase ungrounded faults.

(ii) Test certificates

Circuit breakers shall be covered by test certificates issued by a recognized short-circuit testing station certifying the operation of the circuit breaker at duties corresponding to the rated breaking capacities for the circuit breaker.

The test duty shall not be less onerous than the requirements of the standard. Test certificates or equivalent shall be submitted with the tender.

(iii) Rate-of-rise of Restriking Voltage

Where not specifically stated in the test certificates submitted with the Tender, the Tenderer shall certify that the TRV to which the circuit breaker was subjected during the short circuit tests was the most severe condition that could be imposed by the available test plant for a first phase-to-clear factor of 1.5.

Any device incorporated in a circuit breaker to limit or control the rate of rise of restriking voltage across the circuit breaker contacts shall likewise be to the Engineer's approval and full description of any such device shall be given.

(iv) Reclosure Duty

At 220 kV breakers controlling transmission lines and transformer feeders shall be suitable for high speed single phase and delayed three-phase auto reclosure.

Circuit breakers may be subject to several single shot auto reclosing duty cycles within quick succession upon the occurrence of multiple faults coupled with short reclaim timer settings. The Seller shall state the minimum time interval permissible between each auto reclose duty at rated short circuit current and advise the number of reclosing operations allowable before lockout and maintenance becomes necessary.

The main contractor shall ensure the circuit breaker requirements are embodied in the auto-reclose protection scheme.

(v) Interrupting Duties

In addition to the requirements of IEC 60065 for interrupting terminal faults circuit breakers shall be capable of coping with the interrupting duties produced by the switching of low inductive currents associated with reactors or transformers magnetizing currents, or by the switching of capacitor currents associated with overhead line charging, cable-charging or capacitor banks as may be applicable. Circuit-breakers for these duties shall be of the restrike-free type only.

Circuit breaker shall be capable of interrupting currents associated with short-line faults and the out of phase switching conditions that may occur in service.

The Seller should include a statement of the accumulative breaking capacity which the circuit breakers are capable of before maintenance is required.

(vi) Break Time

In respect of 220 kV circuit breakers attention is drawn to Clause 14.3.

(vii) Insulation Co-ordination

The insulation strength across the open circuit breaker shall be at least 15 per cent greater than the line to ground insulation strength for all impulse, switching surge and power frequency voltage conditions.

9.4 Operating Mechanisms

Circuit breakers mechanisms shall be “trip free” as defined in IEC 60056-1. It is recognized that it may be necessary for contacts to close momentarily prior to opening to ensure satisfactory current interruptions.

Each part of the operating mechanisms shall be of substantial construction, utilizing such materials as stainless steel, brass or gunmetal where necessary to prevent sticking due to rust or corrosion. The overall designs shall be such as to reduce mechanical shock to a minimum and shall prevent inadvertent operation due to fault current stresses, vibration or other causes.

An approved mechanically operated indicator shall be provided on each circuit breaker operating mechanism to show whether the circuit breaker is open or closed. Each phase shall incorporate a mechanical indicator or other approved means of position indication where operating mechanism designs do not utilize mechanical coupling between phases.

220 kV circuit breaker mechanisms shall be provided with duplicate trip coils in order to facilitate duplication of trip coil initiation.

Where circuit breakers comprise three independent units, as in this case, it shall be possible to make independent adjustments to each unit. For three phase operation the three units shall make and break the circuits simultaneously. In the event of any phase failing to complete a closing operation, provision shall be made for automatic tripping of all three phases of the circuit breaker. This scheme shall be inbuilt within the circuit breaker. Indications for operation of this condition shall be indicated locally, remotely and on SCADA.

Power closing mechanisms shall be recharged automatically for further operations as soon as the circuit breaker has completed the closing operation and the design of the closing mechanism shall be such that the circuit breaker cannot be operated inadvertently due to external shock forces resulting from short circuits, circuit breaker operation, or any other cause.

If a circuit breaker closing mechanism is not fully recharged for further operation within a pre-determined time after closing cycle, the mechanism shall be locked out and an alarm initiated.

The circuit breaker shall be provided with slow acting manually powered operating devices for inspection and maintenance purposes only. It shall not be possible to slow close a circuit breaker when in normal service condition.

9.5 Operating Cubicles

Circuit breaker operating mechanism, auxiliary switches and associated relays, control switches, control cable terminations, and other ancillary equipment shall be accommodated in sheet steel vermin-proof and weather proof cubicles. Where appropriate the cubicles may be free standing.

Cubicles shall be of rigid construction, preferably folded by alternatively formed on a frame work of standard rolled steel sections and shall include any supporting steel work necessary for mounting on the circuit breaker or on concrete foundations.

Bolts or carriage keys shall not be used to secure the panels or doors. All fastenings shall be integral with the panel or door and provision made for locking. Doors and panels shall be rigid and fitted with weather proof sealing material suitable for the climatic conditions specified.

Cubicle shall be well ventilated through vermin-proof louvers comprising a brass gauze screen attached to a frame and secured to the inside of the cubicle. Divisions between compartments within the cubicles shall be perforated to assist air circulation. In addition, an anti-condensation heater of an approved type shall be provided and controlled by a single pole switch mounted within the cubicle.

Access doors or panels shall be glazed where necessary to enable instruments to be viewed without opening the cubicles. The arrangement of equipment within the kiosk shall be such that access for maintenance or removal of any item shall be possible with the minimum of disturbance of associated apparatus.

Circuit breaker control position selector and circuit breaker operating control switches as specified shall be installed in the cubicle. Circuit breaker control from this position will be used under maintenance and emergency conditions only.

An approved schematic diagram of the part of the control system local to the circuit breaker, identifying the various components within the cubicle and on the circuit breaker and referring to the appropriate drawings and maintenance instructions, shall be affixed to the inside of the cubicle access door. The diagram shall be marked on durable non-fading material suitable for the specified site conditions.

10 Disconnectors and Earthing Switches

Two 220 kV Disconnectors shall be installed, one on either side of the outgoing 220 kV Circuit Breaker. The disconnectors shall be motorized.

The Disconnector shall be rated at 1200 A, continuous rating and 31.5 kA, 3 sec. withstand.

The disconnector on the Line side shall be equipped with an Earth Switch, mechanically coupled or interlocked with the main disconnector so that the earthing switch and main disconnector cannot be closed at the same time.

Disconnecting and earthing devices shall be in accordance with IEC 60129.

The disconnectors shall preferably be of the single throw double air break centre rotating post type or of the double rotating post type with single air break and shall be subject to approval. Circuit disconnecting switches shall be rated at 1200 A continuous rating.

Disconnecting switches shall be designed for live operations and will not be required to switch current other than the charging current of open bus bars and connections or load currents shunted by parallel circuits.

Service conditions require that disconnecting switches shall remain alive and in continuous service for periods of up to two years in the climatic conditions specified and without operation or maintenance. The contacts shall carry their rated load and short circuit currents without overheating or welding and at the end of the two year period the maximum force required at the end of the operating handle to open a 3-phase disconnector shall not exceed 340N.

The earthing switch, when in closed position shall be capable of carrying the rated short time current for three seconds without the contacts burning or welding. The Earth Switch shall be interlocked with the Line CVTs such that it shall not be possible to close the earth switch when the line is energized.

Disconnecting devices shall be interlocked with circuit breakers and disconnectors as necessary to prevent the possibility of making or breaking load current.

The Disconnectors and the Earth switch shall be equipped with Electrical Interlocks to ensure safe operation. Each Disconnector and the Earth Switch shall be equipped with a solenoid which will normally be de-energised thereby mechanically blocking the operation of the Disconnector or the Earth switch. When all the conditions are right for safe operation of the Disconnector or the Earth switch, the solenoid shall be energized via a push button switch mounted on the disconnector/earth Switch control box, thereby allowing the Disconnector or Earth switch to be operated to the closed or open position. The solenoid shall only require to be energized at the start of the close or open operation and shall not be required to remain energized in order to complete the close or the open operation.

Operation of the Circuit Breaker shall not be permitted when the associated Disconnector Switches are under operation. Interlock to be achieved by use of auxiliary switches.

Also a mechanical Interlock shall be provided between a Disconnector and the associated Earth Switch.

Disconnector operation mechanisms shall be of robust construction, carefully fitted to ensure free action and shall be unaffected by climatic conditions at site. Mechanism shall be as simple as possible and comprise a minimum of bearing and wearing parts. Approved grease lubricating devices shall be fitted to all principal bearings which are not of self lubricating type. The mechanism shall be housed in a weatherproof enclosure complete with auxiliary switches, terminal blocks and cable gland plates. All steel and malleable iron parts including the supporting steelwork shall be galvanized.

The alignment and timing of primary and secondary contacts shall be achieved with ease. Once achieved, continuous operation of the disconnecter without losing the alignment or timing shall be guaranteed.

11 Voltage Transformers

Voltage transformers shall be of the capacitor type and shall comply with IEC 60044-2 and the requirements of this specification.

Capacitor type transformer shall be suitable for use as line couplers for power line carrier communication systems.

Ratings:

Rated Primary Voltage: 220 kV/ $\sqrt{3}$

Rated Secondary Voltage: 110 V/ $\sqrt{3}$

The rated Burden and Class shall be suitable for the connected Protection Relays and other devices.

Separate sets of MCBs shall be provided at the CVT for:

Main 1 protection

Main 2 protection

Instruments, disturbance recorder, fault locator, etc.

Check Synchronizer Relay.

The Main 1 Protection and Main 2 Protection circuits shall be segregated in separate multicore cables from the VT to the Protection panels.

A VT failure Alarm shall be provided for each set of MCBs.

Voltage transformers shall be provided complete with galvanized steel supporting structures such that the earthed end of all porcelain insulators is not less than 2440 mm above ground level.

12 Current Transformers

Current transformers shall comply with IEC 60044-1 and the requirement of this specification.

Primary winding conductors shall be not less than 100 sq. mm section and shall have a one second short time current rating not less than that of the associated switchgear. Secondary windings of each current transformer shall be earthed at one point only, in the relay panel.

Magnetisation and core loss curves and secondary resistance values shall be provided for each type and range of current transformer.

Ratings:

CT ratio:	1500-800-300/ 1 A, to match the remote end CTs
Core 1:	15 VA, 5p20 for Main 1 Protection
Core 2:	15 VA, 5p20 for Main 2 Protection
Core 3:	15 VA, 5p20 for Back-up Protection and Circuit Breaker Failure Protection
Core 4:	15 VA, C1 0.2 for Energy Metering
Core 5:	For Busbar Differential Protection. Seller to specify to match other CTs in the Differential Scheme

Current transformers for balance protective schemes, including neutral current transformers where appropriate, shall have identical turns ratio and shall have magnetization characteristics to the approval of KPLC for each specific instance. Where an existing balanced protective system is being extended, the Seller shall ensure that any additional current transformers are correctly matched on the existing equipment.

The Seller shall ensure that the capacity of the current transformer provided is adequate for operation of the associated protective devices and instruments.

The CT cores for Main 1 and Main 2 protection shall be segregated in separate multicore control cables from the current transformer through to the protection panels.

Where double ratios are specified it shall be possible to select either ratio for each winding without alteration to the number of primary turns. A label shall be provided at the secondary terminals of the current transformer indicating clearly the connection required for either ratio. These connections and the ratio in use shall be shown on the appropriate schematic and connector diagram.

The Seller shall provide details of his method of calculating the outputs of the current transformers for each type of protection specified and shall submit calculations for all current transformers for approval by the KPLC before starting manufacture.

13 Surge Arrestors

Surge arrestors shall be the type employing non-linear metal oxide resistors without spark gaps.

Arrestors shall be designed and tested in accordance with the requirements of IEC 60099-4.

Surge arrestors shall be housed in porcelain insulators designed to withstand extremes of the environment. The insulation shall have a minimum creepage distance of 25 kV/mm. Porcelain shall comply with IEC 60233.

The method of sealing against the ingress of moisture shall be of a type well proven in service and the manufacturing procedures shall include an effective leak test which can be demonstrated to the inspecting Engineer if required.

The internal components of arrestors shall be arranged to minimize radial voltage stresses, internal corona and to ensure minimal capacitive coupling with any conducting layer of pollutant on the outside of the porcelain housing. Except where approved, organic materials are not permitted.

Good electrical contact shall be maintained between resistor blocks, which take account of any thermal expansion and contraction of the block, mechanical shock during transport and erection, by installing a well proven clamping system.

Good quality control of the manufacturing process of the resistor shall be ensured by rigorous testing procedures. The procedures shall ensure that the characteristics of the blocks area, and will remain within the specified limits when new and throughout the anticipated life of the arrestors. Samples may be selected at random by the Engineer for special tests to be agreed with the manufacturer.

All surge arrestors shall be fitted with a pressure relief diaphragm which shall prevent explosive shattering of the porcelain housing in the event of an arrestor failure and the arrestor shall have been tested according to the high and low current tests specified in IEC 60099-1.

Arrestors shall be supplied complete for installation in an outdoor switchyard including insulating bases and surge counters, one per phase and, if applicable, grading rings. The material used for terminals shall be compatible with that of the conductors to which they are connected.

Each arrestor shall be identified by a rating plate in accordance with the requirements of IEC 60099. In addition an identification mark shall be permanently inscribed on each separately housed unit of a multi-unit arrestor so that units can be replaced in the correct position in the event of them being dismantled.

14 Protection and Control

14.1 Multicore Cables and Schematic Diagrams

Protection and control schemes should, in general be based on the use of a single 1.5 sq.mm 7/0.67 mm cores. The Multi-core cables shall have steel Armour for mechanical protection.

This contract includes the preparation of cabling schematic diagrams, showing the approved routing of cores in the various cables, and detailed cable schedules and connection diagrams for all the cables associated with each item of equipment included in the project.

14.2 Relay General Requirements

All relays shall operate correctly within system frequency limits 47 Hz to 51 Hz.

Relays shall be approved types complying with IEC, shall have approved characteristics, be flush mounted in dust and moisture proof cases and shall comply with IEC 60068 test classification 20/40/40.

Relays shall be of approved construction and shall be arranged so that adjustments, testing and replacement can be effected with the minimum of time and labour. Relays of the hand reset type shall be capable of being reset without opening the case.

Electrically reset tripping relays shall be provided where necessitated by the system of control, such as for those circuits subject to remote supervisory control.

Relay contacts shall be suitable for making and breaking the maximum currents which they may be required to control in normal service but where contacts of the protective relays are unable to deal directly with the tripping currents, approved auxiliary contactors, relays or auxiliary switches shall be provided. In such cases, the number of auxiliary contactors or tripping relays operating in tandem shall be kept to a minimum in order to achieve fast fault clearance times. Separate contacts shall be provided for alarm and tripping functions. Relay contacts shall make firmly without bounce and the whole of the relay mechanisms shall be as far as possible unaffected by vibration or external magnetic fields.

Relays, where appropriate, shall be provided with flag indicators, phase coloured where applicable. Flag indicators shall be of the hand rest pattern and shall be capable of being reset without opening the case. Where two or more phase elements are included in one case, separate indicators shall be provided for each element.

All protection relays shall be of the numerical type. The Numerical Relays provided must have facilities to download information to a PC and via a modem, to a remote Location via the available communication system. One PC and associated Software shall be provided. Steps shall be taken to protect the circuitry from externally impressed transient voltages which could reach the circuitry via connections to instrument transformers or the station battery.

The routing of cables should be such as to limit interference to a minimum. Any auxiliary supplies necessary to power solid state circuits shall be derived from the main station battery and not from batteries internal to the protection.

Relays with provision for manual operation from outside the case, other than for resetting, will not be accepted.

Relays, whether mounted in panels or not, shall be provided with clearly inscribed labels describing their application and rating in addition to the general purpose labels.

Attention is particularly drawn to the site climate condition and relay designs should be entirely suitable for duty under these conditions.

To minimise the effect of electrolysis, relay coils operating on DC shall be so connected that the coils are not continuously energized from the positive pole of the battery.

Relays shall be suitable for operation on 110 V nominal, 125 float dc systems without the use of voltage dropping resistors or diodes.

The contractor shall provide detailed current transformer requirements for each type of relay.

14.3 Fault Clearance Times

Overall fault clearance times i.e. from fault initiation to arc extinction shall not exceed the following:

Maximum Fault Clearance Time		
Type of Fault		Maximum Clearance Time 220 kV System
Substation and transformer faults		110 mS
Line faults		
(a)	Up to 72% of the line length (i.e. 90% of a distance relay Done 1 reach assuming 80% Zone 1 setting	100 mS
(b)	From 72% to 100% of line length Plus protection Signalling time	130 mS

These requirements shall be fulfilled under all system conditions including maximum dc current offset and shall include any time delay caused by the use of capacitive voltage transformers.

14.4 Line Protection

14.4.1 Distance Protection

Distance protection for 220 kV lines shall comprise one distance relay installed by OrPower 4 in Olkaria III Substation operating in conjunction with teleprotection channels over fibre optic circuits. The distance Protection shall operate in a permissive overreach mode over a teleprotection signalling channel.

The distance relay shall operate for all types of phase and earth faults. Separate phase and earth fault distance measuring elements shall be provided. Common elements with transfer switching arrangements will not be accepted. Phase and earth fault compensation features shall be incorporated to ensure accurate distance measurements for all types of fault and to allow for variation in the path of earth faults on the system.

Zones 1 and 2 shall operate only for faults in the protected direction. Under no circumstances shall the relay operate for reverse faults even when the voltage supplied to the relay falls to zero on all three phases. Details of methods used for polarising relays to deal with faults close to the relaying point shall be provided.

Zone 3 shall not be non-directional and shall be capable of being independently off-set in both directions.

Starting shall be by impedance relays; overcurrent starting will not be accepted. The relay characteristic shall cover the protected line plus the longest line emanating from the remote station taking current infeed into account.

The starting relays shall not operate during maximum power transfer. During single phase to earth fault coinciding with maximum power transfer, only the starting relay associated with the faulted phase shall operate.

The reach of each measuring zone and starting relay shall be individually adjustable by suitable steps across the setting range. The characteristic angle shall be adjustable between approximately 40 and 85 degrees.

Zone 2 and Zone 3 shall have a delay setting range of 0.1 to 1.0 second and 0.5 to 5.0 seconds respectively.

The sensitivity of the protection shall be adequate for definite operation under minimum plant and single outage conditions and shall not exceed 30 per cent rated current. The relay characteristic shall ensure adequate earth fault resistance cover under all conditions.

The operating time of each zone shall be substantially independent of fault current magnitude. The operating times shall be stated in the Schedule of Particulars and, in addition, curves shall be provided showing the effect of line and source impedance, fault position and operating current on the relay operating time.

A feature shall be incorporated to ensure instantaneous tripping in the event that the circuit breaker is closed into a fault on a previously de-energised line. This feature will be enabled by the absence of line voltage with an appropriate time delay.

A monitoring system shall be provided to supervise the voltage transformer supply to each distance relay. In the event of loss of one or more phases, the monitoring system shall inhibit relay operation and initiate an alarm.

The distance relays shall incorporate indicators to show the zone in which the relay tripped, the phases or phases faulted and whether operation was assisted by a teleprotection signal. Indication must not be lost in event of a DC auxiliary supply failure.

In addition to tripping contacts, the protection shall have contacts for initiating single pole and three pole auto-reclosing, fault locators, fault recorders, signalling and alarms. The protection for the 220 kV feeder shall be suitable for single pole tripping and for use in the single and three phase auto reclosing scheme.

Where appropriate, the protection and associated auto-reclose equipment shall incorporate whatever means are necessary to ensure that all measuring and starting elements in the healthy phases of the faulted line and all measuring elements on the parallel circuit remain reset and are unaffected by the currents which flow in the healthy phases and parallel circuit during the single phase reclosure dead time. Additionally, the inter-phase fault measuring elements on the faulted circuit shall be stable in the presence of a heavy close-up earth fault. The methods used to ensure correct stability of healthy phase elements during single phase dead times and during fault conditions shall in no way prejudice the ability of the protection and auto-reclosing scheme to respond to faults during the dead time and reclaim time in the manner described in Clause 14.5.

The distance protection scheme in permissive mode shall include an “echo” feature to facilitate tripping of the local circuit breaker if a line fault occurs when the remote end disconnector is open or the remote end distance relay has not started. Suitable timers shall be included to prevent continuous carrier send when the circuit breaker is open and to remove the “echo” signal after a time, sufficient for tripping to occur, has elapsed.

The distance protection shall remain in service while the line disconnector is open so as to afford instantaneous protection to the primary connections on the busbar side of the line disconnector. For this purpose line disconnector auxiliary switches shall be used to isolate the CVT connections to the distance relay.

Power Swing Blocking

The 220 kV distance relays shall incorporate power swing blocking Function Characteristic. Power swing blocking shall encompass and be concentric with the distance relay impedance starter or zone 3 characteristic. Similarly, where it is possible to shape the zone 3 or starter characteristic, the power swing blocking Function characteristic shall also be capable of similar shaping.

Where zone 3 is set reverse looking as directional mho, the power swing blocking outer characteristic shall be capable of being set concentric with the zone 2 mho characteristic.

Facilities shall be provided to block zones 1, 2 and 3 of the distance relay as required.

Blocking logic shall be derived by determining the time taken for the apparent impedance of the power swing locus to pass from the characteristic of the power swing to the distance relay starter characteristic. Blocking shall not take place until the apparent impedance has passed through the characteristics and the time has expired.

The associated time delay relay shall have a setting range of 50 – 250 msec.

The setting range of the power swing function characteristic angle shall at least be adjustable over the same range as the distance relay zone 2 or zone 3 characteristic.

Reset times shall be short to ensure the distance relay reverts to its normal role as soon as possible following a power swing.

Power swing blocking shall be inhibited if an earth fault occurs during a power swing.

If the associated VT supplies are lost due to VT failure the power swing blocking Function shall not operate.

Directional Earth Fault Relay

To achieve discriminate clearance of high resistance earth faults, the distance protection specified in Clause 14.4.1 shall be supplemented by an in-built directional earth fault DEF function operating in conjunction with teleprotection channels over multiplexed fibre optic links in a permissive overreaching transfer trip of blocking mode selectable on site. At 220 kV, the two DEF relays shall preferably be provided by different manufacturers.

The protection shall utilise different teleprotection channels to the distance protection specified in Clause 14.4.1.

DEF relays shall be polarised by zero sequence voltage. The relay sensitivity shall be adjustable between approximately 5 and 20% rated current. A relay characteristic angle of 60 degrees is preferred but alternative angles will be considered.

To prevent maloperation under current reversal conditions, during fault clearance on the parallel circuit, the scheme shall include time delay relays or other suitable means.

An adjustable time delay relay shall be provided to allow distance protection to operate before the DEF relay for earth faults having values of arc resistance which lie with the relay Zone 1 characteristic. A further time delay adjustable from 0-10 seconds shall be provided to enable the relay to provide remote back-up protection for high resistance faults independently of carrier equipment. Auto reclosing shall be blocked in this case. It shall be possible to selectively enable to disable the DEF Back-up function.

The DEF scheme in permissive mode shall include an “echo” feature to facilitate tripping of the local circuit breaker if a line fault occurs when the remote end disconnect is open or when the remote end DEF function has not started. Suitable timers shall be included to prevent continuous carrier send when the circuit breaker is open and to remove the “echo” signal after a timer, sufficient for tripping to occur, has elapsed. The echo signal shall not be initiated by a single pole trip.

Selection facilities are required to either block or allow initiation of three pole delayed auto reclose as desired.

14.5220 kV Automatic Reclosing

Three pole and/or single pole, single shot repetitive auto-reclosing equipment shall be provided for 220 kV overhead line circuit breakers.

The scheme shall be specifically designed for substation layouts in which two circuit breakers are associated with a single line end. Suitable logic shall be included to enable the scheme to function as specified if one of the associated circuit breakers is inoperable for any reason, and to prevent simultaneous three pole reclosing of the circuit breakers.

Reclosure shall be initiated following tripping by the distance relay operating in Zone 1 or in conjunction with teleprotection receive signal. Three pole delayed auto-reclosing shall also be initiated by the directional earth fault protection. Reclosure shall not be initiated in the event of a three phase fault, nor any type of fault in the second or third back-up zones, nor when a direct overtripping signal is received, nor when the circuit breaker is closed onto a fault on a previously de-energized line. The following modes of operation shall be selectable by means of a switch or switches:

- (a) Single pole, high speed, auto-reclose. Auto-reclose shall be only initiated in the event of a single phase to earth fault. All other types of faults shall result in three phase tripping without auto-reclosing.
- (b) Three pole delayed reclosing. Delayed reclosing shall only be initiated in the event of a single phase or two phase fault. Three phase faults shall result in tripping without auto-reclosing.
- (c) Single pole, high speed and/or three phase delayed, auto-reclosing as appropriate. Single pole, high speed auto-reclosing shall be initiated only in the event of a single phase-earth fault and delayed reclosing initiated in the event of a two phase fault. Three phase tripping without re-closing shall take place for three phase faults.

(d) No auto reclosing. Three phase tripping without auto-reclose shall take place for any type of fault.

If a second earth fault occurs during the single pole auto-reclose dead time, three phase tripping with subsequent delayed three pole auto-reclose shall take place. If the auto-reclose selector switch is in the single pole reclose mode, three phase tripping with lockout should follow.

The high speed and delayed reclosing dead times have to be co-ordinated with the equipment being provided at the remote substation. Tentative ranges are as follows:

High speed single pole reclose dead time - 0.3 to 3 seconds

Delayed three pole reclose dead time - 3 to 30 seconds

The reclaim time i.e. the time period following the automatic reclosing of the circuit breaker, during which further faults result in three phase tripping and lockout, shall be chosen to match the duty cycle of the circuit-breakers, assuming the shortest available dead time is chosen. The reclaim time shall not, however, be less than five seconds, and the reclaim time range shall extend to 180 seconds. (The reclaim time commences at the instant the reclose command is given to the circuit breaker and, therefore, includes the circuit breaker closing time).

The closing command shall be limited to two seconds, after which time the reclosing equipment shall be automatically reset without resetting the reclaim timer. The reclosing equipment shall also reset if dead line check or synchronism check conditions are not satisfied within a predetermined time of the check relays being energized.

A counter shall be provided to record the number of reclosures.

Reclosing schemes shall include voltage monitoring and check synchronising relays as appropriate.

For dead line charging, voltage monitoring relays shall check the condition of the line and busbar and permit three pole reclosing only when the line is de-energised and the busbar is energised. The line is considered to be de-energised when the voltage is less than twenty percent of rated voltage, and the busbar is considered to be energised when the voltage is greater than eighty percent of rated voltage.

(A signal shall be provided from the dead line check relays for interlocking of the line earth switches to prevent the switches being closed onto a live line).

When a voltage is present on both sides of a circuit breaker, the synchronism check relay shall monitor the magnitudes of the two voltages across the open circuit breaker and the phase angle and slip frequency between these voltages. Closing shall only be permitted when these are within prescribed limits.

Check synchronising relays shall comply with the requirements of Clause 14.2. The same relays may be used as for manual closing.

14.6 Back-up Overcurrent

Inverse definite minimum time overcurrent and/or earth fault relays shall be provided where specified. They shall be of Numeric type and shall have a standard inverse characteristic according to IEC 60255.

Relays should have adjustable settings for both operating current and time, the design of the relay being such that the setting adjustments can be carried out on load without taking the relay out of service. The range of current settings for phase faults shall be 50-200 per cent of rated current with tapings no longer than 25 per cent intervals and the time multiplier setting shall be in steps of 0.025.

The relays shall be thermally rated such that the operating time of the relay at the highest practical current levels on any combination of current and time multiplier settings shall not exceed the thermal withstand time of the relay.

14.7 Breaker Failure Protection

Breaker failure protection shall be included for the 220 kV circuit breaker.

The breaker failure protection on a circuit breaker shall be initiated by all the other protection devices which normally initiate tripping of that breaker. In the event of the circuit breaker failing to open within a pre-selected time, the breaker failure protection shall instigate tripping of all adjacent circuit breakers. It shall also incorporate provision for initiating tripping of any remote infeeds, via teleprotection channels over fibre optical communication Links, as appropriate.

The position of each circuit breaker shall be monitored by two sets of current relays fed from the back-up protection current transformers. The relay outputs shall be connected in series in a "two out of two" arrangement. The relays shall have an operating time of approximately 10 msec, and a consistent rest time of less than 15 msec. The relays shall be capable of remaining in the operated position continuously and carrying twice the circuit rated current continuously.

The operating time of the breaker failure protection shall be selected by means of timers with ranges of 50 to 500 msec. There shall be two timers per circuit breaker. The timer tripping outputs shall be connected in a "two out of two" arrangement and shall energise both tripping coils of the adjacent circuit breakers. The timers shall be of static numeric design to minimise our travel.

The circuit Breaker Failure Protection Relay or Scheme employed shall be able to employ both the Current Check and the Circuit Breaker Closed Status Criterion for correct operation of the Circuit Breaker Failure Protection.

Initiation and Tripping of the Circuit Breaker Failure Protection shall be interlocked with the Circuit Breaker busbar disconnectors and the 220 kV Power Transformer Isolator. The Circuit Breaker Failure Protection Contacts for Tripping and initiating Breaker failure schemes for adjacent as well as remote Circuit Breakers shall be self reset. Circuit Breaker Lock-out Relays shall however be electrically reset.

Incoming Breaker Failure Direct Inter-tripping commands from the remote substation shall be interlocked with the status of the bay disconnector. The D.T.T. command shall not trip the circuit breakers if the bay disconnector is in open position.

14.8 Disturbance Recorder and Fault Locator

The 220 kV feeder shall be monitored by a disturbance recorder to record graphically the currents and voltages during fault conditions as well as the operation of protective relays.

The following facilities should be provided:

- (a) Analogue channels to record voltages and currents.
- (b) Digital channels to record chronologically relay operations.
- (c) Alarm contacts to indicate “disturbance recorder operating” and “disturbance recorder failure” in the Control Room.
- (d) Pushbutton to manually initiate recording of currents and voltages as well as the digital signals.
- (e) Memory for recording currents and voltages ten cycles prior to the occurrence of the fault.
- (f) Provision to adjust the recording period to cover a trip-autoreclose-trip cycle.
- (g) Device which records the precise time of the occurrence of the fault to the nearest millisecond.

The disturbance recorder shall be a numerical device and shall have adequate memory to store a large number of events.

The memory capacity supplied shall equal what is generally available in the market at the time of tender from leading manufacturers of disturbance recorders.

Fault Location:

The disturbance recorder shall be a distance to Fault Location Facility. The distance to fault shall be displayed in kilometres of line length on the Disturbance Recorder LCD Display.

14.9 Tripping Relays

A Self reset Trip Relay shall be provided for each phase. This shall be of the heavy duty type suitable for panel mounting.

A Lockout, Electrically reset Trip relay shall be provided for the line protection.

Relay operating time shall not exceed 10 ms from initiation of trip relay operating coil to contact close.

14.10 Auxiliary Voltage Operating Range

DC relays, coils, elements, etc. will be operated from a 110 V rated DC battery, which under float charging conditions operates at 120 volts. DC operated relays, coils, elements, etc. shall be suitable for operation over a voltage range of 121 to 88 volts, i.e., 110V-20% +10%.

14.11 Protection Settings

Relay settings for all unit type protective schemes and for distance relay shall be submitted to KPLC prior to commissioning of the Olkaria III substation and Transmission Interconnector for approval. Settings shall also be provided for those relays and other equipment provided under this Section of the Contract which do not require an intimate knowledge of existing relay settings e.g. circuit breaker fail relays. Details calculations shall be provided supporting the recommended settings.

The back Overcurrent and Earth Fault Relays shall be set using Normal Inverse Time-Current characteristics for IEC 60255 or BS 142. The Relay shall be set to ensure coordination with other relays existing at Olkaria II substation.

14.12 220 kV Control Panel

One panel shall be installed at Olkaria III Control room. The control panels shall be equipped with the following equipments and devices:

A mimic of the Switchyard design incorporating the following:

Illuminating discrepancy control switches for circuit breaker and motorised disconnector.

Semaphore indicators for the hand operated disconnector and Line Earth switch.

Override/On/Off key selector switch for the 220 kV Circuit Breaker.

Control selector switch for Supervisory/Remote control of circuit breaker and motorised disconnector.

Multi-way alarm Annunciator Relay, complete with accept, reset and lamp facilities. The Annunciator Relay shall provide for all alarms required for the 220 kV Line Protection.

Instruments for 220 kV Line

MW meter:

MV Ar meter:

Ammeter:

Voltmeter with selector switch.

14.13 Protection Relay Panels

Three Protection panels shall be provided as follows:

Main 1 Protection

Main 2 Protection and Back-up Protection

Circuit Breaker Failure Protection and Autoreclose Relay. Trip Relays and Trip Circuit Supervisory to be located in this panel.

110 V DC Charger and Batteries

Duplicate sets (A & B) of 110 V DC Charger and batteries shall be provided and installed in Olkaria III Control Room.

The Charger and Batteries shall be appropriately rated for the required Protection and Control duties. Distribution Board with appropriate switchgear shall be provided.

48 V DC Charger and Batteries

Duplicate sets (A & B) of 48 V DC Charger and batteries shall be provided and installed in Olkaria III Control Room.

The Charger and Batteries shall be appropriately rated for the required communication duties. A distribution Board with appropriate switchgear shall be provided.

415 V AC Auxiliary Supply

415 V AC Distribution Board shall be provided at Olkaria III with adequate outlets for the required applications

Two sources shall be connected to the Board through an Automatic Change-over system.

14.14 OPGW, Communication Equipment and SCADA Requirements

This section covers the Summary of Supply and Installation of communications, telephones, tele-protection and SCADA equipment for the efficient supervision, control, operation and maintenance of the transmission system.

Communication System

Optical fibre communication link is required from Olkaria III substation to Olkaria II substation. At Olkaria II it shall be integrated by KPLC into the existing communication System to Nairobi North and to the National Control Centre.

The optical fibres shall be optical ground wire (OPGW) to be installed on the 220 kV Interconnector from Olkaria III to Existing Olkaria II Substation.

The system shall consist of 12-Fibre, dual window single mode fibre in accordance with the ITU (T) recommendations OPGW over the transmission line route.

SDH STM-1 optical terminal equipment

Communication equipment of Olkaria II end will be located in existing Olkaria II substation control room.

SDH STM-1 multiplexing equipment providing protection. SCADA and voice communications, including all necessary interface cards. This will provide for new protection. SCADA and voice signals installed under this project as well as any existing services which the client required to be carried on the optical fibre.

Lead in cable at Olkaria III Substation connecting the PGW to the terminal equipment.

DC power supplies by KPLC and OrPower 4 each at its side.

Spare fibres will be terminated in the building in such a way as to facilitate their future use.

Terminal Equipment

The terminal equipment for the Fibre Optical Communication link shall be installed at Olkaria III substation. This shall allow connection of Data for SCADA, Speech and Teleprotection Signals to Olkaria II substation. This equipment shall match the Interface Equipment at Olkaria II to allow integration by KPLC into the existing communication system at Olkaria II and hence to National Control Centre located at Juja Rd Substation in Nairobi, to provide mounted in enclosed buildings at Olkaria III. No intermediate repeaters will be used.

Line Differential Protection

This will use dedicated fibres.

Speech Equipment

A PABX exchange equipment already existing at Olkaria II. It's proposed to connect two extensions from this exchange to Olkaria III substation through the proposed communication link. However in case the equipment at Olkaria II requires expansion to accommodate the additional telephone extension, this shall be carried out by KPLC. Seller shall provide the telephone sets at Olkaria III.

Remote Terminal Units

A Remote Terminal Unit RTU shall be installed at Olkaria III Substation for purposes of Supervisory or the Substation as well as the control of the substation Equipment.

The Philosophy of Status, Alarms, Control and Measurements connected to SCADA i.e. type and Numbers shall be followed, and mutually agreed by the parties.

The RTU shall be microprocessor bases and capable of handling all the facilities at Olkaria III Power Station and Substation.

All status inputs whether events or alarms of at least 20 milliseconds duration must be captured and no power system data lost. The RTUs supplied must be totally compatible, and capable of being integrated with the existing system. The new RTU supplied under this contract shall support multiple protocols. As a minimum requirements, they shall fully support the protocol used by the existing SINDAC RTUs and also the IEC 870-5-101 protocol to enable them to be connected to a different master station in the future.

The Seller shall state all the protocols supported by the RTU they propose to install and the means by which the protocol used by the RTU can be changed at a later date.

In the event of loss of dc to the RTU, internal battery back-up shall be required to maintain any volatile memory for several hours. However for system that require reloading of the RTU memory for whatever reason the procedure should be simple without the need for sophisticated loading or test equipment.

For the purposes of RTU testing, self diagnosing facilities should be incorporated and visual indication, by means of light emitting diodes (LEDs), of fault conditions shall be required.

A SCADA interface Marshalling cubicle shall be supplied to interface all power system data i.e. status indication alarms, analogues, interposing relays for control outputs, etc. to the RTU. This cubicle shall also house transducers for analogue inputs and interposing relays for control outputs.

48 volts DC power supplies shall be supplied to power the RTU, interposing relays, telephones equipment.

Scope of Work

The contractor shall include detailed system design, manufacture, supply, installation, testing, commissioning, remedying of defects, maintaining the works during the defects liability period and any incidental work necessary for the proper completion of the work in accordance with this contract.

Detailed requirements are as follows:

System design – the system design and preparation of contractor's drawings to approval of the Engineer

Supply and installation of fibre optic lead-in cables including mounting hardware and splicing

Supply and installation of lead in cables to the equipment terminals.

Supply and installation of fibre optic terminal and multiplexing

Supply and installation of supervisory management system and cabling to the relevant distribution frame(s)

Supply and installation of DC power supplies in Olkaria III only.

Factory testing of the terminal equipment and supervisory prior to delivery of OrPower 4 supplied equipment.

Testing and commissioning of the systems up to the terminal equipment in Olkaria II.

Multiplexed signals for permissive and direct inter-trips for the 220 kV circuits.

Control Room

A Control Room shall be constructed to house Protection and Control panels as well as communications equipment and Auxiliary supply equipment belonging to KPLC.

The Control Room shall have the following areas:

Protection Panels area

Communication equipment area

110 V & 48 V DC Charger area

110 V & 48 V DC Battery area

The designated areas shall be approximately sized to accommodate the respective equipments.

Part D: Metering Equipment

1 Metering Systems

- (a) KPLC shall, at its expense, procure and provide to the Seller the back-up metering equipment (the “**Back-Up Metering Equipment**”) for the Early Generation Facility and for the First Plant, and the Seller shall procure and install the Back-Up Metering Equipment for each of the Second Plant and the Third Plant for KPLC and once the Seller has installed the system KPLC shall own and maintain it. The Seller shall, at its expense, procure, install, own and maintain the principal metering equipment (the “**Main Metering Equipment**”) for the Early Generation Facility and for each Plant.
- (b) KPLC shall provide and install a strip chart recorder and shall make a continuous recording of the Net Electrical Output and Reactive Power of each Plant. Such Net Electrical Output and Reactive Power shall be recorded on appropriate magnetic media or equivalent, which recording shall be used to compute adjustments to the Capacity Payments as provided by Schedule 5. Upon installation, such strip chart recorder shall constitute a part of the Metering System for such Plant.
- (c) The metering points to record the MWh and Mvarh exchange between the Seller and KPLC shall be shown on Figures 3 and 4. The current and voltage transformers will measure current and voltage on the outgoing high voltage terminals of the step-up transformer of the Early Generation Facility and of the step-up transformers of the relevant Plant. Where the Early Generation Facility does not have step up transformers then the current and voltage transformers will be located as close to the Interconnection Point as possible. The meters owned by KPLC will be located within the switchyard in a building housing all marshalling cubicles, control and metering panels and communication equipment. Any photographic facilities will be provided by the Seller as part of the verification process for monthly meter readings.
- (d) Each set of Main Metering Equipment and the Back-Up Metering Equipment (collectively called a Metering System) shall be to a mutually agreed international standard providing a measured accuracy of $\pm 0.2\%$ for each individual component. Each of the First Plant, the Second Plant, the Third Plant and the Fourth Plant shall have its own separate Metering System.

2 Installation of Each Metering System

- (a) Subject to Section 2(b), the Seller shall, at its expense, install the Metering Systems on the Early Generation Site and the Site at locations to be agreed upon by the Parties, and upon completion convey to KPLC all right, title and interest in the Back-Up Metering Equipment free of all charges and encumbrances. Prior to the installation by the Seller of the Metering System, the Seller will deliver to KPLC the protection scheme and the metering plan of the Early Generation Facility and the relevant Plant for KPLC's approval. KPLC will provide written comments on the protection scheme and the metering plan within thirty (30) days of their receipt. The Seller will incorporate KPLC's comments received during such thirty (30) day period into the protection scheme and the metering plan and deliver final copies to KPLC. KPLC will approve the final scheme and plan within fifteen (15) days or notify the Seller that it does not approve the scheme and plan, giving its reasons therefor. If KPLC does not give reasons for not approving the scheme and plan within such fifteen (15) day period, KPLC shall be deemed to have approved such scheme and plan. Upon approval by KPLC, the Seller will complete the design and commence installation of the relevant Metering System. Such installation shall be completed not later than fifteen (15) days prior to the scheduled date to begin initial testing of the Early Generation Facility or the relevant Plant. The Seller shall provide KPLC with thirty (30) days advance notice of, and KPLC shall have the right to observe and inspect the installation of the relevant Metering System. KPLC shall be notified not less than fifteen (15) days prior to, and shall have the right to observe, the installation of the Back-up Metering Equipment for each Plant by the Seller.
- (b) KPLC has reimbursed the Seller for its reasonable expenses incurred by the Seller for the acquisition of the Back-up Metering Equipment of the First Plant.

Part E: Delivery Point

The Delivery Point for the Early Generation Facility was at the early generation 33 kV generating bus as shown on Figure 3.

The Delivery Point for the First Plant is the OrPower side of the Disconnecter LD-3 as shown on Figure 4. The Delivery Point for the Second Plant is the KPLC side of the Disconnecter LD-31 as shown on Figure 5. The Delivery Point for the Third Plant, is the KPLC side of the Disconnecter LD-41 as shown on Figure 5. Where technically feasible, the Delivery Point for the Fourth Plant, if applicable, is the KPLC side of the Disconnecter LD-41 as shown on Figure 6, an additional 11 kV Metering System shall be installed to enable measurement of the output of the Fourth Plant, and related technical details and required adjustments (including to Part D hereof) shall be agreed accordingly between the Parties. If not technically possible, the Delivery Point for the Fourth Plant, if applicable, is the KPLC side of a new Disconnecter at a point as shall be agreed between the Parties.

Part F: Rated Capacity

The Rated Capacity of each Plant and of each Unit shall be:

	Capacity in MW (at reference conditions (see Note (1)), measured by the Metering System)	Comments
First Plant	48.0	
Unit Number		
Unit 1	4.0	Note (2)
Unit 2	4.0	Note (2)
Unit 3	3.0	Note (2)
Unit 4	12.33	Note (3)
Unit 5	12.33	Note (3)
Unit 6	12.33	Note (3)
Second Plant	36.0	
Unit Number		
Unit 7	12.33	
Unit 8	12.33	
Unit 9	12.33	
Third Plant	16.0	Note (4)
Unit 10	12.33	Note (4)
Unit 11	6.17	Note (4)
Fourth Plant		Note (5)
TBD		Note (5)
TBD		Note (5)

Notes:

1. Reference Conditions are specified in Part A of Schedule 2.
2. Already tested as part of the Early Generation Facility.
3. Already tested as part of the First Plant.
4. Determined under the Notice of Third Plant Exercise.
5. To be determined under the Notice(s) of Fourth Plant Exercise.

FIGURE 1
GENERAL MAP OF THE AREA

(See Page 118)

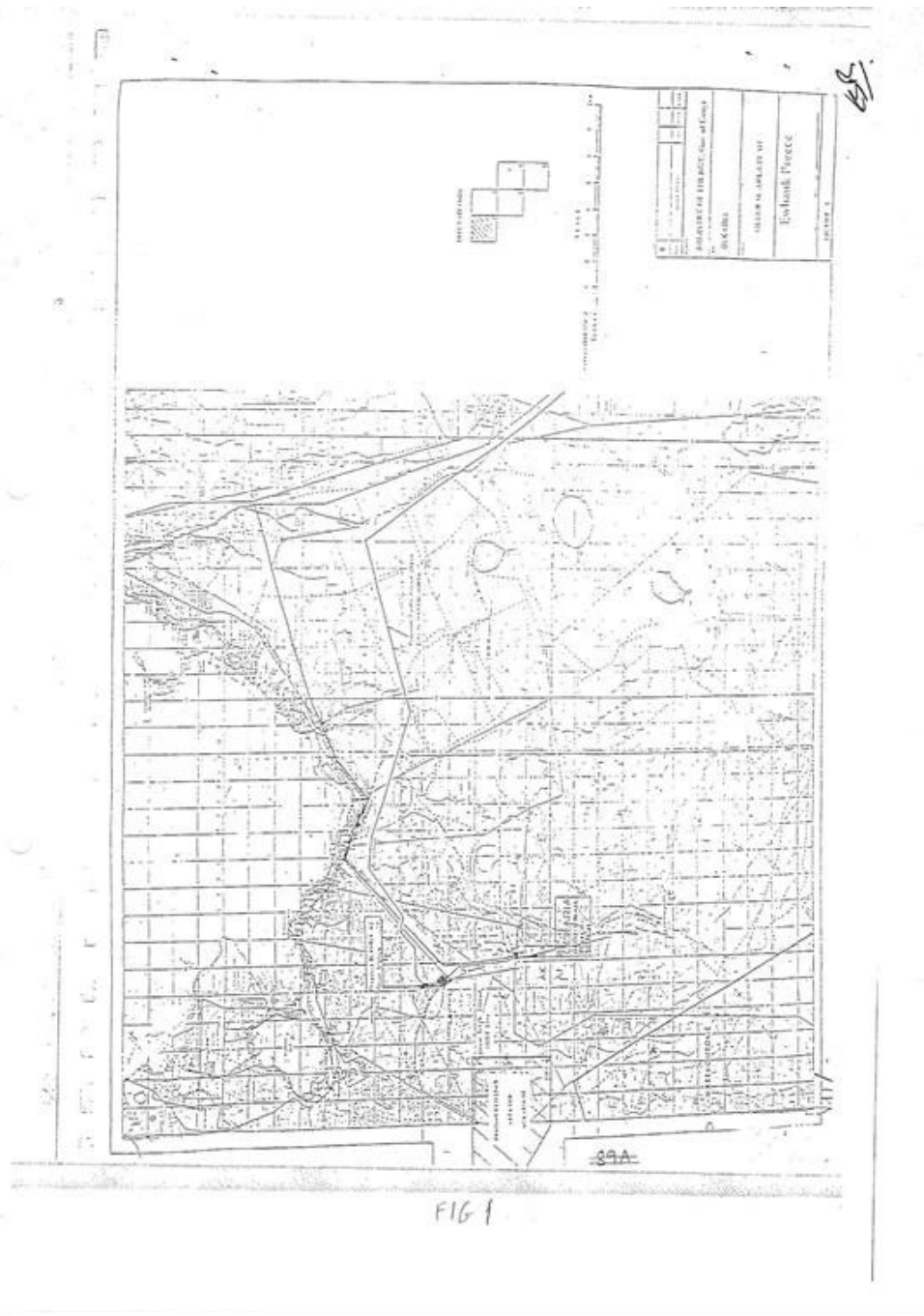


FIGURE 2

MAP SHOWING LICENCE AREA

(See Page 120)

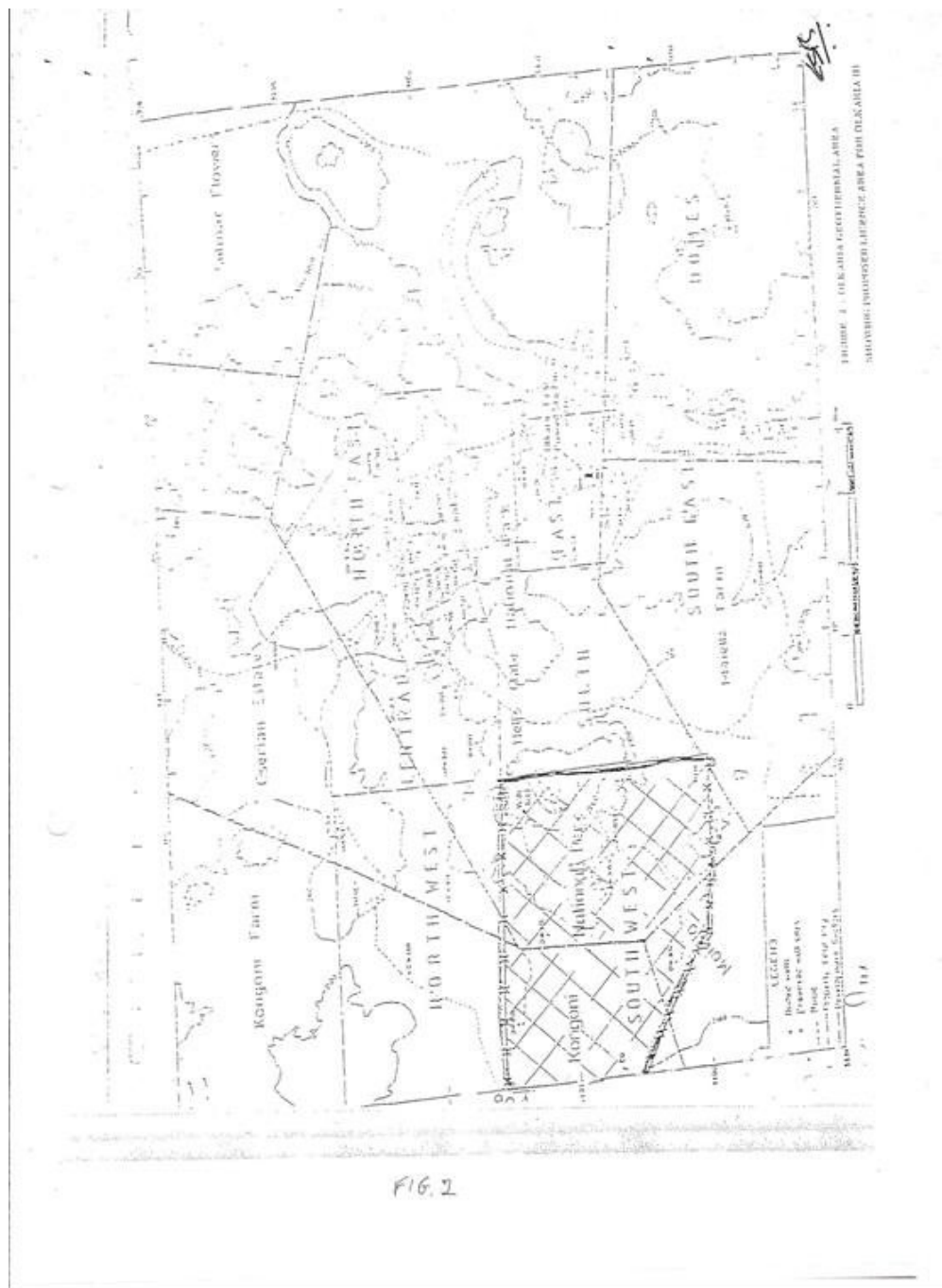


FIGURE 3

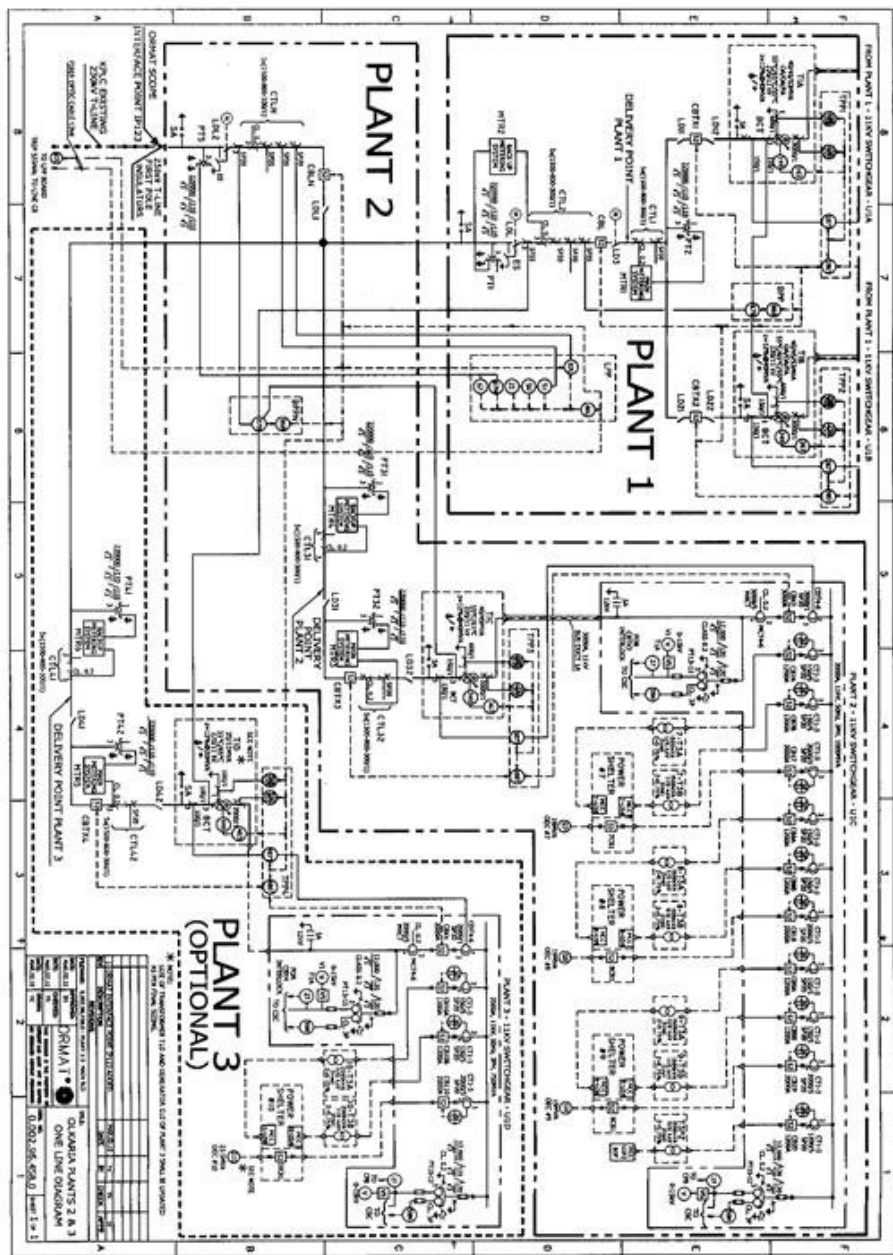
EARLY GENERATION FACILITY DRAWINGS

(See Page 121)

FIGURE 4

PLANT DRAWING (To be replaced for Fourth Plant)

(See Pages 123 and 124)



Schedule 3: Maintenance Allowances of the Early Generation Facility and each Plant

Early Generation Facility (at 12 MW)			First Plant (at 48 MW)		
Contract Year	Contracted Capacity (kW)	Annual Scheduled Maintenance Allowance EGSMA (kWh)	Contract Year	Contracted Capacity (kW)	Annual Scheduled Maintenance Allowance SMA (kWh)
1	12,000	2,016,000	1	48,000	8,410,000
2	12,000	2,016,000	2	48,000	8,410,000
3	12,000	2,016,000	3	48,000	8,410,000
4	12,000	2,016,000	4	48,000	8,410,000
5	12,000	2,016,000	5	48,000	8,410,000
6	12,000	2,016,000	6	48,000	8,410,000
7	12,000	2,016,000	7	48,000	8,410,000
8	12,000	2,016,000	8	48,000	8,410,000
9	12,000	2,016,000	9	48,000	8,410,000
10	12,000	2,016,000	10	48,000	8,410,000
11	12,000	2,016,000	11	48,000	8,410,000
12	12,000	2,016,000	12	48,000	8,410,000
13	12,000	2,016,000	13	48,000	8,410,000
14	12,000	2,016,000	14	48,000	8,410,000
15	12,000	2,016,000	15	48,000	8,410,000
15	12,000	2,016,000	15	48,000	8,410,000
17	12,000	2,016,000	17	48,000	8,410,000
18	12,000	2,016,000	18	48,000	8,410,000
19	12,000	2,016,000	19	48,000	8,410,000
20	12,000	2,016,000	20	48,000	8,410,000

Second Plant (at 36 MW)			Third Plant (at 16 MW).		
Contract Year	Contracted Capacity (kW)	Annual Scheduled Maintenance Allowance EGSMa (kWh)	Contract Year	Contracted Capacity (kW)	Annual Scheduled Maintenance Allowance SMA (kWh)
1	36,000	6,307,500	1	16,000	2,803,333
2	36,000	6,307,500	2	16,000	2,803,333
3	36,000	6,307,500	3	16,000	2,803,333
4	36,000	6,307,500	4	16,000	2,803,333
5	36,000	6,307,500	5	16,000	2,803,333
6	36,000	6,307,500	6	16,000	2,803,333
7	36,000	6,307,500	7	16,000	2,803,333
8	36,000	6,307,500	8	16,000	2,803,333
9	36,000	6,307,500	9	16,000	2,803,333
10	36,000	6,307,500	10	16,000	2,803,333
11	36,000	6,307,500	11	16,000	2,803,333
12	36,000	6,307,500	12	16,000	2,803,333
13	36,000	6,307,500	13	16,000	2,803,333
14	36,000	6,307,500	14	16,000	2,803,333
15	36,000	6,307,500	15	16,000	2,803,333
15	36,000	6,307,500	15	16,000	2,803,333
17	36,000	6,307,500	17	16,000	2,803,333
18	36,000	6,307,500	18	16,000	2,803,333
19	36,000	6,307,500	19	16,000	2,803,333
20	36,000	6,307,500	20	16,000	

Fourth Plant (assuming 32 MW, to be adjusted on a pro rata basis as per final sizing to be determined)					
Contract Year	Contracted Capacity (kW)	Annual Scheduled Maintenance Allowance EGsMA (kWh)			
1	32,000	5,606,666			
2	32,000	5,606,666			
3	32,000	5,606,666			
4	32,000	5,606,666			
5	32,000	5,606,666			
6	32,000	5,606,666			
7	32,000	5,606,666			
8	32,000	5,606,666			
9	32,000	5,606,666			
10	32,000	5,606,666			
11	32,000	5,606,666			
12	32,000	5,606,666			
13	32,000	5,606,666			
14	32,000	5,606,666			
15	32,000	5,606,666			
16	32,000	5,606,666			
17	32,000	5,606,666			
18	32,000	5,606,666			
19	32,000	5,606,666			
20	32,000	5,606,666			

The Contracted Plant Capacity of the First Plant is the result of the Appraisal Works.

The Annual Scheduled Maintenance Allowance for the Early Generation Facility and for each Plant, EGSMa and SMA, set forth in this Schedule shall be converted into a Scheduled Maintenance Allowance for each month, EGSMaP and SMAp, during such Contract Year using the planned maintenance programme notified by the Seller to KPLC in accordance with Clause 9.3 of this Agreement such that, for each Plant, the total of monthly allowances for such Contract Year will equal the Annual Scheduled Maintenance Allowance for such Contract Year. The Scheduled Maintenance Allowance for each month shall be used in the calculation of the Capacity Payment for such Plant and month in accordance with Schedule 5. The Annual Outage Allowance for the Early Generation Facility (EGOA) shall be set as zero point zero eight (0.08) or eight percent (8%), and the Annual Outage Allowance for each Plant shall be set as zero point zero four (0.04) or four percent (4%). This shall be used in the calculation of Unscheduled Maintenance Allowance as set out in Schedule 5.

For the Early Generation the Contract Year 1 starts at the Early Generation Commercial Operation Date and for each Plant the Contract Year 1 starts at the Full Commercial Operation Date of such Plant.

Schedule 4: Procedures

Part A: Commissioning and Testing Procedures

1 Tests Prior to Synchronisation of each Unit

Prior to the first synchronisation of each Unit of a Plant and again after the installation of the Early Generation Facility Units at the Plant Site, the Seller shall carry out the following tests:

- (a) automatic voltage regulator setting and adjusting in stand-still condition and with the generator running at no load;
- (b) turbine governor control checks, including an overspeed test;
- (c) functional testing and timing of high voltage switchgear in the switchyard of the Early Generation Facility and the Plant; and
- (d) the Seller and KPLC shall verify that all protection level settings are as agreed, and shall complete injection tests to verify the operation of the protection relays, equipment and switchgear.

Where the Site and Temporary Site are at the same place and the Units of the Early Generation Facility have not been disturbed during the installation of the Plant then the Units of the Early Generation Facility shall not be required to repeat the Unit Commercial Operations Tests.

2 Tests after Synchronisation of each Unit and Unit Commercial Operations Tests

- (a) After first synchronising each Unit, initial operational testing of such Unit shall be conducted by the Seller. Once the Seller is satisfied that such Unit is capable of continued reliable operation, the Seller shall so notify KPLC in accordance with Clause 7 of this Agreement and carry out the following tests for such Plant (the "Unit Commercial Operations Tests"), which if the Unit satisfies the minimum performance criteria therefore, will result in the Unit having satisfied that test.

- (i) Capacity Demonstration Test;
- (ii) turbine governor operation;
- (iii) reactive capability;
- (iv) minimum load capability;
- (v) response of plant to step load changes.

- (b) Minimum performance criteria for the Unit Commercial Operations Tests are set out below.

- (i) Capacity Demonstration Test.

During the period of the Capacity Demonstration Test, the capacity of the Unit will be demonstrated in the Demonstration Test, the capacity of the Unit will be demonstrated in the following manner:

- the Unit shall be in operation at Rated Capacity with normal auxiliaries and Geothermal Reservoir load;
- the Seller will declare to KPLC the commencement of the test and will record the reading of the Metering System;
- the test duration will be six (6) hours and at the end of this period the Seller will record the new reading of the Metering System. The Capacity as determined by such test shall be the difference between the reading taken at the end of the six (6) hour period and the reading taken at the beginning of such period, divided by six (6); provided, that the Capacity shall not be considered to have been established unless the result of such determination is equal to or greater than the minimum criteria for such test set forth below.

During Commissioning and the Operating Period the Capacity will be determined by measuring the output at the outgoing busbars of the Unit through the Metering System. Tests will be based on relevant American Society of Mechanical Engineers standard ASME power test codes and IEC standards using plant instrumentation and the Metering System. Test results shall be corrected to the "Reference Conditions", specified in Schedule 2, Part A using the correction curves from Figure 5 attached to this Schedule.

The Unit will have satisfied this test if it is demonstrated that the Capacity of the Unit is greater than 70% of the Rated Capacity of each Unit at the date of this Agreement provided that if at least 90% of Rated Capacity has not been achieved within three (3) months of the date of the test, the Unit shall be deemed to have failed the Capacity Demonstration Test and the Seller shall not be entitled to receive any further Capacity Payments until the Unit achieves at least 90% of the Rated Capacity at the date of this Agreement.

(ii) Turbine Governor Operation

The operation of each turbine will be demonstrated over the range of ninety five percent (95%) to one hundred and five percent (105%) of rated speed.

(iii) Reactive Capacity

Tests will demonstrate the capability of the Units to operate stably at rated voltage and frequency at power factors and under reactive conditions as follows:

100% output 0.95 Leading Power Factor

100% output 0.85 Lagging Power Factor

The Unit shall meet the manufacturer's published curves at zero load.

(iv) Minimum Load Tests

Each Unit shall prove its capability to operate stably at fifty percent (50%) of the Capacity demonstrated in its Capacity Demonstration Test for a period of one (1) hour with all other Units shut down and all normal auxiliaries in operation.

(v) Step Load Change Tests

Each Unit shall undergo a test which demonstrates its capability to change load in steps of up to 10% of operating load. At the start of each test the Unit shall be operated at approximately 50% of maximum output for a continuous period of five (5) minutes. The load shall be increased to 55% in one step. The unit shall have passed the test if it immediately responds to the change in load and maintains 55% load for a further five (5) minutes.

3 Early Generation Facility and Plant Commercial Operations Tests

- (a) Following satisfactory completion of the Unit Commercial Operations Tests for all Units of the Early Generation Facility or a Plant (as the case may be), the Seller shall carry out on the Early Generation Facility or such Plant the Early Generation Commercial Operations Tests or the Plant Commercial Operations Tests, as the case may be. The Seller shall notify KPLC of its intention to carry out such tests in accordance with Clause 7 which, if the Early Generation Facility or a Plant, as the case may be, satisfies the minimum performance criteria thereof, will result in the Early Generation Facility or such Plant, as the case may be, having satisfied that test. These tests are:

(i) Contracted Capacity Test;

(ii) Reliability Run Test;

(iii) Unit Trip Test;

(iv) Standby Supplies Test; and

(v) Environmental Tests.

(b) The minimum performance criteria for the Early Generation Commercial Operations Tests or the Plant Commercial Operations Tests as the case may be are:

(i) Reliability Run and Contracted Capacity

Upon completion of the Reliability Run Test prerequisites as included below the Seller shall declare to KPLC the commencement of the Reliability Run Test. During the period of the Reliability Run Test, the Contracted Capacity of the Early Generation Facility or of the Plant, as the case may be, will be determined in the following manner:

- The Early Generation Facility or the Plant, as the case may be, shall be in operation in full output with normal auxiliaries and Geothermal Reservoir load;
- The Seller will declare to KPLC the commencement of the test and will record the reading of the Metering System;
- The test duration will be six (6) hours and at the end of this period the Seller will record the new reading of the Metering System. The Capacity as determined by such test shall be the difference between the reading taken at the end of the six (6) hour period and the reading taken at the beginning of such period, divided by six (6); provided, that the Contracted Capacity shall not be considered to have been established unless the result of such determination is equal to or greater than the minimum criteria, corrected to "Reference Conditions" for such test as set forth below:

(ii) Contracted Capacity

During Commissioning and commercial operations the Contracted Early Generation Capacity or Contracted Plant Capacity of a Plant will be determined by measuring the output at the Metering Point of the Early Generation Facility or of such Plant, as the case may be, through its Metering System. Tests will be based on relevant American Society of Mechanical Engineers standard ASME power test codes and IEC standards using plant instrumentation and the Metering System. Test results shall be corrected to the "Reference Conditions" specified in Schedule 2, Part A using the correction curves from Figure 5 attached to this Schedule.

In the event the Contracted Early Generation Capacity Test carried out during Commissioning to enable the Early Generation Commercial Operation Date to occur demonstrates that the Contracted Early Generation Capacity is greater than ninety five percent (95%) but less than one hundred percent (100%) of the amount shown as the Early Generation Facility Contracted Capacity at the date of this Agreement then the Contracted Capacity shall be adjusted to such lesser amount.

In the event the Contracted Plant Capacity Test carried out during Commissioning to enable the Full Commercial Operation Date of a Plant to occur demonstrates that the Contracted Plant Capacity of such Plant is greater than seventy per cent (70%) but less than one hundred percent (100%) of the amount agreed or determined by the Parties pursuant to Clause 5.12, the Contracted Plant Capacity of such Plant shall be adjusted to such lesser amount provided that if at least 90% of Rated Capacity has not been achieved within three (3) months of the date of the test, such Plant shall be deemed to have failed the Contracted Plant Capacity Test and the Seller shall not be entitled to receive any further Capacity Payments with respect to such Plant until such Plant achieves at least 90% of its Rated Capacity agreed or determined pursuant to Clause 5.12.

(iii) Reliability Run

A reliability run for the Early Generation Facility or a Plant, as the case may be, will be carried out as part of the Commissioning tests. The run will be for a period of thirty (30) days and will include seventy-two (72) continuous hours at one hundred percent (100%) base load (i.e. maximum continuous rating at the prevailing ambient temperatures). The output during the remaining hours of the test will be as requested by KPLC in accordance with Clause 8.3. The test shall have been satisfactorily completed only if the Early Generation Facility or such Plant, as the case may be, experiences no more than five events which prevent the Early Generation Facility or such Plant, as the case may be, from delivering its Contracted Capacity and no single event shall exceed five (5) hours. For the purposes of this clause only a condition on KPLC's System which restricts delivery of electrical energy from the Early Generation Facility or the Plant, as the case may be, shall not be considered one of the five (5) allowable events. Test results shall be corrected to the "Reference Conditions", specified in Schedule 2, Part A using the correction curve from Figure 5 attached to this Schedule.

(iv) Unit Trip Test

Tests shall demonstrate the ability of the Early Generation Facility or a Plant, as the case may be, to withstand the simultaneous disconnection from the KPLC System of, for the First Plant and the Second Plant, the largest two (2) Units, and, for each of the Third Plant and the Fourth Plant, for the single largest Unit, operating at greater than ninety five per cent (95%) of the capacity demonstrated in each Unit's Capacity Demonstration Test, and to continue to operate in a safe manner. Each Unit shall demonstrate that it is Capable of re-synchronisation within thirty (30) minutes.

(v) Standby Supplies Test

With all Units shut down in either the Early Generation Facility or a Plant, as the case may be, the Early Generation Facility or such Plant shall be disconnected from KPLC's System for six (6) hours.

The standby power supplies, as specified in paragraph 4.3(d) of Part A of Schedule 2, shall maintain the Early Generation Facility in such a state throughout the period of disconnection from the KPLC System that a binary energy converter Unit can be synchronised within one (1) hour of reconnection to KPLC's System. At the end of the disconnection period the Seller, with the agreement of KPLC, shall re-synchronise the Early Generation Facility.

In the case of a Plant the standby power supplies, as specified in paragraph 4.3(d) of Part A of Schedule 2, shall maintain such Plant in such a state throughout the period of disconnection from the KPLC System that a binary energy converter Unit can be synchronised within one (1) hour of reconnection to KPLC's System. At the end of the disconnection period the Seller, with the agreement of KPLC, shall re-synchronise at least one (1) binary energy converter Unit.

(vi) Environmental Tests

The Seller shall complete whatever tests are necessary to demonstrate compliance with the Environmental Conditions as specified in paragraph 1.2 of Part A of Schedule 2.

Part B: Meter Procedures

1 Testing of Each Metering System

- (a) KPLC shall initially test a Metering System for accuracy in accordance with this Schedule 4 by the later of fifteen (15) days after it is installed by the Seller or five (5) days prior to the date scheduled for initial testing of the Early Generation Facility or a Plant, as the case may be, to begin, and thereafter at intervals of not less than one hundred and eighty (180) days after giving the Seller no less than forty-eight (48) hours advance notice. The Seller may have a representative present during any such testing, as well as during any inspection of a Metering System or adjustment thereof.
- (b) KPLC shall also test a Metering System at any other time reasonably requested by the Seller, such additional testing to be at the Seller's expense unless the test indicates that such Metering System is inaccurate by more than one-half percent (0.5%), in which case KPLC shall bear the cost of the additional test. The Seller may have a representative present during any such testing, as well as during any inspection of a Metering System or adjustment thereof.
- (c) When on the Site, KPLC shall comply with all reasonable instructions of the Seller and, notwithstanding any other provision in this Agreement to the contrary, shall indemnify and hold the Seller harmless from any loss or damage sustained by virtue of KPLC's negligence or wilful misconduct in the performance of its obligations but only to the extent that such loss or damage is not covered by insurance of the Seller.
- (d) The calibration of meters will be checked to ensure that the accuracy remains within the specified limits.

The method of calibration and frequency of tests will be agreed between the Seller, and KPLC based on knowledge of the performance and the design of the installed meters and the manufacturers' recommendations.

- (e) Compensation will be made for the errors of current and voltage transformers in the meter calibration or during the computation of records. Current and voltage transformers will be tested for ratio and phase angle errors following manufacture at an accredited testing station in the presence of representatives from the Seller; and KPLC. Test certificates issued by the testing station will be issued independently to both parties.
- (f) Testing and calibration of each Metering System shall be carried out by KPLC after giving appropriate notice to the Seller, in line with the agreed frequency of testing or in the event of either Party having reasonable cause to believe the meters are outside specified limits. During such tests and calibration the Seller shall have the right to have a representative present at all times.

2 Reading of Meters

- (a) Procedures: Each Metering System shall be read monthly on the last business day of each month (or such other day as may be agreed upon by the Parties) for the purpose of determining the Net Electrical Output of the Early Generation Facility or of each Plant as the case may be since the preceding reading. The Seller shall read the Metering Systems during the normal business hours and the Seller shall give KPLC at least forty-eight (48) hours notice of the time the Seller shall read the Metering Systems. In the event that a KPLC representative is present at such reading of the Metering Systems for the purpose of measuring Net Electrical Output, then such reading shall be jointly taken and recorded.

Under normal circumstances the readings of the Main Metering Equipment of the Early Generation Facility or a Plant, as applicable, shall be used to determine the amount of Net Electrical Output delivered by the Seller in any Period from the Early Generation Facility or from such Plant.

In the event that a KPLC representative is not present at a reading of Net Electrical Output, then the Seller's representative shall take and record such reading and make a photographic record thereof. The Seller shall maintain a log of all such meter readings. Measurements recorded shall be delivered by the recording Party to the non-recording Party by facsimile within forty-eight (48) hours after the readings are taken. In the event that any set of Main Metering Equipment is not in service as a result of maintenance, repairs or testing, then the best available information, which may include the Back-Up Metering Equipment, shall be used during that period.

- (b) Inaccuracies in Metering System: When, as a result of any test of a Metering System, a Metering System is found to be inaccurate by more than one-half percent (0.5%) or is otherwise functioning improperly or if any seal securing a Metering System is found broken, then the correct amount of Net Electrical Output delivered to KPLC with respect to the Early Generation Facility or such Plant for the actual period during which inaccurate measurements were made, if any, shall be determined as follows:
- (i) First, the readings of the relevant Back-up Metering Equipment, if any, shall be utilised to calculate the correct amount of Net Electrical Output with respect to the Early Generation Facility or any Plant, unless a test of such Back-up Metering Equipment, as required by either Party, reveals that the Back-up Metering Equipment is inaccurate by more than one-half percent (0.5%), is otherwise functioning improperly or any seal securing the Back-up Metering Equipment is found broken;
 - (ii) If there is no Back-up Metering Equipment or if the relevant Back-up Metering Equipment is found to be inaccurate by more than one-half percent (0.5%), is otherwise functioning improperly or any seal securing the Back-up Metering Equipment is found broken, then Seller and KPLC shall jointly prepare an estimate of the correct reading on the basis of all available information and such guidelines as may have been agreed to between the Seller and KPLC;

- (iii) In the event that KPLC and the Seller fail to agree upon an estimate for the correct reading, KPLC shall make any payments to the Seller required as a result of its estimate of the correct reading and the matter may be referred by either party for determination by an Expert pursuant to Clause 19; and
- (iv) The difference between the previous payments by KPLC for the period of inaccuracy and the recalculated amount shall be offset against or added to the next payment to the Seller under this Agreement with respect to the Early Generation Facility or such Plant, as appropriate. If the period of inaccuracy cannot be accurately determined, it shall be deemed to have begun on the date which is midway between the date the meter was found to be inaccurate and the date of the last meter reading accepted by the Parties as accurate. In no event, however, shall any such adjustment be made for any period prior to the date on which the Metering System was last tested and found to be accurate within plus or minus one-half percent (0.5%) and not otherwise functioning improperly.

Part C: Operating and Despatch Procedures

1 Scheduling and Despatch

- (a) In order to assist with scheduling of the Early Generation Facility to meet the requirements of KPLC, the Parties agree that the following procedures will be adhered to:
- (i) Year Ahead Notification: Not less than ninety (90) days before the Early Generation Commercial Operation Date, and thereafter not less than ninety (90) days before the beginning of each Operating Year, KPLC shall provide to the Seller estimated requirements on a monthly basis for Net Electrical Output for each subsequent Year, but KPLC shall not be bound by these figures.
 - (ii) Month Ahead Notification: Not less than fourteen (14) days before the beginning of the Month prior to the Early Generation Commercial Operation Date and thereafter not less than fourteen (14) days before the beginning of each month, KPLC shall provide to the Seller estimated requirements, on a day-by-day basis, for Net Electrical Output during that Month and also, provisionally, for the following Month, but KPLC shall not be bound by these figures.
 - (iii) Week Ahead Notification: Not less than forty-eight (48) hours before the beginning of the Week prior to the Early Generation Commercial Operation Date and thereafter not less than forty-eight (48) hours before the beginning of each week, KPLC shall provide to the Seller estimated requirements, on an hour-by-hour basis, for Net Electrical Output during that week and also, provisionally, during the following week, but KPLC shall not be bound by these figures.
 - (iv) Early Generation Facility Availability Notification: To enable KPLC to give final schedules of requirements as required by subsection (v) below, the Seller shall, by 1200 hours the day before the Early Generation Commercial Operation Date and thereafter by 1200 hours each day, inform KPLC of the estimated Capacity Available during each hour of that day commencing thirty-six (36) hours ahead and, provisionally, for the day immediately thereafter. Such estimates shall not be binding upon the Seller, the Seller shall advise KPLC as soon as possible of any changes in its Declared Capacity for such days.
 - (v) Day Ahead Notification: Not less than seven (7) hours before the start of the day before the Early Generation Commercial Operation Date and thereafter not less than seven (7) hours before the start of each day, KPLC shall provide to the Seller firm requirements, on an hour by hour basis, for Net Electrical Output for the following day. The firm requirements shall not be binding upon KPLC and KPLC may subsequently alter its requirements.

Actual operation levels requested of the Seller will be determined by the requirements for operation in accordance with economic despatch and may be substantially different from the information provided in accordance with this Part C; provided however, that actual operation levels requested by KPLC shall at all times be subject to compliance with the Operating Characteristics.

- (b) In order to assist with scheduling of each Plant to meet the requirements of KPLC, the Parties agree that the following procedures will be adhered to with respect to each Plant:
- (i) Year Ahead Notification: Not less than ninety (90) days before the Full Commercial Operation Date of such Plant, and thereafter not less than ninety (90) days before the beginning of each Operating Year, KPLC shall provide to the Seller estimated requirements on a monthly basis for Net Electrical Output of such Plant for the remainder of the Operating Year in which the Full Commercial Operation Date of such Plant is scheduled to occur, and thereafter for each subsequent Year, but KPLC shall not be bound by these figures.
 - (ii) Month Ahead Notification: Not less than fourteen (14) days before the beginning of the Month prior to the Full Commercial Operation Date of such Plant and thereafter not less than fourteen (14) days before the beginning of each month, KPLC shall provide to the Seller estimated requirements, on a day-by-day basis, for Net Electrical Output of such Plant during that Month and also, provisionally, for the following Month, but KPLC shall not be bound by these figures.
 - (iii) Week Ahead Notification: Not less than forty-eight (48) hours before the beginning of the Week prior to the Full Commercial Operation Date of such Plant and thereafter not less than forty-eight (48) hours before the beginning of each week, KPLC shall provide to the Seller estimated requirements, on an hour-by-hour basis, for Net Electrical Output of such Plant during that week and also, provisionally, during the following week, but KPLC shall not be bound by these figures.
 - (iv) Plant Availability Notification: To enable KPLC to give final schedules of requirements as required by subsection (v) below, the Seller shall, by 1200 hours the day before the Full Commercial Operation Date of such Plant and thereafter by 1200 hours each day, inform KPLC of the estimated Capacity Available of such Plant during each hour of that day commencing thirty-six (36) hours ahead and, provisionally, for the day immediately thereafter. Such estimates shall not be binding upon the Seller, the Seller shall advise KPLC as soon as possible of any changes in the Plant's Declared Capacity for such days.

- (v) Day Ahead Notification: Not less than seven (7) hours before the start of the day before the Full Commercial Operation Date of such Plant and thereafter not less than seven (7) hours before the start of each day, KPLC shall provide to the Seller firm requirements, on an hour by hour basis, for Net Electrical Output of such Plant for the following day. The firm requirements shall not be binding upon KPLC and KPLC may subsequently alter its requirements.

Actual operation levels requested of the Seller will be determined by the requirements for operation in accordance with economic despatch and may be substantially different from the information provided in accordance with this Part C; provided however, that actual operation levels requested by KPLC shall at all times be subject to compliance with the Operating Characteristics.

- (c) Notice of Change of Operating Levels: In connection with its rights to Despatch the Early Generation Facility or each Plant as the case may be in accordance with this Agreement, KPLC will provide the Seller with at least five (5) minutes advance notice of changes in operating levels to be achieved by the Early Generation Facility or the Plant as the case may be (or such greater period as may be required by the Operating Characteristics).
- (d) Where the Early Generation Facility or a Plant as the case may be suffers an Availability Failure the Seller shall notify KPLC of the Capacity available and this shall be the Declared Capacity with respect to the Early Generation Facility or such Plant as soon as practicable. When the Availability Failure has been cleared the Seller shall notify KPLC of the increased Declared Capacity of the Early Generation Facility or such Plant, as applicable, as soon as practicable. KPLC shall always use the Declared Capacity as notified under this section as the upper limit for Despatch Instructions for the affected Units.
- (e) Dispatched partial load will be no less than fifty per cent (50%) of Unit Capacity. There will be no more than 2 shut downs dispatched per month.

2 Operation in Accordance with Despatch

Early Generation Facility or each Plant as the case may be shall be operated by the Seller in accordance with the Despatch Instructions within a despatch tolerance band of +3%.

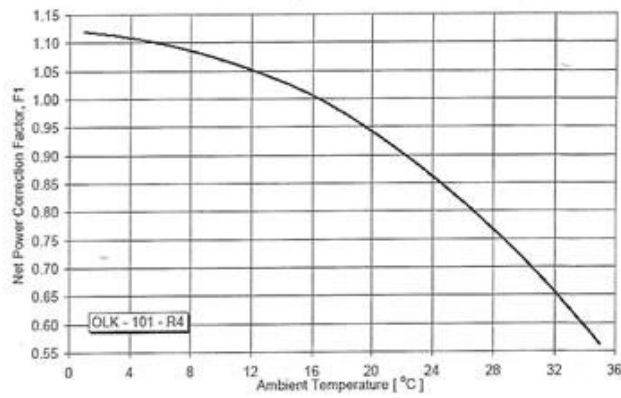
3 Recording of Telephoned Communications

Each Party hereby authorises the other Party to record all telephoned voice communications relating to Declared Capacity control and Despatch of the Early Generation Facility or the Plants, as the case may be, received from the other Party pursuant to this Agreement and shall supply, at the request of the other Party, a copy or transcript of any such recording.

FIGURE 5
CORRECTION CURVE

(See Page 143)

OLKARIA - EARLY GENERATION & PLANT Ambient Temperature Correction Curve



The ambient air temperature (in shade) will be measured at regular intervals throughout the Contracted Capacity Test so that F1 can be derived for the test period as a whole.
David M. Page 1 ATRC / AirCorrectionCurve-Rend 6/29/2006

FIG 5

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Schedule 5: Payment

Part A: Early Generation Tariff

The total levels of tariff payments in respect of the Early Generation Facility in each month shall be according to the following:

- (i) Prior to the Early Generation Commercial Operation Date the total tariff payments in any month shall be equal to EGEC_p; and
- (ii) Following the Early Generation Commercial Operation Date but prior to the Early Generation Cessation Date the total tariff payments in any month shall be equal to EGEC_p plus EGCP_p.

Where EGEC_p and EGCP_p are calculated in accordance with Part A of this Schedule.

Energy Charges

1 Calculation of Energy Charges

For the purposes of Clause 10.2, KPLC shall pay to the Seller Energy Charges in respect of the Net Electrical Output of the Early Generation Facility in each month calculated as follows:

$$\text{EGEC}_p = \text{EGNEO}_p \times \text{EGECR}_p$$

where:

EGEC _p	=	the aggregate amount of Energy Charges (US\$) payable in respect of month p;
EGNEO _p	=	the aggregate Net Electrical Output (kWh) of the Early Generation Facility in month p; and
EGECR _p	=	the Energy Charges Rate (expressed in US\$/kWh) prevailing in month p as calculated in Paragraph 2 directly below.

2 Energy Charge Rate

The Energy Charges Rate for the Early Generation Facility during each month shall be calculated as follows:

$$\text{EGECR}_p = \text{EGNEO}_b \times \frac{\text{CPI}_{p-1}}{\text{CPI}_b}$$

where:

EGECR _p	=	as previously defined;
EGECR _b	=	zero point zero one five six US Dollars per kWh (0.0156US\$/kWh) the Base Energy Charge Rate
CPI _{p-1}	=	The United States Consumer Price Index for the month 3 months prior to the month p; and
CPI _b	=	the United States Consumer Price Index for June 1996

The royalty charge, currently set at 0.004US\$/kWh, will be added to the Energy Charge Rate at cost.

Capacity Payments

1 Capacity Charge Rate

The Capacity Charge Rate for the Early Generation Facility during each month shall be calculated as follows:

$$\text{EGCCR}_p = E + F$$

where:

EGCCR = the Capacity Charge Rate for month p, (expressed in US\$/kW/month)

$$E = \frac{U}{12} \times \frac{Z}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate})$$

where:

U = five hundred and two point nine US Dollars per kW per year (502.9 US\$/kW/year); and
Z = fifty per cent (50%) the percentage of U represented by the fixed Capacity Charge Rate

$$F = \left(\frac{U}{12} \times \frac{G}{100} \right) \times \frac{\text{CPI}_{p-1}}{\text{CPI}_b} \quad (\text{the escalable component of the Capacity Charge Rate})$$

where:

G = the percentage of U represented by escalable costs such that $G = 100\% - Z$;
 CPI_{p-1} = as previously defined; and
 CPI_b = as previously defined

2 Pass Through Cost – Not Applicable

3 Calculation of Capacity Payments

The Seller shall be entitled to Capacity Payments in respect of Capacity of the Early Generation Facility in each month calculated as follows:

$$\text{EGCP}_p = \text{EGCCR}_p \times \text{EGCC}$$

Where:

EGCP_p = the Capacity Payments for the month p (expressed in US\$)
 EGCCR_p = as previously defined; and
EGCC = the Contracted Early Generation Capacity (expressed in kW)

4 Monthly Availabilities

For each month in each Operating Year, starting with the month in which the Early Generation Commercial Operation Date occurs, there shall be calculated a Monthly Target Availability and an Actual Monthly Availability as follows:

(i) Monthly Target Availability

$$\text{EGMTAp} = (\text{EGCC} \times \text{Hp}) - \text{EGSMAp} - \text{EGUSMAP}$$

where

EGMTA _p	=	the Monthly Target Availability (expressed in kWh);
EGCC	=	as previously defined;
H _p	=	the hours in month p;
EGSMA _p	=	the Scheduled Maintenance Allowance in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the Early Generation Capacity would otherwise have been dispatched at its Contracted Capacity calculated using the values of EGSMAs set forth in Schedule 3; and
EGUSMA _p	=	the Unscheduled Maintenance allowance in month p (expressed in kWh) as calculated using the following formula:

$$\text{EGUSMA}_p = \frac{(\text{EGCC} \times \text{EGD} \times \text{H}_y \times \text{EGOA}) - \sum_{p=1}^{(\text{EGD} \times \text{M})} \text{EGSMA}_p}{\text{EGD} \times \text{M}_y}$$

where:

EGD	=	the duration in years between the Early Generation Commercial Operation Date and the planned date of the Early Generation Cessation Date;
H _y	=	the number of hours in a year being eight thousand seven hundred and sixty (8760);
M _y	=	the number of months in a year being twelve (12); and
EGOA	=	Annual Outage Allowance – as described in Schedule 3.

Where the Early Generation Facility continues to operate after the Early Generation Cessation Date then this section shall be recalculated using the revised planned date of the Early Generation Cessation Date.

(ii) Actual Monthly Availability

The Actual Monthly Availability of the Early Generation Facility in month p, EGAMAp, (expressed in kWh) shall be calculated using the following formula:

$$\text{EGAMA}_p = \sum_{y=1}^{2 \times \text{Hp}} \left(\frac{\text{AC}_y}{2} \right)$$

where:

ACy = the Early Generation Available Capacity in Settlement Period y (expressed in kW)

5 Adjustment of Capacity Payments for Monthly Availability – First Month of Operating Year

If in the first month of an Operating Year, starting with the month in which the Early Generation Commercial Operation Date occurs, the Actual Monthly Availability is less than the Monthly Target Availability, the Capacity Payment for that month shall be multiplied by the factor:

$$\frac{EGAMA_p}{EGMTA_p}$$

6 Adjustment of Capacity Payments for Monthly Availability – Subsequent Months of Operating Year

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities for the year to date is less than the sum of the individual Monthly Target Availabilities for the year to date, then the Capacity Payment for that month shall be adjusted such that:

$$EGACP_{tp} = \sum_{p=1}^m (EGCP_p \times \frac{EGAMA_p}{EGMTA_p})$$

where:

$EGACP_{tp}$ = the total of the Actual Capacity Payments received in the Operating Year for each month up to and including month m.

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities for the year to date is greater than or equal to the sum of the individual Monthly Target Availabilities for the year to date, then the Capacity Payment for that month shall be adjusted, if such an adjustment is required, such that:

$$EGACP_{tp} = \sum_{p=1}^m (EGCP_p)$$

7 Force Majeure Payments

For any month in which all or part of the Capacity of the Early Generation Facility is unavailable as a result of Force Majeure the Seller shall be entitled to Capacity Payments which shall be calculated as follows, and prorated for the number of hours in the month for which the Force Majeure exists:

$$EGLC \times E$$

where:

EGLC = the Capacity not Available as a result of the event of Force Majeure (expressed in kW); and
E = 90% of the Capacity Charge Rate as defined in paragraph 1 above (expressed in US\$/kW/month).

The payment under paragraph 2 shall be reduced by an amount equal to the Capacity Payment the Seller would have received had the Force Majeure event not occurred. For the purposes of this paragraph "Force Majeure" shall not include events or circumstances specified in Clauses 15.1(ii), (iii) and (iv), save that in respect of Clause 15(iii), this paragraph shall apply if epidemics or plagues materially affect the operation of the Early Generation Facility.

8 Changes in Contracted Capacity

In the event that the Contracted Capacity for the Early Generation Facility is altered under the provisions of this Agreement during any month, the calculation of payments shall be adjusted pro rata to reflect the differing proportions of the month for which differing Contracted Capacities were agreed.

Part B: Plant Tariff

Part B1: First Plant Tariff

The total levels of tariff payments in respect of the First Plant in each month shall be according to the following:

- (i) Following the Early Generation Cessation Date but prior to the Full Commercial Operation Date of the First Plant the total tariff payments in any month shall be equal to P1MECp; and
- (ii) Following the Full Commercial Operation Date of the First Plant for the remainder of the Term the total tariff payments in any month shall be equal to P1MECp plus P1CPp.

Where P1MECp and P1CPp are calculated in accordance with Part B1 of this Schedule.

Energy Charges of the First Plant

1 Calculation of Energy Charges of the First Plant

For the purposes of Clause 10.2, KPLC shall pay to the Seller Energy Charges in respect of the Net Electrical Output of the First Plant in each month calculated as follows:

$$P1MECp = P1NEOp \times P1ECRp$$

where:

- P1MEC_p = the aggregate amount of Energy Charges (US\$) payable in respect of month p for the First Plant;
- P1NEO_p = the aggregate Net Electrical Output (kWh) of the First Plant in month p; and
- P1ECR_p = the Energy Charge Rate (expressed in US\$/kWh) in month p for the First Plant as calculated in accordance with Paragraph 2 directly below.

2 Energy Charge Rate

The Energy Charge Rate, P1ECRp, for the First Plant in month p shall be calculated as follows:

$$P1ECRp = P1ECR_b \times \frac{CPI_{p-1}}{P1CPI_b}$$

where:

- P1ECR_b = zero point zero one nine two four US Dollars per kWh (0.01924 US\$/kWh) the Base Energy Charge Rate of the First Plant;
- CPI_{p-1} = as previously defined; and
- P1CPI_b = the United States Consumer Price Index for March 2005 = 193.30

The royalty charge, currently set at 0.004US\$/kWh, will be added to the Energy Charge Rate of the First Plant at cost.

Capacity Payments

1 Capacity Charge Rate

1.1 The Capacity Charge Rate for the First Plant during each month consists of the following two components:

- (i) PICCREp with respect to 25% portion (PICCE) of the Contracted Capacity of the First Plant; and
- (ii) PICCRFp with respect to the remaining portion (PICCF) of the Contracted Capacity of the First Plant.

PICCE and PICCF shall be calculated as follows:

$$\text{PICCE} = \text{P1CC} \times 0.25$$

$$\text{PICCF} = \text{P1CC} - \text{PICCE}$$

where:

P1CC = the Contracted Capacity of the First Plant (expressed in kW).

1.2 PICCREp and PICCRFp during each month shall be calculated as follows:

1.2.1 Calculation of PICCREp

$$\text{PICCREp} = \text{P1AE} + \text{P1BE} - \text{Rp}$$

where:

PICCREp = the Capacity Charge Rate of the First Plant for PICCE for month p, (expressed in US\$/kW/month)

$$\text{P1AE} = \frac{\text{P1VE}}{12} \times \frac{\text{P1C}}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the First Plant})$$

P1VE = P1VE₁ for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;

or
= P1VE₂ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.

where:

P1VE₁ = five hundred sixty one point six three six US Dollars per kW per year (561.636 US\$/kW/year) the PICCE Base Capacity Charge Rate of the First Plant;

P1VE₂ = 12 x (P1CCRE_p + R_p) of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant occurs; and

P1C = the percentage of P1VE represented by the fixed Capacity Charge Rate of the First Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$P1BE = \left(\frac{P1VE}{12} \times \frac{P1DE}{100} \right) \times \frac{CPI_{p-1}}{P1CPI_b} \quad (\text{the escalable component of the Capacity Charge Rate of the First Plant})$$

where:

P1DE = the percentage of P1VE represented by the escalable costs such as fixed O&M costs, insurance and administrative costs, P1DE = 100% - P1C;

CPI_{p-1} = as previously defined;

P1CPI_b = P1CPI_{b1} for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;

or

= P1CPI_{b2} for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.

where:

P1CPI_{b1} = the United States Consumer Price Index for March 2005 = 193.30; and

P1CPI_{b2} = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant occurs.

$$P1R_p = P1R \times \frac{CPI_{p-1}}{P1CPI_{b3}} \quad (\text{the reduction in the Capacity Charge Rate of the First Plant for month } p, \text{ expressed in US\$/kW/month})$$

where:

P1R = P1RY/12

P1RY = twenty-five US Dollars and fifty US cents per kW per year (25.50 US\$/kW/year)

P1CPI_{b3} = the United States Consumer Price Index for July 2003 = 183.9

CPI_{p-1} = as previously defined.

1.2.2 Calculation of P1CCRF_p

$$P1CCRF_p = P1AF + P1BF$$

where:

$P1CCRF_p$ = the Capacity Charge Rate of the First Plant for P1CCF for month p, (expressed US\$/kW/month

$$P1AF = \frac{P1VF}{12} \times \frac{P1C}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the First Plant})$$

$P1VF$ = $P1VF_1$ for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;

or
= $P1VF_2$ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.

where:

$P1VF_1$ = four hundred eight-five US Dollars per kW per year (485 US\$/kW/year) the P1CCF Base Capacity Charge Rate of the First Plant; and

$P1VF_2$ = $12 \times P1CCRF_p$ of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant occurs; and

$P1C$ = as previously defined; and

$$P1BF = \left(\frac{P1VF}{12} \times \frac{P1DF}{100} \right) \times \frac{CPI_{p-1}}{P1CPI_b} \quad (\text{the escalable component of the Capacity Charge Rate of the First Plant})$$

where:

$P1DF$ = the percentage of $P1VF$ represented by escalable costs such as fixed O&M costs, insurance and administrative costs, $P1DF = 100\% - P1C$

CPI_{p-1} = as previously defined;

$P1CPI_b$ = $P1CPI_{b1}$ for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;

or
= $P1CPI_{b2}$ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.

where:

$P1CPI_{b1}$ = the United States Consumer Price Index for March 2005 = 193.30; and

$P1CPI_{b2}$ = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date occurs.

2 Pass Through Cost

This subsection 2 is for the KPLC's internal purposes only, and shall not affect the calculation of Capacity Payments payable to OrPower 4.

The Capacity Charge Rate for the First Plant during each month calculated in accordance with this Part B of Schedule 5 shall include a pass through component to consumers being a fuel displacement cost as follows:

(i) With respect to 25% portion (P1CCE) of the Contracted Capacity of the First Plant as specified in this Part B1 of Schedule 5:

$$P1CCRE_{pt1} = 325.749 \text{ US\$kW/yr (58\% of the base Capacity Charge Rate of the First Plant of 561.636 US\$kW/yr)}$$

(ii) With respect to the remaining portion (P1CCF) of the Contracted Capacity of the First Plant:

$$P1CCRE_{pt2} = 281.3 \text{ US\$kW/yr (58\% of the base Capacity Charge Rate of the First Plant of 485 US\$kW/yr)}$$

where:

$$\begin{array}{lcl} P1CCRE_{pt1} & = & \text{pass through component of } P1CCRE_p \\ P1CCRE_{pt2} & = & \text{pass through component of } P1CCRF_p \end{array}$$

Application of this Pass Through arrangement with regard to Plant 1 ceased on 1st December 2013.

3 Calculation of Capacity Payments of the First Plant

The Seller shall be entitled to Capacity Payments in respect of Capacity of the First Plant in each month calculated as follows:

$$P1CP_p = P1CCRE_p \times P1CCE + P1CCRF_p \times P1CCF$$

where:

$$\begin{array}{lcl} P1CP_p & = & \text{the Capacity Payment of the First Plant for month p} \\ & & \text{(expressed US\$);} \\ P1CCRE_p & = & \text{the Capacity Charge Rate of the First Plant for} \\ & & \text{P1CCE for month p (expressed in US\$kW/month)} \\ P1CCRF_p & = & \text{the Capacity Charge Rate of the First Plant for} \\ & & \text{P1CCF for month p (expressed in US\$kW/month)} \\ P1CCE & = & \text{the portion of the Contracted Capacity of the} \\ & & \text{First Plant as previously defined (expressed in kW)} \\ P1CCF & = & \text{the portion of Contracted Capacity of the First} \\ & & \text{Plant as previously defined (expressed in kW)} \end{array}$$

4 Monthly Availabilities of the First Plant

For each month in each Operating Year, starting with the month in which the Full Commercial Operation Date of the First Plant occurs, there shall be calculated a Monthly Target Availability of the First Plant and an Actual Monthly Availability of the First Plant as follows:

(i) Monthly Target Availability of the First Plant

$$P1MTAp = (P1CC \times H_p) - P1SMAp - P1USMAp$$

where:

P1MTA _p	=	the Monthly Target Availability of the First Plant (expressed in kWh);
P1CC	=	as previously defined;
H _p	=	as previously defined;
P1SMA _p	=	the Scheduled Maintenance Allowance of the First Plant in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the First Plant would otherwise have been dispatched at its Contracted Capacity; and
P1USMA _p	=	the Unscheduled Maintenance Allowance of the First Plant in month p (expressed in kWh) shall be calculated using the following formula:

$$P1USMA_p = \frac{(P1CC \times P1PPA_t \times H_y \times P1OA) - \sum_{p=1}^{P1PPA_t \times M_y} P1SMA_p}{(P1PPA_t \times M_y)}$$

where:

P1PPA _t	=	the number of years between the Full Commercial Date of the First Plant and the end of the Term;
H _y	=	as previously defined;
M _y	=	as previously defined; and
P1OA	=	The Annual Outage Allowance of the First Plant – as set forth in Schedule 3.

Where the Contracted Capacity of the First Plant changes after the Full Commercial Operation Date of the First Plant, then P1USMA_p shall be recalculated from the date of the change in the Contracted Capacity of the First Plant. P1PPA₁ shall be the number of years between the date of the Contracted Capacity of the First Plant change and the end of the Term which does not have to be an integer, P1CC shall be the revised Contracted Capacity of the First Plant in kW and all other parameters shall be those as in the initial calculation.

(ii) Actual Monthly Availability of the First Plant

$$P1AMA_p = \sum_{y=1}^{2 \times H_p} \left(\frac{P1AC_y}{2} \right)$$

where:

$P1AMA_p$ = the Actual Monthly Availability of the First Plant in the month p (expressed in kWh)
 $P1AC_y$ = the Available Plant Capacity of the First Plant in Settlement Period y (expressed in kW)

5 Adjustment of Capacity Payments of the First Plant for Monthly Availability of the First Plant – First Month of Operating Year

If in the first month of an Operating Year, starting with the month in which the Full Commercial Operation Date of the First Plant occurs, the Actual Monthly Availability of the First Plant is less than the Monthly Target Availability of the First Plant, the Capacity Payment of the First Plant for that month shall be multiplied by the factor:

$$\frac{P1AMA_p}{P1MTA_p}$$

6 Adjustment of Capacity Payments of the First Plant for Monthly Availability of the First Plant – Subsequent Months of Operating Year

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the First Plant for the year to date is less than the sum of the Individual Monthly Target Availabilities of the First Plant for the year to date, then the Capacity Payment of the First Plant for that month shall be adjusted such that

$$P1ACP_{tp} = \sum_{p=1}^m (P1CP_p \times \frac{P1AMA_p}{P1MTA_p})$$

where:

$P1ACP_{tp}$ = the total of the Actual Capacity Payments of the First Plant received in the Operating Year for each month up to and including month m.

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the First Plant for the year to date is greater than or equal to the sum of the individual Monthly Target Availabilities of the First Plant for the year to date, then the Capacity Payment of the First Plant for that month shall be adjusted, if such an adjustment is required, such that:

$$P1ACP_{tp} = \sum_{p=1}^m P1CP_p$$

7 Force Majeure Payments

For any month in which all or part of the Capacity of the First Plant is unavailable as a result of Force Majeure, the Seller shall be entitled to Capacity Payments for the First Plant which shall be calculated under paragraph 3 and as follows, and pro rated for such number of hours during which the Force Majeure exists in the month:

P1LC x P1A

where:

P1LC	=	the Capacity of the First Plant not Available as a result of the event of Force Majeure; (expressed in kW); and
P1A	=	90% of the Capacity Charge Rate of the First Plant as defined in paragraph 1 above (expressed in US\$/kW/month)

The payment under paragraph 3 shall be reduced by an amount equal to the Capacity Payment for such hours for the First Plant the Seller would have received had the Force Majeure event not occurred.

For the purposes of this paragraph "Force Majeure" shall not include events or circumstances specified in Clauses 15.1(ii), (iii) and (iv), save that in respect of Clause 15.1(iii), this paragraph shall apply if epidemics or plagues materially affect the operation of the Plant.

8 Changes in Contracted Capacity of the First Plant

In the event that the Contracted Capacity of the First Plant is altered under the provisions of this Agreement during any month, the calculation of payments shall be adjusted pro rata to reflect the differing proportions of the month for which differing Contracted Capacities of the First Plant were agreed.

Part B2: Second Plant Tariff

The total levels of tariff payments in respect of the Second Plant in each month shall be according to the following:

Following the Commercial Operation Date of the Second Plant for the remainder of the Term the total tariff payments in respect of the Second Plant in any month shall be equal to P2MECp plus P2CPp.

Where P2MECp and P2CPp are calculated in accordance with Part B2 of this Schedule.

Energy Charges of the Second Plant

1 Calculation of Energy Charges of the Second Plant

For the purposes of Clause 10.2, KPLC shall pay to the Seller Energy Charges of the Second Plant in respect of the Net Electrical Output of the Second Plant in each month calculated as follows:

$$P2MECp = P2NEOp \times P2ECRp$$

where:

- P2MECp = the aggregate amount of Energy Charges of the Second Plant (US\$) payable in respect of month p;
- P2NEOp = the aggregate Net Electrical Output of the Second Plant (kWh) in month p; and
- P2ECRp = the Energy Charge Rate of the Second Plant (expressed in US\$/kWh) in month p as calculated in accordance with Paragraph 2 directly below.

2 Energy Charge Rate of the Second Plant

The Energy Charge Rate of the Second Plant, P2ECRp, in month p shall be calculated as follows:

$$P2ECRp = P2ECRb \times \frac{CPI_{p-1}}{P2CPIb}$$

where:

- P2ECRb = zero point zero two one four three four US Dollars per kWh (0.021434 US\$/kWh) the Base Energy Charge Rate of the Second Plant;
- CPI_{p-1} = as previously defined; and
- P2CPIb = the United States Consumer Price Index for July 2009 = 215.35

The royalty charge, currently set at 0.004US\$/kWh, will be added to the Energy Charge Rate of the Second Plant at cost.

Capacity Payments of the Second Plant

1 Capacity Charge Rate of the Second Plant

1.1 In case a Delay Period of the Second Plant does not occur, the Capacity Charge Rate of the Second Plant during each month shall be calculated as follows:

$$P2CCR_p = P2A + P2B$$

where:

$P2CCR_p$ = the Capacity Charge Rate of the Second Plant for P2CC for month p, (expressed US\$/kW/month)

$$P2A = \frac{P2V}{12} \times \frac{P2C}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the Second Plant})$$

$P2V$ = $P2V_1$ for the period commencing on the Commercial Operation Date of the Second Plant and ending on the eleventh (11th) anniversary Commercial Operation Date of the Second Plant;

or
= $P2V_2$ for the period after the eleventh (11th) anniversary of Commercial Operation Date of the Second Plant.

where:

$P2V_1$ = five hundred twenty-five US Dollars and forty-five cents per kW per year (525.45 US\$/kW/year) the P2CC Base Capacity Charge Rate of the Second Plant; and

$P2V_2$ = 12 x $P2CCR_p$ of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Second Plant occurs; and

$P2C$ = the percentage of P2V represented by the fixed Capacity Charge Rate of the Second Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Commercial Operation Date of the Second Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$P2B = \left(\frac{P2V}{12} \times \frac{P2D}{100} \right) \times \frac{CPI_{p-1}}{P2CPI_b} \quad (\text{the escalable component of the Capacity Charge Rate of the Second Plant})$$

where:

$P2D$ = the percentage of P2V represented by escalable costs such as fixed O&M costs, insurance and administrative costs, $P2D = 100\% - P2C$

CPI_{p-1} = as previously defined;

$P2CPI_b$ = $P2CPI_{b1}$ for the period commencing on the Commercial Operation Date of the Second Plant and ending on the eleventh (11th) anniversary of the Commercial Operation Date of the Second Plant;

Or
 = P2CPI_{b2} for the period after the eleventh (11th) anniversary of the Commercial Operation Date of the Second Plant.

where:

P2CPI_{b1} = the United States Consumer Price Index for July 2009 = 215.35;
 P2CPI_{b2} = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Second Plant occurs.

1.2 In case that a Delay Period of the Second Plant occurs the Capacity Charge Rate of the Second Plant during each month shall be calculated as follows:

$$P2CCR_p = P2A + P2B$$

where:

P2CCR_p = the Capacity Charge Rate of the Second Plant for P2CC for month p, (expressed US\$/kW/month

$$P2A = \frac{P2V}{12} \times \frac{P2C}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the Second Plant})$$

P2V = P2V₁ for the period commencing on the Commercial Operation Date of the Second Plant and ending on the eleventh (11th) anniversary Commercial Operation Date of the Second Plant;

Or
 = P2V₂ for the period after the eleventh (11th) anniversary of Commercial Operation Date of the Second Plant.

where:

P2V₁ = five hundred twenty-five US Dollars and forty-five cents per kW per year (525.45 US\$/kW/year) the P2CC Base Capacity Charge Rate of the Second Plant; and
 P2V₂ = 12 x P2CCR_p of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Second Plant occurs; and
 P2C = the percentage of P2V represented by the fixed Capacity Charge Rate of the Second Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Commercial Operation Date of the Second Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$P2B = \left(\frac{P2V}{12} \times \frac{P2D}{100} \right) \times \frac{CPI_{p-1}}{P2CPI_b} \quad (\text{the escalable component of the Capacity Charge Rate of the Second Plant})$$

where:

P2D	=	the percentage of P2V represented by escalable costs such as fixed O&M costs, insurance and administrative costs, $P2D = 100\% - P2C$
CPI_{p-1}	=	as previously defined;
$P2CPI_b$	=	$P2CPI_{b1}$ for the period commencing on the Commercial Operation Date of the Second Plant and ending on the eleventh (11 th) anniversary of the Commercial Operation Date of the Second Plant;
Or	=	$P2CPI_{b2}$ for the period after the eleventh (11 th) anniversary of the Commercial Operation Date of the Second Plant.

where:

$P2CPI_{b1}$	=	(the United States Consumer Price Index for July 2009 = 215.35) + $P2CPI_{cod}$ - $P2CPI_{red}$;
$P2CPI_{b2}$	=	CPI_{p-1} of the month in which the eleventh (11 th) anniversary of the Commercial Operation Date of the Second Plant occurs.

Where:

$P2CPI_{cod}$ = CPI_{p-1} for the month on which the Full Commercial Operation Date of the Second Plant occurs; and

$P2CPI_{red}$ = CPI_{p-1} for the month on which the Required Full Commercial Operation Date of the Second Plant occurs.

2 Pass Through Cost

This subsection 2 is for the KPLC's internal purposes only, and shall not affect the calculation of Capacity Payments payable to OrPower 4.

The Capacity Charge Rate for the Second Plant during each month calculated in accordance with this Part B2 of Schedule 5 shall include a pass through component to consumers being a fuel displacement cost as follows:

$P2CCR_{pt} = 304.761 \text{ US\$kW/yr}$ (58% of the base Capacity Charge Rate of the Second Plant of 525.45 US\$/kW/yr)

where:

$P2CCRE_{pt}$ = pass through component of $P2CCR_p$

Application of this Pass Through arrangement with regard to Plant 2 ceased on 1st December 2013.

3 Calculation of Capacity Payments of the Second Plant

The Seller shall be entitled to Capacity Payments in respect of Capacity of the Second Plant in each month calculated as follows:

$$P2CP_p = P2CCR_p \times P2CC$$

where:

$P2CP_p$	=	the Capacity Payment of the Second Plant for month p (expressed US\$);
$P2CCR_p$	=	the Capacity Charge Rate of the Second Plant for P2CC for month p (expressed in US\$/kW/month)
$P2CC$	=	the portion of the Contracted Capacity of the Second Plant (expressed in kW)

4 Monthly Availabilities of the Second Plant

For each month in each Operating Year, starting with the month in which the Full Commercial Operation Date of the Second Plant occurs, there shall be calculated a Monthly Target Availability of the Second Plant and an Actual Monthly Availability of the Second Plant as follows:

(i) Monthly Target Availability of the Second Plant

$$P2MTA_p = (P2CC \times H_p) - P2SMA_p - P2USMA_p$$

where:

$P2MTA_p$	=	the Monthly Target Availability of the Second Plant (expressed in kWh);
$P2CC$	=	as previously defined;
H_p	=	as previously defined;
$P2SMA_p$	=	the Scheduled Maintenance Allowance of the Second Plant in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the Second Plant would otherwise have been dispatched at its Contracted Capacity; and
$P2USMA_p$	=	the Unscheduled Maintenance Allowance of the Second Plant in month p (expressed in kWh) shall be calculated using the following formula:

$$P2USMA_p = \frac{(P2CC \times P2PPA_t \times H_y \times P2OA) - \sum_{p=1}^{P2PPA_t \times M_y} P2SMA_p}{(P2PPA_t \times M_y)}$$

where:

$P2PPA_t$	=	the number of years between the Full Commercial Date of the Second Plant and the end of the Term;
H_y	=	as previously defined;
M_y	=	as previously defined; and
$P2OA$	=	The Annual Outage Allowance of the Second Plant – as set forth in Schedule 3.

Where the Contracted Capacity of the Second Plant changes after the Full Commercial Operation Date of the Second Plant, then P2USMA_p shall be recalculated from the date of the change in the Contracted Capacity of the Second Plant. P2PPA1 shall be the number of years between the date of the Contracted Capacity of the Second Plant change and the end of the Term which does not have to be an integer, P2CC shall be the revised Contracted Capacity of the Second Plant in kW and all other parameters shall be those as in the initial calculation.

(ii) Actual Monthly Availability of the Second Plant

$$P2AMA_p = \sum_{y=1}^{2 \times H} \left(\frac{P2AC_y}{2} \right)$$

where:

P2AMA_p = the Actual Monthly Availability of the Second Plant in the month p (expressed in kWh)
P2AC_y = the Available Plant Capacity of the Second Plant in Settlement Period y (expressed in kW)

5 Adjustment of Capacity Payments of the Second Plant for Monthly Availability of the Second Plant – First Month of Operating Year

If in the first month of an Operating Year, starting with the month in which the Full Commercial Operation Date of the Second Plant occurs, the Actual Monthly Availability of the Second Plant is less than the Monthly Target Availability of the Second Plant, the Capacity Payment of the Second Plant for that month shall be multiplied by the factor:

$$\frac{P2AMA_p}{P2MTA_p}$$

6 Adjustment of Capacity Payments of the Second Plant for Monthly Availability of the Second Plant – Subsequent Months of Operating Year

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the Second Plant for the year to date is less than the sum of the Individual Monthly Target Availabilities of the Second Plant for the year to date, then the Capacity Payment of the Second Plant for that month shall be adjusted such that

$$P2ACP_{tp} = \sum_{p=1}^m \left(P2CP_p \times \frac{P2AMA_p}{P2MTA_p} \right)$$

where:

$P2ACP_{tp}$ = the total of the Actual Capacity Payments of the Second Plant received in the Operating Year for each month up to and including month m.

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the Second Plant for the year to date is greater than or equal to the sum of the individual Monthly Target Availabilities of the Second Plant for the year to date, then the Capacity Payment of the Second Plant for that month shall be adjusted, if such an adjustment is required, such that:

$$P2ACP_{tp} = \sum_{p=1}^m P2CP_p$$

7 Force Majeure Payments

For any month in which all or part of the Capacity of the Second Plant is unavailable as a result of Force Majeure, the Seller shall be entitled to Capacity Payments for the Second Plant which shall be calculated under paragraph 3 and as follows, and pro rated for such number of hours during which the Force Majeure exists in the month:

$$P2LC \times P2A$$

where:

$P2LC$ = the Capacity of the Second Plant not Available as a result of the event of Force Majeure; (expressed in kW); and
 $P2A$ = 90% of the Capacity Charge Rate of the Second Plant as defined in paragraph 1 above (expressed in US\$/kW/month)

The payment under paragraph 3 shall be reduced by an amount equal to the Capacity Payment for such hours for the Second Plant the Seller would have received had the Force Majeure event not occurred.

For the purposes of this paragraph "Force Majeure" shall not include events or circumstances specified in Clauses 15.1(ii), (iii) and (iv), save that in respect of Clause 15.1(iii), this paragraph shall apply if epidemics or plagues materially affect the operation of the Plant.

8 Changes in Contracted Capacity of the Second Plant

In the event that the Contracted Capacity of the Second Plant is altered under the provisions of this Agreement during any month, the calculation of payments shall be adjusted pro rata to reflect the differing proportions of the month for which differing Contracted Capacities of the Second Plant were agreed.

Part B3: Third Plant Tariff

The total levels of tariff payments in respect of the Third Plant in each month shall be according to the following:

Following the Commercial Operation Date of the Third Plant for the remainder of the Term the total tariff payments in respect of the Third Plant in any month shall be equal to P3MECp plus P3CPp.

Where P3MECp and P3CPp are calculated in accordance with Part B3 of this Schedule.

Energy Charges of the Third Plant

1 Calculation of Energy Charges of the Third Plant

For the purposes of Clause 10.2, KPLC shall pay to the Seller Energy Charges of the Third Plant in respect of the Net Electrical Output of the Third Plant in each month calculated as follows:

$$P3MECp = P3NEOp \times P3ECRp$$

where:

- P3MEC_p = the aggregate amount of Energy Charges of the Third Plant (US\$) payable in respect of month p;
- P3NEO_p = the aggregate Net Electrical Output of the Third Plant (kWh) in month p; and
- P3ECR_p = the Energy Charge Rate of the Third Plant (expressed in US\$/kWh) in month p as calculated in accordance with Paragraph 2 directly below.

2 Energy Charge Rate of the Third Plant

The Energy Charge Rate of the Third Plant, P3ECRp, in month p shall be calculated as follows:

$$P3ECR_p = P3ECR_b \times \frac{CPI_{p-1}}{P3CPI_b}$$

where:

- P3ECR_b = zero point zero two one four three four US Dollars per kWh (0.021434 US\$/kWh) the Base Energy Charge Rate of the Third Plant;
- CPI_{p-1} = as previously defined; and
- P3CPI_b = the United States Consumer Price Index for July 2009 = 215.35

The royalty charge, currently set at 0.004US\$/kWh, will be added to the Energy Charge Rate of the Third Plant at cost.

Capacity Payments of the Third Plant

1 Capacity Charge Rate of the Third Plant

1.1 In case that a Delay Period of the Third Plant does not occur, the Capacity Charge Rate of the Third Plant during each month shall be calculated as follows:

$$P3CCR_p = P3A + P3B$$

where:

$P3CCR_p$ = the Capacity Charge Rate of the Third Plant for P3CC for month p, (expressed US\$/kW/month)

$$P3A = \frac{P3V}{12} \times \frac{P3C}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the Third Plant})$$

$P3V$ = $P3V_1$ for the period commencing on the Commercial Operation Date of the Third Plant and ending on the eleventh (11th) anniversary Commercial Operation Date of the Third Plant;

or

= $P3V_2$ for the period after the eleventh (11th) anniversary of Commercial Operation Date of the Third Plant.

where:

$P3V_1$ = five hundred twenty-five US Dollars and forty-five cents per kW per year (525.45 US\$/kW/year) the P3CC Base Capacity Charge Rate of the Third Plant; and

$P3V_2$ = 12 x $P3CCR_p$ of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant occurs; and

$P3C$ = the percentage of $P3V$ represented by the fixed Capacity Charge Rate of the Third Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$P3B = \left(\frac{P3V}{12} \times \frac{P3D}{100} \right) \times \frac{CPI_{p-1}}{P3CPI_b} \quad (\text{the escalable component of the Capacity Charge Rate of the Third Plant})$$

where:

$P3D$ = the percentage of $P3V$ represented by escalable costs such as fixed O&M costs, insurance and administrative costs, $P3D = 100\% - P3C$

CPI_{p-1} = as previously defined;

$P3CPI_b$ = $P3CPI_{b1}$ for the period commencing on the Commercial Operation Date of the Third Plant and ending on the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant;

or

= $P3CPI_{b2}$ for the period after the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant.

where:

$P3CPI_{b1}$ = the United States Consumer Price Index for July 2009 = 215.35;
 $P3CPI_{b2}$ = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant occurs.

1.2 In case that a Delay Period of the Third Plant occurs the Capacity Charge Rate of the Third Plant during each month shall be calculated as follows:

$$P3CCR_p = P3A + P3B$$

where:

$P3CCR_p$ = the Capacity Charge Rate of the Third Plant for P3CC for month p, (expressed US\$/kW/month)

$$P3A = \frac{P3V}{12} \times \frac{P3C}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the Third Plant})$$

$P3V$ = $P3V_1$ for the period commencing on the Commercial Operation Date of the Third Plant and ending on the eleventh (11th) anniversary Commercial Operation Date of the Third Plant;

or
 $P3V$ = $P3V_2$ for the period after the eleventh (11th) anniversary of Commercial Operation Date of the Third Plant.

where:

$P3V_1$ = five hundred twenty-five US Dollars and forty-five cents per kW per year (525.45 US\$/kW/year) the P3CC Base Capacity Charge Rate of the Third Plant; and

$P3V_2$ = 12 x $P3CCR_p$ of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant occurs; and

$P3C$ = the percentage of P3V represented by the fixed Capacity Charge Rate of the Third Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$P3B = \left(\frac{P2V}{12} \times \frac{P3D}{100} \right) \times \frac{CPI_{p-1}}{P3CPI_b} \quad (\text{the escalable component of the Capacity Charge Rate of the Third Plant})$$

where:

$P3D$ = the percentage of P3V represented by escalable costs such as fixed O&M costs, insurance and administrative costs, $P3D = 100\% - P3C$

CPI_{p-1} = as previously defined;

$P3CPI_b$ = $P3CPI_{b1}$ for the period commencing on the Commercial Operation Date of the Third Plant and ending on the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant;
 Or
 $P3CPI_b$ = $P3CPI_{b2}$ for the period after the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant.

where:

$P3CPI_{b1}$ = (the United States Consumer Price Index for July 2009 = 215.35) + $P3CPI_{cod}$ - $P3CPI_{red}$;
 $P3CPI_{b2}$ = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Third Plant occurs.

Where:

$P3CPI_{cod}$ = CPI_{p-1} for the month on which the Full Commercial Operation Date of the Third Plant occurs; and

$P3CPI_{red}$ = CPI_{p-1} for the month on which the Required Full Commercial Operation Date of the Third Plant occurs.

2 Pass Through Cost

This subsection 2 is for the KPLC's internal purposes only, and shall not affect the calculation of Capacity Payments payable to OrPower 4.

The Capacity Charge Rate for the Third Plant during each month calculated in accordance with this Part B3 of Schedule 5 shall include a pass through component to consumers being a fuel displacement cost as follows:

$P3CCR_{pt}$ = 304.761 US\$/kW/yr (58% of the base Capacity Charge Rate of the Third Plant of 525.45 US\$/kW/yr)

where:

$P3CCRE_{pt}$ = pass through component of $P3CCR_p$

Application of this Pass Through arrangement with regard to Plant 3 ceased on 1st December 2013.

3 Calculation of Capacity Payments of the Third Plant

The Seller shall be entitled to Capacity Payments in respect of Capacity of the Third Plant in each month calculated as follows:

$P3CP_p = P3CCR_p \times P3CC$

where:

$P3CP_p$ = the Capacity Payment of the Third Plant for month p (expressed US\$);

P3CCR _p	=	the Capacity Charge Rate of the Third Plant for P3CC for month p (expressed in US\$/kW/month)
P3CC	=	the portion of the Contracted Capacity of the Third Plant (expressed in kW)

4 Monthly Availabilities of the Third Plant

For each month in each Operating Year, starting with the month in which the Full Commercial Operation Date of the Third Plant occurs, there shall be calculated a Monthly Target Availability of the Third Plant and an Actual Monthly Availability of the Third Plant as follows:

(i) Monthly Target Availability of the Third Plant

$$P3MTAp = (P3CC \times H_p) - P3SMAp - P3USMAp$$

where:

P3MTA _p	=	the Monthly Target Availability of the Third Plant (expressed in kWh);
P3CC	=	as previously defined;
H _p	=	as previously defined;
P3SMA _p	=	the Scheduled Maintenance Allowance of the Third Plant in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the Third Plant would otherwise have been dispatched at its Contracted Capacity; and
P3USMA _p	=	the Unscheduled Maintenance Allowance of the Third Plant in month p (expressed in kWh) shall be calculated using the following formula:

$$P3USMA_p = \frac{(P3CC \times P3PPA_t \times H_y \times P3OA) - \sum_{p=1}^{P3PPA_t \times M_y} P3SMA_p}{(P3PPA_t \times M_y)}$$

where:

P3PPA _t	=	the number of years between the Full Commercial Date of the Third Plant and the end of the Term;
H _y	=	as previously defined;
M _y	=	as previously defined; and
P3OA	=	The Annual Outage Allowance of the Third Plant – as set forth in Schedule 3.

Where the Contracted Capacity of the Third Plant changes after the Full Commercial Operation Date of the Third Plant, then P3USMA_p shall be recalculated from the date of the change in the Contracted Capacity of the Third Plant. P3PPA₁ shall be the number of years between the date of the Contracted Capacity of the Third Plant change and the end of the Term which does not have to be an integer, P3CC shall be the revised Contracted Capacity of the Third Plant in kW and all other parameters shall be those as in the initial calculation.

(ii) Actual Monthly Availability of the Third Plant

$$P3AMA_p = \sum_{y=1}^{2 \times H} \left(\frac{P3AC_y}{2} \right)$$

where:

$P3AMA_p$ = the Actual Monthly Availability of the Third Plant in the month p (expressed in kWh)
 $P3AC_y$ = the Available Plant Capacity of the Third Plant in Settlement Period y (expressed in kW)

5 Adjustment of Capacity Payments of the Third Plant for Monthly Availability of the Third Plant – First Month of Operating Year

If in the first month of an Operating Year, starting with the month in which the Full Commercial Operation Date of the Third Plant occurs, the Actual Monthly Availability of the Third Plant is less than the Monthly Target Availability of the Third Plant, the Capacity Payment of the Third Plant for that month shall be multiplied by the factor:

$$\frac{P3AMA_p}{P3MTA_p}$$

6 Adjustment of Capacity Payments of the Third Plant for Monthly Availability of the Third Plant – Subsequent Months of Operating Year

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the Third Plant for the year to date is less than the sum of the Individual Monthly Target Availabilities of the Third Plant for the year to date, then the Capacity Payment of the Third Plant for that month shall be adjusted such that

$$P3ACP_{tp} = \sum_{p=1}^m \left(P3CP_p \times \frac{P3AMA_p}{P3MTA_p} \right)$$

where:

$P3ACP_{tp}$ = the total of the Actual Capacity Payments of the Third Plant received in the Operating Year for each month up to and including month m.

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the Third Plant for the year to date is greater than or equal to the sum of the individual Monthly Target Availabilities of the Third Plant for the year to date, then the Capacity Payment of the Third Plant for that month shall be adjusted, if such an adjustment is required, such that:

$$P3ACP_p = \sum_{p=1}^m P3CP_p$$

7 Force Majeure Payments

For any month in which all or part of the Capacity of the Third Plant is unavailable as a result of Force Majeure, the Seller shall be entitled to Capacity Payments for the Third Plant which shall be calculated under paragraph 3 and as follows, and pro rated for the number of hours during which the Force Majeure exists in the month:

$$P3LC \times P3A$$

where:

P3LC	=	the Capacity of the Third Plant not Available as a result of the event of Force Majeure; (expressed in kW); and
P3A	=	90% of the Capacity Charge Rate of the Third Plant as defined in paragraph 1 above (expressed in US\$/kW/month)

The payment under paragraph 3 shall be reduced by an amount equal to the Capacity Payment for such hours for the Third Plant the Seller would have received had the Force Majeure event not occurred.

For the purposes of this paragraph "Force Majeure" shall not include events or circumstances specified in Clauses 15.1(ii), (iii) and (iv), save that in respect of Clause 15.1(iii), this paragraph shall apply if epidemics or plagues materially affect the operation of the Plant.

8 Changes in Contracted Capacity of the Third Plant

In the event that the Contracted Capacity of the Third Plant is altered under the provisions of this Agreement during any month, the calculation of payments shall be adjusted pro rata to reflect the differing proportions of the month for which differing Contracted Capacities of the Third Plant were agreed.

Part B4: Fourth Plant Tariff

The total levels of tariff payments in respect of the Fourth Plant in each month shall be according to the following:

- (i) Following the Commercial Operation Date of the Fourth Plant for the remainder of the Term the total tariff payments in respect of the Fourth Plant in any month shall be equal to P4MECp plus P4Cp.
- (ii) Where P4MECp and P4Cp are calculated in accordance with Part B4 of this Schedule.

Energy Charges of the Fourth Plant

1 Calculation of Energy Charges of the Fourth Plant

For the purposes of Clause 10.2, KPLC shall pay to the Seller Energy Charges of the Fourth Plant in respect of the Net Electrical Output of the Fourth Plant in each month calculated as follows:

$$P4MECp = P4NEOp \times P4ECRp$$

where:

- P4MECp = the aggregate amount of Energy Charges of the Fourth Plant (US\$) payable in respect of month p;
- P4NEOp = the aggregate Net Electrical Output of the Fourth Plant (kWh) in month p; and
- P4ECRp = the Energy Charge Rate of the Fourth Plant (expressed in US\$/kWh) in month p as calculated in accordance with Paragraph 2 directly below.

2 Energy Charge Rate of the Fourth Plant

The Energy Charge Rate of the Fourth Plant, P4ECRp, in month p shall be calculated as follows:

$$P4ECRp = P4ECRb \times \frac{CPI_{p-1}}{P4CPIb}$$

where:

- P4ECRb = zero point zero two one four three four US Dollars per kWh (0.021434 US\$/kWh) the Base Energy Charge Rate of the Fourth Plant;
- CPI_{p-1} = as previously defined; and
- P4CPIb = the United States Consumer Price Index for July 2009 = 215.35

The royalty charge, currently set at 0.004US\$/kWh, will be added to the Energy Charge Rate of the Fourth Plant at cost.

Capacity Payments of the Fourth Plant

1 Capacity Charge Rate of the Fourth Plant

1.1 In case that a Delay Period of the Fourth Plant does not occur, the Capacity Charge Rate of the Fourth Plant during each month shall be calculated as follows:

$$P4CCR_p = P4A + P4B$$

where:

$P4CCR_p$ = the Capacity Charge Rate of the Fourth Plant for P4CC for month p, (expressed US\$/kW/month)

$$P4A = \frac{P4V}{12} \times \frac{P4C}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the Fourth Plant})$$

$P4V$ = $P4V_1$ for the period commencing on the Commercial Operation Date of the Fourth Plant and ending on the eleventh (11th) anniversary Commercial Operation Date of the Fourth Plant;

Or
 $P4V$ = $P4V_2$ for the period after the eleventh (11th) anniversary of Commercial Operation Date of the Fourth Plant.

where:

$P4V_1$ = five hundred twenty-five US Dollars and forty-five cents per kW per year (525.45 US\$/kW/year) the P4CC Base Capacity Charge Rate of the Fourth Plant;

$P4V_2$ = 12 x $P4CCR_p$ of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Fourth Plant occurs;

$P4C$ = the percentage of $P4V$ represented by the fixed Capacity Charge Rate of the Fourth Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Commercial Operation Date of the Fourth Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$P4B = \left(\frac{P4V}{12} \times \frac{P4D}{100} \right) \times \frac{CPI_{p-1}}{P4CPI_b} \quad (\text{the escalable component of the Capacity Charge Rate of the Fourth Plant})$$

where:

P4D	=	the percentage of P4V represented by escalable costs such as fixed O&M costs, insurance and administrative costs, $P4D = 100\% - P4C$;
CPI_{p-1}	=	as previously defined;
$P4CPI_b$	=	$P4CPI_{b1}$ for the period commencing on the Commercial Operation Date of the Fourth Plant and ending on the eleventh (11 th) anniversary of the Commercial Operation Date of the Fourth Plant;
Or	=	$P4CPI_{b2}$ for the period after the eleventh (11 th) anniversary of the Commercial Operation Date of the Fourth Plant.

where:

$P4CPI_{b1}$	=	the United States Consumer Price Index for July 2009 = 215.35; and
$P4CPI_{b2}$	=	CPI_{p-1} of the month in which the eleventh (11 th) anniversary of the Commercial Operation Date of the Fourth Plant occurs.

1.2 In case that a Delay Period of the Fourth Plant occurs the Capacity Charge Rate of the Fourth Plant during each month shall be calculated as follows:

$$P4CCR_p = P4A + P4B$$

where:

$P4CCR_p$	=	the Capacity Charge Rate of the Fourth Plant for P4CC for month p, (expressed US\$/kW/month

$$P4A = \frac{P4V}{12} \times \frac{P4C}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the Fourth Plant})$$

P4V	=	$P4V_1$ for the period commencing on the Commercial Operation Date of the Fourth Plant and ending on the eleventh (11 th) anniversary Commercial Operation Date of the Fourth Plant;
Or	=	$P4V_2$ for the period after the eleventh (11 th) anniversary of Commercial Operation Date of the Fourth Plant.

where:

$P4V_1$	=	five hundred twenty-five US Dollars and forty-five cents per kW per year (525.45 US\$/kW/year) the P4CC Base Capacity Charge Rate of the Fourth Plant;
$P4V_2$	=	12 x $P4CCR_p$ of the month in which the eleventh (11 th) anniversary of the Commercial Operation Date of the Fourth Plant occurs;

P4C = the percentage of P4V represented by the fixed Capacity Charge Rate of the Fourth Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Commercial Operation Date of the Fourth Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$P4B = \left(\frac{P2V}{12} \times \frac{P4D}{100} \right) \times \frac{CPI_{p-1}}{P4CPI_b} \quad \text{(the escalable component of the Capacity Charge Rate of the Fourth Plant)}$$

where:

P4D = the percentage of P4V represented by escalable costs such as fixed O&M costs, insurance and administrative costs, P4D = 100% - P4C;
CPI_{p-1} = as previously defined;
P4CPI_b = P3CPI_{b1} for the period commencing on the Commercial Operation Date of the Fourth Plant and ending on the eleventh (11th) anniversary of the Commercial Operation Date of the Fourth Plant;
Or
= P4CPI_{b2} for the period after the eleventh (11th) anniversary of the Commercial Operation Date of the Fourth Plant.

where:

P4CPI_{b1} = (the United States Consumer Price Index for July 2009 = 215.35) + P4CPI_{cod} - P4CPI_{rcd}; and
P4CPI_{b2} = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Commercial Operation Date of the Fourth Plant occurs.

Where:

P4CPI_{cod} = CPI_{p-1} for the month on which the Full Commercial Operation Date of the Fourth Plant occurs; and

P4CPI_{rcd} = CPI_{p-1} for the month on which the Required Full Commercial Operation Date of the Fourth Plant occurs.

2 Pass Through Cost – Not Applicable

This subsection 2 is for the KPLC's internal purposes only, and shall not affect the calculation of Capacity Payments payable to OrPower 4.

The Capacity Charge Rate for the Fourth Plant during each month calculated in accordance with this Part B4 of Schedule 5 shall include a pass through component to consumers being a fuel displacement cost as follows:

$P4CCR_{pt} = 304.761 \text{ US\$kW/yr}$ (58% of the base Capacity Charge Rate of the Fourth Plant of 525.45 US\$/kW/yr)

where:

$P4CCRE_{pt} =$ pass through component of $P4CCR_p$

3 Calculation of Capacity Payments of the Fourth Plant

The Seller shall be entitled to Capacity Payments in respect of Capacity of the Fourth Plant in each month calculated as follows:

$P4CP_p = P4CCR_p \times P4CC$

where:

$P4CP_p$	=	the Capacity Payment of the Fourth Plant for month p (expressed US\$);
$P4CCR_p$	=	the Capacity Charge Rate of the Fourth Plant for P4CC for month p (expressed in US\$/kW/month); and
$P4CC$	=	the portion of the Contracted Capacity of the Fourth Plant (expressed in kW).

4 Monthly Availabilities of the Fourth Plant

For each month in each Operating Year, starting with the month in which the Full Commercial Operation Date of the Fourth Plant occurs, there shall be calculated a Monthly Target Availability of the Fourth Plant and an Actual Monthly Availability of the Fourth Plant as follows:

(i) Monthly Target Availability of the Fourth Plant

$P4MTA_p = (P4CC \times H_p) - P4SMA_p - P4USMA_p$

where:

$P4MTA_p$	=	the Monthly Target Availability of the Fourth Plant (expressed in kWh);
$P4CC$	=	as previously defined;
H_p	=	as previously defined;
$P4SMA_p$	=	the Scheduled Maintenance Allowance of the Fourth Plant in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the Fourth Plant would otherwise have been dispatched at its Contracted Capacity; and
$P4USMA_p$	=	the Unscheduled Maintenance Allowance of the Fourth Plant in month p (expressed in kWh) shall be calculated using the following formula:

$$P4USMA_p = \frac{(P4CC \times P4PPA \times H_y \times P4OA) - \sum_{p=1}^{P4PPA \times M_y} P4SMA_p}{(P4PPA \times M_y)}$$

where:

P4PPA _t	=	the number of years between the Full Commercial Date of the Fourth Plant and the end of the Term;
H _y	=	as previously defined;
M _y	=	as previously defined; and
P4OA	=	The Annual Outage Allowance of the Fourth Plant – as set forth in Schedule 3.

Where the Contracted Capacity of the Fourth Plant changes after the Full Commercial Operation Date of the Fourth Plant, then P4USMA_p shall be recalculated from the date of the change in the Contracted Capacity of the Fourth Plant. P4PPA₁ shall be the number of years between the date of the Contracted Capacity of the Fourth Plant change and the end of the Term which does not have to be an integer, P4CC shall be the revised Contracted Capacity of the Fourth Plant in kW and all other parameters shall be those as in the initial calculation.

(ii) Actual Monthly Availability of the Fourth Plant

$$P4AMA_p = \sum_{y=1}^{2 \times H_y} \left(\frac{P4AC_y}{2} \right)$$

where:

P4AMA _p	=	the Actual Monthly Availability of the Fourth Plant in the month p (expressed in kWh); and
P4AC _y	=	the Available Plant Capacity of the Fourth Plant in Settlement Period y (expressed in kW).

5 Adjustment of Capacity Payments of the Fourth Plant for Monthly Availability of the Fourth Plant – First Month of Operating Year

If in the first month of an Operating Year, starting with the month in which the Full Commercial Operation Date of the Fourth Plant occurs, the Actual Monthly Availability of the Fourth Plant is less than the Monthly Target Availability of the Fourth Plant, the Capacity Payment of the Fourth Plant for that month shall be multiplied by the factor:

$$\frac{P4AMA_p}{P4MTA_p}$$

6 Adjustment of Capacity Payments of the Fourth Plant for Monthly Availability of the Fourth Plant – Subsequent Months of Operating Year

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the Fourth Plant for the year to date is less than the sum of the Individual Monthly Target Availabilities of the Fourth Plant for the year to date, then the Capacity Payment of the Fourth Plant for that month shall be adjusted such that

$$P4ACP_{tp} = \sum_{p=1}^m (P4CP_p \times \frac{P4AMA_p}{P4MTA_p})$$

where:

$P4ACP_{tp}$ = the total of the Actual Capacity Payments of the Fourth Plant received in the Operating Year for each month up to and including month m .

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the Fourth Plant for the year to date is greater than or equal to the sum of the individual Monthly Target Availabilities of the Fourth Plant for the year to date, then the Capacity Payment of the Fourth Plant for that month shall be adjusted, if such an adjustment is required, such that:

$$P4ACP_{tp} = \sum_{p=1}^m P4CP_p$$

7 Force Majeure Payments

For any month in which all or part of the Capacity of the Fourth Plant is unavailable as a result of Force Majeure, the Seller shall be entitled to Capacity Payments for the Fourth Plant which shall be calculated under paragraph 3 and as follows, and pro rated for the number of hours during which the Force Majeure exists in the month:

$$P4LC \times P4A$$

where:

$P4LC$ = the Capacity of the Fourth Plant not Available as a result of the event of Force Majeure; (expressed in kW); and
 $P4A$ = 90% of the Capacity Charge Rate of the Fourth Plant as defined in paragraph 1 above (expressed in US\$/kW/month).

The payment under paragraph 3 shall be reduced by an amount equal to the Capacity Payment for such hours for the Fourth Plant the Seller would have received had the Force Majeure event not occurred.

For the purposes of this paragraph “Force Majeure” shall not include events or circumstances specified in Clauses 15.1(ii), (iii) and (iv), save that in respect of Clause 15.1(iii), this paragraph shall apply if epidemics or plagues materially affect the operation of the Plant.

8 Changes in Contracted Capacity of the Fourth Plant

In the event that the Contracted Capacity of the Fourth Plant is altered under the provisions of this Agreement during any month, the calculation of payments shall be adjusted pro rata to reflect the differing proportions of the month for which differing Contracted Capacities of the Fourth Plant were agreed.

Part C: Invoicing

- 1 Content: Each invoice shall, subject to this Part C, be in such form as the Seller shall from time to time reasonably determine, and a separate invoice shall be issued for each Plant. Each invoice shall:
 - (a) have a unique number by which the invoice may be identified; and
 - (b) identify the month in respect of which payment is due; and
 - (c) state the Energy Charge for the month in respect of which payment is due, including the relevant quantities metered and recorded in accordance with Clause 11 and Part B of Schedule 4 and such other information including relevant value of the United States Consumer Price Index and calculations, in reasonable detail, to permit KPLC to confirm the consistency of the invoice with the provisions of Schedule 5; and
 - (d) state the Capacity Charge Rate for the month in respect of which payment is due and such other information including the relevant value of the United States Consumer Price Index and calculations, in reasonable detail, to permit KPLC to confirm consistency of the invoice with provisions of Schedule 5; and
 - (e) state the Monthly Target Availability and the Actual Monthly Availability for that month; and
 - (f) state any other charge payable by KPLC together with such other information and calculations, in reasonable detail, as shall be required by KPLC to verify that charge; and
 - (g) state the total amount payable; and
 - (h) state the due date for payment of the invoice.
- 2 Compliance with statutes, etc.: Each invoice shall comply with all relevant statutes, regulations and directives, including those relating to Value Added Tax.
- 3 Details: Each invoice shall be accompanied by a detailed statement setting out the Declared Capacity of the Plant in respect of each Settlement Period, revisions (if any) to the Contracted Capacity of such Plant following a Contracted Capacity Test of such Plant, details of any Availability Failure of such Plant and the computation of the Net Electrical Output of the Plant delivered at its Delivery Point in response to a Despatch Instruction for each Settlement Period and such other information and calculations, in reasonable detail, as shall be required by KPLC to verify the invoice.

Part D: Consumer Prices Index

- 1 If in the opinion of either Party the CPI cannot be properly calculated as a result of any of the following circumstances (an “**Event**”):
 - (a) the non-availability or discontinuance of one or more of the figures, values or prices required to calculate the CPI (whether permanent or temporary);
 - (b) an error is contained in one or more of the published figures, values or prices required to calculate the CPI;
 - (c) the basis upon which the CPI is calculated has been changed and thereby superseded so as materially to affect the validity of CPI comparison over time other than any change arising from changes in the respective consumption patterns upon which the CPI was based;then the Parties shall meet and seek in good faith to agree upon the means whereby the CPI may be adjusted or to agree upon a replacement index and if the Parties cannot agree upon such adjustment or replacement index within a period of thirty (30) days either Party may refer the matter to an Expert who shall determine such replacement index as most closely reflects the CPI prior to the Event and also the date from which such replacement index shall be applicable.
- 2 If an index other than the CPI shall be used, then the provisions of this Part D of this Schedule 5 shall apply to such index mutatis mutandis.

Schedule 6: Conditions Precedent

Part A: Preconditions of the Seller

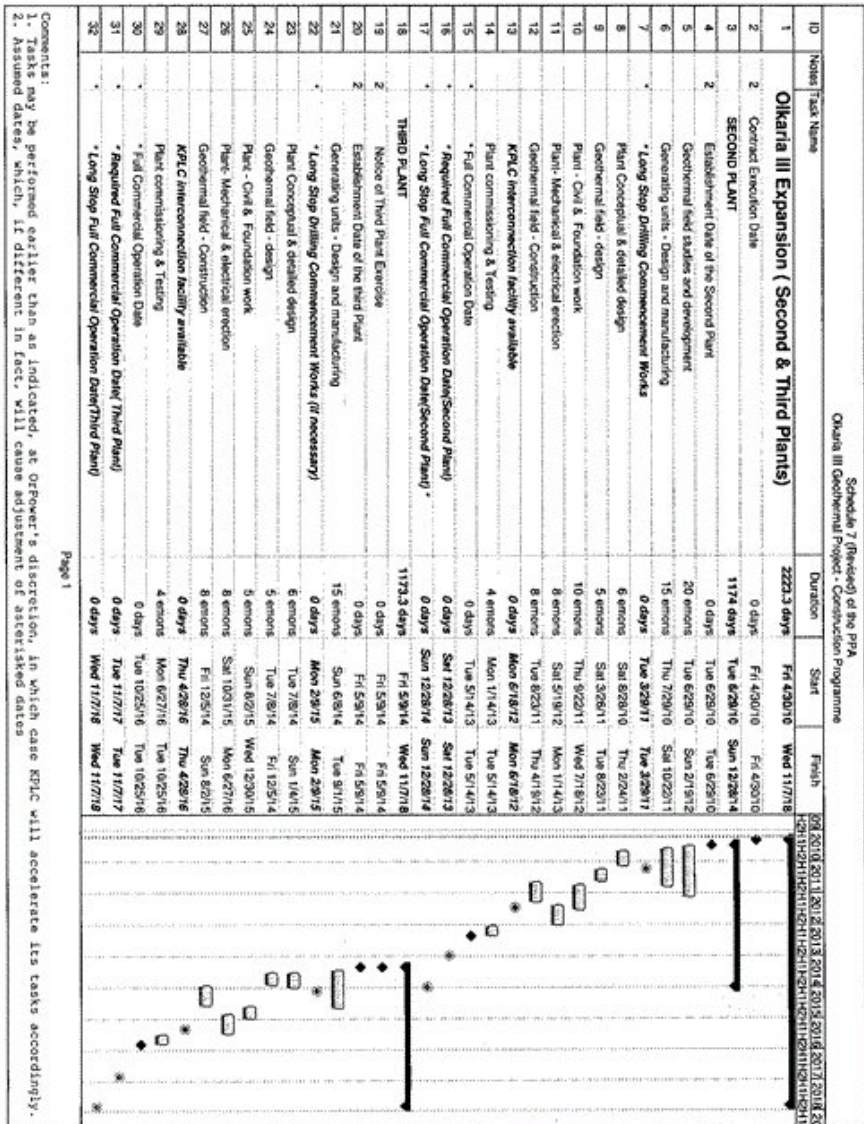
- (i) The grant to the Seller of geothermal resources licence for the Licence Area necessary for the Geothermal Reservoir Development;
- (ii) The execution by the GOK of the Site Agreement; and
- (iii) The granting to the Seller of a Water Permit.

Part B: Preconditions of KPLC

- (i) The Seller providing to KPLC such documentary evidence as shall reasonably satisfy KPLC that the Seller has or has access to such funds as are necessary for the conduct of the Appraisal Works and construction of the Early Generation Facility in accordance with the terms of this Agreement. Such documentary evidence shall include evidence of all loans, grants or other financing arrangements as the Seller shall have procured.

Schedule 7: Construction Programme

(See Page 183)



Comments:
1. Tasks may be performed earlier than as indicated, at OPOWER's discretion, in which case KPLC will accelerate its tasks accordingly.
2. Assumed dates, which, if different in fact, will cause adjustment of asterisked dates

Schedule 8: Parties' addresses and notice details

KPLC:

The Kenya Power & Lighting Company Ltd.
Stima Plaza
P.O. Box 30099-00100
Nairobi,
Kenya

Fax: +254 20 311146

Tel: +254 20 3201000

Marked for the attention of: The Company Secretary

Seller:

OrPower 4 Inc.
6225 Neil Road
Reno
Nevada 89511-1136
USA

Fax: Nevada, USA (775) 356-9039

Tel: Nevada, USA (775) 356-9029

with copy to:

OrPower 4
Kenya Branch
Off Moi South Lake Road
Hellsgate National Park
P.O. Box 1566
20117, Naivasha, Kenya

In either case marked for the attention of: the Company President

Schedule 9: Insurance

Part A: Construction Period

(The period from the start of the construction works until the Full Commercial Operation Date for the Early Generation Facility and each Plant)

1 Marine and Air Cargo:

Cover: All materials, equipment, machinery, spares and other items for incorporation in the Plant and the Seller's Steam Field Facilities against all risks of physical loss or damage while in transit by sea or air from country of origin anywhere in the world to the Site in Kenya, or vice versa from time of the insured items leaving warehouse or factory for shipment to the Site. Cover to institute Cargo Clauses (Air), institute War Clauses (Air), (Sendings By Post), institute Strikes Clause (Cargo, Air Cargo) or equivalent.

Sum Insured: An amount equal to cost and freight of any shipment

Deductible: Not to exceed US\$ 10,000 for each loss; except US\$ 5,000 for the turbine/generators.

Insured: The Seller and its relevant contractors.

2 Loss of Revenue Profits (following Marine incident) – "Marine Delay in Full Commercial Operation Date"

Cover: Against loss of revenue following delay in start of commercial operations as a direct result of physical loss or damage to the materials, equipment, machinery and other items in transit by sea or air to the Site, to the extent covered under the Marine Cargo insurance.

Sum Insured: An amount equal to the estimated continuing expenses, including debt service, during the indemnity period.

Indemnity Period: 12 months or the period required to repair or replace materials, equipment or machinery, whichever is less.

Deductible: Not to exceed 60 days.

Insured: The Seller.

3 Contractors' All Risks

Cover: The contract works, including the Early Generation Facility, Appraisal Works executed, and each Plant and in the course of execution, materials and temporary works, while on the Site, against all risks of physical loss or damage other than war and kindred risks, nuclear risks, unexplained shortage, cost of replacing or repairing items which are defective in workmanship material or design; penalties; consequential losses; cash; vehicles; vessels; aircraft and other standard exclusions contained in such policies. Cover shall provide the equivalent terms, conditions and perils/causes of loss provided under the Erection All Risks insurance policy.

Sum Insured: The Contract Price.

Deductibles: In relation to Contract Works, Materials, etc.

(a) arising during the construction and testing period:

(i) from Storm, Tempest, Flood, Water Damage, Earthquake, Subsidence and Collapse – Not to exceed US\$ 10,000

(ii) from any other cause other than in (a)(i) above – Not to exceed US\$ 5,000

(b) arising out of operational testing or Commissioning:

(i) of turbine generators – Not to exceed US\$ 50,000

(ii) of plant other than turbine generators – Not to exceed US\$ 35,000

Period of Cover: Actual construction, testing and Commissioning.

Insured: The Seller, its contractors and its lenders and all suppliers on the Site; KPLC shall be added as an additional insured as its interests may appear.

4 Loss of Revenue (following C.A.R.) “Delay in a Commercial Operation Date”

Cover: Against loss of revenue following delay in start of commercial operations as a direct result of physical loss or damage to the works during construction or operational testing to the extent that such loss or damage is covered under the Contractors’ All Risks policy.

Sum Insured: An amount equal to the estimated continuing expenses, including debt service, during the indemnity period.

Indemnity Period: Not less than 12 months.

Insured: the Seller and its lenders.

Deductible: Not more than 90 days.

Period of Cover: Construction, testing and Commissioning periods of the Early Generation Facility and each Plant from mobilization of the Seller’s contractors until the day following its Full Commercial Operation Date.

5 Public Liability

Cover: Against legal liability to third parties for bodily injury or damage to property arising out of the construction, testing and Commissioning of the Early Generation Facility and each Plant.

Sum Insured: For any one claim: US\$ 5,000,000.

Deductible: Not to exceed US\$ 25,000 for each claim for damage to property. None for injury to persons.

Insured: The Seller and its contractors; KPLC shall be added as an additional insured as its interest may appear.

Period of Cover: The actual construction, testing and Commissioning of the Early Generation Facility and each Plant from mobilization of the Seller's contractors until the day following its relevant Full Commercial Operation Date.

6 Miscellaneous

Other insurance as is customary, desirable or necessary to comply with local or other requirements, such as Workmen Compensation Insurance in relation to all workmen employed in the construction of the Plant and Motor Insurance on a vehicle.

Part B: Operating Period

(The period from the Full Commercial Operation Date of a Plant until the end of the Term with respect to such Plant)

1 All Risks Insurance – Fixed Assets

Cover: All building contents, machinery, stock, fixtures, fittings and other personal property forming part of the Plant against “All Risks” of physical loss or damage, including (but not limited to) those resulting from fire, lightning, explosion, spontaneous combustion, storm, wind, tempest, flood, hurricane, water damage, riot, strikes, malicious damage, earthquake, collapse and/or loss of contents of tanks, subject to standard policy exclusions.

Sum Insured: Full replacement value of the Plant.

Deductible: Not to exceed US\$ 50,000 each loss.

Insured: The Seller and its lenders; KPLC shall be added, as an additional insured as its interests may appear.

2 Consequential Loss Following All Risks

Cover: Loss of revenue due to loss of capacity and/or loss of output as a direct consequence of loss of or damage to Plant and caused by a period insured under paragraph 1 above.

Sum Insured: An amount equal to the estimated continuing expenses, including debt service, during the indemnity period.

Indemnity Period: Not less than 12 months.

Deductible: Not more than 60 days.

Insured: The Seller and its lenders.

3 Machinery Breakdown

Cover: All machinery, plant and ancillary equipment forming part of the Plant against sudden and unforeseen physical loss or damage resulting from mechanical and electrical breakdown or derangement, explosion or collapse of pressure vessels, electrical short circuits, vibration, misalignment, excessive current or voltage, abnormal stresses, centrifugal forces, failure of protective or regulating devices, overheating, entry of foreign bodies, impact, collision and other similar causes.

Sum Insured: Full replacement value of all machinery, plant, boilers, etc.

Deductible: US\$ 10,000 each loss.

Insured: The Seller and its lenders; KPLC shall be added as an additional insured as its interest may appear.

4 Consequential Loss following Machinery Breakdown

Cover: Loss of revenue due to loss of capacity and/or loss of output as a direct consequence of loss or damage to the Plant caused by a peril insured under paragraph 3 above.

Sum Insured: an amount equal to the estimated continuing expenses, including debt service, during the indemnity period.

Indemnity Period: Not less than 12 months.

Deductible: Not more than 60 days.

Insured: The Seller and its lenders.

5 Public Liability

Cover: Legal liability of the insured for damage to property of third parties or bodily injury to third parties arising out of the ownership, operation and maintenance of the Plant.

Sum Insured: US\$ 5,000,000 for any occurrence.

Deductible: US\$ 25,000 each claim for property. None for injury to persons.

Insured: The Seller and its lenders; KPLC shall be added as an additional insured as its interest may appear.

6 Off Site Facilities

The Seller shall ensure that all plant, equipment and machinery which is necessary for the operation or development of the Early Generation Facility or the Plant but which is not located at the Temporary Site or the Site as the case may be which shall include but not be limited to: drilling rigs and equipment, wells, pipework, cables and instrumentation equipment is comprehensively insured to its replacement values. The Seller shall also procure loss of revenue and third party insurance to a suitable value to be agreed with KPLC for this plant equipment and machinery.

7 Miscellaneous

Other insurance as are customary, desirable or necessary to comply with local or other requirements, such as Workmen's Compensation insurance in relation to all workmen employed in the Plant or in connection with its operation, and Motor Insurance on any vehicle.

If KPLC is added as an additional insured on any of the insurance listed in this Schedule 9, KPLC acknowledges and agrees that (a) it will not be included as a loss payee on any insurance proceed payments relative to such insurance coverage, and (b) it will not be involved in any claim negotiations, discussion or settlements.

Schedule 10: Site Agreement

(See Pages 191-200)



A circular notary seal for Moshe Avidar. The outer ring contains the word "NOTARY" at the top and "AVIDAR" at the bottom. The inner circle contains the name "מוֹשֶׁה אַבִּידָר" in Hebrew and "MOSEH AVIDAR" in English. The seal is stamped in black ink.

- ## SITE AGREEMENT FOR OLKARIA III GEOTHERMAL PLANT

We certify that this document was received in Kenya on 18th November, 1998

Kempson & Stratton

KAPLAN & STRATTON
Advocates
P.O. Box 40111
Nairobi

THIS AGREEMENT is made on 5th November 1998

- (1) **THE GOVERNMENT OF THE REPUBLIC OF KENYA (“GoK”)**; and
- (2) **ORPOWER 4 INC. (“OrPower”)** a company incorporated in Cayman Islands. British West Indies and Of P.O. Box 980 Greg Street, Sparks, NV 89431.

WHEREAS:

- (A) Pursuant to a Request for Proposal (“**RFP**”) dated 5th July 1996 and issued by Ministry of Energy of the Republic of Kenya and as a result of an international bid. OrPower and The Kenya Power and Lighting Company Limited (“**KPLC**”) have entered into a power purchase agreement (the “**PPA**”).
- (B) The PPA provides for GoK and OrPower to enter into a Site Agreement (being this Agreement) for the purposes hereinafter appearing.

IT IS HEREBY AGREED as follows:

1. DEFENITIONS AND INTERPRETATIONS

(a) Definitions

Words and expressions defined in the PPA shall have the same meanings in this Agreement and the following words and expressions shall, unless the context shall otherwise require, have the following meanings:

“**Act**” the Geothermal Resources Act 1982 including any modifications, amendments or replacements thereto from time to time and the refutations made thereunder.

“**Early Generation Lease**” the lease substantially in the form of the draft set out in the schedule hereto to be issued by GoK to OrPower pursuant to Clause 3(a) hereof.

“**Licence**” the Geothermal Resources Licence to be issued by GoK to OrPower pursuant to Section 7 of the Act.

“**Licence Area**” the area of land described in Appendix I hereof.

“**Plant Lease**” the lease substantially in the form of the draft set out in the schedule hereto to be issued by GoK to OrPower pursuant to clause 3(b) hereof.

“**Operations**” the geothermal operations required for the fulfilment of OrPower's obligations under the PPA including but not limited to (i) exploring, drilling, extracting, producing, utilizing and disposal of geothermal resources and (ii) the construction, erection, operation, use and maintenance of wells, pumps, pipes, pipelines, buildings, plants, sumps, brine pits, reservoirs, tanks, waterworks, pumping stations, roads, electric power generating plants, transmission line, industrial facilities, electric, telegraph or telephone lines or cable and of such other works or structures as may be necessary or reasonably convenient for the production,

utilization and processing of geothermal resources or for the full enjoyment of the rights granted under the Licence and hereunder subject to compliance with Legal Requirements.

“owner or occupier” the registered owner, lessee or grantee of the land.

“private land” land other than land owned by the GoK or land declared to be a national park or national reserve pursuant to the Wildlife (Conservation and Management) Act.

“Signature Date” the date of signature of the PPA.

(b) Interpretation

In this Agreement, unless the context otherwise requires:

- (i) reference to a month is reference to a calendar month;
- (ii) words in singular shall be interpreted as referring to the plural and vice versa and words denoting natural persons shall be interpreted as referring to corporations and any other legal entities and vice versa;
- (iii) reference to Clauses is reference to clauses of this Agreement.

2. As soon as possible after the Signature Date OrPower shall apply to the Minister for Energy for issue of the Licence over the Licence Area.

3. In consideration of OrPower entering into the PPA with KPLC, GoK undertakes as follows:

- (a) within ninety (90) days of the Signature Date, to grant to OrPower the Early Generation Lease over a sufficient portion of the Licence Area for the purpose of constructing and operating the Early Generation Facility.
- (b) within ninety (90) days of the completion of the Appraisal Programme and provided in the light of the results of the Appraisal Works it is determined in accordance with the PPA to proceed with the construction of the Plant, grant to OrPower the Plant Lease over a sufficient portion of the Licence Area for the purpose of constructing and operating the Plant and upon which grant OrPower shall surrender to GoK at no cost to OrPower the Early Generation Lease.
- (c) in the event of an effective assignment of the PPA by OrPower pursuant to and in accordance with Section 21.2 of the PPA, to give or procure the Commissioner of Lands to give his consent to the assignment of the Early Generation Lease or the Plant Lease as the case may be.

4. GoK further undertakes to grant to OrPower the following exclusive rights:

- (a) the right and privilege to enter and explore, drill for, extract, produce, utilise and dispose of geothermal steam and associated geothermal resources in or under the Licence Area consistent with the Licence.
- (b) the right to construct or erect and to use, operate and maintain within the Licence Area, together with ingress and egress thereupon for the purpose of conducting the Operations and to use so much of the surface of the land within the Licence Area as may be necessary or convenient for the production, utilisation and processing of geothermal resources or for the full enjoyment of the rights granted hereunder, subject to compliance with all Legal Requirements.

- (c) in so far as it may be necessary for and in connection with the Operations, the right to:
- (i) drill and construct all necessary boreholes;
 - (ii) erect, construct and maintain houses and buildings for OrPower's own use and for use by the OrPower's employees;
 - (iii) erect, construct and maintain plant, machinery, buildings and other erections as may be necessary;
 - (iv) utilize the geothermal resources;
 - (v) subject to the Water Act, reclaim and utilize any water, and
 - (vi) construct and maintain roads and other means of communication and conveniences.

subject to compliance with all applicable Legal Requirements.

- (d) the right to take, use or apply the geothermal resources for the purpose of the PPA.

5. OrPower shall comply with the provisions of the Geothermal Resources Regulations 1990 and the drilling conditions specified in the Licence.
6. OrPower shall carry out an appraisal of the geothermal resources in the Licence Area in accordance with the Appraisal Programme under the PPA.
7. (a) Upon surrender, forfeiture or expiry of the Early Generation Lease or the Plant Lease (as the case may be) OrPower shall be entitled to apply to GoK to enter the Licence Area to remove the plant, machinery, engine or tools installed or erected thereon. GoK's consent to such removal shall not be unreasonably withheld, delayed or conditioned.
- (b) GoK may require OrPower to remove the plant machinery, engines or tools within a reasonable time (being not less than ninety (90) days after the expiry, surrender or forfeiture of such lease) and if the same are not so removed they may be sold by auction at the risk of OrPower.
- (c) The net proceeds of the sale conducted pursuant to paragraph (b) shall be held until applied for by OrPower but may be used in the repair of breaches or faults not made good by OrPower and for payment of the costs incurred in conducting the sale. GoK shall ensure that costs incurred either in the breaches or faults or in the conducting any sale shall be in accordance with the usual or customary rates for the type of expenditure involved and in all cases reasonable and fair.
8. (a) GoK shall, at the request of OrPower, make available to OrPower by way of lease substantially in the form of the draft set out in the schedule hereto such land as OrPower may reasonably require for the conduct of the Operations (provided that such land falls within the Licence Area) and:
- (i) where such land is trust land, GoK shall, subject to paragraph (b) of this Clause set apart such trust land in the Licence Area in accordance with the Trust Land Act (Cap. 288) and Chapter IX of the Constitution;
 - (ii) where such land is private land, GoK shall, subject to paragraph (c) of this clause acquire the land in accordance with the applicable laws;

- (iii) where such land is within a “**National Park**” or “**National Reserve**” within the meaning of the Wildlife (Conservation and Management) Act. GoK shall procure that it obtains all necessary consents and authorisations from a competent authority. OrPower shall on its part provide to GoK a sufficient description of the area required for its operations and supply such other information as may be required by the GoK or the competent authority for the issue of such consent or authorization;
 - (iv) OrPower shall pay or reimburse GoK any reasonable compensation that may be required for the setting apart, use or acquisition of any land for Operations.
 - (b) Where OrPower has occupied trust land for the purpose of the Operations before that land has been set apart, OrPower shall notify GoK in writing of the need to set apart such land before the end of the two (2) years period referred to in Section 115 of the Constitution.
 - (c) GoK shall grant or cause to be granted to OrPower and its contractors and sub-contractors such way-leaves, easements, temporary occupation or other permissions within and without the Licence Area as are necessary to conduct the Operations and in particular for the purpose of laying, operating and maintaining pipelines, powerlines, cables, communication facilities, roads and rights of way in accordance with Legal Requirements.
 - (d) GoK shall at all times give OrPower and its contractors and sub-contractors the right of ingress to and egress from the Licence Area to and from, in particular, the facilities wherever located for the conduct of the Operations.
 - (e) Prior to OrPower requesting GoK to make available to OrPower private land for conduct of the Operations, OrPower shall first enter into negotiations with the owner or occupier of such private land for granting of the required permission or authorisation or for the acquisition of the required interest over such land. In the event that the owner or occupier of any such land fails to grant to OrPower the required permission, authorisation or interest in land within one hundred and twenty (120) days of commencement of negotiations between Licensee and such owner or occupier, GoK shall obtain in accordance with the applicable laws, the required permission, authorisation or other interest in land. In carrying out negotiations with the owner or occupier of private land, OrPower undertakes to act diligently. For the purpose of this clause “**diligently**” shall include pursuing all reasonably available procedures for obtaining the required permission, authorisation or interest in land, including the offer of a rent or purchase price or other consideration which a person carrying out OrPower’s activities would reasonably expect to pay for the grant of such permission or authorisation or interest in land. OrPower shall pay or reimburse GoK any reasonable compensation that may be required for obtaining such permission, authorisation or interest in land.
9. GoK shall, subject to Legal Requirements, obtain for OrPower any permit necessary to enable OrPower to use the water in the Licensee Area for the purpose of Operations but OrPower shall not unreasonably deprive the users of land, domestic settlement or cattle watering place of the water supply to which they are accustomed.
10. OrPower shall, where applicable, pay compensation as required by Section 19 the Act.
11. (a) OrPower undertakes within thirty (30) days of the Signature Date or as soon as possible thereafter to provide GoK, for the purpose of granting the Early Generation Lease, a sufficient description of the land within the Licence Area required by OrPower for the construction and operation of the Early Generation Facility together with a survey plan relating to such land prepared by a registered surveyor appointed by OrPower.

- (b) OrPower further undertakes to provide to GoK, for the purpose of granting the Plant Lease, a sufficient description of the land within the Licence Area (if different from the site of the Early Generation Facility) required by OrPower for the construction and operation of the Plant together with a survey plan relating to such land prepared by a registered surveyor appointed by OrPower.

12. **EXPEDITION**

Subject to OrPower making the necessary applications, providing the required information and otherwise complying with any prescribed terms and conditions or procedural requirements. GoK commits itself to act in a timely manner on all matters to be performed by it under this Agreement so as to put OrPower in a position to meet the deadlines and time periods stipulated in the PPA.

13. **COMMUNICATIONS**

- (a) Every notice demand or other communication under this Agreement shall be in writing and may be delivered personally or by letter, telex or facsimile transmission despatched by the parties to each other in accordance with the details set out below or to such other address and/or facsimile number as the parties may notify each other in accordance with this Clause for the purpose:

OrPower:

The Managing Director
OrPower 4 Inc.
c/o P.O. Box 40111
Nairobi

Fax Number: (02) 340827/242245
Telephone Number: (02) 335333

GoK:

The Permanent Secretary
Ministry of Energy
Nyayo House
P.O. Box 30582
Nairobi
Kenya

Fax Number: (02)
Telephone Number: (02) 330048

- (b) Every notice, demand or other communication shall be deemed to have been received (if send by post) twenty-four hours after being posted first class postage prepaid (if posted from and to an address within Kenya) or 5 working days after being posted prepaid airmail (if posted from or to an address outside Kenya) at the tune of actual delivery or (in the case of a facsimile transmission) receipt if during normal business hours on a working day in the place of intended receipt or to the facsimile transmission number specified above, and otherwise at the opening of business in that number on the next succeeding such day.

14. **DISPUTES**

- (a) Except as otherwise provided in this Agreement, any question or dispute arising out of or in relation to or in connection with this Agreement shall, as far as possible, be settled amicably. Where no settlement is reached within thirty (30) days from the date of dispute, such dispute shall be referred to arbitration in accordance with the provisions hereinafter contained.
- (b) The Government of Kenya and Orpower hereby, consent to submit to the International Centre for the Settlement of Investment Disputes all disputes arising out of this Agreement or relating to any investment made under it for settlement by arbitration pursuant to the Convention on the Settlement of Investment Disputes between States and Nationals of other States (the “**Convention**”).
- (c) It is hereby stipulated that Orpower is a national of the Cayman Islands and that this Agreement is an investment within the meaning of the Convention.
- (d) Any such arbitration proceeding shall be conducted in accordance with the Rules of Procedure for Arbitration Proceedings of the convention on the Settlement of Investment Disputes in effect on the date on which the proceeding is instituted.

15. **GOVERNING LAW**

This Agreement shall be governed and construed in all respect in accordance with the laws of Kenya.

IN WITNESS WHEREOF this Agreement is duly executed.

SIGNED by the Honourable
Chrysanthus B. Okemo. MP. Minister of Energy
for and on behalf of GoK in the presence of:)
)
)
)
)
)
)
)
)
)
)
)

COUNTERSIGNED by
Margaret Chemengich
Permanent Secretary to the Treasure in the
presence of:)
)
)
)
)
)
)
)
)
)
)

Signed by
duly authorized for and on behalf of ORPOWER
4 INC in the presence of:

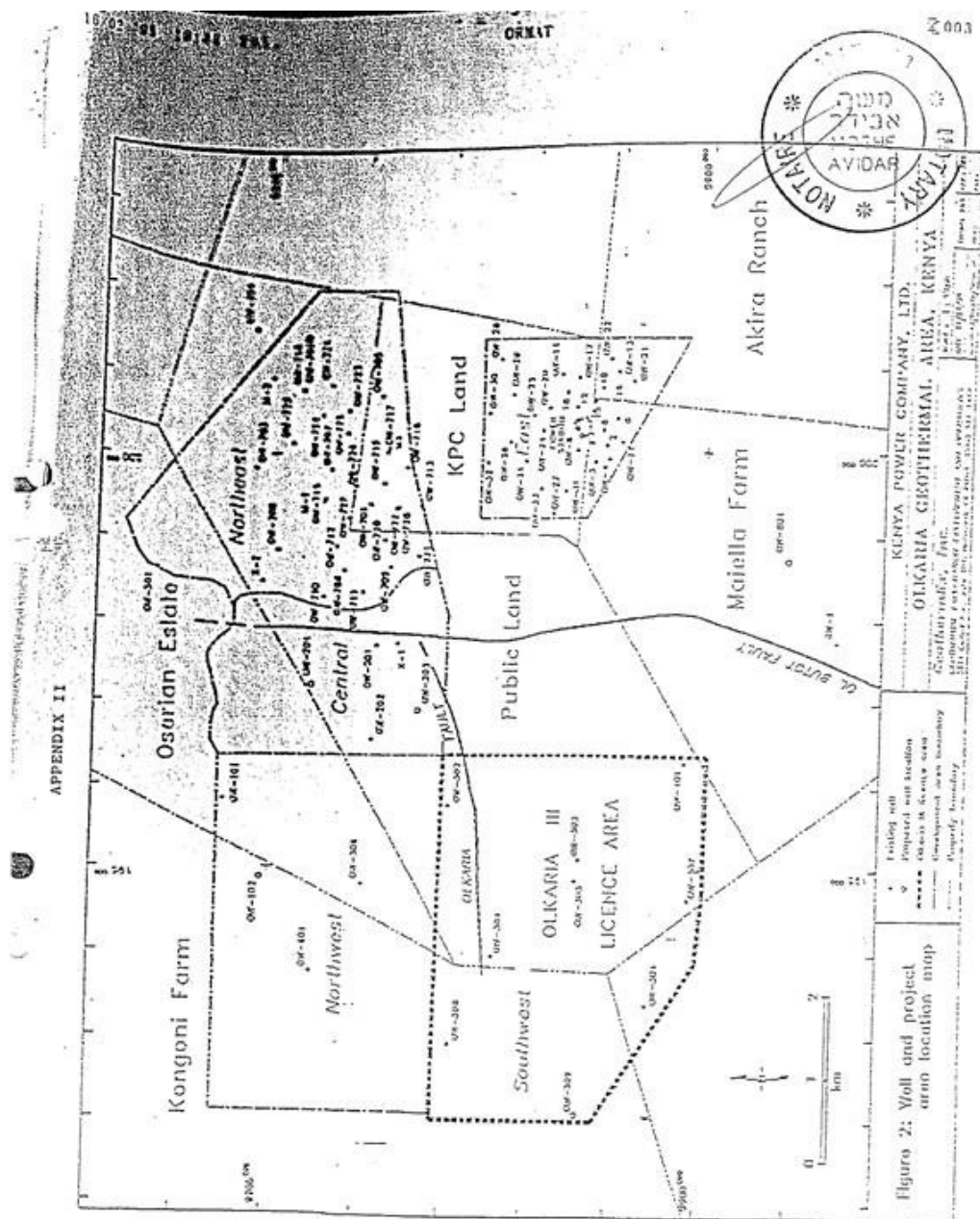
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APPENDIX I

DELINEATION OF LICENCE AREA

The Licence Area shall be the area of land shown on the map annexed hereto as Appendix II for indicative purposes only being that area of land in the Universal Traverse Mercator (UTM) Grid Zone 37, located on Map Series Y731 (D.O.S 423), Sheets 133/3 and 133/4 Sakutiek and Longonot, published for the Government Of Kenya in 1975, closed by straight lines joining adjacent points having the following co-ordinates:

East (metres)	North (metres)
192.000	9 901 100
192.000	9 903 100
196.400	9 903 100
196.400	9 900 000
193.900	9 900 000



Authentication of signature of person signing on behalf of a body corporate or in the name of another person

I the undersigned, MOSHE AVIDAR, Notary at 1 EGOZ ST. YAVNE hereby certify that on 29/10/98 appeared before me at my office: Mr. YANIR YANOVSKY whose identity was proved to me by Identity Booklet No. 006751150 issued by STATE OF ISRAEL at REHOVOT on 13/12/79. and signed of his own free will the attached document marked 'A' in the name of ORPOWER 4 INC.

In witness thereof I hereby authenticate the signature/s of the above named, by my own signature and seal today 29/10/98.

Fees paid: 186 NIS including VAT.



Schedule 11: Energy Regulatory Commission Approvals

(See Pages 202-211)

ELECTRICITY REGULATORY BOARD

National Bank,
Valley Road, 1st Floor
P. O. Box 42681
NAIROBI.

Tel. 717627/31
Fax: 717603

Ref: ERB\CON\PPA\1

25th February, 1999

M/s OrPower 4 Inc.
Queensway House
7th Floor
Kaunda Street
P. O. Box 40111
NAIROBI

Dear Sirs

RE: POWER PURCHASE AGREEMENT: ORPOWER 4 INC. AND KENYA POWER AND LIGHTING COMPANY LTD

Persuant to section 121(1)(F) of the Electric Power Act 1997 and in reference to the Electric Power Purchase Agreement entered between yourselves and the Kenya Power and Lighting Company KPLC), the Electricity Regulatory Board hereby approves the same on the terms and conditions negotiated and set out therein.

Yours faithfully



Hon. Moses M. Wetang'ula
CHAIRMAN



ELECTRICITY REGULATORY BOARD
INTEGRITY CENTRE, FIRST FLOOR, OPPOSITE PANAFRIC HOTEL, VALLEY ROAD
P.O. BOX 42681, NAIROBI, KENYA TEL: 717627/31/75 FAX: 717603
E-mail address: erb@africaonline.co.ke

OUR REF: ERB/LC/IPP.2000
YOUR REF: SEC.55.LN.vk

13th June, 2000

Mr. S.K. Gichuru
Managing Director
Kenya Power & Lighting Company Ltd.
P.O. Box 30099
NAIROBI

Dear S.K.,

SUBJECT: OLKARIA III INDEPENDENT POWER PROJECT

Your letter of June 12th 2000 referenced SEC.55.LN.vk on the captioned matter refers.

The Board welcomes the proposal by OrPower 4 to increase the early generation facility output from 8MW to 12MW under the same terms and conditions as contained in the Power Purchase Agreement between KPLC and themselves. Upon an application being submitted, the Board will consider and approve, as appropriate, any amendments that may be effected to the PPA to reflect the new scenario. In the meantime, both KPLC and OrPower 4 may proceed to finalize the proposed arrangements.

Yours Sincerely,

HON. MOSES WETANG'ULA
CHAIRMAN

ELECTRICITY REGULATORY BOARD

Integrity Centre, Valley Road, First Floor

P.O. Box 42681, NAIROBI

Tel: 717627/31 Fax: 717603

**THE ELECTRIC POWER ACT
(NO 11 OF 1997)**

APPROVAL OF THE FIRST SUPPLEMENTAL AGREEMENT TO THE POWER PURCHASE AGREEMENT DATED NOVEMBER 5th 1998

IN EXERCISE of the powers conferred by Section 21 and Section 121 (1) (f) of the Electric Power Act, 1997, the Electricity Regulatory Board has hereby approved the provisions of the First Supplemental Agreement to the Power Purchase Agreement dated November 5th 1998 and made BETWEEN Orpower 4 Inc. on the one hand, AND The Kenya Power & Lighting Company Limited on the other hand.

One original set of the First Supplemental Agreement to the Power Purchase Agreement is deposited with the Electricity Regulatory Board.

GRANTED at NAIROBI this 19th day of July 2000

SEALED FOR AND ON BEHALF OF

The

THE ELECTRICITY REGULATORY BOARD:



HON. MOSES WETANG'ULA
BOARD CHAIRMAN

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[Signature]



ELECTRICITY REGULATORY BOARD

THE ELECTRIC POWER ACT, 1997

(ACT NO. 11 OF 1997)

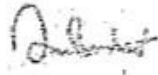
APPROVAL OF SECOND SUPPLEMENTAL AGREEMENT TO THE POWER PURCHASE AGREEMENT FOR OLKARIA III GEOTHERMAL PLANT BETWEEN ORPOWER 4 INC. AND THE KENYA POWER AND LIGHTING COMPANY LIMITED

IN EXERCISE of the powers conferred on the Electric Regulatory Board (“the Board”), under the provisions of Sections 21, 22 and 121 (1) (f) of the Electric Power Act, 1997, (Act No. 11 of 1997) APPROVAL IS HEREBY GRANTED to the Initialled Revised Second Supplemental Agreement annexed to this Instrument of Approval (“the Second Supplemental Agreement”) to be made BETWEEN ORPOWER 4 INC. (ORPOWER 4) a company incorporated in the Grand Cayman Islands, British West Indies, with its registered office on Grand Cayman, British West Indies, with an office at 980 Greg Street, Sparks, Nevada, USA and which will act through its branch at Queensway House, 7th Floor, Kaunda Street, P.O. Box 4011, Nairobi Kenya of one part and KENYA POWER AND LIGHTING COMPANY LIMITED (KPLC) a public limited liability company incorporated in the Republic of Kenya whose registered office is at Stima Plaza, Kolobot Road, Parklands of P.O. Box, 30099, Nairobi of the other hand.

The initialled Second Supplemental Agreement has been deposited with the Board and shall be executed as set out in the initialled Draft Revised Second Supplemental without any alteration.

GRANTED at NAIROBI this sixteenth day of April two thousand and three.

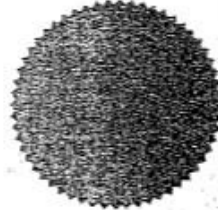
Sealed with the common seal of
ELECTRICITY REGULATORY BOARD
In the presence of



ENG. ISAAC BONDET
EXECUTIVE CHAIRMAN



CATHERINE A. KOLA (MRS.)
BOARD SECRETARY



ELECTRICITY REGULATORY BOARD
INTEGRITY CENTRE, FIRST FLOOR, VALLEY ROAD
P.O. Box 42681, 00100 NAIROBI, KENYA, Tel. 717627/31/75, Fax: 717603
E-mail address: erb.africaonline.co.ke



Please quote:

ER OLKARIA/2004.2

April 16, 2003

.....
Mr. Jasper O. Oduor
Managing Director
Kenya Power & Lighting Co. Ltd.
Stima Plaza
NAIROBI

Lynn Alster
Legal Adviser
OrPower 4. Inc.
980 Greg Street
Sparks, NV 89431-6069

Dear Sir and Madam,

RE: APPLICATION FOR APPROVAL OF THE REVISED SECOND SUPPLEMENTAL AGREEMENT BETWEEN OURSELVES AND ORPOWER 4

Reference is made to the letter dated November 12, 2002 addressed to Electricity Regulatory Board by Kenya Power and Lighting Company Limited, and subsequent correspondence from yourselves culminating in the letter dated April 11, 2003 also addressed by Kenya Power and Lighting Company Limited and copied to OrPower 4 Inc, and to the Revised Second Supplemental Agreement forwarded therein.

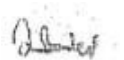
At its 19th Special Meeting held today April 16, 2003, the Electricity Regulatory Board deliberated further on your joint application for approval of the Draft Revised Second Supplemental Agreement.

The Board noted the contents of the Draft Revised Second Supplemental Agreement and has no objection to the execution of the Second Supplemental Agreement between yourselves upon the terms and conditions set out in the initialed Second Supplemental Agreement forwarded in KPLC's letter dated April 14, 2003, aforesaid.

Consequently, the Board approved the initiated Draft Second Supplemental Agreement and the formal instrument of approval is forwarded herewith.

Yours faithfully,

FOR: ELECTRICITY REGULATORY BOARD



ENG. ISSAC BONDET
EXECUTIVE CHAIRMAN

Our mandate is regulating the power sub-sector in Kenya.



ELECTRICITY REGULATORY BOARD

Integrity Centre, 1st Floor, Valley / Milimani Road

P.O. Box 42681, 00100 GPO – NAIROBI

Tel: +254-20-2847000 / 2847200 / 2847242 / 2717627 / 31 / 75 / 2717562

Cell Phone: +254-0722-200 947 / 0734-414 333. Fax: +254-20-2717603

E-mail: info@erb.go.ke; Website: www.erb.go.ke

Our Ref: ERB/TECH/TARIFF/CONF.

18/12/06

18 DEC 2006

CS

Your Ref:

Mr. Don Priestman
General Manager
Kenya Power & Lighting Co. Ltd.
Stima Plaza
NAIROBI

CONFIDENTIAL

Dear Mr. Priestman,

OLKARIA III GEOTHERMAL POWER PLANT: PASS-THROUGH OF PART OF THE CAPACITY CHARGES AND APPROVAL OF THE AMENDED AND RESTATED POWER PURCHASE AGREEMENT

Reference is made to your letter dated 17th October 2006 on the captioned subject.

This is to inform you that at its 99th Meeting the Board approved the initialed Amended and Restated Power Purchase Agreement between KPLC and OrPower4 Inc. The instrument of approval will be forwarded to you in due course.

The Board also approved your request for a pass through of part of the capacity charges. The magnitude of the pass-through approved by the Board is a non escalable 58% of the Capacity Charge rate; which will become effective when the 36 MW Plant comes on stream. Please note that the Board will take cognisance of this pass-through element at all future tariff reviews.

The specific details of the approval will be communicated to you in due course.

Yours Sincerely

MATERE KERIRI, CBS
EXECUTIVE CHAIRMAN

cc.

Mr. Patrick Nyoike, CBS
Permanent Secretary
Ministry of Energy
NAIROBI

Regulating the power sub-sector in Kenya



Energy Regulatory Commission

Eagle Africa Centre, Longonot Road, Upperhill.
P.O. Box 42681-00100, NAIROBI – KENYA
Tel: +254-20-2847000/200/242; 2717627/31/75
Cell phone: +254-0722-200947/0734-414333
Fax: +254-20-2717603
Email: info@erc.go.ke Website: www.erc.go.ke

Our Ref: ERC/ELEC/2 March 15, 2011

Your Ref:

Managing Director
Orpower 4 Inc.
P.O. Box 1566-20117
NAIVASHA

Managing Director
Kenya Power & Lighting Company Ltd.
P.O. Box 30099 – 00100
NAIROBI

Dear Sir

RE: APPROVAL OF OLKARIA 111 SECOND AMENDED AND RESTATED POWER PURCHASE AGREEMENT

Forwarded herewith please find the Instrument of Approval granted in respect of Second Amended and Restated Power Purchase Agreement dated 16th December 2010 between Orpower 4 Inc. and Kenya Power and Lighting Company Ltd.

Please acknowledge receipt.

Yours faithfully

Mueni Mutung'a

For: DIRECTOR GENERAL

Encl.

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Regulating the Energy Sector in Kenya

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Energy Regulatory Commission

ERC/PPA/KPLC-ORPOWER 4/2011

THE ENERGY ACT, No 12 of 2006

**APPROVAL OF OLKARIA III SECOND AMENDED AND RESTATED POWER PURCHASE AGREEMENT
FOR ORPOWER 4, INC. POWER PLANTS**

IN EXERCISE of the powers conferred by the provisions of Section 6 (j) and Section 43 of the Energy Act, 2006 on the Energy Regulatory Commission (the Commission), APPROVAL IS HEREBY GRANTED to the Power Purchase Agreement dated the sixteenth day of December 2010 made **BETWEEN ORPOWER4 INC.**, a duly licensed electric power generating company with its registered offices off Moi South Lake Road, Hells Gate National Park, and of P.O. Box 1566-20117, Naivasha, Kenya **AND KENYA POWER LIGHTING AND COMPANY LIMITED (KPLC)** a duly licensed public electricity supplier of P.O. Box 30099, 00100 GPO, Nairobi, Kenya.

KPLC shall deposit one stamped copy of the Approved Power Purchase Agreement with the Commission and neither party shall amend the Agreement hereby approved except with the prior written approval of the Commission.

GRANTED at NAIROBI this 15th day of March 2011.

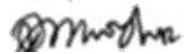
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IN WITNESS WHEREOF the Common Seal)
of the Energy Regulatory Commission was
hereto affixed pursuant to the Authority of the
Commission given on the 24th day of February,
2011.

In the presence of



Eng. Kaburu Mwirichia
DIRECTOR GENERAL
and



Mueni Mutung'a
COMMISSION SECRETARY



Our Ref: ERC/ER/2/1/6
Your Ref: KPI/2/4/ID

4th November, 2014

Dr. Ben Chumo, OGW
Managing Director & CEO
Kenya Power
Stima Plaza, Parklands
P.O. Box 30099-00100
NAIROBI

The Chief Executive Officer
Orpower 4 Inc.
Off Moi South Lake Road
Hells Gate National Park
P.O. Box 1566-20117
NAIVASHA

RE: APPROVAL OF THE POWER PURCHASE AGREEMENT (PPA) FOR THE ORPOWER 4 INC. PROPOSED EXPANSION OF OLKARIA III POWER PROJECT

The above subject matter refers.

This is to advise that the Commission has approved the third amended and restated PPA for the proposed expansion of Olkaria III power project, subject to the following amendments:

- a) Assignment and Variation: Under Clause 21.2, the assignment has to be approved by the Commission.
- b) Termination: There are erroneous cross-referencing under Clause 16.9, which should be corrected; else, the clause may collapse on a technicality if it was to be invoked in the future.

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Please amend the PPA accordingly so that we can finalize the issuance of the instrument of approval.

A handwritten signature in blue ink, appearing to read 'J. Ng'ang'a', is enclosed in a thin black rectangular border.

Eng. Joseph Ng'ang'a
DIRECTOR GENERAL

Our Ref: ERC/ER/2/1/6
Your Ref: KPI/2/4/ID BM;ib

20th November, 2014

Dr. Ben Chumo, OGW
Managing Director & CEO
Kenya Power
Stima Plaza, Parklands
P.O. Box 30099-00100
NAIROBI

The Chief Executive Officer
Orpower 4 Inc.
Off Moi South Lake Road
Hells Gate National Park
P.O. Box 1566-20117
NAIVASHA

RE: APPROVAL OF THE POWER PURCHASE AGREEMENT (PPA) FOR THE ORPOWER 4 INC. PROPOSED EXPANSION OF OLKARIA III POWER PROJECT.

The above captioned matter refers.

Your letter Ref. KPI/2/4/ID dated 19th November, 2014 and our letter Ref. ERC/ER/2/1/6/ dated 4th November, 2014 refers.

Following approval of the proposed expansion of Olkaria III power project by Orpower 4 Inc. by the Commission and revising the PPA as stated in our letter attached herewith find the instrument of approval for your record.



Eng. Joseph Ng'ang'a
DIRECTOR GENERAL



ERC/PPA/KPLC-ORPOWER 4/2014

THE ENERGY ACT, No 12 of 2006
APPROVAL OF POWER PURCHASE AGREEMENT

IN EXERCISE of the powers conferred by the provisions of Section 6 (j) and Section 43 of the Energy Act, 2006 on the Energy Regulatory Commission (the Commission), **APPROVAL IS HEREBY GRANTED** to the Power Purchase Agreement submitted to the Commission on the 29th September 2014 made **BETWEEN ORPOWER 4 INC.**, a duly licensed electronic power generating company with its registered office Off Moi South Lake Road, Hells Gate National Park, and of P.O. Box 1566-20112, Naivasha Kenya **AND KENYA POWER LIGHTING AND COMPANY LIMITED (KPLC)**, a duly licensed public electricity supplier of P.O. box 30099, 00100 GPO, Nairobi, Kenya.

KPLC shall deposit one stamped copy of the approved Power Purchase Agreement with the Commission and neither party shall amend the Agreement hereby approved except with the prior written approval of the Commission.

GRANTED at **NAIROBI** this 30th day of October 2014.

IN WITNESS WHEREOF the common seal of the Energy Regulatory Commission was hereunto affixed

In the presence of)



Eng. Joseph Ng'ang'a
DIRECTOR GENERAL



Mueni Mutung'a
COMMISSION SECRETARY



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AMENDMENT AND TERMINATION AGREEMENT

THIS AMENDMENT OF THE THIRD AMENDED AND RESTATED POWER PURCHASE AGREEMENT AND TERMINATION OF AMENDED AND RESTATED OLKARIA III PROJECT SECURITY AGREEMENT ("AMENDMENT AND TERMINATION AGREEMENT") is dated 30.10.15 ("Effective Date").

BETWEEN:

- (1) THE KENYA POWER AND LIGHTING COMPANY LIMITED, a company incorporated in Kenya with its registered office at Stima Plaza, PO Box 30099-00100, Nairobi, Kenya ("KPLC"),**

and
- (2) ORPOWER 4, INC. a company incorporated in the Cayman Islands, British West Indies, with its registered office in Grand Cayman, British West Indies, with an office at 6225 Neil Road, Reno, Nevada, U.S.A, and which acts through its branch at Off Moi South Lake Road, Hellsgate National Park, P.O. Box 1566-20777, Naivasha, Kenya ("OrPower 4").**

WHEREAS:

- (A) KPLC and OrPower 4 entered Into the original Power Purchase Agreement on 5 November 1998 with respect to the Olkaria III geothermal power project, located In Hell's Gate National Park ("Project").**
 - (B) KPLC and OrPower 4 subsequently entered into a series of agreements which amended and replaced the original Power Purchase Agreement, namely: the First Supplemental Agreement dated 21 July 2000 modifying the terms of the original Power Purchase Agreement, the Second Supplemental Agreement dated 17 April 2003 modifying the terms of the original Power Purchase Agreement and of the First Supplemental Agreement, the Amended and Restated Power Purchase Agreement dated January 19, 2007, the Second Amended and Restated Power Purchase Agreement dated March 29, 2011, and, finally, the Third Amended and Restated Power Purchase Agreement dated November 26, 2014 ("Third A&R PPA"), which supersedes all of the aforementioned power purchase agreements.**
 - (C) OrPower 4 has constructed and maintains and operates Steam Field Facilities and the First, Second and Third Plants (as each such term is defined in the Third A&R PPA), and a fourth Plant is under construction at the Project.**
 - (D) At the time that KPLC and OrPower 4 entered Into the original Power Purchase Agreement, the Parties also entered into the original Security Agreement dated 5 November 1998, to provide enhanced credit support for KPLC's obligations to meet its payment obligations to OrPower 4 for the Project.**
-

- (E) KPLC and OrPower 4 subsequently entered into a series of agreements which amended and replaced the original Security Agreement, namely: the Amended and Restated Security Agreement dated 17 April 2003, which amended and restated the Original Security Agreement but was not operationalized, the Olkaria III Project Security Agreement dated 19 January 2007, and, finally, the Amended and Restated Olkaria III Project Security Agreement dated 19 March 2011, which supersedes all of the aforementioned security agreements.
- (F) KPLC has established and maintains certain letters of credit for the benefit of the Project, pursuant to the Amended and Restated Olkaria III Project Security Agreement.
- (G) KPLC and OrPower 4 have agreed to execute certain amendments to the Third A&R PPA, in exchange for termination of the letters of credit, all in accordance with the terms and conditions hereto.

WITNESSETH as follows:

1. DEFINITIONS

Unless specifically defined otherwise in this Amendment and Termination Agreement, all capitalized terms shall be assigned the definitions as described under Clause 1.1 of the Third A&R PPA, and the rules of interpretation as described under Clause 1.2 of the Third A&R PPA shall govern.

"Direct Agreement"; the agreement among KPLC, Overseas Private Investment Corporation and OrPower 4 dated 5 November 2012;

"Effective Date": the date when this Amendment and Termination Agreement is executed in full by the Parties, pursuant to the approvals of each of the Energy Regulatory Commission and of the Project's lenders.

2. EFFECTIVENESS

This Amendment and Termination Agreement shall enter into effect on the Effective Date.

3. TERMINATION OF SECURITIES

The Parties agree that the Amended and Restated Olkaria III Project Security Agreement and each of the Letters of Credit are terminated.

4. AMENDMENT TO THE THIRD A&R PPA

The Parties agree that the following definitions and clauses of the Third A&R PPA are hereby amended as described below:

- 4.1 The term of the obligations of the Parties with respect to the initial Units of the Fourth Plant (up to 50 MW) is to conform to a twenty year term for the Full Commercial Operation Date of the relevant Units of the Fourth Plant as initially configured In the Initial Notice of Fourth Plant Exercise, and the term of the obligations of the Parties with respect to any additional Units of the Fourth Plant (over 50 MW) is to conform to a twenty year term for the Full Commercial Operation Date of the first relevant Units of the Fourth Plant in excess of 50 MW.
-

Accordingly, subsection 2.2.4 of Clause 2 (entitled "*Term of the Agreement*") of the Third A&R PPA is deleted in its entirety and replaced by the following:

"2.2.4 the obligations of the Parties with respect to the Fourth Plant for purchase by and sale of electricity to KPLC from the Fourth Plant Units established pursuant to a Notice of Fourth Plant Exercise, shall expire as follows: with respect to the Initial Fourth Plant Units of up to 50 MW, twenty (20) years after the Full Commercial Operation Date of the Fourth Plant Units which was achieved pursuant to the Initial Notice of Fourth Plant Exercise, and with respect to the Fourth Plant Units in excess of 50 MW, twenty (20) years after the Full Commercial Operation Date of the first Fourth Plant Units in excess of 50 MW which was achieved pursuant to a Subsequent Notice of Fourth Plant Exercise relevant to such Units. "

- 4.2 The period for determining the final size of the Fourth Plant and the maximum size of the Fourth Plant are extended in order to optimize the potential benefit from the Olkaria III geothermal field.

Accordingly, the second paragraph of Clause 9.8C (entitled "*Notice of Fourth Plant Exercise*") of the Third A&R PPA is hereby amended as follows:

delete "50 MW" and replace by "100 MW"; and

delete "*by Issuance of subsequent Notice(s) of Fourth Plant within one year of the original Establishment Date of the Fourth Plant*" and replace by "*by Issuance of one or more subsequent Notice(s) of Fourth Plant from time to time within five years of the original Full Commercial Operation Date of the Fourth Plant*".

- 4.3 Effective from and subject to OrPower 4's receipt of the amendment to GOK Letter incorporating the Fourth Plant in a form agreed by OrPower 4 and the GOK as required under the definition of the "Establishment Date of the Fourth Plant", the Parties recognize that the Letters of Credit have been provided, good faith negotiations have taken place in an attempt to achieve the Securitization Milestone, all costs and expenses with respect to the same have been met by OrPower 4, and there is no longer need for the continued validity of the Letters of Credit nor for the procurement of the replacement security package.

Accordingly, the following new Clause 11.9.4 is added after Clause 11.9.3 (which is entitled, "Failure to Demand"):

"11.9.4 Satisfaction of Requirements

The Parties acknowledge that all of the obligations, requirements and arrangements under Clauses 11.9.1 through 11.9.3 have been satisfied in full, and shall cease to be applicable to the Project, as of the occurrence of both the Effective Date and of OrPowers4's receipt of the amendment to GOK Letter incorporating the Fourth Plant in a form agreed by OrPower 4 and the GOK as required under the definition of the "Establishment Date of the Fourth Plant."

- 4.4 The Parties recognize that if, pursuant to one or more Subsequent Notices of Fourth Plant Exercise, the total combined Contracted Capacities of the Plants shall exceed 150 MW, an additional 220 kV transmission line may be required to be constructed between the Olkaria III facility and the Olkaria II substation in order to ensure system stability and reliability.

Accordingly, the following new paragraph will be added to Part C of Schedule 2, as clause 14.13:

"14.13 Additional Transmission Line

If pursuant to issuance of one or more Subsequent Notices of Fourth Plant Exercise, the total combined Contracted Capacities of the Plants shall exceed 150 MW, then a second 220kV transmission line of approximately 7KM from the Olkaria III facility to the Olkaria II substation and a 220 kV bay for termination of the line at Olkaria II substation will be constructed and commissioned by OrPower 4 at OrPower 4's cost, and handed over to KPLC. Further design details of the second transmission line will be provided by OrPower 4 pursuant to issuance of the Subsequent Notices of Fourth Plant Exercise resulting in the combined Contracted Capacities to exceed 150 MW. KPLC shall arrange and/or shall support OrPower 4 to arrange, to extend easements and/or wayleaves, to the extent necessary in order for OrPower 4 to construct the second transmission line."

In addition, the following sentence will be added at the end of Part E of Schedule 2:

"If, pursuant to Issuance of Subsequent Notices of Fourth Plant Exercise, the total combined capacity of the Plants will exceed 150MW, the Delivery Point for the capacity of the Units in excess of 150 MW shall be the KPLC side of a new Disconnecter at a point as shall be agreed between the Parties."

5. MUTUAL REPRESENTATIONS

5.1 Each Party represents, warrants and undertakes to the other that:

- (a) This Amendment and Termination Agreement does not and will not conflict with or result in any breach or constitute a default under any agreement, instrument or obligation to which that Party is a party or by which it is bound;
- (b) All necessary authorisations and consents to enable or entitle such Party to enter into this Amendment and Termination Agreement and which are material in the context of this Agreement have been obtained and will remain in full force and effect during the term of this Amendment and Termination Agreement;
- (c) That Party shall obtain, effect and maintain all governmental licenses, authorisations, consents, registrations, filings or approvals which are at any time necessary to enable it to comply with and/or perform its obligations under this Amendment and Termination Agreement;
- (d) It has no claims, and hereby waives the right to any such claims, with respect to any Letter of Credit, the A&R Security Agreement, or the negotiations for the Securitization Milestone, including, without limitation, costs, charges, expenses, taxes and fees relating thereto.

6. MISCELLANEOUS

6.1 Continuing obligations

The provisions of the Third A&R PPA shall, save as amended by this Amendment and Termination Agreement, and the provisions of the Direct Agreement entered into by and between KPLC, Overseas Private Investment Corporation, and OrPower 4, shall continue in full force and effect.

6.2 Further assurance

The Parties shall, at their own expense, do all such acts and things necessary or desirable to give effect to the amendments effected or intended to be effected pursuant to this Amendment and Termination Agreement.

6.3 Variation

This Amendment and Termination Agreement may not be varied nor any of its provisions waived except by an agreement in writing signed by the Parties.

6.4 Waivers of Rights

No delay or forbearance by either Party in exercising any right, power, privilege or remedy under this Amendment and Termination Agreement shall operate to impair or be construed as a waiver of such right, power, privilege or remedy.

6.5 Notices

Any notice or other communication to be given by one Party to the other under or in connection with this Agreement shall be given in writing and may be delivered or sent by prepaid airmail or facsimile or to the recipient at the address, and marked for the attention of the person, specified in Schedule 8 of the A&R PPA or such other address or person from time to time designated by notice to the other in accordance with the notice provisions of the A&R PPA; and any such notice or communication shall be deemed to be received upon delivery, or five (5) days after posting, or on confirmation of transmission when sent by facsimile.

6.6 Effect of Illegality

If for any reason whatever any provision of this Amendment and Termination Agreement is or becomes or is declared by any court of competent jurisdiction to be invalid, illegal or unenforceable, then in any such case the Parties will negotiate in good faith with a view to agreeing one or more provisions to be substituted therefore which are not invalid, illegal or unenforceable and produce as nearly as is practicable in all the circumstances the appropriate balance of the commercial interests of the Parties.

6.7 Entire Agreement

This Amendment and Termination Agreement, together with the Third A&R PPA and the Direct Agreement, contains or expressly refers to the entire agreement between the Parties with respect to its subject matter and expressly excludes any warranty, condition or other undertaking implied at law or by custom and supersedes, all previous agreements and understandings between the Parties with respect to its subject matter and each of the Parties acknowledges and confirms that it does not enter into this Agreement in reliance on any representation, warranty or other undertaking by the other Party not fully reflected in the terms of this Amendment and Termination Agreement.

6.8 Counterparts

This Agreement may be executed in two counterparts and by each Party on a separate counterpart, each of which when executed and delivered shall constitute an original, but both counterparts shall together constitute but one and the same instrument.

6.9 Waiver of Sovereign Immunity

KPLC agrees that the execution, delivery and performance by it of this Amendment and Termination Agreement and the obligations hereunder, constitute private and commercial acts.

In furtherance of the foregoing, KPLC agrees that:

- (a) should any proceedings be brought against KPLC or its assets in any jurisdiction in connection with this Amendment and Termination Agreement, or in connection with any of KPLC's obligations or any of the transactions contemplated by this Amendment and Termination Agreement, no claim of immunity from such proceeding will be claimed by or on behalf of itself or any of its assets;
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- (b) it waives any right of immunity which KPLC or any of its assets has or may have in the future in any jurisdiction in connection with any such proceedings.

6.10 Governing Law

This Agreement shall be governed by and construed in all respects in accordance with the laws of Kenya.

6.11 Dispute Resolution

The provisions of Clause 19 (entitled "Dispute Resolution") of the Third A&R PPA shall apply, *mutatis mutandis*, to any dispute under or in connection with this Amendment and Termination Agreement.

AS WITNESS the hands of the duly authorised representatives of the Parties the day and year first above written.

Signed and Sealed)
for and on behalf of)
The Kenya Power &)
Lighting Company Limited)

Director

Secretary

Signed for and on behalf of

OrPower 4 Inc.:

Ernest Mabwa _____
Authorised Signatory

SECOND AMENDMENT AGREEMENT

THIS SECOND AMENDMENT OF THE THIRD AMENDED AND RESTATED POWER PURCHASE AGREEMENT ("SECOND AMENDMENT AGREEMENT") is dated December 20th, 2016 ("**Effective Date**").

BETWEEN:

(1) THE KENYA POWER AND LIGHTING COMPANY LIMITED, a company incorporated in Kenya with its registered office at Stima Plaza, PO Box 30099-00100, Nairobi, Kenya ("**KPLC**"),

and

(2) ORPOWER 4, INC. a company incorporated in the Cayman Islands, British West Indies, with its registered office in Grand Cayman, British West Indies, with an office at 6225 Neil Road, Reno, Nevada, U.S.A, and which acts through its branch at Off Moi South Lake Road, Hellsgate National Park, P.O. Box 1566-20777, Naivasha, Kenya ("**OrPower 4**").

WHEREAS:

- (A) KPLC and OrPower 4 entered into the original Power Purchase Agreement on 5 November 1998 with respect to the Olkaria III geothermal power project, located in Hell's Gate National Park ("**Project**").
 - (B) KPLC and OrPower 4 subsequently entered into a series of agreements which amended and replaced the original Power Purchase Agreement of 5 November 1998, namely: the First Supplemental Agreement dated 21 July 2000 modifying the terms of the original Power Purchase Agreement, the Second Supplemental Agreement dated 17 April 2003 modifying the terms of the original Power Purchase Agreement and of the First Supplemental Agreement, the Amended and Restated Power Purchase Agreement dated January 19, 2007, the Second Amended and Restated Power Purchase Agreement dated March 29, 2011, and the Third Amended and Restated Power Purchase Agreement dated November 26, 2014. The parties then entered into the Amendment and Termination Agreement dated October 30, 2015 ("**First Amendment Agreement**"), which amended the Third Amended and Restated Power Purchase Agreement dated November 26, 2014 (as amended by the First Amendment Agreement, the "**Third A&R PPA**").
 - (C) KPLC and OrPower 4 have agreed to execute certain additional amendments to the Third A&R PPA by way of this Second Amendment, all in accordance with the terms and conditions hereto.
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WITNESSETH as follows:

1. DEFINITIONS

Unless specifically defined otherwise in this Second Amendment Agreement, all capitalized terms shall be assigned the definitions as described under Clause 1.1 of the Third A&R PPA, and the rules of interpretation as described under Clause 1.2 of the Third A&R PPA shall govern.

"Effective Date": the date when this Second Amendment Agreement is executed in full by the Parties, pursuant to the approvals of each of the Energy Regulatory Commission and of the Project's lenders.

2. EFFECTIVENESS

This Second Amendment Agreement shall enter into effect on the Effective Date.

3. AMENDMENTS TO THE THIRD A&R PPA

3.1 The Parties agree that the Contracted Capacity of the First Plant shall be increased from forty-eight (48) to fifty-eight (58) MW by the execution of the First Plant Additional Unit, and the total aggregate capacity that the Fourth Plant may be increased in accordance with the Third A&R PPA therefore adjusted from 100 MW to 90 MW.

The Parties thereby agree that the following definitions and clauses of the Third A&R PPA are hereby amended as described below:

Clause 1: Amendment, Restatement, Definitions and Interpretation

Certain existing definitions of Clause 1 are deleted and replaced in their entirety and certain new definitions are hereby added to Clause 1, as follows:

"Contracted Plant Capacity" or "Contracted Capacity": The definition is hereby replaced in its entirety as follows:

"for each Plant, the capacity of such Plant at the reference conditions specified in paragraph 1.2(b)(ii) of Part A of Schedule 2 being at the Signature Date, (i) for the First Plant prior to the incorporation of the First Plant Additional Unit, forty-eight (48) MW, and at and after the Full Commercial Operation Date of the Expanded First Plant, fifty-eight (58) MW, for the Second Plant thirty-six (36) MW, for the Third Plant, sixteen (16) MW, and, for the Fourth Plant, twenty-nine (29) MW, which capacity may be increased from time to time as shall be stated in the Notice(s) of Fourth Plant Exercise (up to ninety (90) MW) or, (ii) such other amount as may be agreed or determined from time to time pursuant to Clauses 5.4, 9.8A, 9.8B, 9.8C, 9.10 and 9.11;

"Daily Liquidated Damages Sum": an amount of US\$0.50 per kW of Contracted Early Generation Capacity or, for each new Plant, Contracted Plant Capacity of such Plant or, for each new additional Unit to an existing Plant, (such as in the case of the First Plant Additional Unit), US\$0.50 per kW of the capacity of such new additional Unit.

"Establishment Date of the First Plant": The definition is hereby replaced in its entirety as follows:

"Establishment Date of the First Plant: with respect to the First Plant prior to the incorporation of the First Plant Additional Unit, the date by which the last of the following activities and events have occurred (except, with respect to subclauses (ii), (iii) and (iv), to the extent waived by the benefiting Party):

- (i) the Amended and Restated Power Purchase Agreement of January 19, 2007 and the Olkaria III Project Security Agreement of January 19, 2007 have been duly executed and delivered by the Parties after receipt of all necessary approvals;
- (ii) the initial Letter of Credit for the First Plant has been issued in its full amount in favour of and delivered to the Seller;
- (iii) the Construction Bond for the First Plant has been issued in its full amount in favour of and delivered to KPLC, as described in Clause 3.6 hereto; and
- (iv) the Electricity Regulatory Commission will have approved KPLC's application for pass through of the component of the Capacity Charges provided under Parts A and B of Schedule 5, or as may be otherwise agreed by KPLC and approved by the Electricity Regulatory Commission.

The following new definition is added:

"Establishment Date of the Expanded First Plant:

with respect to the Expanded First Plant, the date by which the last of the following activities and events have occurred (except, with respect to subclause (iii), to the extent waived by the benefiting Party):

- (i) The Energy Regulatory Commission has issued an amendment and extension of the Electric Power Generation License incorporating the Expanded First Plant in a form agreed by the Seller;
- (ii) NEMA and any other necessary Governmental Authorities have issued required approvals for the establishment of the Expanded First Plant;
- (iii) the GOK has issued an amendment to the GOK Letter incorporating the Expanded First Plant in a form agreed by the Seller; and
- (iv) Seller's lenders have approved the First Plant Additional Unit."

"First Plant": The definition is hereby replaced in its entirety as follows:

"means, prior to the Full Commercial Operation Date of the Expanded First Plant, the forty eight (48) MW plant which was constructed prior to and is under operation as of the Signature Date, and, after the Full Commercial Operation Date of the Expanded First Plant, the Expanded First Plant, being the fifty-eight (58) MW plant described in Part A of Schedule 2;"

The following new definition is added:

"First Plant Additional Unit": means the performance of works, including drilling works, replacement of equipment and addition of new equipment to the First Plant, all as described in Part A of Schedule 2;"

"Long Stop Date": The following phrase is added at the end of the clause:

"and the Long Stop Full Commercial Operation Date for the Expanded First Plant";

"Long Stop Full Commercial Operation Date": The phrase "For the First Plant the date falling thirty-six (36) months after the Establishment Date of the First Plant" shall be deleted and replaced by:

"For the First Plant and for the Expanded First Plant, the date falling thirty-six (36) months after its relevant Establishment Date;"

"Required Full Commercial Operation Date": The following is added after the phrase "after the Establishment Date of the First Plant":

"for the Expanded First Plant, the date eighteen (18) months after the Establishment Date of the Expanded First Plant,"

"Target Establishment Date": The following is added at the end of the definition:

"and for the Expanded First Plant, the date which is one month after the Effective Date of the Second Amendment Agreement;"

The following new definition is added:

"Expanded First Plant": as of and after the Full Commercial Operation Date of the Expanded First Plant, means the fifty-eight (58) MW plant described in Part A of Schedule 2; "

Clause 2: Scope and Duration

Certain existing clauses of Clause 2 are deleted and replaced in their entirety and certain new definitions are hereby added to Clause 2, as follows:

The following new paragraph is hereby added at the end of Clause 2.1:

"Until such time that the Full Commercial Operation Date is achieved for the Expanded First Plant, the terms of this Agreement with respect to the First Plant shall remain unaffected, and each of the Party's respective obligations shall continue to be performed with respect to the First Plant and its Units prior to incorporation of the First Plant Additional Unit. When the Full Commercial Operation Date is achieved for the Expanded First Plant, the performance of the Parties' respective obligations with respect to the First Plant under the terms of this Agreement shall be with respect to the Expanded First Plant."

Clause 2.2.1: The wording "December 31, 2033" is hereby deleted and replaced by the following: "May 30, 2034".

Clause 2.4: The wording "and this Third Amended and Restated Power Purchase Agreement" is hereby deleted and replaced by the following:

"the Third Amended and Restated Power Purchase Agreement dated November 26, 2014, and the Amendment and Termination Agreement dated October 30, 2015".

Clause 5: Geothermal Reservoir Appraisal and Development

Clause 5.12: The phrase appearing in the parenthetical "(up to 50 MW)" is deleted and replaced by "(up to 90 MW)".

The following new clause 6.7A is hereby added after Clause 6.7.

"Clause 6.7A: Failure to Achieve Full Commercial Operation Date of the Expanded First Plant by its Required Full Commercial Operation Date: If the Full Commercial Operation Date of the Expanded First Plant has not occurred by its Required Full Commercial Operation Date (otherwise than due to Force Majeure or default by KPLC or GOK pursuant to the GOK Letter) then:

- (a) for each day occurring after the date which is 14 (fourteen) days after the Required Full Commercial Operation Date for the Expanded First Plant and before the Full Commercial Operation Date of the Expanded First Plant, the Seller shall pay monthly, in arrears, to KPLC the Daily Liquidated Damages Sum for the First Plant Additional Unit up to a total aggregate sum of one million United States Dollars (US\$1,000,000); and
 - (b) the Seller shall have no further liability to KPLC in respect of such delay, and payment by the Seller to KPLC under this Clause 6.7A shall constitute KPLC's sole and exclusive remedy for the Seller's failure to achieve the Required Full Commercial Operation Date of the Expanded First Plant."
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The title of Clause 6.8 is hereby deleted and replaced as follows

"Clause 6.8: Long Stop Dates for the Early Generation Facility and the First Plant prior to incorporation of the First Plant Additional Unit"

The following new clause 6.8D is hereby added after clause 6.8C:

"Clause 6.8D Long Stop Date for the Expanded First Plant

(a) If other than by reason of Force Majeure or default by KPLC, the Seller failed to achieve the Full Commercial Operation Date of the Expanded First Plant by the Long Stop Full Commercial Operation Date for the Expanded First Plant, KPLC may terminate the obligations of the Parties under this Agreement solely with respect to the First Plant Additional Unit. Any such termination of the First Plant Additional Unit shall only affect the First Plant Additional Unit, and shall be without prejudice to any rights accrued due to either party with respect to the existing First Plant (exclusive of the First Plant Additional Unit) and the other Plants as at the date of termination; and

(b) any such Seller failure described in subsection (a) above shall not be a Seller Event of Default under Clause 16.1 or otherwise for the purposes of this Agreement, and any such termination of the obligations of the Parties under this Agreement with respect to the First Plant Additional Unit shall not affect the Parties' respective rights and obligations with respect to the First Plant and its Units and the other Plants prior to the incorporation of the First Plant Additional Unit which have achieved the Full Commercial Operation Date, which shall continue to bind each of them."

Clause 7.6: KPLC's Transmission Interconnector and KPLC's Connection Facilities

The following new paragraph is hereby added at the end of Clause 7.6:

"KPLC shall complete the installation, testing and Commissioning of KPLC's Connection Facilities (if not completed prior) and shall accept and evacuate the aggregate output of the Expanded First Plant (together with the Second, Third and Fourth Plants) no later than two (2) months prior to the Required Full Commercial Operation Date of the Expanded First Plant, provided, however, that in case the Seller shall notify KPLC in writing that it anticipates to complete the Expanded First Plant earlier than its then scheduled Full Commercial Operation Date, (but in any case not earlier than June 15, 2017) the parties shall mutually endeavor to accommodate such acceleration."

Clause 7.10 Plant Commercial Operations Tests:

The title of Section 7.10 (a) "First Plant" is hereby deleted and replaced by the following title:

"7.10 (a) (i) First Plant (prior to First Plant Additional Unit):"

The following new subsection 7.10 (a) (ii) is hereby added after clause 7.10(a)(i):"

"(ii) Expanded First Plant:

The above testing regime shall be performed for the First Plant Additional Unit and Expanded First Plant (without requiring Unit testing of the Units other than the First Plant Additional Unit), including the procurement of an independent engineer certificate certifying that the Expanded First Plant is available for full commercial operation, and Seller issuance of a certificate notifying KPLC of the Full Commercial Operation Date of the Expanded First Plant, being a date no later than twenty-one days after the date of such notice. The Seller shall not notify KPLC of such Full Commercial Operation Date of the Expanded First Plant until such time as the other Units of the First Plant (other than the First Plant Additional Unit) have been reenergized and the Expanded First Plant has passed the Plant Commercial Operations Tests;"

Subsection 7.10 (e) Plant Interruptions is hereby deleted and replaced in its entirety as follows:

"The Parties recognize that, for a limited period, Seller may not be able to deliver electricity to KPLC from all or some of the then existing Plant(s) at the time of Commissioning and Testing of a new Plant or, in the case of the Expanded First Plant or a Subsequent Notice of Fourth Plant Exercise, the additional new Unit(s). The Seller shall keep KPLC informed of any need to disconnect or cease deliveries during the Commissioning and Testing period(s) of each new Plant, the Expanded First Plant or Units, which may occur for a period of up to no more than 14 days (or a longer period as may be mutually agreed) for each such Commissioning and Testing. In the case of such Plant(s) interruption, Seller shall have no obligation to produce energy or make capacity available during such period by untested new additional Units, nor shall the same be considered an Availability Failure or computed to the detriment of Seller with respect to meeting Availability requirements or as part of maintenance allowances described in Schedule 3 hereto, and KPLC shall not be required to make any payments to the Seller in respect to energy or capacity which is not provided by the untested new additional Unit of the interrupted Plant(s) during the interruption."

Clause 7.11A: Payment during Expanded First Plant testing:

At the end of the clause, add the following paragraph:

"With respect to the First Plant: prior to the Full Commercial Operation Date of the Expanded First Plant, including during Unit testing of the First Plant Additional Unit and the plant testing of the Expanded First Plant, KPLC shall continue to pay Capacity Payments for the First Plant, and Energy Charges for all Net Electrical Output supplied by the First Plant and by the First Plant Additional Unit. From the Full Commercial Operation Date of the Expanded First Plant, KPLC shall pay Energy Charges and Capacity Payments for the Expanded First Plant, all in accordance with Schedule 5 and the List of Abbreviations Schedule as amended under the Second Amendment Agreement".

Clause 7.13: KPLC failure to complete KPLC's Connection Facilities or KPLC's Transmission Interconnector is hereby deleted and replaced by the following:

"7.13 KPLC failure to complete KPLC's Connection Facilities or KPLC's Transmission Interconnector or Accept Output for Commissioning and Testing: In the event that the Seller is unable to undertake the Commissioning and/or testing of a Unit or a Plant (including, pursuant to an Initial Notice of Fourth Plant Exercise or a Subsequent Notice of Fourth Plant Exercise, or with respect to the First Plant Additional Unit or Expanded First Plant, according to the case) solely due to a failure by KPLC to complete its facilities (if not completed prior) or to accept and evacuate the aggregate output of the Expanded First Plant (together with the Second, Third and Fourth Plants) by, as applicable, the Required Early Generation Commercial Operation Date or, with respect to each Plant, including the Expanded First Plant, its respective Required Full Commercial Operation Date, KPLC shall pay to the Seller monthly (and pro-rated for any proportion of the month), in arrears, an amount, as applicable, which is equal, with respect to the Early Generation Facility, to the Capacity Payment based on the Contracted Early Generation Capacity or, with respect to the affected Plant, the Contracted Plant Capacity of such Plant (and, with respect to the First Plant Additional Unit, the Expanded First Plant and under any Subsequent Notice of Fourth Plant Exercise, as the Contracted Plant Capacity of the affected Plants are adjusted by the addition of such Unit(s) (as the case may be))."

Clause 9.8A Revision to Contracted Plant Capacity:

In the second sentence of Clause 9.8A, the phrase "the Contracted Plant Capacity agreed at the end of the Appraisal Period, for the Second Plant, 36 MW, for the Third Plant, 16 MW, and, for the Fourth Plant, the Contracted Plant Capacity stated in the Notice(s) of Fourth Plant Exercise" shall be deleted and replaced by:

"prior to the Commercial Operation Date of the Expanded First Plant, 48 MW, and after the Commercial Operation Date of the Expanded First Plant, 58 MW, for the Second Plant, 36 MW, for the Third Plant, 16 MW, and, for the Fourth Plant, 29 MW as such capacity may be increased under Subsequent Notice(s) of Fourth Plant Exercise".

Clause 9.8C Notice of Fourth Plant Exercise:

In the second paragraph, the phrase "100 MW" included in the parenthetical shall be deleted and replaced by "90 MW".

Clause 16.5 Termination

The parenthetical "or, where the Fourth Plant has achieved its Full Commercial Operation Date, with respect to the additional Fourth Plant Units contemplated under a revised Notice of Fourth Plant Exercise)" shall be deleted and replaced by the following:

"(and, (i) regarding the Fourth Plant, solely with respect to additional Fourth Plant Units contemplated under a revised Notice of Fourth Plant Exercise and which are the cause and subject of the Event of Default, or (ii) regarding the First Plant, solely with respect to the First Plant Additional Unit that is the cause and subject of the Event of Default)"

3.1.2 The Parties further agree that the following definitions and clauses of the Schedules of the Third A&R PPA are hereby amended as described below:

List of Abbreviations and Schedule 5 Part B: Plant Tariff

The List of Abbreviations is deleted and replaced in its entirety by the attached List of Abbreviations.

With effect from the Full Commercial Operation Date of the Expanded First Plant Schedule 5 Part B, Part BI: First Plant Tariff shall be deemed to be deleted and replaced in its entirety by the attached Schedule 5 Part B, Part BI.

Schedule 2: Facilities to be installed by KPLC and the Seller:

Part A, Section 1A (Functional Specification of the Early Generation Facility and each Plant - General). Subsection 1.1(c) (Project Description - General Description), the second sentence of the fourth paragraph (commencing "The First Plant consists of" is hereby deleted and replaced as follows:

"The Expanded First Plant consists of two (2) modified binary energy converter Units of the Early Generation Facility (Units 1, and 2) , three (3) enhanced binary energy converter Units (Units 4, 5 and 6), and one additional binary energy converter Unit (Unit 7)."

Part F: Rated Capacity

The table appearing in Part F and explanatory notes are hereby deleted and replaced by the following:

	Capacity in MW (at reference conditions (see Note (1)), measured by the Metering System)	Comments
First Plant	58.0	
Unit Number		
Unit 1	5.0	Note (2)
Unit 2	5.0	Note (2)
Unit 4	12.66	Note (2)
Unit 5	12.66	Note (2)
Unit 6	12.66	Note (2)
Unit 7	10	
Second Plant	36.0	
Unit Number		
Unit 21	12	
Unit 22	12	

Unit 23	12	
Third Plant	16.0	
Unit 31	10.66	
Unit 32	5.3	
Fourth Plant	29	
Unit 41	14.68	
Unit 42	14.68	
		Note (3)
		Note (3)
		Note (3)

Notes:

1. Reference Conditions are specified in Part A of Schedule 2.
2. Already tested as part of the First Plant.
3. To be determined under Subsequent Notice(s) of Fourth Plant Exercise. "

Schedule 3: Maintenance Allowances of the Early Generation Facility and each Plant

The table for the First Plant is hereby deleted and replaced by the following:

First Plant (at 58 MW)			
Contract Year	Contracted (kW)	Capacity	Annual Scheduled Maintenance Allowance SMA (kWh)
1	58,000		10,163,000
2	58,000		10,163,000
3	58,000		10,163,000
4	58,000		10,163,000
5	58,000		10,163,000
6	58,000		10,163,000
7	58,000		10,163,000
8	58,000		10,163,000
9	58,000		10,163,000
10	58,000		10,163,000
11	58,000		10,163,000
12	58,000		10,163,000
13	58,000		10,163,000
14	58,000		10,163,000
15	58,000		10,163,000
16	58,000		10,163,000
17	58,000		10,163,000
18	58,000		10,163,000
19	58,000		10,163,000
20	58,000		10,163,000

Schedule 4: Procedures

In **Part A: Commissioning and Testing Procedures**, the following new paragraph will be added under Section 2, Tests after Synchronisation of each Unit and Unit Commercial Operations Tests, paragraph (b) (i), at the end of the third bullet point.

"For the sole purpose of the testing of the First Plant Additional Unit for that Unit's Capacity Demonstration Test for the tests to establish the Commercial Operation Date of the Expanded First Plant, the Capacity of that Unit is determined by measuring the output of the Unit using the metering at the generator terminals."

4. MUTUAL REPRESENTATIONS

4.1 Each Party represents, warrants and undertakes to the other that:

- (a) This Second Amendment Agreement does not and will not conflict with or result in any breach or constitute a default under any agreement, instrument or obligation to which that Party is a party or by which it is bound;
- (b) All necessary authorisations and consents to enable or entitle such Party to enter into this Second Amendment Agreement and which are material in the context of this Second Amendment Agreement have been obtained and will remain in full force and effect during the term of this Second Amendment Agreement;
- (c) That Party shall obtain, effect and maintain all governmental licenses, authorisations, consents, registrations, filings or approvals which are at any time necessary to enable it to comply with and/or perform its obligations under this Second Amendment Agreement;

5. MISCELLANEOUS

5.1 Continuing obligations

The provisions of the Third A&R PPA shall, save as amended by this Second Amendment Agreement, and the provisions of the Direct Agreement entered into by and between KPLC, Overseas Private Investment Corporation, and OrPower 4, shall continue in full force and effect.

5.2 Further assurance

The Parties shall, at their own expense, do all such acts and things necessary or desirable to give effect to the amendments effected or intended to be effected pursuant to this Second Amendment Agreement.

5.3 Variation

This Second Amendment Agreement may not be varied nor any of its provisions waived except by an agreement in writing signed by the Parties.

5.4 Waivers of Rights

No delay or forbearance by either Party in exercising any right, power, privilege or remedy under this Second Amendment Agreement shall operate to impair or be construed as a waiver of such right, power, privilege or remedy.

5.5 Notices

Any notice or other communication to be given by one Party to the other under or in connection with this Second Amendment Agreement shall be given in writing and may be delivered or sent by prepaid airmail or facsimile or to the recipient at the address, and marked for the attention of the person, specified in Schedule 8 of the Third A&R PPA or such other address or person from time to time designated by notice to the other in accordance with the notice provisions of the A&R PPA; and any such notice or communication shall be deemed to be received upon delivery, or five (5) days after posting, or on confirmation of transmission when sent by facsimile.

5.6 Effect of Illegality

If for any reason whatever any provision of this Second Amendment Agreement is or becomes or is declared by any court of competent jurisdiction to be invalid, illegal or unenforceable, then in any such case the Parties will negotiate in good faith with a view to agreeing one or more provisions to be substituted therefore which are not invalid, illegal or unenforceable and produce as nearly as is practicable in all the circumstances the appropriate balance of the commercial interests of the Parties.

5.7 Entire Agreement

This Second Amendment Agreement, together with the Third A&R PPA and the Direct Agreement, contains or expressly refers to the entire agreement between the Parties with respect to its subject matter and expressly excludes any warranty, condition or other undertaking implied at law or by custom and supersedes all previous agreements and understandings between the Parties with respect to its subject matter and each of the Parties acknowledges and confirms that it does not enter into this Second Amendment Agreement in reliance on any representation, warranty or other undertaking by the other Party not fully reflected in the terms of this Second Amendment Agreement.

5.8 Counterparts

This Second Amendment Agreement may be executed in two counterparts and by each Party on a separate counterpart, each of which when executed and delivered shall constitute an original, but both counterparts shall together constitute but one and the same instrument.

5.9 Waiver of Sovereign Immunity

KPLC agrees that the execution, delivery and performance by it of this Second Amendment Agreement and the obligations hereunder, constitute private and commercial acts.

In furtherance of the foregoing, KPLC agrees that:

- (a) should any proceedings be brought against KPLC or its assets in any jurisdiction in connection with this Second Amendment Agreement, or in connection with any of KPLC's obligations or any of the transactions contemplated by this Second Amendment Agreement, no claim of immunity from such proceeding will be claimed by or on behalf of itself or any of its assets;
- (b) it waives any right of immunity which KPLC or any of its assets has or may have in the future in any jurisdiction in connection with any such proceedings.

5.10 Governing Law

This Second Amendment Agreement shall be governed by and construed in all respects in accordance with the laws of Kenya.

5.11 Dispute Resolution

The provisions of Clause 19 (entitled "Dispute Resolution") of the Third A&R PPA shall apply, mutatis mutandis, to any dispute under or in connection with this Second Amendment Agreement.

AS WITNESS the hands of the duly authorised representatives of the Parties the day and year first above written.

Signed and Sealed)
for and on behalf of)
The Kenya Power &)
Lighting Company)
Limited

[SIGNATURE]
Director

[SIGNATURE]
Secretary

Signed for and on behalf of)
OrPower 4 Inc.: by Ernest
Mabwa _____
Authorised Signatory

List of Abbreviations

To promote clarity the following is a listing of the definitions used within these schedules. Where there is a conflict between this list and a definition within the schedules then the definition in the schedules shall be used.

P1AE	=	the non escalable component of portion of the Capacity Charge Rate of the First Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P1AF	=	the non escalable component of portion of the Capacity Charge Rate of the First Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P1AG	=	the non escalable component of portion of the Capacity Charge Rate of the First Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P1BE	=	the escalable component of the Capacity Charge Rate of the First Plant;
P1BF	=	the escalable component of the Capacity Charge Rate of the First Plant;
P1BG	=	the escalable component of the Capacity Charge Rate of the First Plant;
P2A	=	the non escalable component of the Capacity Charge Rate of the Second Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P3A	=	the non escalable component of the Capacity Charge Rate of the Third Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
P4A	=	the non escalable component of the Capacity Charge Rate of the Fourth Plant as defined in Schedule 5, Part B (expressed in US\$/kW/month);
PIACP _{tp}	=	the total of the Actual Capacity Payments of the First Plant received in the Operating Year for each month up to and including month m;
P2ACP _{tp}	=	the total of the Actual Capacity Payments of the Second Plant received in the Operating Year for each month up to and including month m;
P3ACP _{tp}	=	the total of the Actual Capacity Payments of the Third Plant received in the Operating Year for each month up to and including month m;
P4ACP _{tp}	=	the total of the Actual Capacity Payments of the Fourth Plant received in the Operating Year for each month up to and including month m;
P1AC _y	=	the Available Capacity of the First Plant in Settlement Period y (expressed in kW);
P2AC _y	=	the Available Capacity of the Second Plant in Settlement Period y (expressed in kW);
P3AC _y	=	the Available Capacity of the Third Plant in Settlement Period y (expressed in kW);
P4AC _y	=	the Available Capacity of the Fourth Plant in Settlement Period y (expressed in kW);
P1AMA _p	=	the Actual Monthly Availability of the First Plant in month p (expressed in kWh);
P2AMA _p	=	the Actual Monthly Availability of the Second Plant in month p (expressed in kWh);

P3AMA _p	=	the Actual Monthly Availability of the Third Plant in month p (expressed in kWh);
P4AMA _p	=	the Actual Monthly Availability of the Fourth Plant in month p (expressed in kWh);
bara	=	the unit of measurement of pressure with respect to absolute zero pressure as defined in the International Standards Organisation Standard ISO 1000:1992 Specification for SI Units and Recommendations for Use of Their Multiples and Certain Other Units;
P1C	=	the percentage of P1VE and of P1VF represented by the fixed Capacity Charge Rate;
P2C	=	the percentage of P2V represented by the fixed Capacity Charge Rate;
P3C	=	the percentage of P3V represented by the fixed Capacity Charge Rate;
P4C	=	the percentage of P4V represented by the fixed Capacity Charge Rate;
P1CC	=	the Contracted Capacity (expressed in kW) of the First Plant;
P2CC	=	the Contracted Capacity (expressed in kW) of the Second Plant;
P3CC	=	the Contracted Capacity (expressed in kW) of the Third Plant;
P4CC	=	the Contracted Capacity (expressed in kW) of the Fourth Plant;
P1CCRE _p	=	Portion of the Capacity Charge Rate of the First Plant for month p (expressed in US \$/kW);
P1CCRF _p	=	Portion of the Capacity Charge Rate of the First Plant for month p (expressed in US \$/kW);
P2CCR _p	=	the Capacity Charge Rate of the Second Plant for month p (expressed in US \$/kW);
P3CCR _p	=	the Capacity Charge Rate of the Third Plant for month p (expressed in US \$/kW);
P4CCR _p	=	the Capacity Charge Rate of the Fourth Plant for month p (expressed in US \$/kW);
CC _y	=	the Contracted Capacity (expressed in kW) for Settlement Period y;
CPI _b	=	with respect to the Early Generation Facility, the United States Consumer Price Index for June 1996 or as otherwise described in Schedule 5, Part B ("Plant Tariff");
P1CPI _b	=	with respect to the First Plant, the United States Consumer Price Index for March 2005 (= 193.30) or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
P2CPI _b	=	with respect to the Second Plant, the United States Consumer Price Index for July 2009 = 215.35 or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
P3CPI _b	=	with respect to the Third Plant, the United States Consumer Price Index for July 2009 = 215.35 or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
P4CPI _b	=	with respect to the Fourth Plant, the United States Consumer Price Index for July 2009 = 215.35 or as otherwise described in Schedule 5 of Part B ("Plant Tariff");
CPI _{p-1}	=	the United States Consumer Price Index for the month 3 months prior to month p;
P1CP _p	=	the Capacity Payment of the First Plant for month p (expressed in US \$);
P2CP _p	=	the Capacity Payment of the Second Plant for month p (expressed in US \$);
P3CP _p	=	the Capacity Payment of the Third Plant for month p (expressed in US \$);

P4CP _p	=	the Capacity Payment of the Fourth Plant for month p (expressed in US \$);
P1ECR _b	=	the Base Energy Charge Rate of the First Plant;
P2ECR _b	=	the Base Energy Charge Rate of the Second Plant;
P3ECR _b	=	the Base Energy Charge Rate of the Third Plant;
P4ECR _b	=	the Base Energy Charge Rate of the Fourth Plant;
P1ECR _p	=	the Energy Charge Rate of the First Plant (expressed in US\$/kWh) in month p;
P2ECR _p	=	the Energy Charge Rate of the Second Plant (expressed in US\$/kWh) in month p;
P3ECR _p	=	the Energy Charge Rate of the Third Plant (expressed in US\$/kWh) in month p;
P4ECR _p	=	the Energy Charge Rate of the Fourth Plant (expressed in US\$/kWh) in month p;
EGAC _y	=	the Early Generation Available Capacity in Settlement Period y (expressed in kW);
EGACP _{tp}	=	the total of the Actual Capacity Payments of the Early Generation Facility received in the Operating Year for each month up to and including month m;
EGCC	=	the Contracted Capacity of the Early Generation Facility (expressed in kW);
EGCCR _p	=	the Capacity Charge Rate of the Early Generation Facility for month p (expressed in US\$/kW/month)
EGCP _p	=	the Capacity Payment of the Early Generation Facility for month p (expressed in US\$);
EGD	=	the duration in years between the Early Generation Commercial Operation Date and the planned date of the Early Generation Cessation Date;
EGEC _p	=	the aggregate amount of Energy Charges (US\$) of the Early Generation Facility payable in respect of month p;
EGECR _b	=	the Base Energy Charge Rate of the Early Generation Facility;
EGECR _p	=	the Energy Charge Rate (expressed in US\$/kWh) of the Early Generation Facility prevailing in month p;
EGLC	=	the Capacity of the Early Generation Facility not Available as a result of the event of Force Majeure (expressed in kW);
EGMTA _p	=	the Monthly Target Availability of the Early Generation Facility (expressed in kWh);
EGNEO _p	=	the aggregate Net Electrical Output (kWh) of the Early Generation Facility in month p;
EGOA	=	Annual Outage Allowance of the Early Generation Facility – as described in Schedule 3;
EGSMA _p	=	the Scheduled Maintenance Allowance of the Early Generation Facility in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the Early Generation Capacity would otherwise have been dispatched at its Contracted Capacity calculated using the values of EGSMA set forth in Schedule 3;

EGUSMA _p	=	the Unscheduled Maintenance allowance of the Early Generation Facility in month p (expressed in kWh);
P1DE	=	the percentage of P1VE represented by escalable costs;
P1DF	=	the percentage of P1VF represented by escalable costs;
P1DG	=	the percentage of P1VG represented by escalable costs;
P2D	=	the percentage of P2V represented by escalable costs;
P3D	=	the percentage of P3V represented by escalable costs;
P4D	=	the percentage of P4V represented by escalable costs;
H _p	=	the hours in month p;
H _r	=	the enthalpy of the geothermal fluid expressed in kJ/kg at each well head at the instant that a reading of MF, is taken;
H _y	=	the number of hours in a year being eight thousand seven hundred and sixty (8760);
Hz	=	the unit of measurement of frequency as defined in the International Standards Organisation Standard ISO 1000:1992 Specification for SI Units and Recommendations for Use of Their Multiples and Certain Other Units;
P1LC	=	the Capacity of the First Plant not Available as a result of the event of Force Majeure (expressed in kW);
P2LC	=	the Capacity of the Second Plant not Available as a result of the event of Force Majeure (expressed in kW);
P3LC	=	the Capacity of the Third Plant not Available as a result of the event of Force Majeure (expressed in kW);
P4LC	=	the Capacity of the Fourth Plant not Available as a result of the event of Force Majeure (expressed in kW);
P1MEC _p	=	the aggregate amount of Energy Charges (US\$) of the First Plant payable in respect of month p;
P2MEC _p	=	the aggregate amount of Energy Charges (US\$) of the Second Plant payable in respect of month p;
P3MEC _p	=	the aggregate amount of Energy Charges (US\$) of the Third Plant payable in respect of month p;
P4MEC _p	=	the aggregate amount of Energy Charges (US\$) of the Fourth Plant payable in respect of month p;
MF _r	=	the mass flow rate of geothermal fluid at each well head expressed in kg/s;
P1MTA _p	=	the Monthly Target Availability of the First Plant (expressed in kWh);
P2MTA _p	=	the Monthly Target Availability of the Second Plant (expressed in kWh);
P3MTA _p	=	the Monthly Target Availability of the Third Plant (expressed in kWh);
P4MTA _p	=	the Monthly Target Availability of the Fourth Plant (expressed in kWh);
M _y	=	the number of months in a year being twelve (12);
P1NEO _p	=	the aggregate Net Electrical Output (kWh) of the First Plant in month p;
P2NEO _p	=	the aggregate Net Electrical Output (kWh) of the Second Plant in month p;
P3NEO _p	=	the aggregate Net Electrical Output (kWh) of the Third Plant in month p;
P4NEO _p	=	the aggregate Net Electrical Output (kWh) of the Fourth Plant in month p;
NEO _t	=	the Net Electrical Output delivered during the test expressed in kWh;
P1OA	=	the Annual Outage Allowance of the First Plant - as set forth in Schedule 3;
P2OA	=	the Annual Outage Allowance of the Second Plant - as set forth in Schedule 3;

P3OA	=	the Annual Outage Allowance of the Third Plant - as set forth in Schedule 3;
P4OA	=	the Annual Outage Allowance of the Fourth Plant - as set forth in Schedule 3;
P1PPA _t	=	the number of years between the Full Commercial Date of the First Plant and end of the end of the Term;
P2PPA _t	=	the number of years between the Full Commercial Date of the Second Plant and end of the end of the Term;
P3PPA _t	=	the number of years between the Full Commercial Date of the Third Plant and end of the end of the Term;
P4PPA _t	=	the number of years between the Full Commercial Date of the Fourth Plant and end of the end of the Term;
P1SMA _p	=	the Scheduled Maintenance Allowance of the First Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the First Plant would otherwise have been dispatched at its Contracted Capacity;
P2SMA _p	=	the Scheduled Maintenance Allowance of the Second Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the Second Plant would otherwise have been dispatched at its Contracted Capacity;
P3SMA _p	=	the Scheduled Maintenance Allowance of the Third Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the Third Plant would otherwise have been dispatched at its Contracted Capacity;
P4SMA _p	=	the Scheduled Maintenance Allowance of the Fourth Plant in month p (expressed in kWh) representing the total energy available for delivery in month p due to scheduled maintenance outages computed assuming the Fourth Plant would otherwise have been dispatched at its Contracted Capacity;
SP	=	the number of Settlement Periods in the year;
P1USMA _p	=	the Unscheduled Maintenance allowance of the First Plant in month p (expressed in kWh);
P2USMA _p	=	the Unscheduled Maintenance allowance of the Second Plant in month p (expressed in kWh);
P3USMA _p	=	the Unscheduled Maintenance allowance of the Third Plant in month p (expressed in kWh);
P4USMA _p	=	the Unscheduled Maintenance allowance of the Fourth Plant in month p (expressed in kWh);
P1VE	=	Portion of the Base Capacity Charge
P1VF	=	Portion of the Base Capacity Charge
P1VG	=	Portion of the Base Capacity Charge
P2V	=	the Base Capacity Charge Rate of the Second Plant;
P3V	=	the Base Capacity Charge Rate of the Third Plant; and
P4V	=	the Base Capacity Charge Rate of the Fourth Plant.

Schedule 5 Part B, Part BI: First Plant Tariff of the Olkaria PPA**Part B: Plant Tariff****Part BI: First Plant Tariff**

The total levels of tariff payments in respect of the First Plant in each month shall be according to the following:

- (i) Following the Early Generation Cessation Date but prior to the Full Commercial Operation Date of the First Plant the total tariff payments in any month shall be equal to PIMEC_p; and
- (ii) Following the Full Commercial Operation Date of the First Plant for the remainder of the Term the total tariff payments in any month shall be equal to PIMEC_p plus PICP_p.

Where PIMEC_p and PICP_p are calculated in accordance with Part BI of this Schedule.

Energy Charges of the First Plant**1 Calculation of Energy Charges of the First Plant**

For the purposes of Clause 10.2, KPLC shall pay to the Seller Energy Charges in respect of the Net Electrical Output of the First Plant in each month calculated as follows:

$$\text{PIMEC}_p = \text{PINEO}_p \times \text{PIECR}_p$$

where:

PIMEC_p = the aggregate amount of Energy Charges (US\$) payable in respect of month p for the First Plant;

PINEO_p = the aggregate Net Electrical Output (kWh) of the First Plant in month p; and

PIECR_p = the Energy Charge Rate (expressed in US\$/kWh) in month p for the First Plant as calculated in accordance with Paragraph 2 directly below.

2. Energy Charge Rate

The Energy Charge Rate, PIECR_p, for the First Plant in month p shall be calculated as follows:

$$P1BE = \left(\frac{P1VEA}{12} \times \frac{P1DE}{100} \right) \times \frac{CPI_{p-1}}{P1CPI_b}$$

where:

P1ECR_b = zero point zero one nine two four US Dollars per kWh (0.01924 US\$/kWh) the Base Energy Charge Rate of the First Plant;

CPI_{p-1} = as previously defined; and

P1CPI_b = the United States Consumer Price Index for March 2005 = 193.30

The royalty charge, currently set at 0.004US\$/kWh, will be added to the Energy Charge Rate of the First Plant at cost.

Capacity Payments

1 Capacity Charge Rate

1.1 The Capacity Charge Rate for the First Plant during each month consists of the following three components:

P1CCREp with respect to 20.69% portion (P1CCE) of the Contracted Capacity of the First Plant; and

P1CCRFp with respect to 62.07% portion (P1CCF) of the Contracted Capacity of the First Plant; and

P4CCRp with respect to 17.24% portion (P1CCG) of the Contracted Capacity of the First Plant.

P1CCE, P1CCF, and P1CCG shall be calculated as follows:

$$P1CCE = P1CC \times 0.2069$$

$$P1CCF = P1CC \times 0.6207$$

$$P1CCG = P1CC \times 0.1724$$

where:

P1CC = the Contracted Capacity of the First Plant (expressed in kW).

1.2 PICCREp, PICCRFp, and PICCRGp during each month shall be calculated as follows:

1.2.1 Calculation of PICCREp

$$\text{PICCREp} = \text{P1AE} + \text{P1BE} - \text{Rp}$$

where:

PICCREp = the Capacity Charge Rate of the First Plant for PICCE for month p, (expressed in US\$/kW/month)

$$\text{P1AE1} = \frac{\text{P1VEA}}{12} \times \frac{\text{P1C}}{100} \quad (\text{the non-escalable component of the Capacity Charge Rate of the First Plant})$$

P1VE = P1VE₁ for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;

Or
= P1VE₂ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.

where:

P1VE₁ = five hundred sixty one point six three six US Dollars per kW per year (561.636 US\$/kW/year) the PICCE Base Capacity Charge Rate of the First Plant;

P1VE₂ = 12 x (PICCREp + Rp) of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant occurs; and

PIC = the percentage of P1VE represented by the fixed Capacity Charge Rate of the First Plant, which shall be fifty per cent (50%) until the day which is the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant, and which shall be seventy-five per cent (75%) thereafter; and

$$\text{P1BE} = \left(\frac{\text{P1VEA}}{12} \times \frac{\text{P1DE}}{100} \right) \times \frac{\text{CPI}_{p-1}}{\text{P1CPI}_b} \quad (\text{the escalable component of the Capacity Charge Rate of the First Plant})$$

where:

P1DE = the percentage of P1VE represented by the escalable costs such as fixed O&M costs, insurance and administrative costs, P1DE = 100%-PIC;

CPI_{p-1} = as previously defined;

P1CPI_b = P1CPI_{b1} for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;

or

= P1CPI_{b2} for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.

where:

P1CPI_{b1} = the United States Consumer Price Index for March 2005 = 193.30; and

P1CPI_{b2} = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant occurs.

$$P1R_p = P1R \times \frac{CPI_{p-1}}{P1CPI_{b3}}$$

(the reduction in the Capacity Charge Rate of the First Plant for month p, expressed in US\$/kW/month)

where:

$$P1R = P1RY/12$$

$$P1RY = \text{twenty-five US Dollars and fifty US cents per kW per year (25.50 US$/kW/year)}$$

$$P1CPI_{b3} = \text{the United States Consumer Price Index for July 2003} = 183.9$$

$$CPI_{p-1} = \text{as previously defined.}$$

1.2.2 Calculation of P1CCRF_p

$$P1CCRF_p = P1AF + P1BF$$

where:

$$P1CCRF_p = \text{the Capacity Charge Rate of the First Plant for P1CCF for month p, (expressed US$/kW/month)}$$

$$P1AF = \frac{P1VF}{12} \times \frac{P1C}{100}$$

(the non-escalable component of the Capacity Charge Rate of the First Plant)

$$P1VF = P1VF_1 \text{ for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;}$$

or

$$= P1VF_2 \text{ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.}$$

where:

$$P1VF_1 = \text{four hundred eighty-five US Dollars per kW per year (485 US$/kW/year) the P1CCF Base Capacity Charge Rate of the First Plant; and}$$

$$P1VF_2 = 12 \times P1CCRF_p \text{ of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant occurs; and}$$

$$P1C = \text{as previously defined; and}$$

$$P1BF = \left(\frac{P1VF}{12} \times \frac{P1DF}{100} \right) \times \frac{CPI_{p-1}}{P1CPI_b}$$

(the escalable component of the Capacity Charge Rate of the First Plant)

where:

$$P1DF = \text{the percentage of P1VF represented by escalable costs such as fixed O\&M costs, insurance and administrative costs, } P1DF = 100\% - P1C$$

CPI_{p-1} = as previously defined;

$P1CPI_b$ = $P1CPI_{b1}$ for the period commencing on the Full Commercial Operation Date of the First Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant;

or
 $= P1CPI_{b2}$ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the First Plant.

where:

$P1CPI_{b1}$ = the United States Consumer Price Index for March 2005 = 193.30; and

$P1CPI_{b2}$ = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date occurs.

1.2.3 Calculation of $P1CCRG_p$

$$P1CCRG_p = P1AG + P1BG$$

where:

$P1CCRG_p$ = the Capacity Charge Rate of the First Plant for $P1CCG$ for month p , (expressed US\$/kW/month)

$$P1AG = \frac{P1VG}{12} \times \frac{P1C}{100}$$

(the non-escalable component of the Capacity Charge Rate of the First Plant)

$P1VG$ = $P1VG_1$ for the period commencing on the Full Commercial Operation Date of the Fourth Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the Fourth Plant;

or
 $= P1VG_2$ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the Fourth Plant.

where:

$P1VG_1$ = five hundred twenty-five US Dollars and forty-five cents per kW per year (525.45 US\$/kW/year) the $P1CCG$ Base Capacity Charge Rate of the First Plant; and

$P1VG_2$ = $12 \times P1CCRG_p$ of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the Fourth Plant occurs; and

$P1C$ = as previously defined; and

$$P1BG = \left(\frac{P1VG}{12} \times \frac{P1DG}{100} \right) \times \frac{CPI_{p-1}}{P4CPI_b}$$

(the escalable component of the Capacity Charge Rate of the First Plant)

where:

$P1DG$ = the percentage of $P1VG$ represented by escalable costs such as fixed O&M costs, insurance and administrative costs, $P1DG = 100\% - PIC$

CPI_{p-1} = as previously defined;

$P4CPI_b$ = $P4CPI_{b1}$ for the period commencing on the Full Commercial Operation Date of the Fourth Plant and ending on the eleventh (11th) anniversary of the Full Commercial Operation Date of the Fourth Plant;

or

= $P4CPI_{b2}$ for the period after the eleventh (11th) anniversary of the Full Commercial Operation Date of the Fourth Plant.

where:

$P4CPI_{b1}$ = the United States Consumer Price Index for July 2009 = 215.35;

and

$P4CPI_{b2}$ = CPI_{p-1} of the month in which the eleventh (11th) anniversary of the Full Commercial Operation Date of the fourth plant occurs.

2. Pass Through Cost

This subsection 2 is for the KPLC's internal purposes only, and shall not affect the calculation of Capacity Payments payable to OrPower 4.

The Capacity Charge Rate for the First Plant during each month calculated in accordance with this Part B of Schedule 5 shall include a pass through component to consumers being a fuel displacement cost as follows:

(i) With respect to 25% portion ($P1CCE$) of the Contracted Capacity of the First Plant as specified in this Part B1 of Schedule 5:

$P1CCRE_{pt1}$ = 325.749 US\$/kW/yr (58% of the base Capacity Charge Rate of the First Plant of 561.636 US\$/kW/yr)

(ii) With respect to the remaining portion ($P1CCF$) of the Contracted Capacity of the First Plant:

$P1CCRE_{pt2}$ = 281.3 US\$/kW/yr (58% of the base Capacity Charge Rate of the First Plant of 485 US\$/kW/yr)

where:

$P1CCRE_{pt1}$ = pass through component of $P1CCRE_p$

$P1CCRE_{pt2}$ = pass through component of $P1CCRF_p$

Application of this Pass Through arrangement with regard to Plant 1 ceased on 1st December 2013.

3. Calculation of Capacity Payments of the First Plant

The Seller shall be entitled to Capacity Payments in respect of Capacity of the First Plant in each month calculated as follows:

$$P1CP_p = P1CCRE_p \times P1CCE + P1CCRF_p \times P1CCF + P1CCRG_p \times P1CCG$$

where:

$P1CP_p$	=	the Capacity Payment of the First Plant for month p (expressed US\$);
$P1CCRE_p$	=	the Capacity Charge Rate of the First Plant for P1CCE for month p (expressed in US\$/kW/month)
$P1CCRF_p$	=	the Capacity Charge Rate of the First Plant for P1CCF for month p (expressed in US\$/kW/month)
$P1CCRG_p$	=	the Capacity Charge Rate of the First Plant for P1CCG for month p (expressed in US\$/kW/month)
$P1CCE$	=	the portion of the Contracted Capacity of the First Plant as previously defined (expressed in kW)
$P1CCF$	=	the portion of Contracted Capacity of the First Plant as previously defined (expressed in kW)
$P1CCG$	=	the portion of Contracted Capacity of the First Plant as previously defined (expressed in kW)

4. Monthly Availabilities of the First Plant

For each month in each Operating Year, starting with the month in which the Full Commercial Operation Date of the First Plant occurs, there shall be calculated a Monthly Target Availability of the First Plant and an Actual Monthly Availability of the First Plant as follows:

(i) Monthly Target Availability of the First Plant

$$P1MTAp = (P1CC \times H_p) - P1SMAp - P1USMAp$$

where:

$P1MTAp$	=	the Monthly Target Availability of the First Plant (expressed in kWh);
$P1CC$	=	as previously defined;
H_p	=	as previously defined;
$P1SMA_p$	=	the Scheduled Maintenance Allowance of the First Plant in month p (expressed in kWh) representing the total energy not available for delivery in month p due to scheduled maintenance outages computed assuming the First Plant would otherwise have been dispatched at its Contracted Capacity; and
$P1USMAp$	=	the Unscheduled Maintenance Allowance of the First Plant in month p (expressed in kWh) shall be calculated using the following formula:

$$P1USMA_p = \frac{(P1CC \times P1PPA_t \times H_y \times P1OA) - \sum_{p=1}^{P1PPA_t \times M_y} P1SMA_p}{(P1PPA_t \times M_y)}$$

$P1PPA_t$ = the number of years between the Full Commercial Date of the First Plant and the end of the Term;

H_y = as previously defined;

M_y = as previously defined; and

$P1OA$ = The Annual Outage Allowance of the First Plant - as set forth in Schedule 3.

Where the Contracted Capacity of the First Plant changes after the Full Commercial Operation Date of the First Plant, then PIUSMAp shall be recalculated from the date of the change in the Contracted Capacity of the First Plant. PIPPA1 shall be the number of years between the date of the Contracted Capacity of the First Plant change and the end of the Term which does not have to be an integer, P1CC shall be the revised Contracted Capacity of the First Plant in kW and all other parameters shall be those as in the initial calculation.

(ii) Actual Monthly Availability of the First Plant

$$P1AMA_p = \sum_{y=1}^{2 \times H_p} \left(\frac{P1AC_y}{2} \right)$$

where:

$P1AMA_p$ = the Actual Monthly Availability of the First Plant in the month p (expressed in kWh)

$P1AC_y$ = the Available Plant Capacity of the First Plant in Settlement Period y (expressed in kW)

5. Adjustment of Capacity Payments of the First Plant for Monthly Availability of the First Plant - First Month of Operating Year

If in the first month of an Operating Year, starting with the month in which the Full Commercial Operation Date of the First Plant occurs, the Actual Monthly Availability of the First Plant is less than the Monthly Target Availability of the First Plant, the Capacity Payment of the First Plant for that month shall be multiplied by the factor:

$$\frac{P1AMA_p}{P1MTA_p}$$

6. Adjustment of Capacity Payments of the First Plant for Monthly Availability of the First Plant - Subsequent Months of Operating Year

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the First Plant for the year to date is less than the sum of the Individual Monthly Target Availabilities of the First Plant for the year to date, then the Capacity Payment of the First Plant for that month shall be adjusted such that

$$P1ACP_{tp} = \sum_{p=1}^m \left(P1CP_p \times \frac{P1AMA_p}{P1MTA_p} \right)$$

where:

$P1ACP_{tp}$ = the total of the Actual Capacity Payments of the First Plant received in the Operating Year for each month up to and including month m.

If in any subsequent month m of an Operating Year, the sum of the individual Actual Monthly Availabilities of the First Plant for the year to date is greater than or equal to the sum of the individual Monthly Target Availabilities of the First Plant for the year to date, then the Capacity Payment of the First Plant for that month shall be adjusted, if such an adjustment is required, such that:

$$P1ACP_{tp} = \sum_{p=1}^m P1CP_p$$

7. Force Majeure Payments

For any month in which all or part of the Capacity of the First Plant is unavailable as a result of Force Majeure, the Seller shall be entitled to Capacity Payments for the First Plant which shall be calculated under paragraph 3 and as follows, and pro rated for such number of hours during which the Force Majeure exists in the month:

$P1LC \times P1A$

where:

$P1LC$ = the Capacity of the First Plant not Available as a result of the event of Force Majeure; (expressed in kW); and

$P1A$ = 90% of the Capacity Charge Rate of the First Plant as defined in paragraph 1 above (expressed in US\$/kW/month)

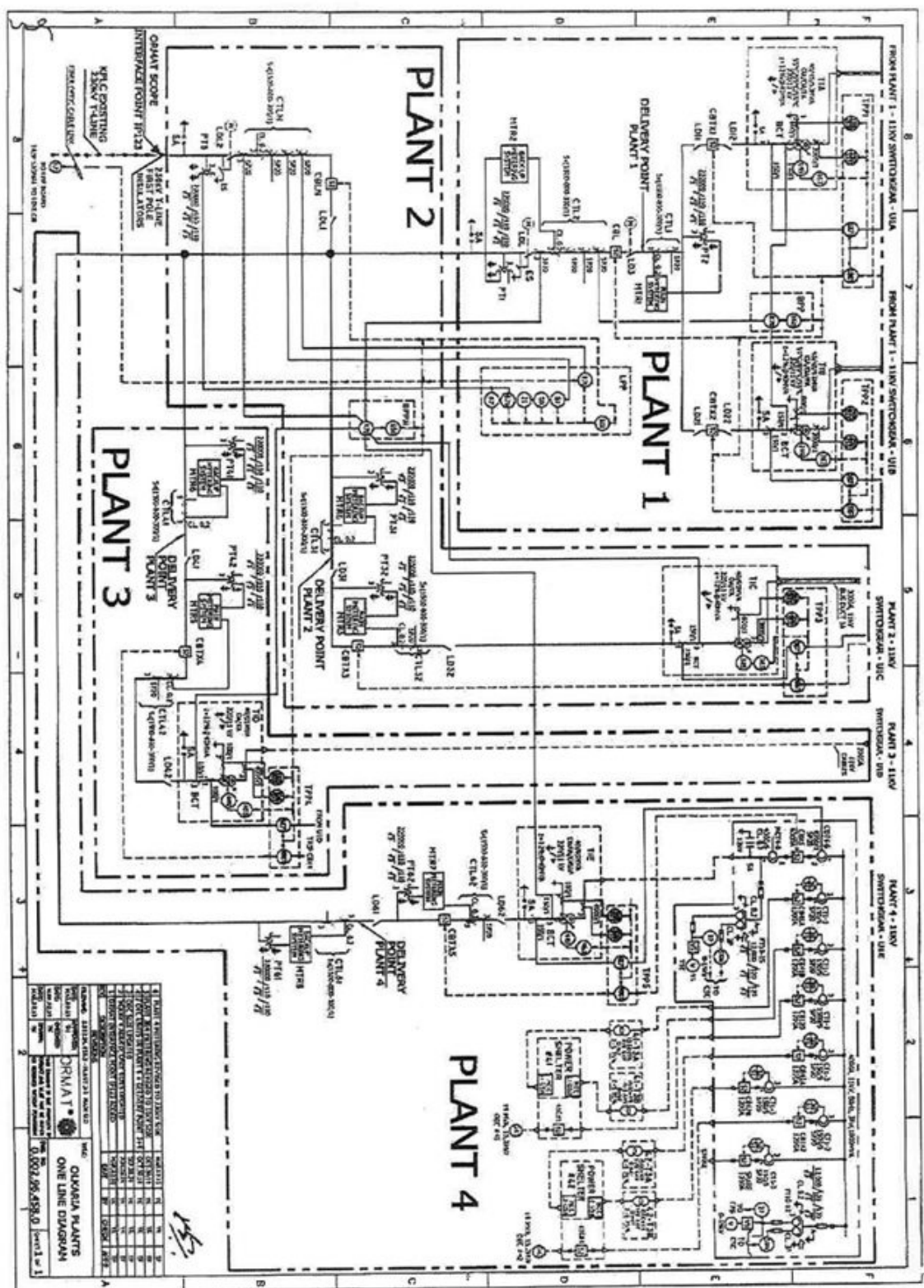
The payment under paragraph 3 shall be reduced by an amount equal to the Capacity Payment for such hours for the First Plant the Seller would have received had the Force Majeure event not occurred.

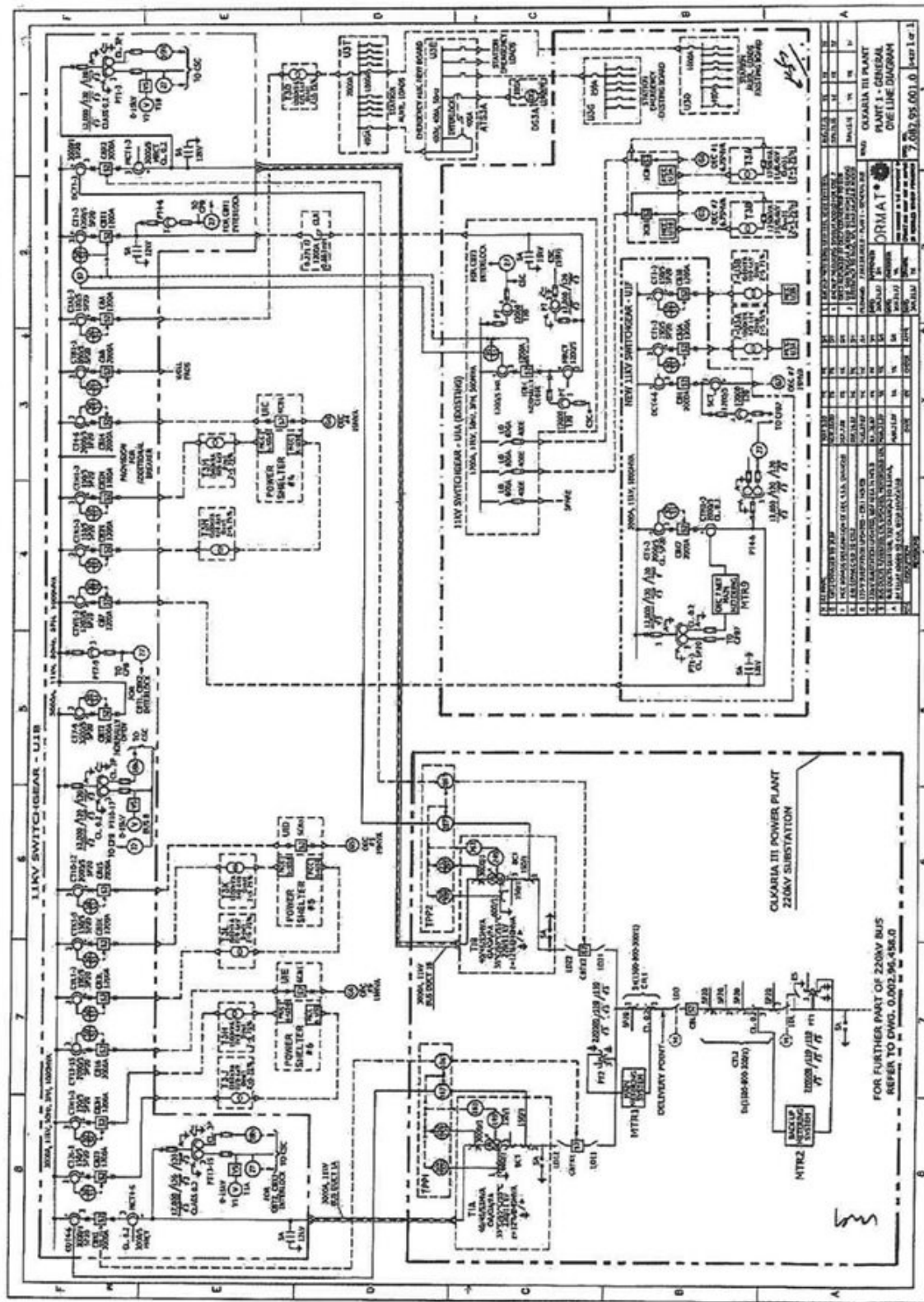
For the purposes of this paragraph "Force Majeure" shall not include events or circumstances specified in Clauses 15.1(ii), (iii) and (iv), save that in respect of Clause 15.1(iii), this paragraph shall apply if epidemics or plagues materially affect the operation of the Plant.

8. Changes in Contracted Capacity of the First Plant

In the event that the Contracted Capacity of the First Plant is altered under the provisions of this Agreement during any month, the calculation of payments shall be adjusted pro rata to reflect the differing proportions of the month for which differing Contracted Capacities of the First Plant were agreed.

"Figure 4 (Plant Drawings) are hereby replaced by the attached updated drawings".





<u>Name of Significant Subsidiary*</u>	<u>State or Jurisdiction of Incorporation</u>
Ormat Nevada Inc.	Delaware
Ormat International Inc.	Delaware
Ormat Systems Ltd.	Israel
OFC 2, LLC	Delaware
ORNI 39, LLC	Delaware
ORNI 41, LLC	Delaware
Orpd, LLC	Delaware
Opal Geo, LLC	Delaware
OrLeaf, LLC	Delaware
Ormat Holding Corporation	Cayman Islands
Orpower 4 Inc.	Cayman Islands

* A number of these entities have subsidiaries below them

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-250110) and Form S-8 (No. 333-129583, 333-143488, 333-181509, and 333-224752) of Ormat Technologies, Inc. of our report dated February 26, 2021 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ Kesselman & Kesselman
Certified Public Accountants (Isr.)
A member firm of PricewaterhouseCoopers International Limited
Tel Aviv, Israel
February 26, 2021

Ormat Technologies, Inc.
Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002

I, Doron Blachar, certify that:

1. I have reviewed this annual report on Form 10-K of Ormat Technologies, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

By: /s/ Doron Blachar
Name: Doron Blachar
Title: Chief Executive Officer

Date: February 26, 2021

Ormat Technologies, Inc.
Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002

I, Assi Ginzburg, certify that:

1. I have reviewed this annual report on Form 10-K of Ormat Technologies, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

By: /s/ Assi Ginzburg
Name: Assi Ginzburg
Title: Chief Financial Officer

Date: February 26, 2021

**CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

I, Doron Blachar, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the annual report of Ormat Technologies, Inc. on Form 10-K for the year ended December 31, 2020 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in such annual report on Form 10-K fairly presents in all material respects the financial condition, results of operations and cash flows of Ormat Technologies, Inc. as of and for the periods presented in such annual report on Form 10-K. This written statement is being furnished to the Securities and Exchange Commission as an exhibit accompanying such annual report and shall not be deemed filed pursuant to the Securities Exchange Act of 1934.

By: /s/ Doron Blachar

Name: Doron Blachar

Title: Chief Executive Officer

Date: February 26, 2021

**CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

I, Assi Ginzburg, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the annual report of Ormat Technologies, Inc. on Form 10-K for the year ended December 31, 2020 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in such annual report on Form 10-K fairly presents in all material respects the financial condition, results of operations and cash flows of Ormat Technologies, Inc. as of and for the periods presented in such annual report on Form 10-K. This written statement is being furnished to the Securities and Exchange Commission as an exhibit accompanying such annual report and shall not be deemed filed pursuant to the Securities Exchange Act of 1934.

By: /s/ Assi Ginzburg

Name: Assi Ginzburg

Title: Chief Financial Officer

Date: February 26, 2021



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