

TSM ASSESSMENT PROTOCOL

A Tool for Assessing Energy Use and Greenhouse Gas Emissions Management Performance

Introduction

Launched in 2004, Towards Sustainable Mining (TSM) is an initiative of The Mining Association of Canada designed to enhance the industry's reputation by improving its performance. MAC members subscribe to TSM guiding principles, a set of commitments that addresses all areas of our industry's performance.

These guiding principles are backed by specific performance indicators, which member companies began reporting against in 2004. These indicators are designed to identify the industry's current performance in key areas, and point to actions that could be taken to improve. Areas for which performance indicators have been developed include tailings management, energy use and greenhouse gas emissions management, Aboriginal and community outreach, crisis management planning, safety and health, and biodiversity conservation management.

This document provides a tool to assist companies in the assessment of the standard of energy use and greenhouse gas emissions management currently being implemented by their facilities, in conformance with the TSM energy use and greenhouse gas emissions management performance indicators. It enables key performance indicators to be segregated and performance improvements for each indicator tracked year to year. The use of this protocol also enhances the consistency of assessments conducted across companies. In addition, this tool has been designed to enable external verification of company performance, consistent with the TSM verification system and the initiative's commitment to transparency and accountability.

Assessing Energy Use and GHG Emissions Management Implementation

The purpose of the assessment protocol is to provide guidance to the member companies in completing their evaluation of energy use and GHG emissions management against TSM indicators. The assessment protocol sets out the general expectations of MAC for energy use and greenhouse gas emissions management by its member companies in support of the TSM initiative. Assessment should also:

- Assist member companies to develop capacity to monitor and improve performance; and
- Provide a basis for company assurance

As with any assessment of a management system, professional judgment is required in assessing the degree of implementation of a system indicator and the quality of management processes and intervention. Application of this protocol will therefore require a level of expertise in auditing and systems assessment and some knowledge of and experience in the practice of energy use and greenhouse gas emissions management. This assessment protocol provides an indicator of the level of implementation of energy use and greenhouse gas emissions management systems in support of the TSM

What are energy use and greenhouse gas (GHG) emissions?

Energy use refers to the consumption of fossil fuels, electric power, solar energy, steam etc.

Greenhouse gases (GHGs) generally refer to the following:

- *Carbon Dioxide (CO₂)*
- *Methane (CH₄)*
- *Nitrous Oxide (N₂O)*
- *Hydrofluorocarbons (HFCs)*
- *Perfluorocarbons (PFCs)*
- *Sulphur Hexafluoride (SF₆)*

initiative and is not, of itself, a guarantee of the effectiveness of energy use and greenhouse gas emissions management activities.

Performance Indicators

Six performance indicators have been established.

1. Energy use management systems
2. Energy use reporting systems
3. Energy intensity performance targets
4. Greenhouse gas emissions management systems
5. Greenhouse gas emissions reporting systems
6. Greenhouse gas emissions intensity performance targets

Five levels of performance are identified for each indicator. Criteria further define performance at each level, as illustrated below.

Energy Use and Greenhouse Gas Emissions Management Assessment Criteria	
Level	Criteria
C	No systems in place; activities tend to be reactive; procedures may exist but they are not integrated into policies and management systems
B	Basic systems/processes developed; comprehensive system planned and under development
A	Comprehensive systems/processes are developed and implemented
AA	Integration into management decisions and business functions
AAA	Excellence and leadership

Specific criteria for each performance indicator are provided in subsequent tables to enable the assessor to determine an appropriate level of performance (Levels C-AAA).

The assessor is required to select the level that most clearly represents the status of the operation. Only one level can be selected for each indicator, and it can be chosen only if all criteria for that level and all preceding levels have been met.

Where a performance element or indicator is not relevant, then an assessment of N/A should be assigned.

The goal of each MAC member is to achieve, at a minimum, a consistent “A” ranking on the TSM Energy Use and Greenhouse Gas Emissions Management assessment and to work towards continuous improvement.

Facility-level Assessments

Respondents are expected to provide facility-level assessments for each specified indicator.

By “facility-level assessments”, it is intended that companies will complete an assessment and report on energy use and greenhouse gas emissions for each distinct operating unit, or facility, of the company. It is recognized that companies may categorize their facilities in different ways.

Facility-level reporting has been found to be the most reliable, informative and useful approach for performance evaluation. The TSM on-line performance reporting database has been designed to facilitate assessment on a facility by facility basis.

Assessment Process

It is recommended that the assessment be completed using a process of interview, discussion and document review, including representative site management, operations and environmental personnel. A level of expertise in auditing and systems assessment and some knowledge of and experience in the practice of energy use management, energy conservation, greenhouse gas emissions calculations, etc., is required.

Only one level can be selected for each indicator, and it can be chosen only if all criteria for that level and all preceding levels have been met. No partial levels of performance (e.g. B+) can be reported. Where a performance element or indicator is not relevant, then an assessment of N/A should be assigned.

Where an operation is shared between two parties, e.g. a joint venture, the two parties are encouraged to discuss amongst themselves who should complete the assessment, whether it should be undertaken jointly or divided so that the results reflect the appropriate activities of each company.

Structure of the Assessment Protocol

For each indicator, the protocol provides:

- A statement of purpose that expresses the spirit and intent of the indicator
- Assessment criteria for each level of performance
- Supporting guidelines to help the assessor to understand the general scope of each indicator and to act as a framework for reviewing documentation and conducting interviews necessary for the assessment of the company’s (or facility’s) performance
- Frequently Asked Questions (FAQs) that provide further information, such as definitions for key terms and answers to common questions that arise.

1. ENERGY USE MANAGEMENT SYSTEMS

Purpose:

To confirm that systems are in place to manage energy use.

Energy Use Management Systems <u>ASSESSMENT CRITERIA</u>	
Level	Criteria
C	No formal energy use management system in place.
B	Basic energy use management system established that includes: <ul style="list-style-type: none"> ■ written senior management commitment at the facility level ■ facility-level Energy Leaders ■ facility-level monitoring infrastructure that measures consumption of energy with a level of disaggregation by major process activity (e.g., mill, smelter, refinery, etc.) ■ aggregation of facility-level measured data into a facility-level database
A	Comprehensive energy use management system established that includes these additional elements <ul style="list-style-type: none"> ■ standard quantification and estimation methodologies used to convert energy data to comparable energy information ■ clear accountability for energy use assigned to operational managers ■ plant control systems that include energy as an operating variable ■ company-level Energy Leader ■ energy system integrated within an operational management system ■ company-level energy database ■ energy awareness included within facility training programs for key personnel
AA	Integration into decision making: <ul style="list-style-type: none"> ■ the facility can demonstrate that energy management is integrated into business planning ■ energy use management system has been subject to internal verification
AA A	Excellence and leadership: Energy use management system is integrated into a broader sustainable business strategy that includes: <ul style="list-style-type: none"> ■ procurement and supply chain management policies that incorporate energy efficiency criteria ■ investments in research and development and demonstration of technologies and processes that optimize energy consumption ■ participation with communities of interest to improve energy efficiency (e.g., community events, environmental non-government organizations, government energy efficiency programs, industry association initiatives)

Energy Use Management Systems FREQUENTLY ASKED QUESTIONS

#	FAQ	PAGE #
1	What is an “Energy Leader”?	See page 17
2	Can corporate documentation be used to demonstrate facility-level commitment?	See page 17
3	What are standard quantification and estimation methodologies?	See page 17
4	What is a major process activity?	See page 17
5	How do facilities include energy use and GHG emissions as an operating variable in plant control systems?	See page 17
14	What does “formal” mean?	See page 20
15	What is a “system”?	See page 20
16	What does “accountability” mean?	See page 20
17	What does “responsibility” mean?	See page 20

Energy Use Management Systems SUPPORTING GUIDELINES

Through interview and review of documentation, determine:

- That formal systems are in place for energy use management which meet all the requirements of level B.
- The level of accountability for energy management.
- The level of sophistication of energy measurement and analysis systems.
- The level of integration of energy use management into the business planning of the facility/company.
- That operators have the procedures, instructions and systems to manage energy use.
- The level of training in energy use management provided.
- That internal/external verification of the energy use management system is conducted and the results reported to senior management.
- That the results of verification are acted upon through formal action plans containing, as a minimum, actions, assigned responsibilities and timelines for completion.
- That and the extent to which the company and/or facility is a leader in energy use management.

2. ENERGY USE REPORTING SYSTEMS

Purpose:

To confirm that energy use tracking and reporting systems are in place for internal use and for public reporting.

Energy Use Reporting Systems <u>ASSESSMENT CRITERIA</u>	
Level	Criteria
C	No energy use reporting system in place.
B	Basic energy use reporting system established that includes: <ul style="list-style-type: none"> ■ a facility-level reporting system for energy use ■ energy database to report annual facility level energy use internally
A	Comprehensive energy use reporting system established that includes: <ul style="list-style-type: none"> ■ facility-based energy performance results reported to management ■ management decision-making processes are supported by regular internal reporting of the current year's energy consumption. ■ annual public reporting of energy¹ use
AA	Integration into decision-making: <ul style="list-style-type: none"> ■ energy use reporting system is internally verified ■ annual public reporting of performance¹ (energy use against target)
AAA	Excellence and leadership: energy use reporting system is externally verified.

¹ The combination of energy consumption and mineral production data can significantly compromise a company's position vis-à-vis its competition, particularly in instances where there are relatively few global competitors (e.g. iron ore). This may affect a company's ability to disclose certain types of information on energy use and GHG emissions. Necessary limits on public reporting for competitive reasons should not prevent a facility from satisfying level A criteria.

Energy Use Reporting Systems

FREQUENTLY ASKED QUESTIONS

#	FAQ	PAGE #
12	What is verification?	<i>See page 19</i>
13	Is a company eligible for a Level AAA rating if it has met all other criteria for Levels C-AAA with the exception of the internal verification required at Level AA in all indicators?	<i>See page 19</i>
15	What is a “system”?	<i>See page 20</i>

Energy Use Reporting Systems

SUPPORTING GUIDELINES

Through interview and review of documentation, determine:

- Processes the facility has in place for tracking energy use and reporting on energy use (e.g. procedures etc.).
- That consistent approaches to energy use reporting are used (i.e. energy types, energy units).
- Who is responsible for energy use tracking, reporting and approval of reports, etc
- That energy use data collectors have appropriate skills in energy use tracking and reporting.
- How often is energy use reported and how the energy data is used (internal or external reporting, performance assessments, etc.).
- That systems are in place for internal/external verification of the energy use reporting system.

3. ENERGY INTENSITY PERFORMANCE TARGETS

Purpose:

To confirm that energy intensity performance targets have been established at each facility.

Energy Intensity Performance Targets <u>ASSESSMENT CRITERIA</u>	
Level	Criteria
C	No energy intensity performance target has been set for the facility.
B	Energy intensity performance target has been set for the facility, but current performance falls short of the target.
A	Energy intensity performance target for the facility is met or exceeded.
AA	Facility has met its energy intensity performance target for 3 of the past 4 years. Facility has established an energy intensity rate of improvement target. Energy intensity performance has been internally verified.
AAA	Facility has met the energy intensity rate of improvement target for 3 of the past 4 years. Energy intensity performance has been externally verified.

Energy Intensity Performance Targets

FREQUENTLY ASKED QUESTIONS

#	FAQ	PAGE #
6	What is energy intensity?	See page 18
8	What is the difference between an “intensity performance target” and an “intensity rate of improvement target”?	See page 18
9	Can a facility with distinctly different production processes have separate Energy/GHG Emissions Intensity Performance targets i.e. one for each production process?	See page 18
10	If a facility uses multiple energy and GHG emissions intensities, does the site have to meet all targets before it achieves a Level A rating?	See page 19
11	In some instances, underground mines are developing new production zones at much greater depth and the energy intensity becomes greater because of the extra energy required for ventilation, pumping, cooling, hoisting and sustaining the infrastructure at depth. What methodology can be used to create a practical intensity target in these cases?	See page 19
12	What is verification?	See page 19
13	Is a company eligible for a Level AAA rating if it has met all other criteria for Levels C-AAA with the exception of the internal verification required at Level AA in all indicators?	See page 19

Energy Intensity Performance Targets

SUPPORTING GUIDELINES

Through interview and review of documentation, determine:

- The processes in place for establishing, working towards, and achieving energy intensity improvement targets.
- That the facility has set an energy intensity performance target and whether it is meeting its target.
- That the facility has met the energy intensity performance target for three of the past four years.
- That the facility has systems in place for internal/external verification of energy intensity performance.
- That the facility has set and met an energy intensity rate of improvement target for 3 of the past 4 years.

4. GHG EMISSIONS MANAGEMENT SYSTEMS

Purpose:

To confirm that systems are in place to manage greenhouse gas emissions.

GHG Emissions Management Systems <u>ASSESSMENT CRITERIA</u>	
Level	Criteria
C	No formal GHG emissions management system in place.
B	Basic GHG emissions management system established that includes <ul style="list-style-type: none"> ■ written senior management commitment at the facility level ■ facility-level responsibility for GHG reduction assigned to department or individual ■ facility-level monitoring infrastructure that measures fossil fuel use with a level of disaggregation by major process activity (e.g., mill, smelter, refinery, etc.) ■ aggregation of facility-level measured data into a facility-level database
A	Comprehensive GHG emissions management system established that includes these additional elements: <ul style="list-style-type: none"> ■ standard quantification and estimation methodologies used to convert fossil fuel use and process emissions data to comparable GHG emission information ■ clear accountability for GHG reduction assigned to operational managers ■ plant control systems include GHG emissions as an operating variable ■ company-level GHG Leader ■ GHG emissions management system integrated with an operational management system ■ company-level GHG emissions database ■ GHG emissions awareness included within facility training programs
AA	Integration into decision making: meets Level A criteria and has integrated the following elements into the process: <ul style="list-style-type: none"> ■ the facility can demonstrate that GHG emissions management is integrated into business planning ■ GHG emissions management system has been internally verified

GHG Emissions Management Systems

ASSESSMENT CRITERIA continued

AAA	Excellence and leadership: GHG emissions management system is integrated into a broader sustainable business strategy that includes: <ul style="list-style-type: none">■ procurement and supply chain management policies that incorporate GHG emissions criteria■ investments in research and development and demonstration of technologies and processes that optimize GHG emissions■ engagement with communities of interest to improve energy efficiency (e.g., community events, environmental non-government organizations, government energy efficiency programs, industry associations initiatives)
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GHG Emissions Management Systems

FREQUENTLY ASKED QUESTIONS

#	FAQ	PAGE #
2	Can corporate documentation be used to demonstrate facility-level commitment?	<i>See page 17</i>
3	What are standard quantification and estimation methodologies?	<i>See page 17</i>
4	What is a major process activity?	<i>See page 17</i>
5	How do facilities include energy use and GHG emissions as an operating variable in plant control systems?	<i>See page 17</i>
14	What does “formal” mean?	<i>See page 20</i>
15	What is a “system”?	<i>See page 20</i>

GHG Emissions Management Systems

SUPPORTING GUIDELINES

Through interview and review of documentation, determine:

- If formal systems are in place for GHG emissions management that meet all the requirements of level B.
- The level of accountability for GHG emissions management.
- The level of sophistication of GHG emissions measurement and analysis systems.
- The level of integration of GHG emissions management into the business planning of the facility/company.
- If operators have the procedures, instructions and systems to manage GHG emissions.
- The level of training in GHG emissions management provided.
- If internal/external verification of the GHG emissions management system is conducted and the results reported to senior management.
- If the results of verification are acted upon through formal action plans containing, as a minimum, actions, assigned responsibilities and timelines for completion.
- The extent to which the company/facility is leader in GHG emissions management.

5. GHG EMISSIONS REPORTING SYSTEMS

Purpose:

To confirm that greenhouse gas emissions tracking and reporting systems are in place for internal use and for public reporting.

GHG Emissions Reporting Systems <u>ASSESSMENT CRITERIA</u>	
Level	Criteria
C	No GHG emissions reporting system in place.
B	Basic GHG emissions reporting system established that includes: <ul style="list-style-type: none"> ■ a facility-level reporting system for GHG emissions ■ GHG emissions database used to report annual facility level emissions internally
A	Comprehensive GHG emissions reporting system established that includes: <ul style="list-style-type: none"> ■ facility-based GHG performance results reported to management ■ management decision-making processes are supported by regular internal reporting of the estimated current year's GHG emissions ■ annual public reporting of GHG emissions²
AA	Integration into decision-making: <ul style="list-style-type: none"> ■ GHG emissions reporting system is internally verified ■ annual public reporting of performance² (GHG emissions against target)
AAA	Excellence and Leadership: GHG emissions reporting system is externally verified.

² The combination of energy consumption and mineral production data can significantly compromise a company's position vis-à-vis its competition, particularly in instances where there are relatively few global competitors (e.g. iron ore). This may affect a company's ability to disclose certain types of information on energy use and GHG emissions. Necessary limits on public reporting for competitive reasons should not prevent a facility from satisfying level A criteria.

GHG Emissions Reporting Systems

FREQUENTLY ASKED QUESTIONS

#	FAQ	PAGE #
12	What is verification?	<i>See page 19</i>
13	Is a company eligible for a Level AAA rating if it has met all other criteria for Levels C-AAA with the exception of the internal verification required at Level AA in all indicators?	<i>See page 19</i>
15	What is a “system”?	<i>See page 20</i>

GHG Emissions Reporting Systems

SUPPORTING GUIDELINES

Through interview and review of documentation, determine:

- Processes the facility has in place for tracking greenhouse gas emissions and reporting on greenhouse gas emissions (e.g. procedures etc.).
- That consistent approaches to greenhouse gas emissions reporting are used (i.e. energy types, energy units)
- Who is responsible for greenhouse gas emissions tracking and reporting?
- That energy use data collectors have received appropriate training in greenhouse gas emissions tracking and reporting.
- How often greenhouse gas emissions are reported and what use is made of the information.
- That systems are in place for internal/external verification of the greenhouse gas emissions reporting system.

6. GHG EMISSIONS INTENSITY PERFORMANCE TARGETS

Purpose:

To confirm that greenhouse gas emissions intensity performance targets have been established at each facility.

GHG Emissions Intensity Performance Targets <u>ASSESSMENT CRITERIA</u>	
Level	Criteria
C	No GHG emissions intensity performance targets have been set for the facility.
B	GHG emissions intensity performance targets have been set for the facility, but current facility performance falls short of the target.
A	GHG emissions intensity performance targets for the facility are met or exceeded.
AA	Facility has met its GHG emissions intensity performance target for 3 of the past 4 years. Facility has established a GHG emissions intensity rate of improvement target. GHG emissions intensity performance has been internally verified.
AAA	Facility has met the GHG emissions intensity rate of improvement target for 3 of the past 4 years. GHG emissions intensity performance has been externally verified.

GHG Emissions Intensity Performance Targets

FREQUENTLY ASKED QUESTIONS

#	FAQ	PAGE #
7	What is GHG Intensity?	<i>See page 18</i>
8	What is the difference between an “intensity performance target” and an “intensity rate of improvement target”?	<i>See page 18</i>
9	Can a facility with distinctly different production processes have separate Energy/GHG Emissions Intensity Performance targets i.e. one for each production process?	<i>See page 18</i>
10	If a facility uses multiple energy and GHG emissions intensities, does the site have to meet all targets before it achieves a Level A rating?	<i>See page 19</i>
11	In some instances, underground mines are developing new production zones at much greater depth and the energy intensity becomes greater because of the extra energy required for ventilation, pumping, cooling, hoisting and sustaining the infrastructure a	<i>See page 19</i>
12	What is verification?	<i>See page 19</i>
13	Is a company eligible for a Level AAA rating if it has met all other criteria for Levels C-AAA with the exception of the internal verification required at Level AA in all indicators?	<i>See page 19</i>

GHG Emissions Intensity Performance Targets

SUPPORTING GUIDELINES

Through interview and review of documentation, determine:

- The processes in place for establishing, working towards, and achieving GHG emissions intensity performance targets.
- That the facility has set a GHG emissions intensity performance target and whether it is meeting its target.
- That the facility has met its GHG emissions intensity performance target for three of the past four years.
- That the achievement of the company’s GHG emissions intensity performance target has been verified internally or by an external party.
- That the facility has set and met GHG emissions intensity rate of improvement target for 3 of the past 4 years.

APPENDIX 1: FREQUENTLY ASKED QUESTIONS

PROTOCOL-SPECIFIC GUIDANCE

1. What is an “Energy Leader”?

An energy leader is an employee whose job responsibilities include energy management.

2. Can corporate documentation be used to demonstrate facility-level commitment?

Written senior management commitment at the corporate level (e.g. a corporate policy) can be accepted as evidence during a facility-level self-assessment or TSM verification if it is accompanied by evidence that the corporate commitment is being applied and adhered to at the facility level. There must be evidence of a link between the corporate documentation and facility-level practices. If this linkage is established, then the corporate documentation can be accepted as evidence of facility-level commitment.

3. What are standard quantification and estimation methodologies?

Standard quantification and estimation methodologies are conversion factors, process equations or process simulations that have been accepted by the federal/provincial/territorial harmonized reporting process for energy use and GHG emissions.

4. What is a major process activity?

This can be defined as a significant component of the production process that can be easily bounded and whose consumption of energy and GHG emissions can be accurately measured.

5. How do facilities include energy use and GHG emissions as an operating variable in plant control systems?

The key energy management principle applied in this indicator is that energy use must be treated as a controlled consumable or input to the production process in question and that the GHG emissions associated with the production process must be treated as a controlled by-product. This means that, when energy use and GHG emissions are material production process variables, both must be metered with approved quantification protocols and then controlled by the technologies and operators that operate the production process, as is the case with any key production process variable. Therefore, information about energy use/GHG emissions must be present on the operator’s control interface (computerized or analogue) so that the operator can control to engineered performance levels.

However, where GHG emissions are a direct result of energy use (e.g. GHG emissions from the consumption of natural gas in a direct fired boiler or emissions from the consumption of diesel by a fleet of mobile mining equipment), then the control of energy use can be used as a proxy for the control of GHG emissions. With the application of the appropriate conversion factors or quantification protocols, controlled energy performance can be expressed as GHG emission performance. In these instances, information on GHG emissions does not need to be present on the operator’s control interface, but can be inferred from the energy use information.

Operator actions related to energy use and GHG emissions must be included in the operator’s job procedures. In the situation where the GHG emissions are directly related to energy use, then energy related job procedures act as a proxy for GHG control procedures.

6. What is energy intensity?

Energy intensity is defined as *energy consumption per unit of production*, where production for a mine/mill is “head tonnes” and for smelters/refineries is “refined metal or metal in matte”. “Head tonnes” is the term used for tonnes of ore delivered to a concentrator. It is the denominator that is commonly used to determine intensity. Head tonne volume is the most appropriate driver of energy consumption in production processes and is independent of changing ore grades.

7. What is GHG Intensity?

Greenhouse gas intensity is defined as GHG emissions per unit of production, where production for a mine/mill is “head tonnes” and for smelters and refineries is “refined metal or metal in matte”.

8. What is the difference between an “intensity performance target” and an “intensity rate of improvement target”?

An intensity performance target is a **fixed** target for the performance of a facility or company that relates energy/emissions to units of production, e.g. *20 gigajoules or 20 tonnes of CO₂ equivalent / tonne of copper cathode production*. The objective or target is to sustain this intensity annually.

An intensity rate of improvement target is one that dictates that the emissions intensity will improve by some percentage on an annual basis, e.g. the longstanding CIPEC target of a 1% energy intensity improvement per year. The improvement rate is determined by a linear trend line taken over a series of years.

9. Can a facility with distinctly different production processes have separate Energy/GHG Emissions Intensity Performance targets i.e. one for each production process?

Yes. Typically, intensity (energy use per tonne of production) is used as the performance indicator for overall facility energy performance as well as production process energy performance. However, it has been pointed out that a single indicator may not be sufficient in the case of an open pit facility that is comprised of the pit and a concentrator, or where smelters are processing an increasing amount of recycled material. It may be necessary to have multiple intensities representing a single facility where the dynamics of the production processes are so different that one common production unit is not a representative consumption driver for each production process.

The intent of this performance indicator is to accurately represent energy performance, facilitate the development of improvement targets, and stimulate management action to improve energy performance and reduce GHG emissions. In the case of the open pit/concentrator facility, head tonnes can be used as the production driver (denominator) for milling/crushing consumption and emissions intensities, while pit material hauled can be used as the driver for diesel consumption and emissions intensities.

Typically, the processing of recycled feedstock consumes more energy per unit of output metal than normal concentrates. Therefore, in the case of a production process where the feedstock is predominantly recycled material, use the input tonnage as the consumption driver (denominator) when determining the intensity for that specific production process. Maintain separate intensities and targets for concentrate and recycle production processes.

10. If a facility uses multiple energy and GHG emissions intensities, does the site have to meet all targets before it achieves a Level A rating?

Yes. The intent of the TSM Indicators is that they reflect the performance of the total facility. Therefore, all targets must be met in order to achieve a Level A rating.

11. In some instances, underground mines are developing new production zones at much greater depth and the energy intensity becomes greater because of the extra energy required for ventilation, pumping, cooling, hoisting and sustaining the infrastructure at depth. What methodology can be used to create a practical intensity target in these cases?

A zero based energy budget can be used to determine the new intensity level as well as the performance indicator and target. The zero based energy budget is established by estimating baseline consumptions for each mining activity (e.g. ventilation, pumping, lighting, hoisting) at depth for a convenient period of time, and then determining the expected total monthly and annual consumptions relative to forecasted production levels. Typically, operations monitor total monthly consumption versus the estimated consumption budget. However, the total estimated monthly consumption can be divided by the forecasted production to determine monthly intensity targets. Actual performance can then be tracked throughout the year versus these target intensities.

VERIFICATION

12. What is verification?

Verification is the systematic, independent and documented process for the evaluation of an energy or GHG assertion (for example, related to management systems, reporting systems, or performance) against agreed verification criteria. (Adapted from ISO 14064: 2006.)

13. Is a company eligible for a Level AAA rating if it has met all other criteria for Levels C-AAA with the exception of the internal verification required at Level AA in all indicators?

No. The intent of Level AA is to ensure that energy use and GHG emissions are included in internal business processes and operational management systems. For example, many organizations use risk-based internal review processes as part of an operational management system like ISO 14001. The requirement of Level AA is that energy and GHG emissions be integrated into these review processes. Internal verification can be completed by company personnel or can be outsourced to a third party in cases where internal resources are limited. The third party would follow normal internal practices.

External verification is completed by a third party, and the verification is conducted using the third party's policies and procedures. Therefore, external verification alone does not meet the requirements of Level AA and cannot be considered as satisfying both Level AA and Level AAA criteria.

DEFINITION OF KEY TERMS

14. What does “formal” mean?

The term “formal” is used frequently in the assessment, and usually in conjunction with “system” or “process”. Formalized processes or activities are usually given status through clear and precise requirements, usually documented as a written procedure. This means that the business can clearly and easily demonstrate that the process or system is in place. It would also typically require documented processes or an ‘audit trail’.

15. What is a “system”?

A system, or “management system” represents processes that collectively provide a systematic framework for ensuring that tasks are performed correctly, consistently and effectively to achieve a specified outcome and to drive continual improvement in performance. A systems approach to management requires an assessment of what needs to be done, planning to achieve the objective, implementation of the plan and review of performance in meeting the set objective. A management system also considers necessary personnel, resources and documentation requirements. Other definitions associated with systems are:

- **Policy:** The formal expression of management’s commitment to a particular issue area that presents the stance of the company to interested external parties.
- **Practice:** Informal, undocumented approaches to carrying out a task.
- **Procedure:** A formalized, documented description of how a task is to be carried out.
- What does “accountability” mean?

16. What does “accountability” mean?

Accountability: The energy use and GHG emissions management system must identify the party who is ultimately answerable for energy use and GHG emissions management performance and the development and implementation of the energy use and GHG emissions management system at the facility. This accountability cannot be delegated. Resources are available to the accountable party to ensure proper systems (training, equipment, communications, etc) are in place to effectively meet their energy use and GHG emissions management goals.

17. What does “responsibility” mean?

Responsibility: Within the energy use and GHG emissions management system, specific energy use and GHG emissions management related requirements and tasks are identified and assigned to specific positions within the facility. It is important that responsibilities are clearly communicated so that each position understands what is expected of them.

APPENDIX 2: SELF-ASSESSMENT CHECKLIST
Energy Use and GHG Emissions Management

Facility name:		Company name:	
Assessed by:		Date submitted:	

SUPPORTING DOCUMENTATION / EVIDENCE:	
NAME OF DOCUMENT	LOCATION

Interviewees:			
NAME	POSITION	NAME	POSITION

	Question	Y	N	NA	Description & Evidence
INDICATOR 1: ENERGY USE MANAGEMENT SYSTEMS					
Indicator 1 Level B	Has a basic energy use management system been established that includes:				
	■ written senior management commitment at the facility level?				
	■ facility-level Energy Leaders?				
	■ facility-level monitoring infrastructure that measures consumption of energy with a level of disaggregation by major process activity (e.g., mill, smelter, refinery, etc.)?				
	■ aggregation of facility-level measured data into a facility-level database?				
<i>If you have answered "Yes" to all of the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all of the Level B questions, assess the facility as a Level C.</i>					
Indicator 1 Level A	Has a comprehensive energy use management system established that includes these additional elements:				
	■ standard quantification and estimation methodologies used to convert energy data to comparable energy information?				
	■ clear accountability for energy use assigned to operational managers?				
	■ plant control systems that include energy as an operating variable?				
	■ company-level Energy Leader?				
	■ energy system integrated with an operational management system?				
	■ company-level energy database?				
■ energy awareness included within facility training programs for key personnel?					
<i>If you have answered "Yes" to all of the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all of the Level A questions, assess the facility as a Level B.</i>					
Indicator 1 Level AA	Can the facility demonstrate that energy management is integrated into business planning?				
	Has the energy use management system been internally verified?				
	<i>If you have answered "Yes" to all of the Level AA questions, continue to the Level AAA questions. If you have not answered "Yes" to all of the Level AA questions, assess the facility as a Level A.</i>				
Indicator 1 Level AAA	Is the energy use management system integrated into a broader sustainable business strategy that includes:				
	■ procurement and supply chain management policies that incorporate energy efficiency criteria?				
	■ investments in research and development and demonstration of technologies and processes that optimize energy consumption?				

	Question	Y	N	NA	Description & Evidence
	<ul style="list-style-type: none"> participation with communities of interest to improve energy efficiency (e.g., community events, environmental non-government organizations, government energy efficiency programs, industry association initiatives)? 				
<p><i>If you have answered "Yes" to all of the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all of the Level AAA questions, assess the facility as a Level AA.</i></p>					
ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 1					Level: _____

	Question	Y	N	NA	Description & Evidence
INDICATOR 2: ENERGY USE REPORTING SYSTEMS					
Indicator 2 Level B	Has a basic energy use reporting system been established that includes:				
	<ul style="list-style-type: none"> a facility-level reporting system for energy use? energy database to report annual facility level energy use internally? 				
	<p><i>If you have answered "Yes" to all of the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all of the Level B questions, assess the facility as a Level C.</i></p>				
Indicator 2 Level A	Has a comprehensive energy use reporting system been established that includes:				
	<ul style="list-style-type: none"> facility-based energy performance results reported to management? management decision-making processes supported by regular internal reporting of the current year's energy consumption? annual public reporting of energy use? 				
	<p><i>If you have answered "Yes" to all of the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all of the Level A questions, assess the facility as a Level B.</i></p>				
Indicator 2 Level AA	annual public reporting of performance (energy use against target)?				
	Is the energy use reporting system <u>internally</u> verified?				
	<p><i>If you have answered "Yes" to this Level AA question, continue to the Level AAA question. If you have not answered "Yes" to this Level AA question, assess the facility as a Level A.</i></p>				
Indicator 2 Level AAA	Is the energy use reporting system <u>externally</u> verified?				
	<p><i>If you have answered "Yes" to this Level AAA question, assess the facility as a Level AAA. If you have not answered "Yes" to this Level AAA question, assess the facility as a Level AA.</i></p>				
ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 2					Level: _____

	Question	Y	N	NA	Description & Evidence
INDICATOR 3: ENERGY INTENSITY PERFORMANCE TARGETS					
Indicator 3 Level B	Has an energy intensity performance target been set for the facility, but current performance falls short of the target?				
	<i>If you have answered "Yes" to this Level B question, continue to the Level A question. If you have not answered "Yes" to this Level B question, assess the facility as a Level C.</i>				
Indicator 3 Level A	Has the energy intensity performance target for the facility been met or exceeded?				
	<i>If you have answered "Yes" to this Level A question, continue to the Level AA questions. If you have not answered "Yes" to this Level A question, assess the facility as a Level B.</i>				
Indicator 3 Level AA	Has the energy intensity performance target been met for 3 of the past 4 years?				
	Has an energy intensity rate of improvement target been set?				
	Has energy intensity performance been <u>internally</u> verified?				
	<i>If you have answered "Yes" to all of the Level AA questions, continue to the Level AAA questions. If you have not answered "Yes" to all of the Level AA questions, assess the facility as a Level A.</i>				
Indicator 3 Level AAA	Has the energy intensity rate of improvement target been met for 3 of the past 4 years?				
	Has energy intensity performance been <u>externally</u> verified?				
	<i>If you have answered "Yes" to all of the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all of the Level AAA questions, assess the facility as a Level AA.</i>				
	ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 3	Level: _____			

	Question	Y	N	NA	Description & Evidence
INDICATOR 4: GHG EMISSIONS MANAGEMENT SYSTEMS					
Indicator 4 Level B	Has a basic GHG emissions management system been established that includes:				
	<ul style="list-style-type: none"> written senior management commitment at the facility level? 				
	<ul style="list-style-type: none"> facility-level responsibility for GHG reduction assigned to department or individual? 				
	<ul style="list-style-type: none"> facility-level monitoring infrastructure that measures fossil fuel use with a level of disaggregation by major process activity (e.g., mill, smelter, refinery, etc.)? 				
	<ul style="list-style-type: none"> aggregation of facility-level measured data into a facility-level database? 				
<i>If you have answered "Yes" to all of the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all of the Level B questions, assess the facility as a Level C.</i>					
Indicator 4 Level A	Has a comprehensive GHG emissions management system established that includes these additional elements:				
	<ul style="list-style-type: none"> standard quantification and estimation methodologies used to convert fossil fuel use and process emissions data to comparable GHG emission information? 				
	<ul style="list-style-type: none"> clear accountability for GHG reduction assigned to operational managers? 				
	<ul style="list-style-type: none"> plant control systems that include GHG emissions as an operating variable? 				
	<ul style="list-style-type: none"> company-level GHG Leader? 				
	<ul style="list-style-type: none"> GHG emissions management system integrated with an operational management system? 				
	<ul style="list-style-type: none"> company-level GHG emissions database? 				
	<ul style="list-style-type: none"> GHG emissions awareness included within facility training programs? 				
<i>If you have answered "Yes" to all of the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all of the Level A questions, assess the facility as a Level B.</i>					
Indicator 4 Level AA	Can the facility demonstrate that GHG emissions management is integrated into business planning?				
	Has the GHG emissions management system been internally verified?				
	<i>If you have answered "Yes" to all of the Level AA questions, continue to the Level AAA questions. If you have not answered "Yes" to all of the Level AA questions, assess the facility as a Level A.</i>				
Indicator 4 Level AAA	Is the GHG emissions management system integrated into a broader sustainable business strategy that includes:				
	<ul style="list-style-type: none"> procurement and supply chain management policies that incorporate GHG emissions criteria? investments in research and development and demonstration of technologies and processes that optimize GHG emissions? 				

	Question	Y	N	NA	Description & Evidence
	<ul style="list-style-type: none"> engagement with communities of interest to improve energy efficiency (e.g., community events, environmental non-government organizations, government energy efficiency programs, industry association initiatives)? 				
<p><i>If you have answered "Yes" to all of the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all of the Level AAA questions, assess the facility as a Level AA.</i></p>					
ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 4					Level: _____

	Question	Y	N	NA	Description & Evidence
INDICATOR 5: GHG EMISSIONS REPORTING SYSTEMS					
Indicator 5 Level B	Has a basic GHG emissions reporting system been established that includes:				
	<ul style="list-style-type: none"> a facility-level reporting system for GHG emissions? GHG emissions database to report annual facility level emissions internally? 				
	<p><i>If you have answered "Yes" to all of the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all of the Level B questions, assess the facility as a Level C.</i></p>				
Indicator 5 Level A	Has a comprehensive GHG emissions reporting system been established that includes:				
	<ul style="list-style-type: none"> facility-based GHG performance results reported to management? management decision-making processes supported by regular internal reporting of the estimated current year's GHG emissions? annual public reporting of GHG emissions? 				
	<p><i>If you have answered "Yes" to all of the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all of the Level A questions, assess the facility as a Level B.</i></p>				
Indicator 5 Level AA	annual public reporting of performance (GHG emissions against target)?				
	Is the GHG emissions reporting system <u>internally</u> verified?				
<p><i>If you have answered "Yes" to this Level AA question, continue to the Level AAA question. If you have not answered "Yes" to this Level AA question, assess the facility as a Level A.</i></p>					
Indicator 5 Level AAA	Is the GHG emissions reporting system <u>externally</u> verified?				
	<p><i>If you have answered "Yes" to this Level AAA question, assess the facility as a Level AAA. If you have not answered "Yes" to this Level AAA question, assess the facility as a Level AA.</i></p>				
ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 5					Level: _____

	Question	Y	N	NA	Description & Evidence
INDICATOR 6: GHG EMISSIONS INTENSITY PERFORMANCE TARGETS					
Indicator 6 Level B	Has a GHG emissions intensity performance target been set for the facility, but current performance falls short of the target?				
	<i>If you have answered "Yes" to this Level B question, continue to the Level A question. If you have not answered "Yes" to this Level B question, assess the facility as a Level C.</i>				
Indicator 6 Level A	Has the GHG emissions intensity performance target for the facility been met or exceeded?				
	<i>If you have answered "Yes" to this Level A question, continue to the Level AA questions. If you have not answered "Yes" to this Level A question, assess the facility as a Level B.</i>				
Indicator 6 Level AA	Has the GHG emissions intensity performance target been met for 3 of the past 4 years?				
	Has a GHG emissions intensity rate of improvement target been set?				
	Has GHG emissions intensity performance been <u>internally</u> verified?				
	<i>If you have answered "Yes" to all of the Level AA questions, continue to the Level AAA questions. If you have not answered "Yes" to all of the Level AA questions, assess the facility as a Level A.</i>				
Indicator 6 Level AAA	Has the GHG emissions intensity rate of improvement target been met for 3 of the past 4 years?				
	Has GHG emissions intensity performance been <u>externally</u> verified?				
	<i>If you have answered "Yes" to all of the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all of the Level AAA questions, assess the facility as a Level AA.</i>				
ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 6					Level: _____