



# GUIDELINES ON ENERGY MANAGEMENT SYSTEM

[GP/ST/No.46/2024]





**ENERGY EFFICIENCY AND CONSERVATION ACT 2024**  
**[Act 861]**

**GUIDELINES ON ENERGY MANAGEMENT SYSTEM**

**GP/ST/No.46/2024**

IN exercise of the powers conferred by subsection 6(2) and section 67 of the Energy Efficiency and Conservation Act 2024 [Act 861], the Commission issues the following guidelines:

**Citation and commencement**

1. These guidelines may be cited as the Guidelines on Energy Management System.
2. These Guidelines shall come into operation on 1 January 2025.

**Purpose**

3. The purposes of these Guidelines are to—
  - (a) to specify the requirements on energy management system for the energy consumer to comply with; and
  - (b) to ensure energy management system is developed and implemented effectively by the energy consumer.

Dated: 30 December 2024

**DATO' IR. TS. ABDUL RAZIB BIN DAWOOD**

Chief Executive Officer  
Energy Commission

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**1. SCOPE**

These Guidelines shall apply to—

- (a) any energy consumer who are subjected under subsection 3(3) of the Energy Efficiency and Conservation Act 2024 [Act 861]; and
- (b) a registered energy manager under paragraph 27(3)(a) of the Energy Efficiency and Conservation Act 2024 [Act 861].

**2. INTERPRETATION**

In these Guidelines, the following terms shall bear the following meanings:

- “Act”** means the Energy Efficiency and Conservation Act 2024 [Act 861];
- “Commission”** has the meaning assigned to it under the Energy Efficiency and Conservation Act 2024 [Act 861];
- “Committee”** means the Energy Management Committee;
- “EEI”** means an Energy Efficiency Indicator which refers to a measurement that shows the efficiency of the energy used in a system, process or organization;
- “EnMS”** means an energy management system, which is a set of interrelated or interacting elements to establish an energy policy and energy objectives, and the processes and procedures to achieve the energy objectives;
- “ESM”** means an Energy Saving Measures, which refers to range of actions, strategies, and practices implemented to reduce energy consumption and improve energy

efficiency in various systems, processes, and operations;

**“M&V”**

means Measurement and Verification which refers to the process of quantifying the energy savings resulting from energy efficiency projects. This involves the use of data collection, monitoring, and analysis to determine the actual energy savings achieved by a project, compared to a baseline or pre-project scenario;

**regression analysis**

means a statistical technique that estimates the dependence of a variable of interest (in this case will be energy consumption) on one or more independent variables (in this case, variables that need to be reported). Thus, it can be used to estimate the effects on the dependent variable of a given independent variable while controlling for the influence of other variables at the same time;

**“SEU”**

means the Significant Energy Use which refers to any system, proses, or equipment within an organization that consumes a substantial amount of energy.

### 3. INTRODUCTION

- 3.1 These Guidelines are issued in compliance with the Act which requires every energy consumer to whom the Act applies to develop, implement and maintain an effective EnMS.
- 3.2 These Guidelines has taken into consideration the industry standard practice where the relevant stakeholders, building owners and energy management experts has been engaged and consulted accordingly to obtain the consolidated viewpoints and consensus. Several energy management guidelines, including the energy management references were reviewed to set minimum practices for the EnMS implementation under the Act as follows:
- (a) ISO 50001:2018 Energy Management Systems;
  - (b) United Nations Industrial Development Organization (UNIDO) Practical Guide for Implementing an Energy Management System;
  - (c) ENERGY STAR Guidelines for Energy Management; and
  - (d) ASEAN Energy Management Accreditation Scheme (AEMAS) Sustainable Energy Management System.
- 3.3 The EnMS is a set of policies and procedures integrated and put into practice to track, analyse, and plan for energy usage in a facility. These Guidelines comprises of five main components, which are outlined in Figure 1 and illustrated in a flowchart. These components include—
- (a) Establish Commitment;
  - (b) EnMS Planning: Assess Performance and Develop Targets;
  - (c) Develop Action Plan;
  - (d) Implement Action Plan; and
  - (e) Measure Progress and Management Review.

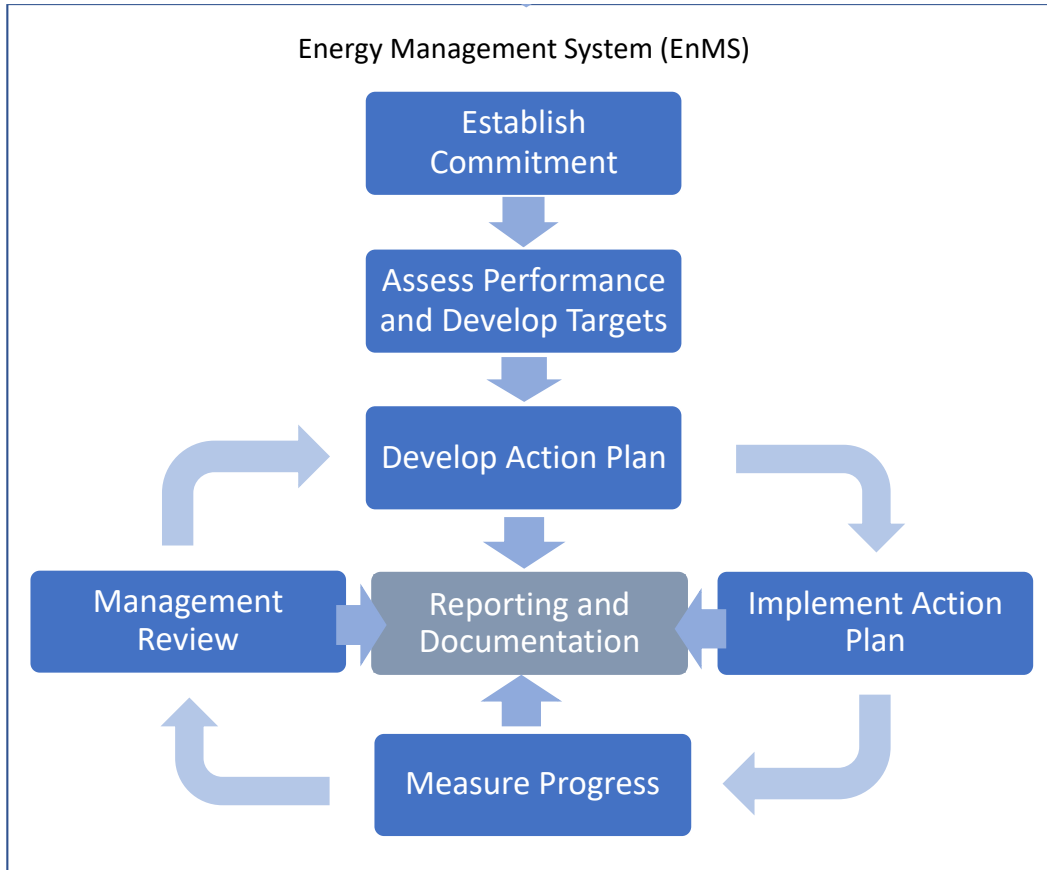


Figure 1: Flowchart of Energy Management System (EnMS)

3.4 Reporting and documentation are an ongoing activity in the EnMs for continual process improvement.

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## COMPONENT OF ENERGY MANAGEMENT SYSTEM

### 4.0 ESTABLISH COMMITMENT

4.1 In the EnMS, commitment from different levels of personnel in an organization are imperative for a successful implementation. An effective communication of energy management objectives from the top management to the staff and employees must be clearly defined and deployed, so that everyone has a clear understanding of their role and responsibilities in achieving energy targets. In this regard, the energy consumer shall establish a commitment in their energy management policy that will govern the energy management plan and its implementation.

#### 4.2 Secure Top Management Commitment

The most critical key to the success of the EnMS is to get the continuous involvement and support from the top management. The primary elements of management's role include setting the strategic direction for the energy management implementation and ensuring results are measured and reviewed. Based on the results attained, the management shall take the appropriate actions to ensure effectiveness of the EnMS and continual improvement of energy performances.

##### (a) Management Responsibility

The top management's responsibilities shall include but not limited to—

- (i) review and endorse boundary of the EnMS;
- (ii) review and endorse energy policy;
- (iii) allocate human and financial resources;
- (iv) approve and appoint a management representative in the Committee;
- (v) review and endorse objectives, targets, and appropriate Energy Efficiency Indicator (EEI);
- (vi) communicate importance of energy management to the whole organization;

- (vii) consider energy performance in long-term planning;
- (viii) endorse implementation of measurement and verification for quantifying energy performance; and
- (ix) conduct management review.

(b) Management Representatives

To secure top management's commitment, the management representative shall be appointed among the top management or chief executive officer to oversee the EnMS implementation and to make any decision regarding the energy management.

The management representative is responsible to establish a Committee, lead the Committee and jointly planning, implementing and continually improve the EnMS.

For the purpose of an effective implementation by the Committee, the management representative shall report the progress and results to the top management regularly.

### 4.3 Establish the Committee

(a) Committee representatives

The Committee shall consist of the representatives from the departments with the subject matter as follows but not limited to:

- (i) environmental health and safety;
- (ii) utility, facility management, engineering operations and maintenance;
- (iii) production for industry sector;
- (iv) procurement and finance;
- (v) human resource; and
- (vi) administration.

(b) Duties and responsibilities of the Committee

The Committee is generally a multi-disciplinary working team to develop energy planning and implementing the energy management action plan as agreed by the top management and shall meet not less than 4 times a year. Specific duties of the Committee shall include but not limited to:

- (i) preparing and developing an energy management policy for the energy consumer;
- (ii) conducting energy management self-evaluation;
- (iii) organizing EnMS internal performance review;
- (iv) preparing and implementing action plan;
- (v) conducting awareness, campaign and training;
- (vi) coordinating, checking and approving the working procedures, manuals and tools;
- (vii) monitor implementation and performance of the EnMS;
- (viii) ensuring the implementation of measurement and verification for reporting energy performance; and
- (ix) reviewing and revising energy target and action plan for continual improvement.

(c) Function of REM and members of the Committee

(i) The Committee and the management representative shall be assisted by REM for the purpose of energy management development and implementation as follows:

- (A) establishing comprehensive EnMS objectives and targets;
- (B) determining and providing the resources needed for continual improvement of energy management and performance;
- (C) determining appropriate EEI for measuring and monitoring energy performance;
- (D) managing EnMS internal performance review;
- (E) defining and implementing energy data collection plan;
- (F) developing and executing action plan to achieve the EnMS objectives and energy targets;

- (G) identifying opportunities to improve energy performance;  
and
  - (H) implementing measurement and verification for reporting savings.
- (ii) Specific roles of other members in accordance with the subject matter of the departments shall include but not limited to:
- (A) environmental health and safety officer (being responsible for requirements of safety and health in the EnMS implementation and addressing environmental issues);
  - (B) accountant (being responsible for financial related to the EnMS implementation);
  - (C) human resource officer (being responsible for human resource management and capacity development related to the EnMS implementation);
  - (D) utility, facility management, engineering operations and maintenance officer (being responsible for providing energy related data and control the daily operation and maintenance of the energy consumer);
  - (E) production manager/engineer/supervisor (being responsible for providing production data and communicate energy management activities to the production department in an industry); and
  - (F) administration officer (being responsible for providing any relevant data related to energy consumer's activities and facilities such as floor area, as built drawing).

Figures 2 and 3 show example of organization structure of the Committees in an industry sector and building sector, respectively as follows:

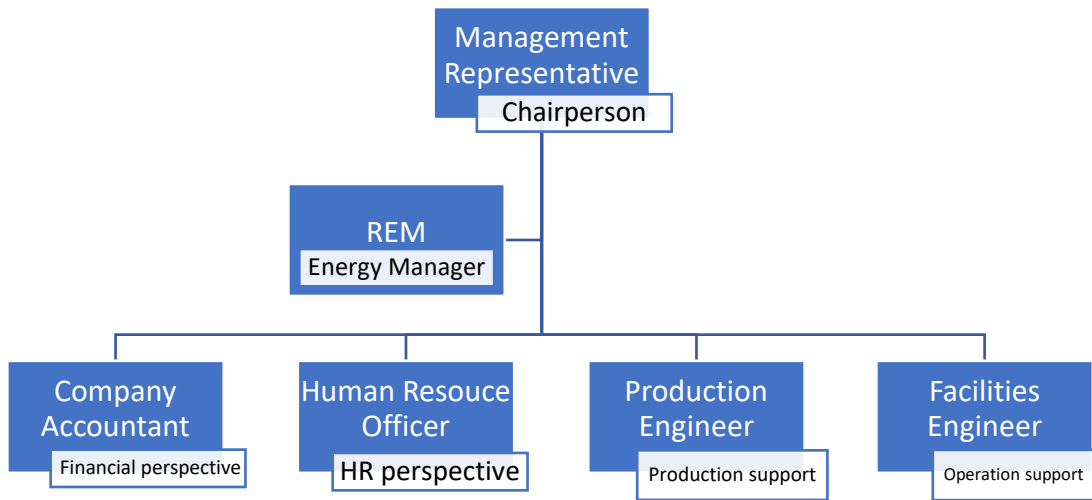


Figure 2: Example of the Committee in industry sector

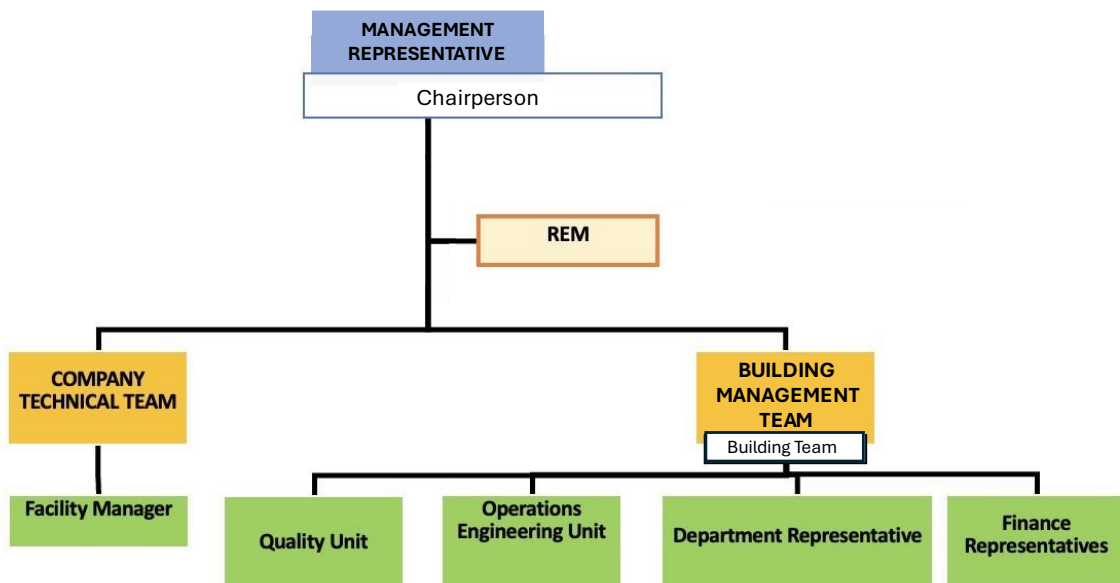


Figure 3: Example of the Committee in building sector

#### 4.4 Establish Energy Management Policy

4.4.1 The energy consumer shall develop an energy management policy which requires the following commitments:

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- (a) continual improvement of energy performance through development of action plan to achieve EnMS objectives and targets;
  - (b) providing the necessary information, data and resources for the implementation of the action plan;
  - (c) compliance with any other written law; and
  - (d) supporting the use, purchase and services of energy efficient products in new projects, retrofitted and renovated facilities where economically feasible for the energy consumer to pursue.
- 4.4.2 The developed energy policy shall be properly documented, implemented and promoted throughout the organization. It shall be regularly reviewed based on the energy management performance to ensure the continuing suitability and improvement.
- 4.4.3 The energy management policy shall be kept up-to-date and signed by the current top management.
- 4.4.4 It shall also be displayed in a conspicuous part of the premise that is visible to all staff and employees.
- 4.4.5 Samples of energy management policy are provided in Appendix A.

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**5.0 ENERGY MANAGEMENT SYSTEM PLANNING: ASSESS PERFORMANCE AND ESTABLISH ENERGY TARGET**

5.1 EnMS planning shall be developed after the energy consumer has set its commitment towards the energy management implementation. The key elements in the EnMS planning consist of EnMS and energy assessment, development of EEI, energy baseline, energy targets and action plan.

5.2 Assessment

5.2.1 Two assessments that shall be performed by the energy consumer are as follows:

- (a) EnMS assessments; and
- (b) Energy use performance through audits.

5.2.2 The findings from the assessments shall be used to define the energy targets.

5.2.3 Energy Management System (EnMS) Assessment

The EnMS assessment can be performed by two approaches:

- (a) EnMS self-evaluation using energy management matrix

The Committee shall conduct EnMS self-evaluation using energy management matrix to determine the performance level of EnMS. The energy management matrix provides a quick assessment of strengths and weaknesses across the components of energy management as below:

- (i) energy policy;
- (ii) energy management organization;
- (iii) communication and motivation mechanisms;
- (iv) performance monitoring and targeting mechanisms;
- (v) promotion, awareness and capacity building; and

- (vi) financial and budget management for energy efficiency programmes.

Appropriate actions shall be taken to mitigate weaknesses highlighted in the self-evaluation. The EnMS self-evaluation shall be conducted as early as during the formation of the Committee. It shall be reviewed and re-assessed periodically. The energy consumer shall report and document how the self-evaluation was performed.

Sample of an Energy Management Matrix is shown in Figure 4 and other samples of EnMS Evaluation Matrix are provided in Appendix B.

Level	Energy policy	Organisation	Motivation	Information system	Marketing	Investment
4	Energy policy, action plan and regular review, have commitment of top management as part of an environmental strategy	Energy management has been fully integrated into management structure. Clear delegation of responsibility for energy consumption	Formal and informal channels of communication regularly exploited by energy manager and energy staff at all levels	Comprehensive system sets targets, monitors consumption, identified faults, quantifies savings and provides budget tracking	Marketing the value of energy efficiency and the performance of energy management both within and outside the organization	Positive discrimination in favor of green schemes with detailed investment appraisal of all new build and refurbishment opportunities
3	Formal energy policy, but no active commitment from top management	Energy manager accountable to energy committee representing all users, chaired by a member of the managing board	Energy committee used as main channel together with direct contact with major users	M&T reports for individual premises based on sub-metering but savings not reported effectively to users	Program of staff awareness and regular publicity campaigns	Same payback criteria employed as for all other investment
2	Unadopted energy policy set by energy manager or senior department manager	Energy manager in post ,reporting to ad-hoc committee but line management and authority are unclear	Contact with major users through ad-hoc committee chaired by senior department manager	Monitoring and targeting report based on supply meter data. Energy unit has ad-hoc involvement in budget setting	Some ad-hoc staff awareness training	Investment using short term payback criteria only
1	An unwritten set of guidelines	Energy management is the part-time responsibility of someone with only limited authority or influence	Informal contacts between engineer and a few users	Cost reporting based on invoice data. Engineer compiles reports for internal use within technical department	Informal contacts used to promote energy efficiency	Only low measures taken
0	No explicit policy	No energy management or any formal delegation of responsibility for energy consumption	No contact with users	No information system. No accounting for energy consumption	No promotion of energy efficiency	No investment in increasing energy efficiency in premises

Figure 4: Sample of Energy Management Matrix for self-evaluation

(b) EnMS Performance Review

The energy consumer shall conduct an internal EnMS performance review as a basis for organization's self-declaration of conformity across the components of EnMS specified in Figure 1. The EnMS performance review provides a more



detailed appraisal of EnMS performance by evaluating the commitment, processes, procedures and implementation of the EnMS to generate specific opportunities for continual improvements, respond to non-conformity and work towards compliance of standards, procurement criteria for energy efficiency, work instructions and etc.

### 5.2.4 Energy Performance Analysis and Audits

Energy performance analysis and audits are a periodic process of evaluating energy use in the organization and shall be conducted in the following manner:

(a) Define Boundary

A clearly defined boundary allows the energy consumer to set a clear expectation and scope for EnMS implementation and data collection. The boundary of an EnMS shall cover the whole facilities of the energy consumer. The scope of identifying the SEU can be identified by quantifying the amount of energy consumed by the facility, process, or equipment.

(b) Data Collection

After defining the boundary and SEU, the data collection shall be carried out and such data which requires to be collected are as follows:

- (i) inventory of operation system, mechanical and electrical services, production process and equipment;
- (ii) energy consumption data which includes all data in relation to energy or energy resources purchased from supplier of energy. The method for energy consumption data collection can be either using utility bills for facility or submetering for individual SEU such as system, process or equipment. At minimum, the energy consumption use data shall be collected from the utility bills. For this measurement scope, it is necessary to

gather at least twelve months of the most recent energy consumption use data;

- (iii) energy generation data which includes all data in relation to energy types generated on-site. These include electricity (kWh), chilled water (RTh), steam (tonne) and all other forms of energy generated in the facility; and
- (iv) variable data such as operating hours, production volume, weather, occupancy, etc which affects the energy consumption of facility or SEU.

(c) Establishment of Energy Baseline

- (i) There are several ways to represent the baseline as follows:

- (A) Energy Efficiency Indicator (EEI)

- EEI can be represented by Specific Energy Consumption (SEC) for an industry that determines the energy consumed to produce one unit of output product. The Building Energy Intensity (BEI) is commonly used for building sector which is defined as the annual energy use per Gross Floor Area (GFA).

- (B) Regression analysis

- Regression analysis helps to establish a relationship between energy consumption with one or more variables to forecast energy consumption and track annual progress of energy savings.

- (ii) The energy baseline may be revised if—

- (A) the EEI is no longer reflect the energy consumer's energy performance; or

- (B) there have been changes to the static factors that affect the energy consumption such as changes to the energy consumer's size or operation system, equipment failure or natural events.

(d) Energy Benchmarking

Energy benchmarking is a systematic and continuous process of searching, learning, adapting, and implementing the best practices from within own organization or from other organizations towards attaining superior performance. Energy consumer may establish the energy benchmarking, depending on the suitability, in the following categories:

(i) External Benchmarking

The energy consumer shall perform external benchmarking by comparing its EEI with other facilities or services in the same or similar category or comparing its EEI with the established standard value; or

(ii) Internal Benchmarking

The energy consumer shall perform internal benchmarking by comparing the current EEI or regression analysis with its past performance or baseline within 12 months or by comparing with the efficiency and energy targets determined by the energy consumer;

5.3 Determine opportunities and establish targets

5.3.1 The energy consumer shall use the EnMS assessment and energy performance analysis to establish the performance targets.

5.3.2 The established performance targets may be achieved within three years from the date of the establishment.

## 6.0 DEVELOP ACTION PLAN

The action plan shall include the following components:

### (a) Establish strategies

In developing strategies for the action plan, the Committee shall—

- (i) Review EnMS self-evaluation and assessment findings, technical assessments and energy audit findings and identify gaps between current performance and targets;
- (ii) define technical strategies for improving the current performance to achieve the targets including implementing ESMs, developing energy management working procedures, operational guidelines, maintenance procedures, etc; and
- (iii) determine other capacity development programme such as training, awareness programmes and campaigns, sharing best practices, etc.

### (b) Setup Timelines

- (i) establish the timeframe for implementing the ESM in the action plan and specify the estimated savings of the initiatives; and
- (ii) in prioritizing the ESM for implementation, the energy consumer may perform financial analysis tools including Cost Benefit Analysis (CBA), Simple Payback Period (SPP), Net Present Value (NPV), Internal Rate of Return (IRR) or Return on Investment (ROI).

### (c) Determine roles and resources

The Committee shall determine the role and resources for each strategy in the action plan through initiatives such as the following:

- (i) identify the individuals involved in each ESM in the action plan and define their ownership and responsibilities. This may include internal

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roles within the organizations and external roles such as consultants, contractors, service providers, vendors, etc; and

- (ii) estimate the cost and human resources required for each ESM in the action plan.

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## 7.0 IMPLEMENT ACTION PLAN

7.1 The energy consumer shall implement an action plan which consist of creating communication plan, raising awareness and capacity building, developing motivation strategy, implementing control operation and develop measurement and verification (M&V).

7.2 The progress of action plan implementation shall be documented by the energy consumer.

7.3 Implementation of ESM

(a) Energy efficiency retrofit

Energy consumer may implement the identified energy efficiency retrofit as part of ESM based on the prioritizing list developed from the action plan.

(b) Implementation of control operation

Implement work procedures to control energy use in the operation. These procedures may include:

(i) instructions on how to operate the process and equipment according to the operational criteria; and

(ii) instructions on how to operate and adjust the control parameters to optimize the energy use by the process and equipment.

7.4 Maintenance programme

(a) maintenance schedule is incorporated into the energy monitoring work procedures; and

(b) ensure the measuring equipment is calibrated according to the plan.

7.5 Implementation of the work procedures for handling non-conformance and initiating corrective and preventive actions to minimize energy waste. Samples of the working procedures and log sheet for specific systems and equipment are provided in Appendix D and Appendix E.

### 7.6 Conduct Measurement and Verification (M&V)

The Committee shall establish and conduct a proper M&V mechanism for each ESM project according to the M&V plan for determining and accurately reporting energy and cost savings from the implementation of ESMs.

The M&V plan, energy and variables data collection and savings analysis shall be documented and archived.

### 7.7 Develop Motivation Strategy

To ensure the interest in energy initiatives and developing motivation among the staff and employees, the energy consumer shall implement any activity which initiates motivation strategies such as offer incentives for energy management and includes as follows:

- (a) internal competition – compare energy performance between buildings, departments, units, etc.;
- (b) external award competition – promote external energy award beyond the organization;
- (c) recognition – highlight and reward energy use achievements accomplishment of individuals, departments, and facilities;
- (d) financial rewards – offer cash rewards to individuals, departments, and or facilities that achieved the energy target or win the internal competition;
- (e) environment and social responsibility – use environmental messages to promote environmental and social responsibility; and
- (f) performance standard – to link employee's performance with energy targets.

### 7.8 Create Communication Plan

Creating communication plan involves developing strategies for to effectively delivering information about energy management. To communicate effectively, the Committee shall define the following in their communication plan:

- (a) identify platform to disseminate the information to the target audiences, such as information gathered through meetings, town hall, notice boards, posters, emails, database and Internet of Things (IoT) system, etc.;
- (b) determine time and frequency of the communication;
- (c) identify target audiences involving the key energy users such as staff and employees, customers, and stakeholders;
- (d) specify information to be delivered such as policy, action plans, energy management programmes, awareness, energy and cost savings, etc.; and
- (e) provide platforms for staffs to provide feedback and input to improve energy management performance.

A communication matrix may be used to develop the EnMS communication plan. The communication matrix is a structured table for communication activities comprising the type of communication, objective of the communication, frequency and communication channel to internal and external audiences regarding the EnMS activities.

The sample of communication matrix for EnMS project is provided in Appendix C.

### 7.9 Raise Awareness and Build Capacity

The Committee shall increase the awareness of energy used among the staff and employees as well as stakeholders in the organization through the conduct of various programmes such as follows:



- (a) general energy awareness programmes such as orientation, posters campaign, earth day events, exhibitions, fairs, summits and through email and websites;
- (b) energy use performance awareness by demonstrating the energy statistics, energy or energy resources, specific energy use of equipment or department, scorecards, etc.;
- (c) top management awareness by keeping the management up-to-date on the implementation of the action plans, status of energy performance and target achievement, employee's engagement, etc. Increasing the awareness of top management can help to build support for energy management initiatives; and
- (d) training and capacity building programmes for top management, the Committee, staff and employees, and other stakeholders.

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## 8.0 MEASURE PROGRESS AND MANAGEMENT REVIEW

8.1 Measuring progress involves a formal review of the energy use data and activities carried out in the action plan, as well as achievement of the EnMS by the Committee.

### 8.2 Evaluate Results

The Committee shall evaluate the energy management performance through the following activities:

- (a) review energy management achievements using the EnMS assessment and compare the current achievements with the previous assessments;
- (b) implement periodical EnMS internal review for at least once a year to ensure that the system is effectively implemented and maintained, as well as achieves the energy policy, energy objectives and targets;
- (c) analyze energy efficiency achievements based on established EEI;
- (d) review benchmarking by comparing the current energy performance with baselines, targets and peers;
- (e) verify energy and cost savings from the ESM projects;
- (f) assess awareness, knowledge and competency of staff and employees;  
and
- (g) evaluate the compliance of the legal requirements.

### 8.3 Management Review

After the Committee has reviewed the progress and the performance of the energy management performance and progress, the management representative shall bring and present the outcome's results to the top management as to ensure the ongoing suitability, adequacy, and effectiveness of the EnMS.

Based on the review of the EnMS and the energy performance result, the top management shall decide the actions to be taken involving any policy implementation or improvement, energy targets, resources and strategies for continual improvement of the EnMS and energy performance. Conducting a management review shall consist of the following steps:

- (a) analyzing data related to the EnMS and energy performance;
- (b) determining if appropriate actions are being taken; and
- (c) making decisions on the required changes and opportunities for improvement.

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**9.0 APPENDIXES**

APPENDIX A: SAMPLE OF ENERGY MANAGEMENT POLICY

<b>CORPORATE ENERGY POLICY</b>	
Applies to	
This document applies to all XXX Sdn Bhd operations.	
Introduction and Background of Purpose	
XXX Sdn Bhd will seek to both promote the efficient use of energy in our operations and to deliver products to our customers that help them save energy.	
Requirements or Expectations	
XXX Sdn Bhd is committed to continual energy performance improvement and will take the following steps to support this policy:	
<ul style="list-style-type: none"><li>(a) Assess energy performance in our existing operations, in the construction of new facilities, in the development of new products and, where applicable, in the procurement process.</li><li>(b) Implement an effective energy management system that supports manufacturing capabilities while providing a safe and comfortable work environment with the information and resources needed to set and achieve appropriate energy objectives and targets.</li><li>(c) Secure adequate reliable and, when feasible, renewable energy supplies at competitive rates and conduct appropriate contingency planning activities to protect operations from interruptions.</li><li>(d) Encourage continuous energy performance improvement by employees in their work and personal activities.</li><li>(e) Drive development and application of innovative energy efficiency technologies in our products and through our operations.</li><li>(f) Cooperate, when feasible, with governmental agencies, utility companies and other organization on energy programs and comply with all legal requirements relating to energy use, consumption and efficiency.</li><li>(g) Report progress toward XXX Sdn Bhd energy objectives and targets to executive management and external stakeholders on a regular basis.</li></ul>	
Signature :	Effective Date :
Name :	
Designation :	

ENERGY POLICY

Declaration of Commitment

Hospital XXXX is committed in supporting, emphasizing, and practicing energy management and conservation initiatives in accordance with the Energy Efficiency and Conservation Act (EECA) and other relevant Acts and Regulations.

Policy Statement

This policy is to create a sustainable energy management system to:

- (a) Improve energy management for continuous improvement and efficiency
- (b) Improve environmental performance and cost effectiveness
- (c) Promote innovation in green technologies
- (d) Support and implement the Government Green Procurement (GGP)
- (e) Provide the resources needed to achieve energy efficiency objectives and targets

Signature :

Effective Date :

Name :

Designation :

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APPENDIX B: SAMPLE OF ENERGY MANAGEMENT SYSTEM (EnMS) SELF-EVALUATION MATRIX

ENERGY STAR Energy Management Assessment Matrix

<b>ENERGY STAR<sup>®</sup> Energy Management Assessment Matrix</b>				
	<b>Little or no evidence</b>	<b>Some elements</b>	<b>Fully implemented</b>	<b>Next Steps</b>
<b>Make Commitment to Continuous Improvement</b>				
<b>Energy Director</b>	No central or organizational resource Decentralized management	Central or organizational resource not empowered	Empowered central or organizational leader with senior management support	-
<b>Energy Team</b>	No company energy network	Informal organization	Active cross-functional team guiding energy program	-
<b>Energy Policy</b>	No formal policy	Referenced in environmental or other policies	Formal stand-alone EE policy endorsed by senior mgmt.	-
<b>Assess Performance and Opportunities</b>				
<b>Gather and Track Data</b>	Little metering/no tracking	Local or partial metering/tracking/ reporting	All facilities report for central consolidation/analysis	-
<b>Normalize</b>	Not addressed	Some unit measures or weather adjustments	All meaningful adjustments for organizational analysis	-
<b>Establish baselines</b>	No baselines	Various facility-established	Standardized organizational base year and metric established	-
<b>Benchmark</b>	Not addressed or only same site historical comparisons	Some internal comparisons among company sites	Regular internal & external comparisons & analyses	-
<b>Analyze</b>	Not addressed	Some attempt to identify and correct spikes	Profiles identifying trends, peaks, valleys & causes	-
<b>Technical assessments and audits</b>	Not conducted	Internal facility reviews	Reviews by multi-functional team of professionals	-
<b>Set Performance Goals</b>				
<b>Determine scope</b>	No quantifiable goals	Short term facility goals or nominal corporate goals	Short & long term facility and corporate goals	-
<b>Estimate potential for improvement</b>	No process in place	Specific projects based on limited vendor projections	Facility & organization defined based on experience	-

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<b>Establish goals</b>	Not addressed	Loosely defined or sporadically applied	Specific & quantifiable at various organizational levels	-	
<b>Create Action Plan</b>					
<b>Define technical steps and targets</b>	Not addressed	Facility-level consideration as opportunities occur	Detailed multi-level targets with timelines to close gaps	-	
<b>Determine roles and resources</b>	Not addressed or done on ad hoc basis	Informal interested person competes for funding	Internal/external roles defined & funding identified	-	
<b>Implement Action Plan</b>					
<b>Create a communication plan</b>	Not addressed	Tools targeted for some groups used occasionally	All stakeholders are addressed on regular basis	-	
<b>Raise awareness</b>	No promotion of energy efficiency	Periodic references to energy initiatives	All levels of organization support energy goals	-	
<b>Build capacity</b>	Indirect training only	Some training for key individuals	Broad training/certification in technology & best practices	-	
<b>Motivate</b>	No or occasional contact with energy users and staff	Threats for non-performance or periodic reminders	Recognition, financial & performance incentives	-	
<b>Track and monitor</b>	No system for monitoring progress	Annual reviews by facilities	Regular reviews & updates of centralized system	-	
<b>Evaluate Progress</b>					
<b>Measure results</b>	No reviews	Historical comparisons	Compare usage & costs vs. goals, plans, competitors	-	
<b>Review action plan</b>	No reviews	Informal check on progress	Revise plan based on results, feedback & business factors	-	
<b>Recognize Achievements</b>					
<b>Provide internal recognition</b>	Not addressed	Identify successful projects	Acknowledge contributions of individuals, teams, facilities	-	
<b>Get external recognition</b>	Not sought	Incidental or vendor acknowledgement	Government/third party highlighting achievements	-	

GUIDELINES ON ENERGY MANAGEMENT SYSTEM

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APPENDIX C: SAMPLE OF COMMUNICATION PLAN MATRIX

Communication Type	Objective of communication	Medium	Frequency	Audience	Owner
Kick-off Meeting	Introduce the project team and the project. Review project objectives and management approach	-Face to face (brainstorming)	Once	-Project team -Stakeholders	Project manager
Project Team Meetings	Review status of the project with the team	-Face to face (briefing)	Weekly	-Project team	Project manager
Technical Design Meetings	Discuss and develop technical design solutions for the project	-Face to face	As needed	-Project technical staff	Technical lead
Project Status Meetings	Report on the status of the project to management	-Face to face (focus group)	Monthly	-Project team	Project manager
Project Status Reports	Report the status of the project including activities, progress, costs and issues	-Email	Monthly	-Project team -Stakeholders	Project manager
Final Report	Report about all the communication results	-Face to face -Email	Once	-Project team -Stakeholders	Project manager



APPENDIX D: SAMPLES OF WORK PROCEDURES

Work Procedures for Chiller Plant

WORK PROCEDURES			
Task No. :		Page : 1 of 1	
Asset Description	Chiller Plant	Workgroup	Mechanical
Asset No:		Frequency	Daily
<ol style="list-style-type: none"> <li>1. Start shift</li> <li>2. Check log sheet on previous shift record/notes</li> <li>3. ON AHU</li> <li>4. ON CHWP</li> <li>5. ON CDWP</li> <li>6. ON CT</li> <li>7. ON chiller</li> <li>8. If one of the equipment not working properly, start trouble shoot for corrective actions</li> <li>9. If this sets of equipment fail to start, try other set</li> <li>10. Record data on log sheet and cross check with control parameters</li> <li>11. End of shift</li> <li>12. Handing over to next shift</li> <li>13. New shift start work</li> <li>14. Check log sheet on previous shift record/notes</li> <li>15. ON AHU</li> <li>16. ON CHWP</li> <li>17. ON CDWP</li> <li>18. ON CT</li> <li>19. ON chiller</li> <li>20. If one of the equipment not working properly, start trouble shoot for corrective actions</li> <li>21. If this sets of equipment fail to start, try other set</li> <li>22. Record data on log sheet and cross check with control parameters</li> <li>23. End of shift</li> <li>24. Handing over to next shift</li> </ol>			

Work Procedures for Lighting

WORK PROCEDURES			
Task No. :		Page : 1 of 1	
<b>Asset Category</b>	Lightings	<b>Workgroup</b>	Electrical
<b>Work Request No.</b>		<b>Frequency</b>	Daily

**User.**

1. Upon entering any rooms the user must identify the right switch for the space or room to be lighted.
2. Switch on the lights
3. Switch off the lights when leaving to room or space and when there is no other occupants
4. User are required to report to the repair/technician team for any faulty lights

**Repair/Technician Team**

1. Upon receiving repair report technician will select the right bulb to be replaced
2. If there is no stock then technician will raise PR to replenish stock
3. Remove old bulb and replace with new bulb
4. Check the room/space lighting condition should not be less then (e.g. for office working area-300lux).
5. Close problem

GUIDELINES ON ENERGY MANAGEMENT SYSTEM

APPENDIX E: SAMPLES OF LOG SHEETS

Log Sheet for Centrifugal Chiller

CENTRIFUGAL CHILLER PLANT ROOM LOG SHEET							
Task No.:				Page: 1 of 1			
Asset Description	Centrifugal Chiller			Workgroup	Mechanical		
Asset No.:				Frequency	Daily		
				Date			
<b>NO</b>	<b>Chilled Water Set _____ deg F</b>	<b>Chiller No. 1 / 2 / 3 / 4 / 5</b>		<b>TIME (HRS)</b>			
	<b>Setting Auto / Manual</b>	<b>Control Parameters</b>		0800	1400	2000	0200
		<b>Min</b>	<b>Max</b>				
<b>1</b>	<b>Purge Unit</b>						
	Run (Hrs)						
	Suction Temp (eg F)						
<b>2</b>	<b>Compressor Report</b>						
(a)	Differential Oil Pressure (Psid)	18	35				
(b)	Oil Tank Temperature (Deg F)	140	170				
(c)	Discharge Oil Pressure (Psi)	55	70				
	Compressor phase (Amps R)						
	Compressor phase (Amps Y)	150	450	Lower is better, high will result more energy			
	Compressor phase (Amps B)						
	Bearing Temperature 1 (Deg F)	80	110				
	Bearing Temperature 2 (Deg F)	100	160				
	Operating Oil Level (High / Low)	1/4	3/4				
<b>3</b>	<b>Refrigerant Report</b>						
(d)	Evaporator Refrigerant pressure (Inches hg / Psi)	30	40				
(e)	Evaporator Refrigerant temperature (Deg F)	30	45				
(f)	Condenser Refrigerant Pressure (Psi)	100	125				
(g)	Condenser Refrigerant temperature (Deg F)	90	180				
<b>4</b>	<b>Temperature (Deg F)</b>						
(h)	Condenser water inlet	78	90	Lower is better, high will result more energy due to resistant			
(i)	Condenser water outlet	85	105				
(j)	Chilled water inlet	48	60	Low will result more energy due to more work to compressor, high will result low energy but may affect comfort to user			
(k)	Chilled water outlet	39	55				
<b>5</b>	<b>Pressure (Psig)</b>						
(L)	Condenser water inlet						
(m)	Condenser water outlet			High Delta P will create more resistance and more energy consumption			
(n)	Chilled water inlet						
(o)	Chilled water outlet						
<b>6</b>	<b>Flow rate (Usgpm)</b>						
(p)	Chilled water flow rate						
(q)	Condenser water flow rate						
<b>1</b>	<b>Condenser water Pump Motors – Current (Amps)</b>						
	Pump 1		35				
	Pump 2						
	Pump 3						
<b>2</b>	<b>Chilled water Pump Motors - Current (Amps)</b>						
	Pump 1		30				
	Pump 2						
	Pump 3						
<b>3</b>	<b>Cooling Tower motor- Current (Amps)</b>						
	Tower 1		15				
	Tower 2						
	Tower 3						
<b>INCIDENCE RECORD</b>				<b>Technician On Duty:</b>			
Raise Schedule Corrective Maintenance work order if necessary				1st Shift 1. _____ 2. _____			
				2nd Shift 1. _____ 2. _____			
				3rd Shift 1. _____ 2. _____			
<b>Supervising Personnel</b>							
Checked By: _____ Date _____ Verified BY: _____ Date: _____							

## GUIDELINES ON ENERGY MANAGEMENT SYSTEM

### Log Sheet for Lighting

LOG SHEET						
Task No:				Page: 1 of 2		
Asset Description	Lighting	Workgroup	Electrical			
Asset No:		Frequency		Date/Month		
Location/Buildings:						
Area/room/Zone	Type of Lightings	Condition	Last Date Installed/Replacement	Lux measurement	Lux Parameters	
					Min	Max
Prepared/Checked by:			Approved By:			
Name:			Name:			
Date:			Date:			