

Building Energy Management Guidelines and Criteria for Electrical Energy Evaluations

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1. Background

1.1 Introduction

The Energy Management Guidelines (EMG) is formulated for different types of buildings and other relevant characteristics based on the framework of the Malaysian Federal Buildings Energy Management Program (MFBEMP). The EMG is central to MFBEMP and is meant to assist the building owners to comply with the requirements of MFBEMP. A monitoring and reporting scheme is included in the EMG so that building owners can monitor their progress upon implementing the MFBEMP. At the same time, a nationwide monitoring scheme will be proposed to monitor the extent and impact of the application of the EMG. The EMG is produced to support the MFBEMP but not limited to public buildings. The EMG is applicable and recommended for all buildings.

The EMG will help the Energy Managers and the building owners to:

- manage energy consumption in their buildings efficiently with minimal energy waste;
- conduct comprehensive energy evaluations;
- implement identified energy conservation measures;
- measure and verify the implemented energy conservation measures;
- use a web-based Energy Management System (EMS) to track the impact of new energy efficiency retrofits or energy management programs; and
- carry out benchmarking.

EMG will benefit the building owners and/or building managers in their use of electrical energy. They will be able to measure their energy use; if the building(s) use minimum energy for the operations, the building owners gain and benefit from it and if the building(s) use excessive energy unnecessarily, they have become inefficient energy users. The building owners, with help from Energy Managers and Energy Management Committee (EMC) will be able to improve on the performance of their electrical energy consumption. The EMG will be able to determine the use of electrical energy by each of the buildings' electrical installations as it will analyse and measure usage and will provide data for improvement activities. The EMG will stress on awareness by providing training for the employees. In this way, all employees including the decision makers will be better informed to exercise energy consumption efficiently without compromising the building environment and operational output.

This document provides the guidelines and criteria for the implementation of the Building Energy Management and Energy Evaluations (BEMEE). There are other documents including EnMS, ISO50001, JKR audit guidelines, NBEIS which provide support to the EMS and are addressed through separate documents.

1.2 Efficient Management of Electrical Energy Regulations (EMEER) 2008

EMEER was set up to promote the efficient use of electrical energy. The objectives of EMEER are to set the standards and practices on the use of electricity. Efficient electricity management is necessary to reduce its consumption and to reduce carbon emission to the environment.

Each kilowatt of electrical energy used emits 0.741kg of carbon gases to the atmosphere. The Malaysian Government has pledged at the Conference of Parties (COP 15) of 2009 to reduce the carbon intensity by 40% towards 2020. The regulations will help to improve the building's energy operations and managing carbon emission.

Regulation 11 of EMEER 2008 requires that the involved buildings to issue an order that each building owner shall appoint a Registered Electrical Energy Manager (REEM). It is the regulation under the Electricity Supply Act 1990 and was approved in 15th December 2008 with the same effective date and the regulation is enforced by Energy Commission (EC) which has jurisdictions on electricity supply sector in Peninsular Malaysia and Sabah.

There are four parts in the EMEER 2008:

PART I : PRELIMINARY	
Regulation	
1	Citation and commencement
2	Interpretation
3	Application
4	Fees
PART II : ELECTRICAL ENERGY MANAGEMENT	
5	Obligation to submit information to the Commission
6	Notification by the Commission
7	Obligation of private installation licensee or consumer
8	Additional information
9	Review
10	Withdrawal
PART III :REEM	
11	REEM of installation
12	Qualification requirements
13	Application for registration
14	Issuance of certificate of registration
15	Medical evidence of fitness of applicant
16	Functions and duties of a REEM
17	Validity period of registration and renewal
18	Cancellation of registration of a REEM
PART IV :GENERAL	
19	Register
20	Replacement of certificate of registration
21	Certified true copy of certificate of registration
22	General penalty
23	Extension of time
24	Service of notice
First Schedule	

Regulation 3(1) This Regulation shall apply to:

Any installation which receives electrical energy from a licensee or supply authority with total electrical energy consumption equal or exceeding 3,000,000 kWh as measured at one metering point or more over any period not exceeding six consecutive months must comply with requirements in the regulations.

Regulation 5

A licensee or supply authority who supplies electrical energy to any installation under paragraph 3(2) (b) shall submit to the Commission information or documents regarding the names and particulars of consumers and generators whose total electrical energy consumption/generation over any period not exceeding six consecutive months equals to or exceeds 3,000,000 kWh, not later than one month after the expiry of the period of six consecutive months from the effective date.

Regulation 6 mentioned that installations with total electrical energy consumption equal or exceeding 3,000,000 kWh as measured at one metering point or more over any period not exceeding six consecutive months must appoint a REEM. The building owners are required to submit a written confirmation of such appointment or designation to EC containing the name and particulars of the REEM as well as the date of expiry of his registration as an electrical energy manager.

Regulation 16 is about the functions and duties of the REEM.

- (a) He shall be responsible for:
 - (i) To audit and analyze the total electrical energy consumption or total net electrical energy generation at the installation, including the significant end use of electricity;
 - (ii) To advise the private installation licensee or consumer in developing and implementing measures to ensure efficient management of electrical energy at the installation;
 - (iii) To monitor effective implementation of the measures referred to in subparagraph (ii)
- (b) He shall supervise the keeping of records on efficient management of electrical energy at the installation and verify its accuracy; and
- (c) He shall ensure that the private installation licensee or consumer submits the information and report under Regulations 6 and Regulation 8 within the periods as specified in regulation 7.

While EMEER is only applicable to involved buildings, the building owners who are not affected can still practice EM by using the guidelines. The guidelines will be the platform for the decision makers to make their buildings more efficient in their electrical energy usage.

2. Criteria for an effective and impactful Energy Management Program (EMP)

2.1 Commitment of Decision Makers of the Organization

Definition: The Direct participation by the decision makers of the buildings; building owners and building managers, is an important aspect of the program which includes setting up and serving on the EMC, formulating and establishing policies and objectives, providing resources and training, overseeing the implementation of EM activities at all levels of the organization, evaluating and revising their progress.

The building owners shall participate actively in the EMP. The building owners have the right to the building(s) and its operations. The involvement of the decision makers is critical as their approval is essential in order to proceed with EM activities including getting the permission, budget and approval, and in return the building owners will be kept updated on the improvement of the electrical energy used of the building(s).

The building owners are encouraged to complete information regarding the following:

- the statement of policy for efficient electrical energy management of the building(s);
- the objectives of efficient electrical energy management;
- the documents, accounts and approval pertaining to efficient electrical energy management;
- the report in Form A of the Second Schedule that has been duly signed (for buildings effected by EMEER); and
- any other information which Energy Commission may require from time to time (for buildings effected by EMEER).

2.2 Clear and Defined Roles of Energy Management Committee (EMC)

The EMC has a coordinating role with respect to the activities undertaken by the Energy Managers in implementing energy conservation practices. One of the duties of the committee members is to coordinate energy surveys in cooperation with the Energy Managers. Responsibilities of the committee members may include but not limited to:

- identifying the buildings energy inventory;
- resources and administrative procedures related to EM;
- ensuring that each building has an Energy Manager;
- maintaining the register of Energy Managers for the building;
- prioritizing and determining the projected energy savings for annual evaluations; and
- provide training to the others.

Organization Structure

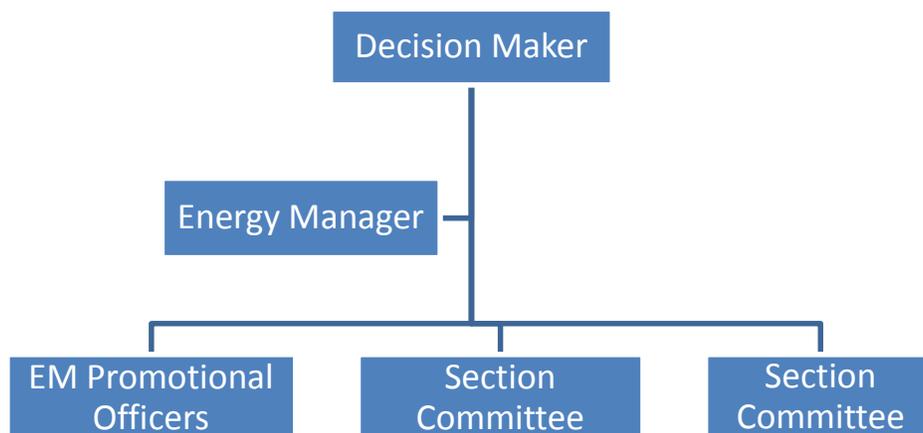
The organization structure of EMC should not overlap with the building's organizational structure or facility maintenance structure. The EM promotional officer is an employee who is designated to carry out EM within the organisation for internal communication and administrative activities. The terms of reference of the EMC are as follows:

- Decision Maker (Grade 52/senior manager or above).
 - a. Establish organisational policy and target of EM activities.
 - b. Follow up and ensure EM activities are in line with policy.
 - c. Consider ideas and suggestions from EMC.
 - d. Consider reports from EMC and presented it to the decision makers.
 - e. Monitor and supervise the EMC and Energy Manager(s).

- EM promotional officers (Grade 41/executive and above)
 - a. Ensure that all EM activities at each level are executed as scheduled.
 - b. Promote EM activities and ensure the smooth running of these activities.
 - c. Provide appropriate guidance and support to continuously promote EM activities.
 - d. Develop EM ideas from feedback of small groups
 - e. Provide support in running EM activities for small groups.
 - f. Maintain good human relations, friendly reactions and be service minded.

- Section committee members (every division/department)
 - a. Invite suggestions from members
 - b. Promote cooperation among members.
 - c. Provide appropriate training for other employees.
 - e. Provide appropriate atmosphere, environment and work place suitable for working.
 - f. Continuously check and promote working ability and appropriate working environment.
 - g. Discuss with Energy Manager/ Decision Maker for the execution of small group activities.

An example of organizational chart for EM committee is provided below:



2.3 Roles of the Energy Managers

Energy managers plan, regulate and monitor energy use in the building(s). They aim to improve energy efficiency by evaluating energy use and implementing new policies and changes where

necessary. Energy managers coordinate all aspects of energy management, from energy efficiency and reduction of carbon dioxide emissions to waste management and sustainable development by:

- encouraging the use of sustainable energy resources within the building(s);
- deriving solutions for carbon management; and
- raising the profile of energy conservation.

Under EMEER 2008, the term “registered electrical energy manager,” with respect to a building, means the individual who is responsible for ensuring compliance with the buildings; and registered by the Energy Commission as stipulated in the **Regulation 11** and his functions were stated in **Regulation 16**. The term “registered electrical energy manager” could include:

- a contractor/consultant of the building;
- a full/part-time employee of the building; and
- an individual who is responsible for multiple buildings.

2.3.1 Scope of Energy Managers

The Decision Makers of the building(s) may determine the number of buildings under the care of an energy manager, based on its organizational structure and the building’s electrical energy operations. The key criteria for determining the number of buildings for which an Energy Manager responsible for is the capability of the Energy Manager to procure and complete comprehensive evaluations on assigned buildings within a specific number of years. This responsibility should also include the management of subsequent project implementation and the tracking of electrical energy usage.

Some buildings may already have Energy Managers assigned for fulfilling the needs of existing facility contract requirements or organizational structure. The building owner would have evaluated the building’s existing criteria when assigning an energy manager.

Building owners may also require the Energy Managers to design the buildings’ energy conservation implementation plans and measures. The Energy Managers shall focus on reducing the cost of energy used and pollution prevention through improved energy conservation practices, equipment modifications and building occupants’ or employees’ awareness. Energy Managers can also identify, design and implement no-cost/low-cost measures and coordinate the implementation of larger capital projects financed through alternative energy financing, such as energy savings performance contracts (EPCs).

Energy Managers work on-site at building(s) to meet energy efficiency objectives. They are usually contractors, some are employees, and work with existing employees to enhance conservation efforts. Building(s) that employ REEMs usually have high annual energy budgets. Sites with smaller energy budgets can also do it with help of Energy Managers.

Regulation 16 stated, upon receipt of the notice to comply from EC, the involved installations shall appoint or designate a REEM to carry out the functions and at each installation.

Energy Managers are encouraged to submit a written confirmation to such an appointment or designation to EC of which contains the detailed particulars of the Energy Managers.

Subsequently, the Energy Managers are encouraged submit this information:

- policy statement for efficient electrical energy management of the installation;
- the objectives of efficient electrical energy management;
- the accounts and documents pertaining to efficient electrical energy management;
- submit the report in Form A of the Second Schedule that has been duly signed (Required by EC for REEM); and
- submit any other information which EC may require from time to time (Required by EC for REEM).

2.3.2 Designation of Energy Managers

Each building owner is encouraged to appoint an energy manager responsible for implementing EM and managing energy use at their own buildings. While there is no requirement for reporting these specific designations to the parliament, a system of accountability is necessary to ensure compliance. This installation system of accountability must also be flexible enough to accommodate personnel turnover and allow each building to control the release of the identities of the energy managers (who may be the employees, consultants or private contractors).

To address these issues, a register will be created for each Energy Manager. This unique identifier will be used as the user identification for logging into the web-based energy management system such as BCIS and entering data pertaining to the buildings. It will be the responsibility of the building's Energy Manager or EMC members to maintain the register which links the building's energy managers with the unique identifier and the list of buildings for which the energy manager is responsible.

By creating a register for each Energy Manager, accountability would be achieved while maintaining the privacy of the building's employee or facility maintenance contractor. With the register, the number of buildings for which an Energy Manager has been assigned can be determined and confirming that the building actually has an Energy Manager.

Building owners should regularly maintain and updated the register of all their buildings and their Energy Managers.

2.4 Key Performance Indicators (KPIs) and Incentives

EMG suggests the following as the annual KPIs for the EMC:

- Detailed building(s) energy evaluation is done by June for each year and should be conducted at least once in 3 years;

- Annual electrical energy saving of 5 percent (during the first year implementation) based on certain year baseline (e.g.: 2011 as baseline year) and improved for the following years;
- Awareness and education campaign at least twice a year; and
- Technical training(s) for EMC at least once a year;

Building owners may create an employee incentive program to raise visibility and reward exceptional performance in implementing energy conservation action plans and consider nominating exceptional performers for EM Awards (if any).

3. Energy Management Activities

3.1 Introduction

First, the building owners shall start with the requirements in Chapter II. Once completed, they shall start conducting EM Activities. The EM activities are as essential as the EMC. The decision makers, EMC with the Energy Managers and the rest of the employees should commit to these activities. The activities described below are applicable to all buildings, however if the buildings consumed a certain amount of energy exceeding or equal to 3 million kilowatt hour in 6 months, the buildings need to comply with the specific requirements in EMEER.

Those affected buildings with EMEER need to comply with the regulations and more to be done in order to have a substantial impact in electrical energy savings from the EM practices.

3.2 Identification of Priority Areas

The EMC shall decide and determine on the priority areas for the electrical energy evaluations. There are initial assessments and retro-commissioning evaluations that need to be done in the EM activities. These activities are done in-house which is conducted by EMC. These activities will take a few days and will continue for some time for a detailed audit with ECMs.

It is encouraged that building owners include all building(s) in their energy consumption inventory. The building owners are encouraged to evaluate their building(s) at least once in every 3 years.

3.3 Electrical Energy Evaluations

3.3.1 Initial Assessment and Retro-commissioning Evaluation

Energy managers are required to identify and assess retro-commissioning measures as part of the necessary evaluation. To fulfil the requirement of the commissioning component of the energy and water evaluation, it is recommended to do a two-step approach:

- 1) Initial Assessment. Prioritize and conduct an initial walk-through. This walk-through can take up to a day for a typical office building(s) in addition to the comprehensive data collection and analysis to determine if it is a good candidate for a more detailed assessment. If the initial walk-through finds that the building does not require a more detailed commissioning effort (example, all equipment is operating according to specifications and any identified minor remedial actions are addressed), then the commissioning requirement for the building is fulfilled.
- 2) Detailed retro-commissioning Evaluation. A more detailed evaluation shall be conducted in those buildings initially identified as economically viable candidates for further commissioning. Detailed efforts can take from one to three days, depending on the size of the buildings within the targeted installations. Additional energy and water-related operations, maintenance and optimization opportunities will often be identified. The expected savings and cost to implement will also be provided. More capital-intensive retrofit opportunities incidental to the assessment may be identified and should be passed forward to the detailed audit portion of the comprehensive energy evaluation.

Exclusion of Small Facilities

It is often not cost effective to retro-commission building(s) sized less than 2,000 square metre and the expense of retro-commissioning is the primary criteria for exclusion. Therefore, the building owners may exclude buildings with less than 2,000 square metre, unless the building(s) houses energy intensive operations.

3.3.2 Audit Component of Evaluations

The required comprehensive evaluations will also include an audit component. The audit report component of the building(s) electrical energy evaluations needs to contain sufficient detail and actionable information about ECMs so that sound project decisions can be made based on the audit results. JKR audit standard for meeting the requirements is sufficiently rigorous, but flexible enough to ensure that viable energy-saving projects are identified. The proposed ECMs should not be so ambitious as to require extensive resources to be spent auditing structures where engineers and technicians can quickly and easily conclude that no viable projects currently exist.

The format of the required audit report is based on the EPC Preliminary Assessment (PA) level audits. The level audit contains the documented findings of a walk-through survey and may include an evaluation of electrical energy cost savings and electrical energy unit savings' potential, building conditions, electrical energy consuming equipment, and hours of use or occupancy, for the purpose of developing preliminary technical and price proposals.

Reports should contain technical and price assessments in accordance with the following elements below:

1. Project Overview

- a. Executive Summary - As a minimum, a narrative description of the project summarizing the ECMs; the energy and related cost savings; implementation price (including design, construction, management, and inspection costs); financial summary; and results from any renewable energy assessment.
- b. Site Information

2. Technical Assessment

- a. ECM description - For each ECM proposed, the audit shall contain narrative information for items as applicable, in the format specified below. All applicable measures should be considered and included.
 - 1. ECM title and narrative description.
 - 2. Location(s) affected.
 - 3. ECM projected energy usage, cost, and savings.
 - 4. ECM interface with building equipment and detailed description of existing energy consuming equipment and systems.
 - 5. Utility interruptions – Specify the extent of any utility interruptions needed for the installation of the proposed ECM.
 - 6. Agency support required – Specify any agency support required during implementation of the ECM.
 - 7. Describe potential environmental impact resulting from the installed ECM.
 - 8. Provide information on potential utility rebates, system benefits and fund financial and tax incentives. If applicable, specify ECM financial incentive(s) available, source, estimated payment amount; how and when payment or financing reduction will be applied; impact on project cash flow (Examples, ancillary payment before acceptance, reducing implementation price and tax-based financing amount) and proposed percentage of estimated financial incentive payment or financing reduction for which the contractor guarantees.
- b. List of identified energy measures
The following will be required for the EMS:
 - 1. Description of measure.
 - 2. Estimated cost of measure.
 - 3. Estimated annual electrical energy consumption and cost savings.
 - 4. Estimated life-cycle electrical energy savings.
 - 5. Estimated life-cycle cost savings.
 - 6. Payback Period, return on investment and internal rate return.
 - 7. Summary of the economics of bundled ECMs with total interactive life-cycle savings and payback period.

3.3.3 Completing Evaluations

It is recommended Energy Managers to complete detailed electrical energy evaluation for the building(s) at least once in every three years. As part of the electrical energy evaluation, the energy manager shall identify and assess conservation measures for each electrical energy installation in the building(s).

Schedule for Completing Evaluations

The building owners are provided with some flexibility in completing energy evaluations of their building each year, as long as all buildings are evaluated in detail over three years. Building owners can perform building energy evaluations based on:

- Number of buildings,
- Energy use of each building, or
- Energy use per square meter of each building.

The overriding requirement is that building owners are encouraged to evaluate their buildings in every three years. It is recommended that at least one building be evaluated by the Energy Manager each year as the best way to evenly distribute work load over the years. The building owners must rely on a consistent metric for all buildings.

Date for Completion of the Evaluations

It is recommended that beginning on the date that in 180 days after the date of each calendar year, i.e. 30 June, the energy manager shall complete, a comprehensive energy evaluation for at least one of the building(s). Example; in calendar year 2015, the decision makers will expect that the Energy Manager will complete for 2015 building evaluations by 30th June, 2015.

Recently Evaluated Buildings

Building owners that have completed their electrical energy evaluations in 2011 or later and meet the specifications may complete the rest of comprehensive evaluation for their buildings (if any) within three years.

3.3.4 Approaches for Completing Evaluations

Building owners can assign the following resources for completing their comprehensive electrical energy evaluations:

- Employees with energy training (in-house engineering staff);
- Energy Managers or facility maintenance contractor;
- Malaysian Green Tech Corporation for a fee-for-service or JKR;
- Private sector contractors either on a fee-for-service basis through a financed arrangement under EPC; and
- Private audit contractors retained on a fee-for-service basis through normal procurement.

Building Energy Managers should consider potential funding source when making a determination on which resource to use in accomplishing the required evaluations. For

example, if the building owners want to retain the energy service company (ESCO) or facility maintenance contractor, they will have to finance the implementation of energy conservation measures through EPC. EPC payment streams are based on guaranteed energy cost savings where audits that are initially completed by the ESCOs proposing an EPC or the audit can be done by a third party. Using the same ESCO for the audit and implementation phase will be more cost effective than repeating the audit for the purpose of the EPC.

Implementation of identified ESMs should be included in the detailed energy survey used to develop the final EPC proposal.

3.3.5 Evaluation Output and Potential Submission to Energy Commission

The important parameters for evaluation output is as recommended by the web-based National Building Energy Input System (NBEIS) and to the EC for buildings registered with EMEER. Building owners should submit the list of electrical energy consumed by all their buildings to the EC and BCIS for the energy reporting process. The important parameters are as follows:

- Building(s) name;
- Location (city, state or zip code);
- Building(s) gross and net square footage;
- Building(s) annual energy consumption in kilowatt hour;
- Building(s) energy consumption every month in kilowatt hour;
- Building energy index;
- Carbon emission per annum;
- Carbon emission per month;
- Load apportioning per annum;
- Load apportioning per month; and
- Energy Conservation Measure(s) which justifiable.

At the request of Energy Commission and the Secretary General of Ministry of Energy, Green Technology and Water may exempt specific data for specific facilities from disclosure to the public in the NBEIS for national security purposes. It is recommended that all building owners register and fill up the data with Energy Commission. If the buildings are excluded as affected installations, building owners should note them when submitting their lists to the Energy Commission. Even though those buildings are not affected by EMEER, it is recommended to submit them to the EC. The buildings which are not affected by EMEER should benchmark themselves with the ones involved. It will results in energy efficiency improvement.

4. Tools for Energy Management

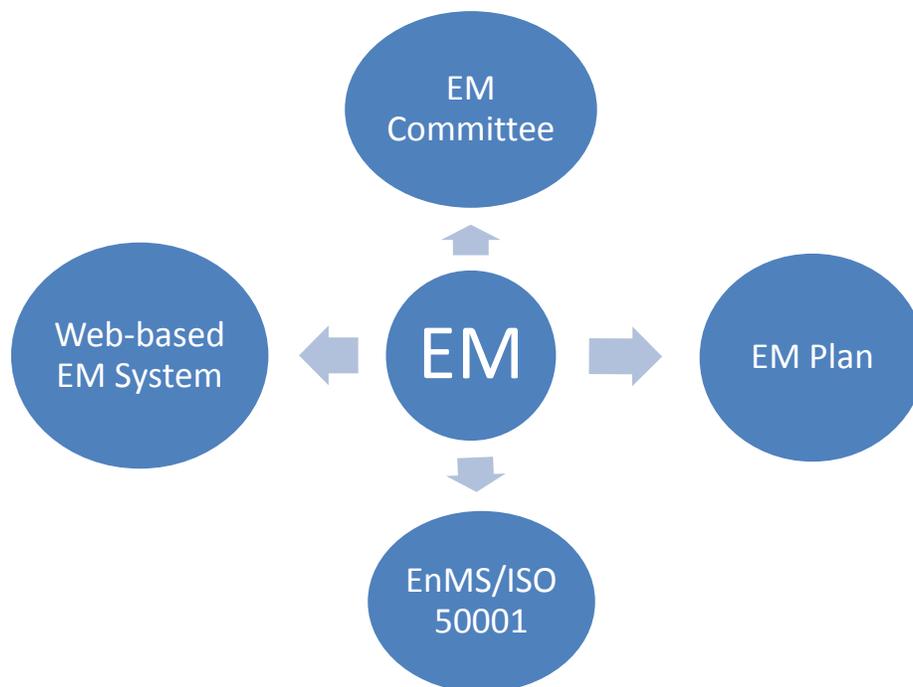
4.1 Introduction

The tools bridges between management and technology. Technology coupled with operations and maintenance practices, as well as, management systems can lead to significant energy

efficiency and energy savings. Building owners shall commit to the tools that develops management strategies. The tools clearly states goals on energy efficiency, conservation and sustainability. It also delegates the responsibility and accountability to the EMC, the employees and the building owners. The system tracks and assesses the energy used and application of technology to the involved installations. Other benefits of the tools are:

- communication throughout all levels of the organization;
- continuous investigation of potential energy reduction projects;
- application of business models to energy technology projects; and
- internal recognition and reward program for achieving energy goals.

Energy efficiency is achieved through changes in how energy is managed in a building, not only through installation of new technologies or equipment. An energy management standard provides a method to integrate energy efficiency into existing buildings management systems for sustainability improvement. All existing EM standards are compatible with ISO 9000/14000. Building owners can voluntarily adopt an established energy management plan such as ISO 50001 to achieve further improvements and international recognitions.



4.2 Energy Management Plan (EMP)

EMP assists a company in developing a baseline of energy use as a reference. The baseline is important as it provides basic energy consumption and current usage to determine the differences in order to ensure improvement in building operations. The current operational efficiency could be high but there is still room for improvement. The plan should actively manage energy use and the cost of operation. EMP could be crucial for buildings with different tariff rates throughout a certain period of time. Other benefits of the EMP are to reduce emissions without any impact to the building.

The features of EMP are:

- to provide a strategic plan that requires measurement, management, and documentation for continuous improvement of energy efficiency;
- to cross reference between decision makers-divisional management team lead by a high-ranking officers (Grade 52 and above or senior managers) who reports directly to the top management and is responsible to the EMC;
- to conceptualize policies and measures to address all aspects of energy;
- to execute projects to demonstrate continuous improvement in energy efficiency and conservation;
- to prepare the Energy Manual, an additional document for purposes of documenting energy saving projects that have been undertaken;
- to identify the relevant KPIs to track and measure progress; and
- to prepare and submit Progress Reports to Management periodically.

4.3 ISO 50001

ISO 50001:2011 Energy Management Systems is a guidance of specifications created by the International Organization for Standardization (ISO) for an energy management system. The standard specifies the requirements for establishing, implementing, maintaining and improving an energy management system with the purpose to enable an organization to follow a systematic approach in achieving sustainable energy performance including energy efficiency, energy conservation, energy use and consumption. The standard aims to help organizations continuously reduce their energy use and their greenhouse gas emissions.

The guidance is standardized in the field of energy management which covers:

- energy supply;
- procurement practices for energy using equipment and systems;
- energy use; and
- any use and related disposal issues.

The standard will also address measurements of current energy usage and implementation of a measurement system to document, report, and validate continuous improvement in the area of EM. ISO 50001:2011 provides a framework of requirements for organizations to:

- develop a policy for more efficient use of energy;
- fix targets and objectives to meet the policy;
- use data to better understand and make decisions about energy use;
- measure the results;
- review how well the policy works; and
- continually improve energy management.

4.4 Web-based Energy Management System

EMG encourages the building owners to upload the building electrical energy consumption to the web-based EMS. The web-based EMS could track:

- Electrical energy evaluations;
- Estimated cost and savings for measures to be implemented in the building(s);
- Implementation of identified electrical energy efficiency investments or ECMs;
- Follow-up on implemented measures;
- Measured savings and continued savings for implemented measures; and
- Building benchmarking information and baseline from a certain period of time.

The building owners are encouraged to upload their buildings energy consumption and the building details to the NBEIS which is currently managed by MGTC. NBEIS is an online input database system for the purpose of monitoring the energy and water consumption of buildings. The building owners are encouraged to send a copy to the Energy Commission prior to the input to the NBEIS.

This registration for the buildings is subject to the Ministry of Energy, Green Technology, & Water and MGTC approval. Should there is any problem on the registration, please contact the administrator at admin@greentownship.my.

5. Education and Awareness

Building owners are responsible to ensure that their employees are trained with the energy conservation practices. Effective training will not be accomplished in a single session that once completed, may be quickly forgotten. Training on awareness must be thorough and continuous to help not only to inform, but also to change attitudes of the employees. The decision makers must give proper support to their EMC and to the Energy Managers in the form of training and education. Training allows the employees to explore new ideas, interchange them with experts and with other participants to feel more comfortable with their role in the EM exercise. In turn, trained employees should be encouraged to provide in-house training to operation and lower level employees.

Staff training is the primary tool by which awareness is generated and knowledge is transmitted. As part of the EMG, there are a few major areas for employee/employer training:

- Training to develop new skills in technologies/management
 - in-house training;
 - outsourced training and site visit; and
 - overseas training.
- Training to adopt new attitudes towards energy efficiency and conservation.

The building owners need to train new as well as experienced personnel in energy efficient operation of the buildings' facilities. The need for training in each should be reviewed annually to ensure that all personnel are properly trained and as a refresher the existing personnel. The employees' training is typically at three levels:

- decision maker;
- engineering, technical and administration; and
- general.

The objectives of the energy conservation training is to develop energy conservation practices and skills to the organisations' employees, to adapt EM practices to the EMC and to raise awareness to the employees. The building owners are encouraged to send different employees for the EM training every year. EM practices is a continuous training. Employees with technical background should be sent for technical EM training while non-technical background employees shall be sent for awareness and education on EM training.

The decision makers, with the help from EMC, should develop a basic EM guidelines specifically for their own installations. The EM guidelines will tell specifically how to manage their own building(s) and for each of the energy consuming component. There should be an education and awareness notes/ pamphlet/ mini-book for the employees to read and practice. It is recommended that the decision makers conduct the awareness seminar twice a year.

6. References

1. Building Consumption Input System (BCIS) Available: www.greentownship.my [18 June 2014]
2. Efficient Management of Electrical Energy Regulation 2008 Available: <http://www.st.gov.my/index.php/policies/regulations/efficient-management-of-electrical-energy-regulations-2008.html> [11 June 2014]
3. International Standard Organization (ISO) 50001: Energy Management Available: <http://www.iso.org/iso/home/standards/management-standards/iso50001.htm> [18 June 2014]

7. Glossary

COP	Conference of Parties The governing body of an international convention
EC	Energy Commission The regulator for energy industry in Peninsular Malaysia and Sabah. The commission promotes and regulates matters to electricity and gas supply industry within the scope of the applicable legislations

ECM	Energy Conservation Measure Identified activity conducted to improve the energy use in any organization
EMC	Energy Management Committee A working group to manage energy lead by a decision maker with help from Energy Manager(s) and a few members
EMEER	Efficient Management of Electrical Energy Regulations A regulation to regulate the energy use by the consumers and generators with certain requirements to fulfil for better energy management. The regulation is administered by the Energy Commission
EMG	Energy Management Guidelines A document to guide on efficient energy management
EMS	Energy Management System A system with aided tools to monitor, control and optimize the energy use and load
Energy Manager	A man who plans, regulates and monitor energy use in an organization or facility. He aims to improve energy efficiency
Energy Manual	A book on energy use in an organization or facility
EPC	Energy Performance Contracting An alternative financing mechanism to allow improvement for energy efficiency practice
ESCO	Energy Service Company A commercial business that provides a broad range of energy solutions
ISO 9000/14000/50001	International Standard Organization ISO 9000 for quality management, ISO 14000 for environmental management and ISO 50001 for energy management
MFBEEM	Malaysian Federal Building Energy Management Program An Energy Management program developed for the government buildings
NBEIS	National Building Energy Input System An online input database system to monitor energy and water consumption of buildings developed and administered by the Government of Malaysia
REEM	Registered Electrical Energy Manager

A qualified electrical Energy Manager registered with the Energy Commission with certain requirements and obligations to comply with the Efficient Management of Electrical Energy Regulations