

MINISTRY OF ENERGY AND PUBLIC UTILITIES

ENERGY EFFICIENCY MANAGEMENT OFFICE

Guidelines for the reduction of electricity consumption in Public Institutions

1.0 Introduction

The following budget measure has been announced in the Annex to the Budget Speech 2021/22:

“All public institutions will be required to reduce their electricity consumption by at least 5% of its current electricity consumption. The Energy Efficiency Management Office will establish procedures to monitor energy efficiency and consumption”

Currently, Mauritius relies mostly on the import of fossil fuels for its energy needs. To mitigate the adverse effects of climate change and as a response to the economic crisis, there is an urgent need to promote energy conservation and energy efficiency measures in all sectors or activity. Moreover, the world has witnessed a rise in the price of crude oil recently.

Over the past three years, the Energy Efficiency Management Office (EEMO) has been providing for energy audits, funded under the Expert Skills Scheme of the Ministry of Finance, Economic Planning and Development, to be conducted in public institutions where energy consumption is significant but do not fall under Mandatory Energy Audits as per the Energy Efficiency Act. To date, energy audits have been conducted in 50 such buildings. The findings of the energy audit reports show that, in general, energy conservation and energy efficiency are not given adequate consideration in the public sector. In this respect, this budget measure will pave the way to the introduction of a culture of energy conservation and energy efficiency in public bodies.

Based on statistics obtained from the CEB, it has been noted that some 210 GWh of electricity was consumed by public institutions in 2020. A 5% reduction will lead to reduced demand on the CEB by 11 GWh, representing an overall saving of about Rs 110 million in electricity bills.

The possibility to save on electricity consumption exists in most buildings through behavioural changes and implementation of simple no-cost measures.

The Energy Efficiency Management Office has worked out a procedure to support public institutions in reaching the objective of 5% reduction in electricity consumption set in the Budget Speech.

2.0 Procedure

Energy cost is a major component in building operations. Based on advancement in energy efficiency practices and technologies, it is now possible to reduce energy cost significantly in the buildings without reducing the thermal comfort and productivity of the building occupants. This can be achieved by initiating a systematic energy assessment of the building, followed by implementation of the most cost effective energy efficiency measures.

2.1 Setting up an Energy Management Committee (EMC)

Each Ministry needs to set up an Energy Management Committee (EMC), chaired by the Accounting Officer of the Ministry or a designated representative from Senior Management. The EMC plays an important role in ensuring the success of an Energy Conservation and Efficiency (ECE) Programme.

The Committee should include, as members, Heads of all the departments falling under the Ministry including the Manager Human Resources, Manager Financial Operations and Manager Procurement Services. The presence of key stakeholders on the Committee signals that there is strong Top Management commitment and provides the required support to the ECE programme.

The Committee should meet at least once every three months to take stock of progress made in the ECE Programme. The EMC is also expected to facilitate implementation of suitable projects and follow up on the implementation of Energy Conservation and Efficiency Measures identified by the Ministry and its Departments.

2.2 Setting up of an Energy Management Team (EMT)

The next step is for each department to set up an Energy Management Team (EMT) so as to foster a sense of inclusiveness from all employees in energy conservation and efficiency.

The Energy Management Team will identify ECE programmes and report to the Energy Management Committee. The team can oversee the assessment, implementation, and review of the ECE programme at departmental level.

The EMT will monitor the implementation process to ensure that all key tasks are being followed through by internal staff and contractors. They can also be involved in helping to establish a reasonable measuring and verification process. It is also recommended that they provide an on-going review of Energy Conservation and Efficiency Measures to ensure existing measures are being undertaken fully, and that new measures implemented are periodically reviewed.

The EMT should be chaired by the head of the department with members as listed below:

- Director/DPS/Officer in Charge
- One officer from the HR department
- One officer from the Finance department
- One officer from the Procurement department
- One officer responsible for maintenance of the facility
- One officer for the Office Auxiliary Cadre

While the composition of members can vary depending on the functions of the department, it should be chaired by the Head of Department. The EMT should meet at least once every month.

The functions of the EMT will be to:

- a) Introduce this budget measure to officers and explain its procedure;
- b) Demonstrate commitment to the initiative through signature of the individual pledge and setting an example by following the pledge;
- c) Identify suitable Energy Conservation and Efficiency Measures that can be implemented at the respective levels;
- d) Communicate energy efficiency tips and Energy Performance Indicators (EnPI) to staff regularly. EnPIs are one means of determining a reduction in electricity consumption and

understanding its energy efficiency trends. Example of EnPIs are: electricity consumption per visitor, electricity consumption per employee, electricity consumption per square metre. The Energy Management Tool (Annex 7) available on the website of the EEMO calculates the EnPIs once populated with appropriate data.

2.2.1 The functions of each member of the EMT will be as follows:

Head of Department

The role of the Head of Department will be to ensure that members of the EMT fulfil the tasks assigned to them through regular monitoring meetings. The Head of Department, as leader of the EMT, will be required to sign the Organisation Pledge (Annex 1) and ensure that it is affixed in a conspicuous place in the building. The Organisation Pledge can be customised to better represent the institution.

Human Resource Department

Some of the tasks assigned to the HR Department will be as follows:

- a) To circulate the Individual Pledge (Annex 2) to each officer and ensure same is filled and affixed in a conspicuous place in the office of the Officer;
- b) To circulate to all staff the energy saving tips (Annex 3) and the EnPIs achieved each month
- c) To print the required number of stickers (Annex 4) and distribute to all departments. The EMT can adopt another format for the stickers which they find more appealing and to which the staff would relate the most;
- d) To act as the liaison officer with the EEMO for scheduling of informative talks; and
- e) To participate fully at the level of the EMT.

Finance Department

Some of the tasks to be fulfilled by the Finance Department will be as stated below:

- a) To fill in the Energy Management Tool (Annex 7), in order to calculate the average electricity consumption of the last two years of the department and EnPIs;
- b) To generate a time graph using the Energy Management Tool;
- c) To communicate Energy Performance Indicators (EnPIs) to the EMT and HR department;
- d) To submit to the EEMO the Survey Form (Annex 4); and
- e) To participate fully at the level of the EMT.

Procurement Department

Some of the tasks to be fulfilled by the Procurement Department will be as follows:

- a) To ensure that appliances which are procured include energy efficiency specifications (Annex 8);
- b) To ensure that maintenance agreements for energy consuming appliances are in place and being followed; and

- c) To participate fully at the level of the EMT.

Officer responsible for maintenance of the facility

Some of the tasks assigned to the Officer will be as follows:

- a) To carry out a survey to determine the total surface area of the building if the information is not already available;
- b) To survey existing equipment and fill in the Survey Form (Annex 4) accordingly;
- c) To submit the Survey Form to the Finance Department; and
- d) To participate fully at the level of the EMT.

Office Auxiliary

Some of the tasks assigned to the Office Auxiliary are as follows:

- a) To ensure ACs, lights and other appliances are switched off in unoccupied offices;
- b) To affix the required number of stickers;
- c) To replace detached stickers and those which have been defaced; and
- d) To participate fully at the level of the EMT.

2.2.2 Tasks to be undertaken by the EMT

a) Baseline data collection

After formation of the EMT, the next step is to gather preliminary data related to the building and its energy consumption. Preliminary data collection helps develop the energy baseline, and specifies the basic information gathered before a programme/project begins. The baseline is then used to provide a comparison for assessing the effect of the programme/project. The purpose is to monitor and assess the progression and effectiveness of the ECE activities. The baseline establishes the level of energy consumption before an ECE measure is implemented. Each energy-consuming equipment, process or activity has a baseline energy use level. Once these are combined together, they form the overall baseline for the building. The Energy Management Tool and Survey form may be used for this step.

b) Walk-Through Energy Audit

A walk-through energy audit, as the name suggests, starts with a walk around the building to study the building envelope and services. It is a process used to establish an overall picture of the potential of energy savings through visual inspection of the premises including air conditioning system, lighting, metering, maintenance and other factors affecting energy consumption of the building.

Building features such as building wall colour, external sun-shading devices, window screens and tint are noted. The survey inside the building would include confirmation that the air-conditioning and other systems are being properly operated and maintained; and any additions or alterations are noted. The type and condition of the windows, effectiveness of window seals, typical lighting and

power requirements, office equipment, pumping and water heating requirements, occupancy and space usages are also noted. System and plant data can be obtained by a visit to the mechanical and plant rooms.

After evaluating the results of the walk-through energy audit, Energy Conservation and Efficiency Measures can be listed.

c) Identify Energy Conservation and Efficiency Measures

An Energy Conservation and Efficiency Measure represents an installation or modification of an installation or a remodelling of, in an existing building in order to reduce energy consumption and operating cost. Energy Conservation and Efficiency Measures can also be in the form of change in current operating procedures resulting in energy savings without compromising the comfort and efficiency of the building occupants.

Energy Conservation and Efficiency Measures can be at no cost, a small expense, or a more significant investment; it depends on the magnitude of the action taken to conserve energy and reduce waste. Similarly, returns from Energy Conservation and Efficiency measures can be high, medium or low, irrespective of the associated costs.

Typically, in public buildings, lighting, heating and cooling, and use of office equipment consumes the most energy, consequently energy savings can be achieved by implementing Energy Conservation and Efficiency Measures around these building systems. The list of tips may be used as a start to identify such measures.

d) Evaluation of savings

The payback period is generally used for evaluation of the return on investment. Calculating the payback period helps management assess the financial viability of Energy Conservation and Efficiency Measures.

Simple payback is a basic calculation for each measure implemented; it indicates the number of years taken to pay back the investment. Evaluating cost effectiveness of a large investment over time requires more complicated net present value or life cycle cost methods. This guideline focuses on simple payback period as it is the least complicated method, and can be used for a quick evaluation as well as budget planning. The shortest payback period is generally considered to be the most acceptable.

Calculating the payback period involves the cost of investment divided by energy saving. If there is a financial subsidy for efficiency investments, it should be subtracted from the total investment cost. Detailed calculations may include operating expenses such as regular maintenance cost and replacement of parts.

$$\text{Simple Payback} = \frac{\text{Cost of Investment} - \text{Financial Subsidy}}{\text{Annual Energy Savings} - \text{Operating Expenses}}$$

Example:

A public body operating on a five-day basis per week (i.e. Monday to Friday) wants to replace all of its fluorescent tubes with LED tubes. There are 100 tubes in total. To replace fluorescent tubes with LED tubes, the retrofit needs to include the labour cost to disconnect the ballasts at Rs 20 per tube. Each LED tube cost Rs 100. The lights are operated 6 hours daily. Fluorescent tube lamp consumes 36W + 10W ballast loss. LED tubes consume 18W. The cost of electricity is taken as Rs 5/kWh.

Investment cost	= 100 tubes x Rs 100 = Rs 10,000
Watts saved	= 100 tubes x (46W-18W) = 2,800W
Energy saving	= Number of operating hours x watt saved = (260 days x 6 hours) x 2,800 W = 4,368,000 Wh per year = 4,368 kWh per year
Simple Payback	= (Rs 120 x 100 lamps) / (4,368 kWh x Rs 5/kWh) = 12,000/ 21,840 = 0.55 years

The proposed retrofit has a return on investment within one year and is considered a worthwhile project.

3.0 Tools

The following are being enclosed for providing support to the public institutions in their endeavour to reduce their electricity consumption:

1) Organisation Pledge (Annex 1)

The Organisation Pledge is the commitment undertaken by Top Management for reducing electricity consumption in their institution. The aim of the Organisation Pledge is one of the ways to show commitment from Top Management.

2) Individual Pledge (Annex 2)

The Individual Pledge is the commitment to be undertaken by each officer, the aim of which, is for each officer to feel a sense of responsibility towards achieving the common goal of reducing electricity consumption. It comprises a list of energy saving measures classified under different electrical appliance. The officer has to choose two from each classification which he takes the pledge to accomplish.

3) Energy Saving Tips (Annex 3)

This is a list of energy saving measures. It consists of tips that are applicable to an individual, a group and those that apply to management only.

4) Stickers (Annex 4)

These stickers are provided to be affixed near switches for lights and air conditioners. Management can choose another format or re-adapt the ones provided.

5) Survey Form (Annex 5)

A basic survey of the premises has to be conducted and the relevant data filled in the form. This form has to be submitted to the EEMO along with the first submission of the filled-in Energy Management Tool.

6) Specifications for Electrical Appliances (Annex 6)

These are key Energy Efficiency specifications to be included in technical specifications used for the procurement of appliances to ensure Energy Efficiency is taken into consideration.

7) Energy Management Tool (Annex 7)

The Energy Management Tool is an excel document which needs to be filled in with data extracted from CEB Bills and is used to determine the Energy Performance Indicators of the building. The tool also provides for a dashboard which can be used for monitoring the monthly electricity consumption and EnPIs of the organization. The Energy Management Tool should be submitted to the EEMO every six months.

8) Energy Management Tool Manual (Annex 8)

The Energy Management Tool Manual as the name suggests is a manual providing instructions on how to fill in the Energy Management Tool. The purpose of the manual is to help the user to fill in the Energy Management Tool.

4.0 EEMO support

The EEMO will also be available for conducting talks on energy conservation and energy efficiency in order to help the staff have a better understanding on the process of reducing electricity consumption. The EEMO will also provide a grounding on how to carry out a walk through audit during the talks.

Request to conduct talks can be sent through email on eemo@govmu.org

The Energy Management Tool as well as forms referred to in Annex 1 to 6 can be downloaded on the website of the EEMO at: <https://eemo.govmu.org/Pages/default.aspx>