MAXWELL STAMP PLC

Energy Efficiency / Demand Side Management Master Plan and Action Plan

Technical Support to the Ministry of Energy and Public Utilities

Revised

Prepared For:

The Ministry of Energy and Public Utilities / Agence Francaise de Developpement

6th May 2016

Contents

List of Abbreviations

Abbreviation	Definition
AFD	Agence Française de Développement
AOSIS/SIDSDOCK	Alliance of Small Island States / Small Island Developing States (SIDS) Sustainable Energy and Climate Resilience Initiative
AP	Action Plan
BEMS	Building Energy Management System
CDM	Clean Development Mechanism
CEB	Central Electricity Board
CFL	Compact Fluorescent Lamp
DST	Daylight Saving Time
DSM	Demand Side Management
EAMS	Energy Audit Management System
EE	Energy Efficiency
EEBR	Energy Efficiency Buildings Regulations
EEMO	Energy Efficiency Management Office
ESCO	Energy Service Company
ESD	Energy Service Division of Ministry of Public Infrastructure and Land Transport
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GOM	Government of Mauritius
GWh	Giga Watt Hours
GVA	Gross Value Added
JEC	Joint Economic Council
IAEA	International Atomic Energy Agency
IEM	Institute of Engineers Mauritius
LPG	Liquefied petroleum gas
MAED	Model for Analysis of Energy Demand
MBEAT	Energy Audit Software Tool
MEPU	Ministry of Energy and Public Utilities
MID	Maurice Ile Durable
M&SMEs	Micro, Small and Medium Enterprises
MSB	Mauritius Standards Bureau
NEEP	National Energy Efficiency Programme
NEF	National Empowerment Foundation
NHDC	National Housing Development Company

OTEC	Ocean Thermal Energy Conversion
RECP	Resources Efficiency and Cleaner Production
SCP	Sustainable Consumption Production
SWOT	Strengths, Weaknesses, Opportunities, Threats
SMEDA	Small and Medium Enterprises Development Authority
SWH	Solar Water Heater
SUNREF	Green Lending Scheme Mauritius
UNDP	United Nations Development Programme
UNOPS	United Nations Office for Project Services

1. Project Synopsis

Project objectives:

The objective of the project 'Technical Support to MEPU' is to provide capacity building to MEPU, the Energy Efficiency Management Office (EEMO) and the Central Electricity Board (CEB) of Mauritius in energy planning, energy demand forecasting and the development of strategies, action plans, regulation and incentive schemes in energy, renewables and EE.

In addition, the project will address the main barriers in energy planning, renewables and EE and determine the necessary tools for the energy planning. In light of this, scenarios for energy demand will be developed and forecasts of energy demand will be elaborated using the proposed tools. Options for measures and incentives to strengthen the introduction of renewables and EE will also be investigated and assessed. Moreover, an assessment of the EE potential will be drafted. The Long Term Strategy and Action Plan will be updated and Master Plans and Action Plans for renewables and for EE will also be developed. In addition, a grid expansion plan will be developed and training on this will be delivered as part of the integrated energy planning.

During the project incentive schemes and financial mechanisms for renewables and EE will be analysed and recommendations made to enhance the legislation, regulatory and incentive framework. Recommendations to design an awareness raising campaign in EE will also be provided.

The project will take into consideration the existing experience in energy planning and energy demand forecasting as well as the existing legislative and regulatory framework, and enhance these and train the beneficiaries. Several limitations and constraints will also be considered and the activities of the project will be adjusted to take them into account, proposing solutions in parallel.

Key Planned outputs:

Energy demand forecasts, updated Long Term Energy Strategy and Action Plan 2015-2030, Grid Expansion Plan, Renewable Energy Master Plan and Action Plan 2015-2030, Energy Efficiency Master Plan and Action Plan 2015-2030, Assessment of EE potential, trained MEPU, EEMO and CEB staff.

Beneficiaries:

Ministry of Energy and Public Utilities (MEPU), Energy Efficiency Management Office (EEMO), Central Electricity Board (CEB)

Project starting date: 22nd June 2015

Project duration: 39 weeks (up to 18th March 2016)

2. Executive Summary

2.1 Introduction and contents of the EE/DSM Plan

The document's objective is to update the existing Energy Action Plan 2011-2025 regarding energy efficiency and demand side management by incorporating new measures that will be implemented during the period 2016-2030. The relevant measures already included in the Energy Action Plan 2011-2025 will continue to be implemented. The updated Action Plan will be called Energy Efficiency and Demand Side Management (EE/DSM) Master Plan 2016-2030. Hence, the EE/DSM Master Plan starts from the existing Energy Action Plan and builds upon it to expand the set of EE/DSM measures.

The organization of the reports is as follows:

- Chapter 1: Synopsis of the project 'Technical Support to MEPU'
- Chapter 2: Executive Summary
- Chapter 3: Introduction to the EE /DSM Master Plan. This chapter also includes the description of the objectives of the Master Plan as well as the underlying philosophy of it. The philosophy includes the priorities and the prerequisites for the successful implementation of the Master Plan. It also analyses the main justification for the proposed EE measures.
- Chapter 4: Existing framework conditions in EE/DSM. This chapter summarizes the existing strategies and policies in the EE sector and the initiatives that have been implemented or are on-going. In addition, the barriers and the SWOT analysis of the EE sector will be summarized to establish the link between the current situation in the EE sector, the current barriers and the proposed EE/DSM measures that will contribute to the alleviation of the barriers.
- Chapter 5: The methodology for developing the Master Plan. The methodological tools that were used to derive the proposed EE measures will be described and their application to the specific case analyzed. These tools were used as aid to thinking and organizing the concepts in order to identify the problems and establish the relationships between the causes of the problems, the problems and theirs consequences (cause-effect relationships).
- Chapter 6: The Logical Framework Approach (LFA). LFA is an analytical process used to support project planning and management. It is used extensively by the European Commission in designing, implementing and monitoring projects and large programmes. The method involves the presentation of the results of analysis in such a way that it is possible to set out the programme's or project's objectives in a systematic, logical and structured way. This should reflect the causal relationships between the different levels of objectives, define the activities needed to implement the objectives, monitor the progress of the activities, check whether these objectives have been achieved, and establish what assumptions outside or inside the control of the programme or project may influence its success. Based on the barriers, the SWOT analysis and the cause-effect relationships, the intervention logic is described and explained using the LFA. The LFA explains the links between the overall objective of the energy strategy of Mauritius (which is reflected in the Master Plan), the intermediate objectives, the expected results and the proposed EE/DSM measures. Further, the link between the barriers and the proposed EE measures is also explained. The LFA is also used as a monitoring tool because it includes monitoring indicators to check the progress of the proposed measures and the achievement of the objectives.
- Chapter 7: Proposed EE/DSM measures. EE/DSM measures are categorized according to the major sectors: industry, services, households, public sector and transport. Furthermore, horizontal measures that impact more than one sector are described. The

impacts of the measures in energy savings per sector are quantified.

2.2 Objectives and philosophy of the EE/DSM Master Plan

The EEMO has done important work on the energy efficiency so far and they should continue to carry out this work. The Master Plan is building on its past and current work and the existing Action Plan so that the latter is enhanced with additional measures.

The objectives of the EE/DSM Master Plan are the following:

- Provide to the EEMO, which is the main institution in the EE sector, the sufficient staff and capacities to implement the Master Plan and further develop the EE sector,
- Build and populate a database on the existing technologies, materials, equipment and systems in all sectors and the building stock to increase the quality of planning,
- Generate sustainable energy savings by increasing the number of EE investments in all sectors via the development of the enabling environment, the cooperation of the public sector with the local banks and the provision of targeted financial incentives and technical assistant to project developers,
- Assist the private sector to acquire information, capacities, experience and implement more EE projects via the exemplary initiatives of the public sector,
- Develop and contribute to the growth of the market for EE services and technologies thus, contributing to the creation of employment and economic growth,
- Nourish the energy efficient behaviour as a lifestyle.

The EE/DSM Plan Master emphasizes EE/DSM measures that broadly reflect policies, not specific measures to substitute a single technology with a more efficient one. The reason for this is the lack of data on the current situation. The policy measures that are proposed in the EE/DSM Master Plan support the implementation of integrated EE/DSM solutions not just EE/DSM measures in a single technology. These solutions usually cover more than one technology and more than one energy use. Moreover, policy measures tend to be broader than targeted technological substitution, aiming at changing the awareness, education and behaviour of the energy consumers towards the use of energy in the every-day life. Therefore, integrated policy measures have advantages as compared to single technology substitution measures: they lead to deeper and sustainable energy savings by implementing more technologically advanced measures involving a wider spectrum of technologies and end uses as well as changing behaviors. Thus, they create markets for EE/DSM services and products more effectively than single technology measures. Additionally, the philosophy of the EE/DSM Master Plan envisages the growth of the private market for EE/DSM services and products. This is also an additional reason that integrated EE/DSM measures, which support a wide range of technologies and services over a wide range of sectors, are proposed.

EEMO is a very important player in the EE sector and has a scientific and technical mandate that puts it responsible for the implementation of large part of the Master Plan and the leadership in the development of the sector. EEMO is called upon to implement and manage scientifically and managerially complex technical projects according to the requirements of its mandate. To achieve its mandate the following should be considered as priorities and prerequisites:

- Complete the organisation structure of EEMO and start the recruitment process, according to the staffing needs stemming out of its mandate and the needs of the Master Plan.
- Engage in continuous and long-term capacity building of existing and new staff of EEMO which includes theoretical and practical training programmes in subjects conducive to its mandate.
- The necessary funds for the above two activities are available.

Hence, the respective measure of the Master Plan that foresees the capacity building of EEMO is a priority.

The partnership and co-operation with a more advanced organisation in EE/DSM can be very beneficial for EEMO. In line with this, EEMO should seek to make long-term partnerships and alliances with more advanced institutions in order to benefit from the transfer of knowledge and know-how to enhance the capacities of its experts.

Another priority for the EE/DSM sector is to create a system to collect data on the technologies, materials and systems used and their energy characteristics, efficiencies, processes and energy use per type of process technologies as well as data on the building stock. The lack of such data poses hurdles to the optimal planning and decision making as well as the informative monitoring and evaluation of strategies, policies and action plans. Therefore, the measure of the Master Plan that foresees the establishment of such a system should be treated as a priority.

Currently, financial support to the private sector for the implementation of EE/DSM projects is given by two programmes: the National Energy Efficiency Programme (NEEP) and the AFD credit line programme (SUNREF). Mostly, larger companies reap the benefits of these financial support programmes. SMEs seem unable to exploit these funding mechanisms because of their lack of liquidity and low creditworthiness. In addition, EE investments are perceived as highly risky by the local banks and the latter ask for high collaterals with the companies cannot give. Moreover, there is no financial support scheme for the residential sector apart from the support scheme for the solar water systems. In light, of the above, it is clear that the development of the EE sector needs financial resources to provide the funding for EE measures. There is also the need to manage these financial resources and create financial products that can alleviate the barriers described above. Besides, a greater need for the development of the EE sector is to avoid fighting for funds within the system of governmental budget allocations to various sectors/activities. Therefore, the establishment of an EE Financing Scheme is proposed. The Financing Scheme would integrate and manage the funds available for financing the measures for the development of the EE sector, including the measures of the EE Master Plan. The funds could come from governmental budget appropriations, grants of international donors, taxes, public benefit charges, or any other source. The Financing Scheme could also integrate and manage the funds for RE projects. The Financing Scheme could be a funding line within the governmental budget combined with a managing committee that decides how the funds will be spent. A wide array of initiatives can be financed: the Master Plan, other incentives, pilot projects, research and development projects, EE projects in the public sector and other initiatives. The governmental or other funds of within the Financing Scheme can also be combined with donor funding to design bigger and more influential projects. The establishment of the Financing Scheme should be considered as a priority to secure the funding of the EE measures.

The private sector needs to be kick started by providing incentives, information and demonstrations of the benefits of investing in new, more efficient technologies. Therefore, the public sector should allocate the appropriate funds and use its prominent position to set the example by managing the energy in the public buildings, fund and implement complex technical projects, EE/DSM action plans for the public buildings and pilot projects in EE/DSM to demonstrate new technologies. In addition to the above, the EE measures that can be implemented in the public sector can bring quick energy savings. The reasons for this are: a) several public buildings in which the measures can be applied are under the absolute control of the public authorities (no other parties have interest in the buildings), b) the implementation of the measures can be quick since no external factors or parties are involved, c) there is no need for consultation, awareness to inform and sensitivise consumers or target groups that are involved in the EE measures. Moreover, the measures in the public sector will create the market for EE services, studies and technologies and lead to new the generation of growth and new jobs. For the reasons above, the public sector measures should be one of the priorities of the Master Plan.

Voluntary agreements are "a contract between the government and industry or services sector, or negotiated targets to improve EE with commitments and time schedules on the part of all participating parties". Sustainable and continuous energy savings in energy-intensive companies of

the private sector can effectively be achieved when conditions of continuous cooperation, dialogue and consensus exist between the government and the companies. Furthermore, the private sector needs technical assistance and incentives (such as tax credits or facilitation to environmental licensing or avoidance of obnoxious sanctions of not meeting energy saving targets) to proceed with EE investments. Voluntary agreements set a framework for both parties, the government and the companies, to negotiate their commitments and agree on them. Hence, the companies commit to improve their EE and carry out EE investments while the government to support them in carrying out EE investments and reward them for achieving their targets. Thus, the voluntary agreements provide the vehicle for continuous and sustainable energy savings and continuous improvement of EE practices in the companies. To companies will be motivated to engage in voluntary agreements mainly because of the reduction of their energy cost and, subsequently, of the production cost by implementing cost-effective EE measures that do not compromise their competitiveness. Further, the companies will receive technical assistance, incentives, avoidance of unwanted sanctions or taxes in order to implement EE investments under the voluntary agreements. Once targets are met, the companies can be rewarded by public recognition, thus, free marketing. Furthermore, the voluntary agreements are tools to develop long-term plans for improving EE, train company staff in energy management and change the behaviour in energy use, thus, achieving sustainable and long-term energy savings. From the side of the government, they would like to find measures to improve the energy efficiency of the large consumers in order to save on the energy imports and protect the environment without overburdening the companies. The voluntary agreements ensure that energy-intensive companies implement measures to improve their EE and do this continuously for long periods. The voluntary agreements can also be used by the government as an instrument that contributes to the realisation of the national EE and/or environmental policy. Finally, the voluntary agreements will increase the demand for EE technologies and services, thus, decisively grow the EE sector contributing to the growth of the economy. Therefore, the start for the establishment of voluntary agreements should be made as soon as possible considering not only their importance in energy savings and in the development of the sector but also the fact that their preparation and negotiation may be long. Therefore, the voluntary agreements should be regarded as priority.

Awareness of EE/DSM in all sectors needs to be improved. EEMO is doing important work in designing and conducting awareness campaigns on EE/DSM. The implementation of awareness campaigns by EEMO should continue independently whether these are included as measures in the EE/DSM Master Plan or not.

The design and implementation of EE/DSM policies and action plans as well as the planning in the energy sector necessitates strong and regular communication with stakeholders and consumers from all sectors (industry, services, tourism, residential, banks, NGOs, business associations, utilities, etc). This arises from the need of the planners to know their problems as well as their roles and capacities in order to design effective EE/DSM policies. The stakeholders and consumers are vital players in the implementation of the measures and without their co-operation neither the planning nor the implementation of EE policies and measures will be successful. Therefore the EEMO should establish strong and sustainable communication channels with the stakeholders and the consumers in all sectors and cooperate with them as equals in the planning and implementation phase.

The EE/DSM initiatives being implemented in the recent past, the ones that are on-going, the future initiatives as well as the work of EEMO are significant steps forward in order to build the enabling environment for the sector and finally to build the sector itself. The proposed new measures of the EE/DSM Master Plan will be additional to the existing and future measures/initiatives/projects and will build on the experience gained so far by MEPU and EEMO. In this way, the positive impacts of the existing measures will not be lost.

2.3 The proposed EE/DSM measures

Code	Proposed EE measure	Description	Cost (MUR)[1]	Responsibility	Timeline
Horizontal measures					
H1	Establishment of an EE/RE Financing Scheme	EE/RE Financing Scheme to promote and enhance commercial financing for EE/RE projects. The EE/RE Financing Scheme will provide partial credit guarantees for EE investments and subsidise interest of loans for EE investments and energy audits. The target group will be mostly SMEs.	18,318,993,600 (total estimated budget requirements until 2030)	MEPU and Managing Committee of the EE/RE Financing Scheme	The implementation of the measure should start after the completion of the energy audit management scheme. A pilot phase can last during 2016-2018.
H2	Establishment of an EE Information Centre for companies	Establish an information centre on EE for companies and especially for SMEs to collect, organise, create and disseminate information and raise awareness.	120,000,000	MEPU and EEMO	Starting in 2017 and completion in 2019. The operation shall be on-going thereafter.
H3	Energy Information System	Development of an Energy Information System that will be used as central data point for energy planning, monitoring	20,000,000	MEPU and EEMO	Starting in 2018 and completion in 2020.

[1] The cost of each measure in the EE Master Plan and the total cost are estimations. During the design of each measure, a detailed cost determination should be carried out. Moreover, the cost of each measure depends on the way it is implemented and the tasks that it includes. This should be detailed in the design phase of the measure.

		and energy information dissemination.			
H4	System for data collection surveys	Creation of a system to conduct surveys in order to periodically collect information on the technologies used and efficiencies and the building stock.	8,000,000	MEPU, EEMO, Statistics Mauritius	Starting in 2016, on-going thereafter.
H5	Energy performance of buildings – Update of building codes	Update the building codes, update the technical specifications of new public buildings and develop the respective regulations.	Funded by UNDP	Ministry of Public Infrastructure and Land Transport	The implementation of the measure has started in July 2015 and is expected to be completed in March 2016.
H6	Introduction of energy performance contracting	Develop regulatory framework, contracts and technical documents for energy performance contracting.	24,000,000	MEPU and EEMO	Starting in 2020 and completion in 2022.
H7	Market research and display of certified energy efficient products	Research the market for certified EE products and display these products and their suppliers on a website.	6,000,000 (surveys, development of website) 80,000 (yearly for website update)	MEPU and EEMO	Starting in 2018, on-going thereafter.
H8	Development of the skills of installers	Develop and deliver training schemes for installers in technologies for the building envelope (insulation, efficient windows etc.), HVAC, lighting, solar water heaters, industrial technologies, etc.	32,000,000	MEPU/EEMO, Ministry of Education and Human Resources, Tertiary Education and Scientific Research, Ministry of Labour, Industrial Relations, Employment and Training, Ministry of	Starting in 2017 and competed in 2019. The training to the installers will be on-going thereafter.

				Public Infrastructure and Land Transport, Mauritius Institute of Training and Development (MITD), Mauritius Qualifications Authority, Mauritius Accreditation Service MAURITAS	
H9	Establish co-operation between EEMO and SMEDA for training of SMEs in EE	SMEDA cooperates with EEMO to include training in EE and energy management to the managers of SMEs in its training programmes.	4,000,000	EEMO and SMEDA	Starting in 2017, on-going thereafter.
H10	Establishment of a centre for EE/DSM training within EEMO	A training centre would be established within EEMO in order to provide professional training for professionals in EE (energy auditors, energy managers, engineers, suppliers of technologies, etc.) to cover the needs of the Mauritian market.	The cost of development of the training material is estimated to be MUR 4,000,000 if the EEMO is supported by an external consultant to prepare it. The development of the webpages will cost MUR 200,000 while their update MUR 40,000 per year. All these equal to MUR 4,800,000 until 2030	EEMO	The training centre should be established after EEMO receives the long-term capacity building. Estimated start in 2018 and be on-going thereafter.
H11	Introduction of EE in school curricula	Introduce EE in educational curricula in schools as the follow up of the awareness campaigns.	12,000,000	EEMO, Ministry of Education and Human Resources, Tertiary Education and Scientific Research,	Starting in 2016, on-going thereafter.

				Mauritius Institute of Education (MIE)	
H12	Twinning project to enhance the capacities of EEMO	Build capacities of EEMO and exchange knowledge, experience and technologies via a long-term co-operation commitment in science and/or research between EEMO and another counterpart, more advanced, institution(s) with similar characteristics or mandate.	97,957,000	EEMO and counterpart institution(s)	Starting in 2016 and completion in 2018.
H13	Establish technical specification for solar water heaters entering the Mauritian market	Set technical specifications for the energy performance and quality of the SWHs imported in Mauritius.	4,000,000	Mauritius Standardisation Bureau	Starting in 2016 and completion in 2017.
H14	Development of minimum energy performance standards (MEPS) for electric appliances	Development of MEPS for refrigerators, electric oven, dish washer, air-conditioner, tumble dryer, electric lamps, and washing machines within the project 'Technical Support to the Energy Efficiency Management Office'.	Funded by UNDP	EEMO and Mauritius Standards Bureau	Started in July 2015.
H15	Energy labelling	Enforcement of energy labels for refrigerators, dishwashers and electric ovens.	Funded by the Government of Mauritius	EEMO and Mauritius Standards Bureau	Starting May/June 2016, on-going thereafter.
H16	Establishment of EE/DSM working groups and	Set up of working groups in the subsectors to improve planning, exchange experience, lessons	20,000 per meeting	MEPU and EEMO	Starting in 2017, on-going thereafter.

	networking in different subsectors for EE/DSM planning	learned and information, as well as to initiate a structured approach for regularly engaging stakeholders in planning.			
Measures in industry					
I1	Establishment of voluntary agreements with industrial companies	Establishment and operation of voluntary agreements with companies which are large consumers in the industry and the services sectors to reduce energy consumption.	Establishment of a voluntary agreement scheme: MUR 5,440,000 establishment of a computerized data-based monitoring system: MUR 8,000,000 Management and operation cost of the voluntary scheme MUR 14,000,000 per year	MEPU and EEMO	Starting in 2016, on-going thereafter.
Measures in services					
S1	Energy efficiency awareness and information campaign for buildings and technologies used of the services sector	Awareness and information campaign for private sector buildings in the services sector as well as technologies used in commercial sites such as communication/call centres, banks, healthcare, recreational and cultural entities.	11,771,845	MEPU and EEMO	Starting in 2017 and completion in 2018
S2	Design and conduct a feasibility study on self-generation for hotels	Design and conduct a study to assess the technicalities and feasibility of disconnecting hotels from the grid and generate the electricity they need locally at system peak	8,000,000	CEB, hotels with private generators	Starting in 2018 and completion in 2019.

		hours.			
S3	Design and conduct a feasibility study on the use of Building Energy Management Systems (BEMS) in hotels and commercial buildings to reduce energy consumption	Design and conduct a study to assess the technicalities and feasibility of hotels or service businesses using Building Energy Management Systems (BEMS) to lower consumption during system peak hours.	8,000,000	CEB, hotels, commercial buildings	Starting in 2019 and completion in 2020.
Measures in households					
HL1	Governmental Programme for financing EE interventions in residential buildings	Governmental Programme for financing EE interventions in residential buildings which applies a combination of subsidy and soft loans for supporting the implementation of the energy audits and EE measures.	23,040,000,000 (required funds until 2030)	EEMO, local financial institutions	Starting in 2018. The completion of the measure depends on the availability of funds.
HL2	Energy efficiency awareness and information campaign for households	Awareness and information campaign for households to promote the Governmental Programme for financing EE interventions in residential buildings.	24,990,000	MEPU and EEMO	Starting in 2018 (when the Governmental Programme for financing EE interventions in residential buildings will start) and completion in 2019.
HL3	New Solar Water Heater Scheme for	Programme for providing subsidy to the initial cost of solar water heaters for the	100,000,000	Ministry of Public Infrastructure and Land Transport,	Started in 2014 and it is on-going. The completion depends

	households	residential sector.		National Empowerment Foundation (NEF), Ministry of Housing and Lands	on the availability of funds.
Measures in public sector					
P1	Appointment of energy managers in public buildings	Introduce energy managers in all public buildings; train existing technical staff as energy managers on monitoring and managing energy in buildings and developing energy management plans.	The cost of the measure will be included in the existing public budget appropriations already allocated to the implementing entities. The cost depends on the numbers and salaries of the energy managers.	MEPU/EEMO and line Ministries responsible for each public building	Starting in 2016, on-going thereafter.
P2	Energy efficiency in street/public area lighting	The main objective of this measure will be to get a standard and a design guideline for Mauritius for street and lighting in external lighting of public areas.	Under preparation	EEMO and municipalities	Starting in 2016. Estimated completion in 2018
P3	Energy efficiency in water pumping	Development of an action plan for EE in water pumping.	Under preparation	Central Water Authority and municipalities	Started in 2015. Estimated completion in 2017.
P4	Develop an action plan for EE/DSM interventions in public schools	Creation and implementation of an action plan for EE interventions in public schools.	32,000,000	MEPU and EEMO	Starting in 2016 and completed in 2017.
P5	Develop an action plan for EE/DSM interventions in	Creation and implementation of an action plan for EE interventions in local authority	32,000,000	MEPU and EEMO	Starting in 2016 and completed in 2017.

	local authority buildings	buildings.			
P6	Develop an action plan for EE/DSM interventions in public buildings of Central Government	Creation and implementation of an action plan for EE interventions in public buildings of Central Government.	32,000,000	MEPU and EEMO	Starting in 2016 and completed in 2017.
Measures in transport					
T1	Financial incentives to promote electric vehicles	Provision of financial incentives for facilitating the purchase and use of vehicles (passenger cars, motorcycles, bicycles, heavy vehicles) and construction of vehicle recharging points (RE-powered and/or conventional)	A study is needed to establish the budget	Ministry of Public Infrastructure and Land Transport, National Transport Authority	Starting 2017 and be on-going. The duration depends on the availability of funds.
T2	Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (more energy efficient vehicles, vehicles fuelled by biofuels and hybrid vehicles)	The purpose of the measure is to provide financial and tax incentives to replace old energy-intensive vehicles with new, state-of-the-art ones and to promote energy efficient vehicles.	A study is needed to establish the budget	Ministry of Public Infrastructure and Land Transport, National Transport Authority	Starting 2017 and be on-going. The duration depends on the availability of funds.
		Total cost (until 2030)	**42,065,172,445**		

3 Introduction

3.1 Purpose of the report

This document aims to update the existing Energy Action Plan 2011-2025 regarding energy efficiency and demand side management by adding measures to it that will be implemented during the period 2016-2030. The relevant measures already included in the Energy Action Plan 2011-2025 will continue to be implemented. The updated Action Plan will be called Energy Efficiency and Demand Side Management (EE/DSM) Master Plan 2016-2030. Hence, the EE/DSM Master Plan starts from the existing Energy Action Plan and builds upon it to expand the set of EE/DSM measures.

In order to establish the link between the current situation in the EE sector, the current barriers to its development and the proposed EE/DSM measures that will contribute to the alleviation of the barriers, the existing framework of the EE sector and the barriers will be summarized first[2] . The SWOT analysis is repeated in this report for the facilitation of the reader.

Based on the barriers and the SWOT analysis, the intervention logic will be described and explained. To facilitate this, the Logical Framework Approach will be followed which will explain the links between the overall objective of the energy strategy of Mauritius (which is reflected in the Master Plan), the intermediate objectives, the expected results and the EE/DSM measures. Further, the link between the barriers and the proposed EE measures is also explained.

The description of the proposed EE/DSM measures follows. EE/DSM measures are categorized according to the major sectors: industry, services, households, public sector and transport. Furthermore, horizontal measures that impact more than one sector are described. The description of each EE measure includes an outline of its implementation approach. Finally, monitoring indicators are defined for each measure as well as the sources of verification of them.

3.2 Objectives and philosophy of the EE/DSM Master Plan

The EEMO has done important work on the energy efficiency so far and they should continue to carry out this work. The Master Plan is building on its past and current work and the existing Action Plan so that the latter is enhanced with additional measures.

The objectives of the EE/DSM Master Plan are the following:

1. Provide to the EEMO, which is the main institution in the EE sector, the sufficient staff and capacities to implement the Master Plan and further develop the EE sector,
2. Build and populate a database on the existing technologies, materials, equipment and systems in all sectors and the building stock to increase the quality of planning,
3. Generate sustainable energy savings by increasing the number of EE investments in all sectors via the development of the enabling environment, the cooperation of the public sector with the local banks and the provision of targeted financial incentives and technical assistant to project developers,
4. Assist the private sector to acquire information, capacities, experience and implement more EE projects via the exemplary initiatives of the public sector,
5. Develop and contribute to the growth of the market for EE services and technologies thus, contributing to the creation of employment and economic growth,
6. Nourish the energy efficient behaviour as a lifestyle.

[2] More detailed information is provided in the 'Report on the consolidated assessment of potential for energy efficiency and demand side management in Mauritius, and current incentive structures', Maxwell Stamp, 2015

The EE/DSM Plan Master emphasizes EE/DSM measures that broad reflect policies, not specific measures to substitute a single technology with a more efficient one. The reason for this is the lack of data on the current situation. It was not possible to identify the current status of technologies used and the EE technologies that can be used for the substitution of the current inefficient technologies due to the absence of a sufficient number of energy audits or data surveys. Instead, the policy measures[3] included in the EE/DSM Master Plan support the application of a wide array of technologies. However, the mix of technologies that are eventually going to be applied in specific EE interventions cannot be known at the policy design stage, thus, the energy savings per measure cannot be precisely calculated.

The policy measures that are proposed in the EE/DSM Master Plan support the implementation of integrated EE/DSM solutions not just EE/DSM measures in a single technology. These solutions usually cover more than one technology and more than one energy use. Moreover, policy measures tend to be broader than targeted technological substitution, aiming at changing the awareness, education and behaviour of the energy consumers towards the use of energy in the every-day life. Therefore, policy measures have advantages as compared to single technology measures, they:

- Lead to deeper energy savings by not only catching the easiest to achieve energy savings but implementing more technologically advanced measures involving a wider spectrum of technologies and end uses;
- Create markets for EE/DSM services and products more effectively than single technology substitution measures;
- Create professional expertise and skills in the private sector in more EE/DSM technologies and services;
- Result in more sustainable energy savings by changing the energy consumption behaviour.

Integrated EE/DSM measures may be more costly to the end user. Financial support from Government is often needed to overcome the initial cost barrier.

Additionally, the philosophy of the EE/DSM Master Plan envisages the growth of the private market for EE/DSM services and products. This is also an additional reason that integrated EE/DSM measures, which support a wide range of technologies and services over a wide range of sectors, are proposed.

The private sector needs a mature investment environment in order to start investing. If the laws, regulations and support mechanisms are not in place, private investors will be reluctant to invest in EE/DSM. The enabling environment includes: building codes, certification of energy auditors, certification of ESCOs, policy incentives for EE investments or voluntary agreements, among many other mechanisms. Therefore, the best practice is to create technical entities that can develop and implement laws and regulations and execute complex technical projects and demo projects to develop the enabling environment. In Mauritius EEMO is the entity to drive the implementation of the EE/DSM Master Plan and the development of the EE sector. However, for EEMO to fulfil its mandates and its role as a technical entity three key priorities must be addressed as soon as possible:

[3] A policy measure, for example, is the creation of an EE Fund which provides financial incentives to a wide spectrum of EE/DSM projects that may involve a combination of EE/DSM technologies and other EE/DSM activities like training or awareness raising. A policy measure can also be a measure that involves training or awareness raising activities. A technology measure is, for example, the substitution of inefficient motors in industry by variable speed drive motors or the replacement of old air conditions with COP above 4 with air conditions with inverter and COP below 3.

1. Complete the organisation structure and start the recruitment process, according to the staffing needs stemming out of its mandate and the needs for the implementation of the Master Plan.
2. Engage in continuous and long-term capacity building of existing and new staff of EEMO which includes theoretical and practical training programmes in subjects conducive to its mandate. This should make EEMO capable of implementing complex and multi-disciplinary technical protects.
3. The necessary funds for the above two activities are available.

These are prerequisites and priorities for the implementation of the EE Master Plan and, in general, for the development of the EE/DSM sector and the growth of the respective market. The respective measure of the Master Plan that foresees the capacity building of EEMO is a priority.

The partnership and co-operation with a more advanced organisation in EE/DSM can be very beneficial for EEMO. In line with this, EEMO should seek to make partnerships and alliances with more advanced institutions in order to benefit from the transfer of knowledge and know-how to enhance the capacities of its experts. EEMO should pursue such co-operation which should also be a long-term one. In the framework of such co-operation EEMO and the partner institution(s) should engage in training and also in joint implementation of projects which will envisage the practical training of EEMO. The proximity of Mauritius to Reunion, which is a French island belonging in EU and the existence of Agence Régionale de l'Energie Réunion (ARER), the regional EE agency of Reunion can be beneficial from EEMO. ARER is more advanced in knowledge, experience and technologies as compared EEMO and it may be a suitable potential candidate for EEMO to partner with. A Memorandum of Understating (MoU) sealing such a partnership can be a potential first step to a closer co-operation between the two institutions. The case of ARER is referred only as an example for no other reason but the proximity to Mauritius. Other entities can be approached by EEMO and cooperation with them be pursued (for example Agence de l'environnement et de la maîtrise de l'énergie (ADEME) of France, National Energy Conservation Centre of China, Bureau of Energy Efficiency of India, National Environment Agency of Singapore, Cyprus Energy Agency, Cyprus Institute of Energy, Centre for Renewable Energy Sources and Savings (CRES) of Greece, etc). Furthermore, if Mauritius applies EU legislation (eg. on energy labels), the combination of the needs of Mauritius and Reunion may create larger markets for engineers and/or suppliers.

Currently in Mauritius, the lack of disaggregated data on the efficiencies and other technical characteristics of technologies, materials, processes and energy use per type of technology prevent effective energy planning and hinder the making of informed decisions on the selection of policy options as well as the informative monitoring and evaluation of strategies, policies and action plans. In addition, without a system to collect disaggregated data, the monitoring of the progress and results of policies and action plans is suboptimal. Therefore, a prerequisite for the successful implementation and monitoring of the EE/DSM Master Plan and, generally, the energy planning is the establishment of a system to identify, collect, organise and compile the necessary data. Without such a system, the realisation of future planning exercises will be problematic and the monitoring and evaluation of policies and EE/DSM measures incomplete. Therefore, the measure of the Master Plan that foresees the establishment of such a system should be treated as a priority for the implementation of the EE/DSM Master Plan.

When markets are at their infancy, like the EE/DSM market in Mauritius, the private sector often needs to be kick-started by providing information and demonstrations of the EE/DSM practises, technologies, projects and the benefits of investing in EE/DSM. The public sector should exploit its prominent position to kick-start and set the example accelerating the EE/DSM investments in the private sector. This will create markets and growth for the private sector, make the private companies and engineers more experienced, make the public sector more experienced and set the example of how EE projects are designed and implemented, thus passing this knowledge to the private sector. Hence, the activities of the public sector could be:

- Management of the energy consumption in public buildings to set the example for the private sector,
- Demonstrate the benefits of new technologies and best practices to the private sector and the wider public.
- Create projects in renovating or constructing public buildings, installing energy management systems etc., thus opening the market for EE/DSM services and technologies.
- Build capacities of private engineers and equipment suppliers in EE/DSM.

In addition to the above, the EE measures that can be implemented in the public sector can also bring quick energy savings. The reasons for this are: a) several public buildings in which the measures can be applied are under the absolute control of the public authorities (no other parties have interest in the buildings), b) the implementation of the measures can be quick since no external factors or parties are involved, c) there is no need for consultation, awareness to inform and sensitivise consumers or target groups that are involved in the EE measures. Hence, the implementation of the measures in the public sector could start quickly. Moreover, the measures in the public sector will create the market for EE services, studies and technologies and lead to new the generation of growth and new jobs. The private sector will also be motivated to invest in EE once the feasibility of such investments has been demonstrated in the public sector. The private companies will also increase their capacities by engaging in the implementation of the measures of the public sector. For the reasons above, the public sector measures should be one of the priorities of the Master Plan. Therefore, the public sector should allocate the appropriate funds and use its prominent position to fund complex technical projects, EE/DSM action plans for the public administration and implement pilot projects in EE/DSM.

Currently, financial support to the private sector for the implementation of EE/DSM projects is given by two programmes:

- The National Energy Efficiency Programme (NEEP) funded mainly by AFD and with a smaller share by the government. The NEEP provides subsidy for large companies and SMEs in the industrial and services sectors to implement energy audits.
- The AFD credit line programme (SUNREF). SUNREF provides grants for companies in all sectors to implement EE investments, including SMEs. After verification of the EE savings, the investor receives a grant of 8% of the loan amount borrowed from the bank for EE the EE investment. A streamlined process with a list of automatically eligible equipment for project sizes below €250k is in place for SMEs.

Mostly larger companies reap the benefits of these financial support programmes due to their ability to find funds to co-finance audits, engineering studies and investments. A limited number of SMEs used these instruments. SMEs seem unable to exploit these funding mechanisms because of their lack of liquidity and low creditworthiness. In addition, EE investments are perceived as highly risky by the local banks. The banks ask for high collateral from companies in order to lend for EE investments. They are reluctant to lend to SMEs even when the latter proposed feasible and profitable EE investments, so sound projects are lost. There is no financial support scheme for the residential sector to assist households to engage in EE measures apart from the support scheme for the solar water systems. Therefore, financial measures are foreseen in the Master Plan to tackle these problems. In light, of the above, it is clear that the development of the EE sector needs financial resources to provide the funding for EE measures. There is also the need to manage these financial resources and create financial products that can alleviate the barriers described above. Besides, a greater need for the development of the EE sector is to avoid fighting for funds within the system of governmental budget allocations to various sectors/activities. Therefore, the establishment of an EE Financing Scheme is proposed. The Financing Scheme would integrate and manage the funds available for financing the measures for the development of the EE sector, including the measures of the EE Master Plan. The funds could come from governmental budget appropriations, grants of international donors, taxes, public benefit charges, or any other source.

The Financing Scheme could also integrate and manage the funds for RE projects. The Financing Scheme could be a funding line within the governmental budget combined with a managing committee that decides how the funds will be spent. A wide array of initiatives can be financed: the Master Plan, other incentives, pilot projects, research and development projects, EE projects in the public sector and other initiatives. The governmental or other funds of within the Financing Scheme can also be combined with donor funding to design bigger and more influential projects. The establishment of the Financing Scheme should be considered as a priority to secure the funding of the EE measures.

Voluntary agreements are "a contract between the government and industry or services sector, or negotiated targets to improve EE with commitments and time schedules on the part of all participating parties"4. Sustainable energy savings and continuous improvement of EE in energy-intensive companies of the private sector can effectively be achieved when conditions of continuous cooperation, dialogue and consensus exist between the government and the companies. Furthermore, the private sector needs technical assistance and incentives to proceed with EE investments. Voluntary agreements provide such a framework. Under voluntary agreements, the government and the companies negotiate their commitments and agree on them. It is this process of negotiation and joint development of the terms of an agreement between policy-making and the industrial community that distinguishes voluntary agreements from other "traditional" command-and-control policy tools. This process can make voluntary agreements an instrument that has a long life-time, achieves long-term and sustainable energy savings and receives the less resistance by the consumers because it is based on agreement and consensus. Since the voluntary agreements have emerged from negotiation, dialogue and consensus, they provide the vehicle for continuous energy savings and continuous improvement of EE practises in the companies.

From the side of the companies, under voluntary agreements, they commit to set and meet their EE targets by implementing cost-effective EE measures (which do not harm their competitiveness). They also commit to draft EE action plans and realise them within an agreed timeframe. Moreover, they could introduce energy management systems in their operations which would set the procedures for continuously managing energy, identifying EE opportunities and monitoring energy consumption. The voluntary agreements can also change attitudes and awareness of managerial and technical staff of the companies regarding EE due to the element of continuous improvement and learning that they embody. They also improve the cooperation among companies providing learning mechanisms within a sector to combine knowledge and develop new competencies.

On the other hand, the government commits to provide technical assistance, training and information to the companies to realise the EE investments for the benefit of the latter. Overall, the voluntary agreements are, according to the international experience5,6,7,8,9, instruments

[4] Paolo Bertoldi, Silvia Rezessy, Voluntary Agreements for Energy Efficiency: Review and Results Of European Experiences, European Commission, Directorate General Joint Research Centre, Institute for Environment and Sustainability, Central European University, Environmental Sciences and Policy Dept, 2007.

[5] Blok, K., 2000. "Experiences with Long Term Agreements on Energy-efficiency Improvements in the European Union," Presentation at the Workshop on Learning from International Best Practice Energy Policies in the Industrial Sector, May 22-23, 2000, Beijing.

[6] Paolo Bertoldi, Silvia Rezessy, Voluntary Agreements for Energy Efficiency: Review and Results Of European Experiences, European Commission, Directorate General Joint Research Centre, Institute for Environment and Sustainability, Central European University, Environmental Sciences and Policy Dept, 2007.

[7] Dowd, J., Friedman, K, and Boyd, G. 2001. "How Well Do Voluntary Agreements and Programs Perform At Improving Industrial Energy Efficiency," Proceedings of the 2001 ACEEE Summer Study on Energy Efficiency in Industry. Washington, DC: American Council for an Energy-Efficient

which accelerate the implementation of EE investments, promote the continuous improvement of EE and the change in human behaviour in energy use through continuous cooperation and dialogue between the government and the energy-intensive companies and the provision of support and/or incentives to the companies by the government.

The companies will be motivated to participate in the voluntary agreements by the following benefits which they can reap:

- Reduction of the energy cost and, subsequently, of the production cost by implementing cost-effective EE measures that do not compromise the companies' competitiveness,
- Technical assistance provided by EEMO to the companies to implement the EE measures, use financial incentives, monitor, measure and verify energy savings,
- Incentives such as tax credits or facilitation to environmental licensing, when the achievement of the targets within the voluntary agreement are linked to such incentives. Alternatively, avoidance of monetary sanctions of targets are not met,
- Information services provided through the voluntary agreements to the participating companies reduce information search and learning costs associated with implementing EE measures,
- The awareness and learning of the companies on EE opportunities, investment and solutions related to lowering energy costs,
- The introduction and usage of an energy management system for a long period by the participating companies (as part of the commitments within the voluntary agreements) provides a systematic and structured procedure to continuously manage energy, find EE opportunities and integrate energy management in the operations in a continuous manner. It also commits the organisational structure and assigns responsibilities to carry out energy management within the company; thus continuous energy savings can be generated,
- The long-term nature of the voluntary agreement facilitates training and learning of company staff in energy management, EE technologies and practises,
- Change in the behaviour of the companies' management and staff towards more efficient use of resources as energy management is a priority,
- Networking and sharing of information among participating companies can increase the investments in EE,
- Public recognition by the Government thus, free marketing, of companies that fulfil their EE targets lead to the improvement of the green image of the company as energy efficient and may lead to the attraction of more customers and/or investors,
- A process of continuous cooperation, dialogue and interaction between the Government and the companies creates a framework of trust between both parties.
- The voluntary agreements allow the companies to be flexible to adapt targets and EE measures to each industrial sector and allow tailor-made solutions both for the specific industrial sector and for individual companies within the sector.

The voluntary agreements also have benefits for the government:

- The government would like to find measures to improve the energy efficiency of the large consumers in order to save on the energy imports and protect the environment

Economy.

[8] Price L. , Voluntary Agreements for Energy Efficiency or GHG Emissions Reduction in Industry: An Assessment of Programs Around the World, Lawrence Berkeley National Laboratory, 2005.

[9] Signe Krarup, Stephan Ramesohl, Voluntary Agreements in Energy Policy – Implementation and Efficiency Final Report from the project Voluntary Agreements – Implementation and Efficiency (VAIE), January 2000.

without overburdening the companies. The voluntary agreements ensure that energy-intensive companies implement measures to improve their EE and do this continuously for long periods,

- The government can use the voluntary agreements as an instrument that contributes to the realisation of the national EE and/or environmental policy,
- The EE measures are cost-effective and they do not degrade the competitiveness of the companies,
- Voluntary agreements may be easier and quicker to update and upgrade than legislation or regulations allowing the private sector to follow technological evolution and market changes,
- The implementation of voluntary agreements can serve as a tool for investigating new EE policies.
- The voluntary agreements will increase the demand for EE technologies and services, thus, decisively grow the EE sector.

The Energy Efficiency Act and the Energy Consumer and Energy Audit Regulation support the implementation of mandatory energy audits to the large consumers. The mandatory energy audits is a measure that can be beneficial in several ways: a) define the energy consumption patterns of the companies and, thus, the baseline, b) identify EE opportunities and their potential and, thus, set EE targets and c) inform and raise the awareness of the companies as regards their energy consumption profile and ways to reduce consumption. Further, the mandatory energy audits provide the information on the baseline, EE measures and potential to the Government thus, facilitating policy planning.

However, in order the energy savings to be achieved, the EE measures identified in the mandatory energy audits have to be implemented. The proposed voluntary agreements include the commitment of the participating enterprises in defining energy saving targets and meeting these targets with cost-effective EE investments. The identification of the energy savings targets and the EE investments to achieve them require the implementation of energy audits by the companies participating in the voluntary agreements. The participating companies could carry out the mandatory energy audits determining their baseline, the energy saving target and the EE investments. Under the framework of the voluntary agreements, the participating companies can commit to implement the EE investment identified during the energy audits and they will benefit by receiving the technical assistance, training and information offered by the government to implement the investments and achieve their EE targets. So, the voluntary agreements provide the supporting framework to the companies to set energy saving targets and achieve them by carrying out the EE investments identified in the energy audits. Hence, the framework of voluntary agreements can be combined with the existing mandatory energy audits and this correlation can result in a win-win situation for the companies and the government. Furthermore, the framework of mandatory energy audits can be applied to those companies that do not wish to participate in the voluntary agreements.

The start for the establishment of voluntary agreements should be made as soon as possible considering not only their importance in energy savings and in the development of the sector but also the fact that their preparation and negotiation may be long. Therefore, the voluntary agreements should be regarded as priority.

The introduction and use of an energy management system in a company (in which ISO 50001 belongs to) means change and it is not about technology and engineering, but mainly about people's behavior, processes and practices. That change may be bigger and more difficult than technology substitution. The establishment and implementation of energy management systems is promoted in the Master Plan via the voluntary agreements. The reasons for this are[10]:

[10] International Energy Agency, Institute for Industrial Productivity, Policy Pathway- Energy

- International experience has shown that in order for energy management systems to be successful, governments must cooperate and make consultations and continuous dialogue with the companies in order to provide support to the latter and a supportive framework to integrate energy management systems to the company's operations. Such conditions are provided in the framework of voluntary agreements, which by nature promote cooperation and dialogue.
- Since energy management systems require a change in people's behavior, practices and processes, this change can be larger and more influential if the enterprises that will operate energy management systems voluntarily agree and commit to do so rather than if it is imposed to them.
- Within a framework of voluntary agreements, the energy management systems can be used to achieve EE targets and the commitments of the companies, identify new EE projects, monitor energy consumption patterns and savings, and thus continuously improve the efficiency of the companies. Hence, the energy management systems are tools that assist companies to place EE as a priority in their management.
- The continuous improvement of the energy management systems is also promoted as these can result in substantial energy savings contributing to the achievement of the targets.
- Under the voluntary agreements, the government could also offer incentives to the enterprises to establish an energy management system (tax credits, technical assistance, etc), technical tools and capacity building and monitor whether the energy management system is operating efficiently.

Monitoring and evaluation is a crucial part of the decision making and planning. Every measure of the Master Plan should be monitored and evaluated by estimating or calculating the monitoring indicators and by drafting monitoring reports which capture the qualitative details the indicators fail to reflect. Monitoring and evaluation allows the planners to adjust the measures when appropriate and correct possible shortcomings. In addition, the evaluation should be an input to the planning of the next period reflecting the lessons learned from the implementation of the Master Plan, problems that appeared with the implementation of the measures and how these problems were solved. A monitoring and evaluation team of the EE/DSM Master Plan should be set up by EEMO. Other institutions that have responsibility to implement measures of the Master Plan should participate in the monitoring and evaluation team. The monitoring plan, which is a part of the Logical Framework Matrix[11], is based on the use of the existing structures to collect data on the monitoring indicators. Only when the existing structures are not adequate, new structures shall be built.

The EEMO is administered and managed by the Energy Efficiency Committee. The members of the Committee are mainly representatives of line Ministries; some come from the private sector while the new Chairman comes from the industrial sector. The representation of the stakeholders in the Committee is satisfactory and can even be improved by adding representatives from the academic and research institutions and the civil society. The Committee should be seen as a tool for quality participatory planning in the EE sector and not just as a managerial tool of the EEMO and its

Management Programmes For Industry, 2012, An introduction to energy management systems: energy savings and increased industrial productivity for the iron and steel sector, Organisation for Economic Co-operation and Development, 2015, Osamu Kimura, Fuyuhiko Noda, Does regulation of energy management systems work? A case study of the Energy Conservation Law in Japan, ECEEE 2014 Industrial Summer Study – Retool For A Competitive And Sustainable Industry, Amélie Goldberg, Julia Reinaud, Robert P. Taylor, Promotion Systems and Incentives for Adoption of Energy Management Systems in Industry - Some International Lessons Learned Relevant for China, Institute for Industrial Productivity, 2012.

[11] It was used a tool to identify the consistencies between the hierarchy of the objectives and the proposed measures. An introduction to this topic is presented in Annex XI

projects. The existence of the Committee it is an opportunity to enhance the quality, transparency and ownership of the plans in the EE sector and also to monitor the existing policies and plans and correct inefficiencies.

The design and implementation of EE/DSM policies and action plans as well as the planning in the energy sector necessitates strong and regular communication with stakeholders and consumers from all sectors (industry, services, tourism, residential, banks, NGOs, business associations, utilities, etc). This arises from the need of the planners to know their problems as well as their roles and capacities in order to design effective EE/DSM policies. The stakeholders and consumers are vital players in the implementation of the measures and without their co-operation neither the planning nor the implementation of EE policies and measures will be successful. The stakeholders and the consumers need to have the ownership of the EE measures in which they have a role to play in order to believe in the measures and facilitate or contribute their implementation. There is also the requirement to frequently provide EE/DSM information, networking and exchange of knowledge. Therefore in order to revise, when needed, but, more importantly, to implement the Master Plan, the EEMO should establish strong and sustainable communication channels with the stakeholders and the consumers in all sectors and cooperate with them as equals in the planning and implementation phase.

As regards the DSM measures, CEB is the player that could design and implement them due to its advantages: a) knowledge of the consumption profiles of its customers, b) daily contact with the consumer base, c) means to approach consumers, d) management of the transmission and distribution networks, e) ability to have access to the meters of the consumers, f) ability to invest in smart metering technology, g) capacity to develop efficient DSM and demand response measures, h) ability to develop tariffs that incentivise consumers to shift demand and i) past experience in DSM activities. CEB is an independent organisation which has autonomy in making business decisions. On one hand, CEB should look for activities that can generate profit and/or enlarge its customer base. Such activities can be DSM activities. On the other hand, it should engage in detailed studies as regards the profitability and feasibility of DSM measures before their implementation. Pilot projects that deploy DSM measures to a representative sample of consumers should be implemented before large scale implementation of the measures to assess their profitability and feasibility.

Awareness of EE/DSM in all sectors needs to be improved. EEMO is doing important work in designing and conducting awareness campaigns on EE/DSM. The implementation of awareness campaigns by EEMO should continue independently whether these are included as measures in the EE/DSM Master Plan or not. Awareness raising will also facilitate the implementation of the EE/DSM Master Plan so it needs to be pursued continuously. Therefore, the EE/DSM Master Plan puts emphasis on training, information provision and awareness raising measures.

As regards private businesses, SUNREF and NEEP should be supported and facilitated by the Government. Additional financial support measures are proposed in the EE/DSM Master Plan. They are complementary to NEEP and SUNREF. For the residential sector it will be useful to establish a financial support scheme coupled with technical assistance and information provision to apply the new building codes and open the residential EE market to newly qualified energy auditors, engineers and equipment suppliers.The implementation of EE/DSM measures should take advantage of existing structures and mechanisms that are already operational in Mauritius to reduce the cost. For example, the proposed establishment of a system of surveys to collect data on the technologies, materials, processes and energy use per type of technology uses the existing survey tools/templates and experience of Statistics Mauritius. Another example is the programme to 'Establish co-operation between EEMO and SMEDA for EE training in SMEs' which envisages the use of the existing training structures, experience and networking of SMEDA to insert EE topics into current training programmes or to develop dedicated training programmes for EE in the SMEs.

The impact of the proposed EE/DSM measures in energy consumption is estimated via the MAED-2 model per sector. For each sector (households, industry, services and transport), a modified EE scenario is created. The modified EE scenario is based on the base case scenario and the EE scenario[12]. A modified EE scenario was created per sector. The modified EE scenario of a sector adopts the parameters of the EE scenario that affect only this sector (e.g. the modified EE scenario for industry, includes the parameters of the EE scenario that are related only to industry). All other parameters of the modified EE scenario are equal to the ones of the base case scenario. To estimate the impact on energy consumption, the modified EE scenario per sector is compared to the base case scenario. The assumptions used in all scenarios were conservative, so actual EE savings potential accrued from the proposed EE/DSM measures may be larger.

The EE/DSM initiatives being implemented in the recent past, the ones that are on-going, the future initiatives as well as the work of EEMO are significant steps forward in order to build the enabling environment for the sector and finally to build the sector itself. All the initiatives and the activities of EEMO are in line with the Long-Term Energy Strategy 2009 – 2025 and the Energy Sector Action Plan 2011-2025. The MEPU and EEMO are gaining experience and capacities by implementing these measures and programmes and also by receiving training from international consultants. The proposed new measures of the EE/DSM Master Plan will be additional to the existing and future measures/initiatives/projects and will build on the experience gained so far by MEPU and EEMO. Hence, they will come as a continuation of the existing measures in the EE sector. In this way, the positive impacts of the existing measures will not be lost.

4. Existing framework conditions in EE/DSM

4.1 Summary of the existing strategies and policies in EE/DSM

4.1.1 Long-Term Energy Strategy 2009 – 2025

The Government policies and programmes in the EE sector are currently governed by the Long-Term Energy Strategy 2009 – 2025 which was drafted in September 2009. The vision of the Strategy is to '*increase further the contribution of renewable energy in the electricity sector, the introduction of biofuels in the transportation sector and the implementation of EE and conservation measures in all economic sectors, particularly where energy usage is intensive*'.

The specific objectives of the Strategy are:

- Reduce the vulnerability of Mauritius with regard to imported fossil fuels and their volatile prices;
- Promote economic growth and job creation;
- Democratize energy supply;
- Secure affordable energy to consumers;
- Ensure the financial sustainability of the electricity utility; and
- Promote long-term sustainable development.

In EE, the Strategy foresees the removal of barriers to the effective implementation of the EE concept in all sectors of the economy. In view of that, the Strategy envisages the drafting of an Energy Efficiency Act and its ratification and the creation of an Energy Efficiency Unit (EEU) within the MEPU. The Strategy aims at making the EEU a centre of excellence for the a) creation of a national data base on energy usage, b) renewable energy technologies, c) utilising the Clean

[12] The base case scenario and the EE scenario are described in the report 'Report on the consolidated assessment of potential for energy efficiency and demand side management in Mauritius, and current incentive structures', Maxwell Stamp, 2015.

Development Mechanism, d) developing and managing EE programs management and e) promotion and awareness-raising on energy supply/demand. The Strategy also specifies targets for energy savings until 2025. These targets are determined with the consumption of 2008 as the

baseline. In the public sector, the Strategy's target is to reduce energy consumption to half the level of 2009 by 2015 and to continue to aggressively target EE opportunities through to 2025.The exemplary role of the public sector is stressed in the Strategy. The targets for the reduction of the energy consumption are:

- 2% by 2010;
- 4% by 2015;
- 6% by 2020;
- 10% by 2025.

A number of measures are identified in the Draft Strategy to achieve these targets:

- Legislation to make makes energy audits mandatory for specific categories of consumers;
- Establishment of standards for energy auditing;
- Establishment of certification scheme for energy auditors;
- Improvement of standards for the energy use in buildings;
- Awareness and educational activities on EE;
- Hiring of certified energy auditors and the development of energy management plans by energy intensive industries;
- Measures to enhance human capital and promote energy services companies (ESCOs);
- Promotion of efficient lighting, including street and traffic lighting;
- Introduction of the highest standards for energy management and use in the public sector, procurement practices of energy efficient equipment;
- EE retrofits to public buildings;
- Enactment of the new Building Control Act;
- Awareness campaigns will be launched to change behavior at working places and large buildings;
- Making solar water heaters mandatory in new or existing public buildings, integrated resort schemes, residential estate schemes and integrated hotel schemes;
- Implementing EE/DSM measures in the tourism sector to support:
  - retrofitting of existing hotels with the latest energy efficient technologies,
  - mandatory use of solar hot water systems in hotels and
  - mandatory low-energy lighting/appliances/air-conditioning and cooling devices throughout the hotel industry,
  - mandatory introduction of low-energy airport transfer policies and
  - mandatory provision by businesses of optional facilities to allow tourists the option to offset the carbon impact of their flights by investing in sustainable energy schemes in Mauritius;
- Implementing measures targeting the tourism sector and industry:
  - voluntary agreements;
  - technology and know-how transfer projects;
  - training in specialist sustainable energy topics;
  - awareness building,
  - promotion and transfer of know-how;
  - financial and fiscal tools.
  - legal obligation on large companies to carry our energy audits by licensed energy auditors and develop energy management plans;
- Introduction of EE labelling;
- Introduction of minimum energy performance standards for household and non-

household appliances/equipment;

- Design of a new incentive scheme for the installation of solar water heaters;
- Establishment of standards for solar water heaters and provision of the necessary testing facilities at the Mauritius Standards Bureau;
- Revision of the subsidy to households in the medium-to-long term and design and implementation of targeted low-income subsidies;
- Design and implementation of EE schemes for vulnerable households;
- Design and implementation of fiscal schemes for industry;
- Support for local banks to provide credit to industries which invest in EE;
- Use of Clean Development Mechanism to attract additional financing for EE investments;
- Introduction of policies and legislation to facilitate the establishment of ESCOs;
- Removal of subsidies in energy tariffs;
- Subsidies to help low-income households and social institutions;
- Incentives to promote the choice of sustainable energy products and services;
- Introduction of time-of-day electricity metering and tariffs and create consumer awareness of day/night tariffs;
- Introduction of smart meters for larger customers;
- Creation of a carbon offsetting scheme that is well-publicized and visible/verifiable by the airline travelers who pay for them.

The EE/DSM policies of the Strategy that have been or are being implemented are the following:

Measures	Progress
Enactment of the Energy Efficiency Act	Enacted in 2011
Establishment of the EEMO	EEMO was established in 2011
Development of a certification system for Energy Auditors and Energy Managers	Being developed by EEMO in co-operation with external international consultants. Training of energy auditors is ongoing.
Develop professional courses in Energy Auditing, Energy Management, Monitoring and Targeting and sustainable building design	Being implemented by EEMO. 45 auditors have been trained so far.
Introduce mandatory sustainable energy design standards for new buildings	Building Codes are being updated by an international consultant
Development and enactment of legislation so that existing hotels and rented spaces use solar water heating systems, low-energy lighting and appliances and rented houses/apartments use low-energy lamps as well as appliances of the highest energy efficiency label are replaced gradually	Regulation to support the building codes is being updated
Introduction of a range of complementary policies, incentives and disincentive programmes to promote solar water heating systems to achieve in a short-to-medium term the target of 50% households and businesses, and in the longer term near-eliminating the use of LPG and electricity for water heating purpose	Three phases of the support scheme for solar water heaters for households have been implemented during 2009-2013 and the fourth is under implementation
Implementation of programmes as a permanent activity to create awareness of the benefits of energy efficiency, renewable energy and sustainable living, including	EEMO is been implementing EE awareness campaigns according to its mandate

information on incentives/deterrents and rights/obligations for consumers	
Commissioning of a specialised study on energy efficient, safe public lighting, leading to a short-term action programme to eliminate energy-inefficient lamps, reconfigure lighting patterns as appropriate and address issues such as over-lighting	The study will be procured under funding from the Government of Mauritius
Introduction of sustainable procurement as a mandatory practice for all public services	The EE in the public procurement practices is already taken into account in the procurement tenders
Introduction of sustainable energy projects for public sector	Under implementation

Table 1: Progress of the measures on the Long-Term Energy Strategy 2009 – 2025

The following policies described in the Strategy have been deferred to be implemented in the future:

- Proclamation of a new Electricity Act originally planned by 2009,
- Enactment of the Sustainable Development (MID) Act originally planned by 2012,
- Introduction of a series of targeted grants for energy efficiency or renewable energy initiatives originally planned by 2010,
- Introduction of financial incentives such as low-interest loans for consumers to purchase sustainable energy products and services originally planned by 2009,
- Provision of incentives to promote Energy Service Companies (ESCOs) originally planned by 2012,
- Construction of a bus line in the roads originally planned by 2010,
- Creation of a carbon offsetting scheme that is well-publicized and visible/verifiable by the airline travelers who pay for them originally planned by 2015.

4.1.2 Energy Action Plan 2011-2025

The drafting of Updated Action Plan of the Strategy 2011-2015 was finalized in April 2014. The development of the EE sector since the elaboration of the Action Plan follows the implementation of the options identified in it. The progress of the implementation of the measures of the Action Plan in depicted in the following table:

Measures	Progress	Responsible body
Institutional measures		
The enactment of the Energy Efficiency Act	The Act was enacted in 2011	MEPU
The establishment of EEMO	EEMO was established in 2011	MEPU
Set up a data base on EE (Observatoire de l'Energie)	On-going and carried out by EEMO	EEMO
Reinforcement of technical capacity within the implementing agencies of the Action Plan	Capacity building of EEMO and MEPU is ongoing through donor-funded projects	MEPU/EEMO
Energy efficiency labelling for (i) refrigerating appliances;(ii) electric	Labels and draft legislation have been prepared by EEMO and the scheme will	MEPU

ovens; (iii) electric dishwashers	be launched in 2016	
Implementation of a voluntary labelling scheme for dishwashers, air conditioners, refrigerators, ovens, lamps, clothes dryer, washing machines and TVs	Being carried out by EEMO	EEMO
Development of professional courses in energy auditing, energy management, monitoring and targeting of sustainable building design	Being carried out by EEMO in co-operation with external international consultants. 45 auditors have been trained so far through donor-funded projects.	EEMO
Introduction of Building Control Bill	The Act was enacted in 2012	
Sustainable energy design standards for new buildings, including housing, hotels and offices, including natural ventilation; day lighting; appropriate orientation; solar hot water systems; time-of-day and smart metering; intelligent lighting systems that are suitable for low-energy lamps; and building energy management systems for buildings more than 500m2	Building Codes are being updated by the Ministry of Public Infrastructure and Land Transport via a donor funded project	Ministry of Public Infrastructure and Land Transport
Development of guidelines for passive solar design for buildings of less than 500m^2	Developed in 2010	Ministry of Public Infrastructure and Land Transport
Implementation of awareness campaigns	EEMO is implementing awareness campaigns according to its mandate	EEMO
Implementation of a programme to eliminate energy-inefficient lamps, reconfigure lighting patterns as appropriate, and address issues such as over-lighting	Will be procured and financed by donors	EEMO
Adoption of Energy Audit Management Scheme (EAMS) for non-residential buildings	Being developed through a UNDP funded project	EEMO
Mandatory energy audits in non-residential buildings of designated consumers	The audits are mandatory according to the EE Act and the Energy Audit Regulation	EEMO
Training and Certification of Energy Auditors	Being carried out by EEMO in co-operation with international consultants through donor-funded projects	EEMO
Energy Management in Industrial		JEC

Processes: • Development of Guidelines for energy management in industries; • Mandatory energy audits in industries; • Energy efficiency projects: a National Energy Efficiency Programme for 100 major consumers (industrial and services sectors) is being developed in a partnership comprising GOM/AFD/JEC.	• Guidelines developed under the 'Setting up of a framework for EE and energy conservation in Industries in Mauritius' project funded by UNDP • Audits are mandatory according to the EE Act • The National Energy Efficiency Programme is operational and first 30 audits of the Programme will be completed by the end of 2015	
Solar water heaters: • Subsidy for the purchase of solar water heaters Phase II; • Provision of solar water heater systems in 11 hospitals; • 50% of the hot water requirements of all new large buildings to be met from solar water heaters, in accordance with the Energy Efficiency Building Code.	• Three phases of the scheme "Solar water heater scheme for households" have been completed between 2009-2013 • Public hospitals have solar water heaters • The Energy Efficiency Building Code. Is being updated via a donor funded project	Ministry of Infrastructure and Land Transport
Legislative and regulatory measures		
Regulations to prescribe: • Standards for products • Draft standards for energy audits • Regulations on energy audits, regulations for EE labelling of electrical appliances • Regulations for registration of energy auditors)	The following standards have been developed: • Household air conditioners • Household refrigeration appliances (the EU labelling regulation was adopted) • Household washing machines • Household electric lamps • Household electric ovens (the EU labelling regulation was adopted) • Household electric dishwashers (the EU labelling regulation was adopted) • Household tumble driers • Household televisions • Thermal solar systems and components • Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling – general requirements, test conditions, test methods, usage requirements	Mauritius Standards Bureau, EEMO

	• Electric dishwashers for household use – Methods for measuring the performance • Energy efficiency of electric lamps for household use – Measurement methods • Electric cooking ranges, hobs, ovens and grills for household use – Methods for measuring performance Standards for energy audits are being developed by EEMO in co-operation with an international consultant through a donor funded project. All regulations have been developed by EEMO but have not been passed yet.	
Energy audits by licensed energy auditors for the largest companies and development of energy management plans	Energy audits are being carried out by licensed international energy auditors under the National Energy Efficiency Programme	JEC
Implementation of energy audits in 100 government buildings	28 completed	Energy Service Division (ESD) of Ministry of Public Infrastructure and Land Transport
Capacity building for sustainable energy projects in Government buildings	Ongoing	EEMO
Introduction of sustainable procurement as a mandatory practice for all public services	It is being followed as procurement practice	Procurement office

Table 2: Progress of the measures of the Energy Action Plan 2011-2025

4.1.3 Main initiatives in EE/DSM

The EEMO is working constantly and effectively in the EE/DSM sector. Until today it has implemented the following activities:

- A voluntary scheme for EE labelling of electrical appliances was launched by EEMO in January 2014. This functions in accordance with the regulation on energy labels. The objective is to introduce the concept of labelling to the importers, retailers and salesmen.
- Energy Observatory of Mauritius which is a database for energy and EE statistics is operational by EEMO.
- Energy efficiency awareness campaigns in 2014 and 2015. The campaign of 2014 informed the public about EE/DSM; the one in 2015 aims covered energy labels.
- Talks on EE in community centres and social welfare centres.
- Three competitions on EE for students of primary and secondary schools in 2014 and

2015.

- Monitoring of energy consumption in public sector buildings.
- Development of the database for energy auditors.
- Development of legislation and regulations.

The CEB has also engaged in EE/DSM activities in the recent past. These include:

- Distribution of one million Compact Fluorescent Lamps (CFLs) in Mauritius and Rodrigues in 2008-2009.
- Daylight Saving Time (DST) project which aimed at sensitizing the public to shift working hours by one hour all year around.
- Ongoing sensitization campaign in EE since 2005.
- Installation of smart meters on the premises of some large consumers, replacing conventional meters.

In terms of financial support to the private EE/DSM investments, there are two main instruments:

- SUNREF: Green Lending Scheme Mauritius, a financing tool to assist private companies and households to make investments in renewable energy, EE, pollution abatement and clean technology. The funder of SUNREF is AFD, which works with local banks in Mauritius and together have developed a credit line for financing investments. The scheme funds projects with maximum capex of €7m. Loans are given by the local commercial banks and the interest rate is negotiated between the investor and the commercial bank. After verification of the EE savings, the investor receives an Investment Grant of 8% of the loan amount borrowed from the bank. A streamlined process with a list of automatically eligible equipment for project sizes below €250k is in place for SMEs. The first round of financing support, using a €40m loan from AFD, was signed in October 2009. It is now fully disbursed and has funded 104 projects with sizes ranging from €4k to €4m. The second round has been implemented since 2014 and utilizes a €60m concessionary loan from AFD to local banks. Half of this loan has already been deployed. The SUNREF second round provides technical assistance to the banks and borrowers which a) build and consolidate eligibility criteria and accompany AFD in the necessary eligibility assessments, and b) assists banks and promoters in the preparation of projects on a case-by-case basis by advising on experts and terms of reference for feasibility studies and reviewing existing feasibility studies.
- The National Energy Efficiency Programme (NEEP) is a partnership between the GoM, AFD and the Joint Economic Council (JEC) to offer Mauritian companies technical and financial assistance to implement energy audits to reduce energy consumption, control costs, gain competitiveness and be more eco-friendly. NEEP provides for 100 energy audits in 2015-2016. A subsidy of 60% of the cost of the energy audit is offered to industrial companies that register. NEEP also offers technical assistance in the form of preliminary energy audits by a team of international and local experts in EE.
- The Solar Water Heater Scheme for Households was one of the first projects supported and funded by the Fund Maurice Ile Durable (MID Fund) in 2008. The scheme subsidizes the purchase of residential solar water heaters. The first phase started in December 2008 and ended in December 2009. Its budget was MUR 250 million. The subsidy level was set at MUR 10,000 and 24,000 households benefited. The second phase started in January 2012 and lasted until end of 2012. Its budget was MUR 150 million. A list of qualified suppliers was set up and the applicants had to choose a supplier from the list. A set of mandatory technical requirements was adopted. During the second phase 13,400 subsidies were granted. The third phase started in January 2013 and was completed in September 2013. Its budget was MUR 212 million and it covered 21,500 households. The approved supplier list and the

mandatory technical requirements were retained. In total from end- 2008 to September 2013, 58,900 households benefited. The estimated annual energy savings achieved from 2012 onwards are 20GWh/year[13].

- In 2014, MUR 100 million was provided for a New Solar Water Heater Scheme, out of which MUR 25 million was earmarked for 1,400 new Houses of the National Housing Development Company (NHDC). An additional budget of MUR 75 million has been provided on an exceptional case. The support instruments for the New SWH Scheme have been reviewed as follows:
  - Grant of MUR 10,000 to a householder whose salary does not exceed MUR 25,000;
  - Grant of MUR 5,000 to a householder whose salary exceeds MUR 25,000;
  - SWH with all fittings and connection to be installed on new houses of the National Empowerment Foundation (NEF) and NHDC houses being built by the Ministry of Housing and Lands for 2015-2016.

4.1.4 Other initiatives and donor projects

4.1.4.1 Setting up of a framework for EE and energy conservation in Industries in Mauritius

This project is funded by UNDP. The project started in November 2012 and ended in July 2013. It developed appropriate energy audit tools and provided capacity-building for enhanced energy efficiency in the industrial sector. The project delivered:

- Guidelines on energy auditing of industrial energy systems and processes.
- A Code of Good Practice in industrial energy management.
- An Energy Audit Software Tool for industrial energy systems and processes.
- Training of 50 people in energy auditing of industrial energy systems and processes.
- Training of 40 people in industrial energy management.
- Energy audits of 5 energy-intensive local industries for training purposes.
- A software tool to assess the energy consumption of existing and new buildings.

4.1.4.2 Consultancy services to assist the EEMO in Energy Audit Management

This project started in 2015. It is financed with a grant from AOSIS/SIDSDOCK, with the assistance of UNDP. Its objectives are:

- Develop an Energy Audit Management Scheme to enable the systematic energy auditing of the buildings in Mauritius, propose the technical, financial and human resources of the management scheme and prepare a comprehensive and user-friendly manual for the Energy Audit Management Scheme describing all the mechanisms, procedures and work processes.
- Capacity building of staff of the MEPU, EEMO and other institutions.
- Upgrade and customize an existing Energy Audit Software Tool (MBEAT) for energy auditing purposes.
- Develop a macro-based Excel software tool for energy auditing purposes.
- Design a financial support mechanism for energy audits.
- Train and certify 60 local potential energy auditors including the staff of the EEMO for the Energy Audit Management Scheme.
- Undertake the energy audit of 10 non-residential buildings (>500m^2).
- Capacity building of the future custodians and managers of the programme.

4.1.4.3 Technical Support to the Energy Efficiency Management Office

[13] Households Electricity Utilisation Survey 2012 Report, CEB

The project is funded by UNDP and its objectives are as follows:

- Prepare a baseline report on EE in the building sector and develop a methodology to measure and monitor evolution of EE with respect to the baseline.
- Advise on standards in the building sector in the Mauritian context.
- Develop an Excel-based tool, and carry out an economic and financial analysis, to demonstrate the feasibility of implementing these energy consumption standards.
- Develop an economic and financial tool to assess the implementation of EE projects and train EEMO staff.
- Carry out market surveys on regulated products (refrigerator, electric oven, dish washer, air-conditioner, tumble dryer, electric lamp, washing machine).
- Develop minimum energy performance standards for regulated products.
- Develop a mechanism to enforce the minimum energy performance standards.
- Develop methodology for assessing the technical quality of energy audit reports and train EEMO staff on how to carry out the review.
- Develop materials necessary for an online course on energy management/EE to promote a culture of energy saving and EE in the Civil Service.

4.1.4.4 Energy efficiency in street/public area lighting

The main objective of this project will be to get a standard and a design guideline for Mauritius for street and lighting in external lighting of public areas. A design guideline shall also be prepared for retrofitting of existing street and public area lighting systems. The most important activities of the project include:

- Assessment of the existing systems in Mauritius for street lighting for all types of roads (and for public area lighting;
- Development of a standard for street and public area lighting or customization of an existing international standard;
- Development of a design guideline and technical specifications for new energy efficient lighting systems for street and public areas, including the use of solar systems;
- Implementation of a pilot project for each type of road and public area lighting to demonstrate the suitability of the use of such lighting systems.

The project will be funded by Government of Mauritius and its ToR is currently under development.

4.1.4.5 Support to the Ministry of Public Infrastructure and Land Transport

The Ministry of Public Infrastructure and Land Transport is currently working with an international consultant in a project funded by UNDP which includes the following activities:

- Update building codes to match the needs of the country and the market;
- Develop the compliance scheme for the codes, the technical details and the administrative responsibilities and chain;
- Update the technical specifications of new public buildings to include EE elements;
- Update the Building Control Act, if needed, as required by the changes in the building codes and the creation of the compliance scheme;
- Develop the regulations for the codes, the compliance scheme and the Building Control Act.

4.1.4.6 Technical Support to MEPU

The current project 'Technical Support to MEPU' is funded by the AFD. He project started in June 2015 and will be completed in March 2016. The objective of the project is to provide capacity building to MEPU, the Energy Efficiency Management Office (EEMO) and the Central Electricity

Board (CEB) in energy planning, energy demand forecasting and the development of strategies, action plans, regulation and incentive schemes in energy, renewables and EE. Energy demand scenarios will be developed and demand forecasts will be elaborated using the proposed tools. Practical instructions on how to use the tools will be developed and delivered to MEPU, EEMO and CEB. The Long Term Energy Strategy and Action Plan 2015-2030 will be developed and include the supply plans. The EE potential will be evaluated by developing scenarios for the energy demand forecast and modelling them with demand forecasting tools. The EE Master Plan and Action Plan until 2030 will also be developed. The Master Plan and Action Plan will include EE measures in addition to these proposed under the Energy Sector Action Plan 2011-2025. Furthermore, an awareness campaign for energy labelling of electrical appliances will be designed. In renewables, the renewable energy technologies that are suitable for Mauritius will be investigated and analysed. The most suitable of these technologies will be selected, supply scenarios will be devised and the respective supply options for renewables will be elaborated. The supply scenarios for renewables will be included in the Renewable Energy Master Plan and Action Plan until 2030 which will also be developed during the project. In addition, a grid expansion plan will be developed and training on this will be delivered.

4.1.4.7 Energy efficiency in water pumping

The Central Water Authority is investigating the efficiency of water pumps used for irrigation, water treatment, waste water and other uses and will develop a plan for the improvement of their efficiencies.

4.2 Barriers in EE/DSM

The barriers analysis and the SWOT analysis have been used because they are tools that can identify the gaps and the problematic areas in a sector's operation and the involved stakeholders. The identification of the problems and gaps is the steppingstone to identify the measures that will serve as solutions to the problems and complete the gaps. Then the description of the intervention logic will explain the rational link between the barriers and the measures. The measures will form the EE/DSM Master Plan until 2030. The analysis of barriers was based on the interviews with MEPU, EEMO, the CEB, line Ministries, public organisations responsible for sectors and sub-sectors and other stakeholders that represent consumers, associations, academic community, financiers, etc. Furthermore, the analysis of the current legislative and regulatory framework as well as the existing studies contributed to the identification of the barriers to EE/DSM.

The barriers that were identified are briefly presented below. A more thorough analysis of them can be found in the 'Report on the consolidated assessment of potential for energy efficiency and demand side management in Mauritius, and current incentive structures'.

4.2.1 Weak institutional framework

4.2.1.1 Ministry of Energy and Public Utilities

MEPU is the policy maker and planner in the energy and water sectors and the institution which develops legislation and regulations in those sectors. However, its capacities in energy planning are still inadequate to undertake integrated energy planning activity of the country that includes the interactions of the electricity, hydrocarbons, renewables and EE subsectors and consumers, especially in EE. MEPU suffers from understaffing since only four professionals are responsible for policy making and planning for both the energy (including EE/RE) and water sectors. Furthermore, the bureaucracy in the public sector is a barrier as well. It leads to inflexibility and delays and generally does not facilitate the decision on energy planning and the implementation of technical projects.

4.2.1.2 Energy Efficiency Management Office

EEMO was established in 2011 with the Energy Efficiency Act and it is in operation since then. The Act mandates EEMO with significant and complex scientific and technical responsibilities which include policy making and implementation of complex technical activities.

EEMO does not have the full spectrum of skills it needs to implement its mandate and suffers from insufficient professional staff to cope with its mandate according to the Energy Efficiency Act. Furthermore, the technical capacities of the existing staff of EEMO are not adequate to fully accomplish its mandate.

EEMO is part of the public sector under MEPU and the rigid government administrative, staffing and contracting procedures are not flexible or fast enough. Delays in hiring new staff occur. In addition, EEMO has to rely solely on financing from the national budget and has no mechanism to offer financial incentives to its staff. These are drawbacks for EEMO because it needs specialised staff that are in short supply in Mauritius.

4.1.2.3 Improvement of communications with stakeholders

The design of EE policies necessitates strong communication and co-operation with stakeholders on a regular basis, especially with private sector consumers and financing organisations, to identity their needs and gaps and intervene accordingly. This area needs improvement in the EE planning procedure. EEMO lacks the human resources to carry out this task systematically.

4.2.2 Weak financial capabilities

The financial capabilities of many Mauritian SMEs are limited. As a result they have difficulties even to pay the cost of an energy audit. Companies with limited financing often do not consider EE as priority and apply resources towards activities that will assist them to survive. The relatively high capital cost of some EE investments makes them reluctant to proceed in making the investment.

Furthermore, the majority of the SMEs and quite a few large ones are unable to give guarantees or collateral to the banks when they try to get loans for EE projects. So, the banks reject their projects even when they are of high technical quality and produce adequate energy savings to pay back the loans. Local banks perceive energy efficiency investments as risky because they regard the energy savings as uncertain and they are reluctant to lead or they lend with higher than the market rates.

4.2.3 Lack of professional energy managers in public buildings

Currently, the engineers of the Energy Services Division of the Ministry of Public Infrastructure are responsible for the energy management of the public buildings. However, in reality they do not carry out this task because their number is small and they cannot be present in the public buildings on a daily basis which is a prerequisite of a professional energy manager. In addition, the technical staff of the buildings is occupied with other tasks since energy management is not included in their job description. Therefore the public sector buildings do not have energy managers.

4.2.4 Improvement of mechanisms to provide access to information in EE

The provision of information is crucial to stimulate private sector interest in EE activities the provision of information is crucial General awareness is valuable but is not enough to implement EE measures. Deeper, more analytical information is necessary as the next stage. More concrete and tailored information is needed to cover the needs of each sector, subsector or group. In Mauritius today the only mechanism to provide such information is the EEMO website. However, the information in the website needs enrichment to inform all target groups in all sectors. Moreover, there is no dedicated organisation currently that can collect, tailor, manage and present such information or create an informational material for the specific target groups. EEMO does this but it has a wide range of other responsibilities that often take precedence. The information

that is available is dispersed and there is no single hub to provide it.

4.2.5 Lack of data to make informed policy decisions and monitor policies and action plans

Any planning exercise in the EE sector and in the energy sector in general should be based on a solid foundation of data. Moreover, the monitoring of policies and action plans once they have been adopted requires the collecting and processing of a quite significant amount of data. Currently, Mauritius lacks disaggregated data on energy consumption and data at the level of the transformation of energy (e.g. burning of oil in boilers to produce steam, burning of sugar cane in boilers to produce steam that drives the steam turbine and produces electricity) and the energy conversion technologies to make informed planning in EE.

4.2.6 Lack of integrated tool for the policy making and monitoring of EE

EE and DSM, policy planning and monitoring is getting more and more complex as the economy becomes more sophisticated, new players and technologies become available and the easy wins are things of the past.

Furthermore, EE planning should take into account the interactions and interdependencies of all subsectors in the energy system as well as the needs of consumers and the economic, social and demographic conditions. Therefore integrated information systems are needed, to provide:

- A mechanism for monitoring the EE sector and progress on EE strategy, policies and action plans.
- A tool for decision support in energy policy and planning through the provision of data to the analytical modelling tools.
- An infrastructure for providing energy information services to all interested parties nationally and internationally.
- A tool to systematise, organise, display and disseminate data.

Mauritius does not currently have such an integrated information system.

4.2.7 Capacities of local engineers need improvement

The capacities of local professionals to independently carry out energy audits, energy studies and feasibility studies need improvement. This will increase their ability to advise effectively their clients in selecting technologies and equipment.

4.2.8 Improvement of EE awareness in all sectors

The level of awareness of EE in all sectors needs to be improved. EEMO has already started working on designing and conducting awareness campaigns on EE but there is still way to go. Many managers of large industries, hotels and commercial sites appear to be unaware of the EE opportunities and their staff does not have the capacity to identify, design and analyse the economics of EE investments. The problem is more acute in SMEs in the industry, hotels and the services sector, generally. Low awareness of EE solutions is also a reality among the general public.

4.2.9 Reluctance of retailers to promote EE equipment

Retailers can offer efficient technological solutions to their customers if there is sufficient demand. Retailers order the energy efficient equipment and import it in Mauritius from bulk suppliers in other countries. However, retailers do not promote the most efficient technologies to their customers and prefer more standard solutions for the following reasons:

- They fear that the higher initial cost of more efficient technologies will deter clients in making the purchase;
- They lack sufficient expertise and knowledge about more efficient solutions and how to select them, design and present them to the clients;

- They do not have the after sales support and they fear not being able to offer maintenance;
- They are sceptical of more efficient solutions;
- They believe that the client will not choose a more efficient solution.

As a result the customers do not become aware of such energy efficient products and they do not demand them from their suppliers.

4.2.10 Limited CEB interest in EE and DSM

CEB is oriented towards traditional electricity generation. CEB primarily views EE/DSM as mechanisms that will also decrease its sales and profit, and they are therefore not prioritised in its policies and activities. Moreover, the absence of an independent regulator in the energy sector, a public body with the mandate to make decisions for the public benefit, means there is no effective mechanism to impose EE/DSM targets on CEB or to incentivise CEB to engage more actively in EE/DSM. Furthermore, the involvement of a CEB as an EE/DSM energy service provider is not included in its future plans.

4.2.11 Exploitation of the benefits of existing financial support mechanisms by SMEs

Based on the experience from the National Energy Efficiency Programme (NEEP) and SUNREF credit line, it appears that SMEs seem unable to exploit these funding mechanisms mainly due to lack of awareness, information and limited financial capabilities. The SMEs are not willing to pay for even a subsidized energy audit. Hence, the need of a financial support scheme targeted to the needs of the SMEs is clear. In addition to the above, there is no public EE fund or a mechanism that can provide and manage funds for EE measures to provide financial assistance to the private sector in EE/DSM projects. The previous experience of the MID Fund, which was used to finance the past three phases of the Solar Water Heaters Household incentive programme, can be utilized to establish a new EE fund or a mechanism that can provide and manage funds for EE measures. In the residential sector there is no financial support to assist households to engage in EE measures apart from the support scheme for the solar water systems.

4.2.12 Electricity tariffs' reflection of real electricity generation costs

Tariffs are not based on the real cost of electricity generation. The phenomenon is more intense in industry while in households and services the average tariff almost equals the cost of electricity generation. The average tariffs in industry is 3.3 MUR/kWh, and in services and households 6 MUR/kWh[14]. The average cost of production of electricity is around 6 MUR/kWh[15]. This creates a significant disincentive to implement EE measures and to shift demand in non-peak hours and damages the financial performance of CEB.

4.2.13 Improvement of mechanism to provide systematic training courses specialised for EE/DSM

The local capacities in auditing, engineering studies, selection of technologies and guidance of the private sector in achieving EE/DSM need enhancement at the present time if they are to meet the demands posed by the Master Plan. The expansion even of this small market will create the need to make available professional training to the professionals in the public sector, engineers, technical staff of companies, suppliers and EE/DSM professionals. Training should be a continuous activity, especially in EE/DSM. Currently, there are no locally organised training courses that can

[14] CEB website: http://ceb.intnet.mu/

[15] Report of the National Energy Commission, Making The Right Choice For A Sustainable Energy Future: The Emergence Of A "Green Economy", October 2013

provide systematic professional training to build local capacity on EE/DSM. Although EEMO can provide training, this will not be systematic unless the design and delivery of the courses is integrated in the core professional business.

4.2.14 Public sector need to set a good example

The activities of the public sector in EE are crucial in order to set an example and demonstrate how EE measures can reduce energy consumption and save money. In Mauritius, the public sector is still trying to build the institutional framework in the EE sector and has not engaged in actual technical measures in its buildings. However, if the EE is going to be promoted and the EE market for services and equipment is going to open, the public sector should set the example by investing in EE measures and publicising the results as demo projects.

4.3 SWOT analysis in the EE/DSM

The following SWOT analysis for the EE/DSM sector is drawn from the 'Report on the consolidated assessment of potential for energy efficiency and demand side management in Mauritius, and current incentive structures'[16].

Strengths	Weaknesses
Political support for EE by the Government EE strategy, targets and updated Action Plan exist Some legislation and regulation in EE is in force or under development MEPU is receiving training in energy planning EEMO is receiving training in energy planning and energy audit management Projects in EE and DSM are being carried out and others will start very soon EEMO has been established and it is operating EEMO is successfully working to implement several EE measures that are in line with the Energy Sector Action Plan 2011-2025 EEMO has experience in EE awareness campaigns and in drafting laws and regulations The software for registering the energy audits and data collection is under preparation Labelling regulation under preparation There is experience in incentive programmes for the introduction of solar water heaters as well as the replacement of inefficient lamps with CFLs CEB is experienced in DSM and has carried	Island with no interconnections and far from continental countries Small market Small production base – little or no local manufacturing capacity for EE and RE products and equipment MEPU is understaffed The capacities of MEPU are not yet adequate for decision making and planning EEMO is understaffed The current technical capacities of EEMO are inadequate to carry out its mandate EEMO does not have its own funding resources; it relies exclusively on governmental budget for funds The rigid administrative procedures on the public sector cause delays in EEMO in hiring professionals and in carrying out technical EE projects The communication of EEMO with private consumers and banks needs to be improved SMEs have weak financing capacities to undertake EE projects and lack the know-how and expertise to evaluate and implement them

[16] Maxwell Stamp, 2015.

out projects in the past The National EE Programme subsidises energy audits in industry and services Credit lines for funding EE projects are provided by AFD and administered by two banks There is funding from donors for EE projects The building codes and the compliance scheme are under preparation; training in assessors will be given The system for training and certification of energy auditors is under development Measures for improving the environmental performance of vehicles are under preparation Statistics Mauritius has experience in data collection surveys Several standards for appliances and equipment have been developed by the Mauritius Standards Bureau SMEDA provides technical and business support and programmes in SMEs	Lack of understanding of technical aspects in commercial banks limits their willingness to lend for viable EE/DSM projects once donor-funded projects are completed No public fund for private EE investments and financing incentives Lack of professional energy managers in public buildings The mechanisms to provide analytical information in EE need improvement Lack of disaggregated data to make informed planning Absence of integrated information tool for policy making and monitoring in EE The awareness of the general public on EE needs improvement Energy labelling has not been enforced yet Limited capacities of local engineers on EE studies and projects Retailers do not promote EE technologies to clients due to fear of the higher cost of these technologies and lack of knowledge about their features The CEB is not actively promoting EE/DSM due to potential revenue loss Inadequacy of existing financial mechanisms to promote EE in households Inadequacy of existing financial mechanisms to promote EE investments for SMEs The mechanism to provide systematic and professional training on EE audits and studies etc, to energy professionals needs improvement Electricity tariffs mainly in industry do not reflect real energy generation costs; tariffs in industry do not incentivise EE Long process to pass legislation and regulations Only few private companies in EE services are present No regulation and enabling framework for ESCOs. ESCO sector undeveloped. No time-of-use tariffs

	The public sector has not yet set the example in EE Bureaucratic and inflexible public sector causes delays and limits the impact of government initiatives Government fiscal constraints limit funds available for EE/DSM programmes
Opportunities	Threats
Considerable EE potential in industry, services, residential and public buildings The EE Building code was drafted recently– needs a simple update EEMO experience in EE/DSM can be used to train engineers in energy audits EEMO and CEB experience in EE/DSM can be used to design and implement awareness campaigns CEB can provide energy services and EE/DSM programmes Interest of the private sector to implement energy audits and EE interventions Interest of private engineers to be trained as auditors and building assessors Interest of the tourism sector to offer DSM solutions Interest of the commercial banks to provide credit for EE and RE projects The services and residential sector show increasing interest in solar water heaters The energy audit management scheme and the building codes/compliance scheme will be ready soon The first energy auditors will be trained and certified soon Suppliers can import EE equipment Significant solar energy and bagasse potential	Energy demand and the peak electricity demand grow at a considerable pace Volatile energy prices of fossil fuels Low oil price reduces incentive for EE Small market may not provide opportunities to manufacturers, engineers and consulting firms EE may be perceived as uncertain investment by the private investors and local banks Funding from donors may cease if no progress is made in the EE sector Certain EE measures (eg labelling, standards) can add to cost of production while Mauritius is too small a market for large multinationals like Sony, Samsung etc. to change products just to fit; additional costs of compliance will be passed on to consumers Too few staff to implement too many policies & programmes, the staff that are there spend significant time in training limiting their availability for actual implementation

5. Methodology

The methodology followed to develop the EE/DSM Master Plan was based firstly on the information collected on the interviews with the stakeholders. Further, a detailed analysis of the

existing Energy Sector Strategy and Action Plan, as well as the existing legislation and regulations were conducted. The EE/DSM initiatives that are currently in operation and those that will start soon were also analysed. The MAED-2 model was used to estimate the energy savings as a result of some proposed EE/DSM measures. Below, a further analysis of the use of tools in order to develop the EE/DSM Master Plan is presented. It has to be noted that these tools are simply instruments to aid analysis by presenting ideas in a structured way. These tools do not aim and cannot replace the mind of the decision maker.

5.1 Tool 1: Interviews

Semi-structured interviews were used to contact the stakeholders and collect information. An interview guideline was used (flexible framework of topics derived from the questions). The interview guideline's instructions with additional questions were modified, in order to develop useful areas of inquiry during the interview. The stakeholders that were interviewed comprise of line Ministries, business associations, the electrical company, financial institutions, the private sector and public authorities. The exhaustive list of interviewees is presented in Annex X. During the interviews information was collected on the existing situation in the EE/DSM sector and the barriers that pose obstacles to the further development of the sector. The interviewees expressed their opinions and perspectives, each based on its own type of business and experience, for policies that can be adopted to improve the sector and to open the EE/DSM market for energy services and technologies.

5.2 Tool 2: SWOT and barrier analysis of the EE/DSM sector

The information that was collected from the interviews and the literature study was organized and systematized in order to analyse in depth the situation of the EE/DSM sector and especially the barriers that hinder the development of the sector. In order to systematize and organize the information received from the interviews and to have a macroscopic view of the EE/DSM sector, the SWOT analysis was used (strengths, weaknesses, opportunities and threats). The SWOT analysis was used to analyse the internal strengths and weaknesses of the EE/DSM sector and the external opportunities and threats that it faces. The SWOT analysis allows arranging EE/DSM sector diagnosis in accordance with a matrix basis (strengths, weaknesses, opportunities and threats). In order to put in objective terms, the design of matrix quadrants, special definitions of matrix elements are suggested as follows:

- Strengths: Variables, characteristics and/or circumstances of EE/DSM sector which contribute to its development and growth, improving its service capacity and sustainability.
- Weaknesses: Variables, characteristics and/or circumstances of EE/DSM sector which limit its development by means of reducing its service capacity and sustainability.
- Opportunities: Variables, characteristics and/or circumstances of external environment which may impact on EE/DSM sector future operation, making its development easier and/or improving its sustainability.
- Threats: Variables, characteristics and/or circumstances of external environment which may impact on EE/DSM sector future operation, slowing its development down and/or deteriorating its sustainability.

The SWOT analysis presents a macroscopic view of the current state of the EE/DSM sector.

The SWOT analysis was used as an input to the in depth analysis of the barriers in the EE/DSM sector. The analysis of the barriers revealed the cause-effect relationship that inherently exists in the barriers. The cause-effect relationship described the causes of the barriers and relates them to the adverse effects they have on the development and sustainability of the EE/DSM sector. This link is further analysed by describing the way the causes of the barriers affect the development and sustainability of the EE/DSM sector.

5.3 Tool 3: 'Problem-tree' and 'Objectives-tree' analysis of the EE/DSM sector

In order to analyse the cause-effect relationship the 'problem-tree' analysis was used. These methodological tools are used extensively by the European Commission in the design, implementation and monitoring of large programmes or projects[17].

Problem-tree analysis identifies the negative aspects of an existing situation and establishes the cause and effect relationships between the identified problems. It, generally, involves three main steps:

- Definition of the framework and subject of analysis;
- Identification of the major problems faced by target groups and beneficiaries (what is/are the problem/s? whose problems?) and statement of problems in a negative manner;
- Group problems by similarity of concerns;
- Develop the 'problem-tree':
  - Select a focal problem or focal problems from the list and relate other problems to the focal problem(s).
  - If the problem is a cause of the focal problem(s) it is placed below the focal problem(s).
  - If the problem is a consequence(s) of the focal problem(s) is placed above the focal problem(s)
  - If the problem is an effect of consequence(s) is goes above the consequence(s);
- Visualisation of the problems in form of a diagram, called a 'problem tree to help analyse and clarify cause-effect relationships[18].

The final output of the 'problem-tree' analysis will be the actual 'problem-tree'. A general format of the 'problem-tree' is presented in Figure 1 below.

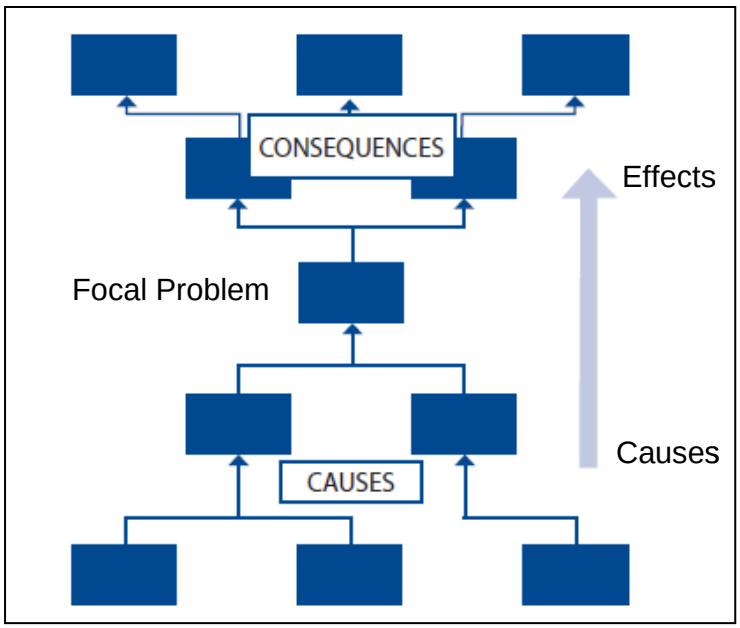


Figure 1: The general format of 'problem-tree' analysis

[17] European Commission, Project Cycle Management Guidelines, March 2004

[18] In the case of this report, due to space constrains the 'problem tree' is presented as a table

In the case of the EE/DSM sector in Mauritius the 'problem tree' is presented in a tabular format for space limitation reasons. The 'problem tree' table is presented in the following. The analysis is aimed at identifying the real bottlenecks which stakeholders attach high priority to, and which they wish to overcome. A clear barrier analysis thus provides a sound foundation on which to develop a set of relevant and focused objectives and measures to achieve the objectives.

Causes	Problems	Consequences	Effects
MEPU is understaffed	Professionals who manage the energy sector are overstressed	The management of the energy sector needs improvement	The exploitation of the EE/DSM potential needs to be realised The income created by the EE/DSM market needs to be increased The market for EE/DSM services/technologies remains small
EEMO is understaffed	EEMO cannot cope with the complexity of the duties imposed by its mandate	Projects/measures that develop the EE/DSM sector remain outstanding	
The current technical capacities of EEMO are inadequate to carry out its mandate			
Rigid administrative and contracting procedures of EEMO	Delays in recruitment of new staff	EEMO's understaffing problem remains unsolved	
	Possible delays in tendering technical activities	Delays in project implementation	
EEMO relies solely on government funds	No mechanism to offer financial incentives to its staff	Specialised professionals may be reluctant to join EEMO	
The communications of EEMO with stakeholders needs improvement	Partial understanding of the problems of stakeholders/not optimal for policy planning	Suboptimal decisions making and planning	
Weak financial capabilities of SMEs	Companies do not make energy audits and EE investments due to large capital cost	Access to EE financing is hindered	
	Companies unable to give guarantees or collateral to the banks	Good quality and feasible EE projects are rejected by the banks	
Lack of the professional energy managers in public buildings	The energy savings potential in public buildings remains untapped	Limited EE projects in public buildings	
	The opportunity to gain experience in energy management is lost		
Mechanisms to provide access to information in EE need improvement	Cost of information remains a prohibitive factor for companies	Lack of information leads to missing EE/DSM opportunities	
	The professionals' and companies' knowledge on EE needs improvement		
Lack of data to make informed policy decisions and monitor policies and action plans	Planning and monitoring are suboptimal	The planning and monitoring mechanisms need improvement	
Lack of integrated tool for the policy making and monitoring of EE	The systematisation of the processing of data and the provision of data for demand forecasting, decision making	The planning and monitoring mechanisms need improvement	

	and monitoring activities need improvement	
Low capacities of local engineers	Energy audits, energy studies and feasibility studies lack the level of quality needed to create bankable projects	Some good projects are not identified and opportunities are lost
The qualifications of the craftsmen/installers need improvement	The quality of installations is not known	Energy savings are potentially lost due to low quality installations
The awareness on EE/DSM in all sectors needs improvement	Companies cannot realise energy is wasted and the solutions	Some good projects are not identified and opportunities are lost
Retailers do not represent the efficient technologies to their customers and prefer more standard solutions because of lack of knowledge, fear of high cost, lack of after sales support	Consumers do not become aware of the energy efficient products Demand for energy efficient products does not increase	As a general trend, EE technologies are not installed and potential remains untapped
CEB views EE/DSM as mechanisms that will decrease its sales so it has limited interest in them	CEB is not implementing EE/DSM projects for its customers	As a general trend, energy and peak demand are not mitigated via EE/DSM projects
The exploitation of the benefits of existing financial support mechanisms by SMEs needs improvement Absence of a financial support scheme targeted to the needs of the SMEs	SMEs cannot exploit financing schemes to fund EE/DSM projects	As a general trend, EE/DSM projects are not funded and opportunities are lost
In the residential sector there is no financial support to assist households to engage in integrated EE measures	Households cannot fund EE/DSM projects	
Electricity tariffs reflection of real electricity generation costs	Disincentive to implement EE measures and to shift demand in non-peak hours	As a general trend, EE measures and demand shift are not realised
The mechanism to provide systematic training courses specialised for EE needs improvement	The quality of auditing, engineering studies, selection of technologies and guidance of the private sector in achieving EE needs improvement Engineers face difficulty to improve their skills	As a general rule, the low quality of studies and projects compromises the resulting energy savings
Public sector need to set a good example	The number of EE/DSM projects in public sector needs to be increased Number of demo projects in limited	The private sector is not motivated by the public sector
Minimum energy performance standards (MEPS) for electric appliances have not been established yet	Dominance of inefficient electric appliances in the market	The households use inefficient appliances

MEPS are not enforced		
The enforcement of energy labels has not started yet	The consumers are not informed about the energy consumption of appliances	
Lack of plan and investments in efficient street/public area lighting	Street/public area lighting still uses inefficient lamps	Municipalities spend a lot in street/public area lighting
Lack of plan and investments in efficient water pumping	Street/public area lighting still uses inefficient water pumps	The spending on electricity consumption for water pumping is high
No incentives for electric vehicles	There are no electric vehicles in the market	The new vehicle technologies are not present in the market and do not produce energy savings
No incentives for efficient new vehicles, hybrid and biofuel fuelled vehicles	No stimulus of the private users for efficient vehicles	The new vehicle technologies are not present in the market and do not produce energy savings
The building codes have not been updated and enforced yet	The standards for building construction are not enforced yet	The buildings are not currently constructed with EE features
The energy audit scheme has not been established yet	The methodologies for conducting energy audits and managing statistical data are not in place yet	The data from energy audits are not harmonised and stored

Table 3: The cause and effect relationship of the EE/DSM sector in Mauritius

The 'problem table' defines the problems faced in the EE/DSM sector. The causes of these problems are identified. A problem may have more than one cause while one cause may cause more than one problem. The consequences of the problems are also described. A problem may have more than one consequence while a consequence maybe caused by more than one problem. The ultimate effects of the consequences are also presented. So, the cause and effect relationship is established. The relationships that are not 1-1 are coloured.

The 'objective tree' ('objective table' in the current report) is established on the basis of the 'problem tree'. The 'objective-tree' presents an identification and analysis of the objectives needed to be achieved to tackle the identified problems and their causes. In addition, the relationship between the measures to achieve the objectives is described. The 'objective table' was also developed to define the proposed EE measures and to check the consistency between the relationship causes-problems-measures-objectives.

Objectives and problems are firmly tied using this kind of procedure. Once complete, it presents a summary of the desired future situation along with the measures to achieve every desired objective of this future situation. Analysis of objectives is a methodological approach employed to:

- Describe the situation in the future once identified problems have been remedied.
- Verify the hierarchy of objectives.
- Illustrate the means-ends relationships in a diagram. The means are the measures and the ends are the objective(s) that are the desired future situation. Hence, the diagram (the table in the case of this report) will depict what measures will be needed to achieve the objective(s).

The relation of the 'problems-tree' and the 'objectives-tree' is tight, so the 'objectives-tree' emerges from the 'problems-tree' as it is illustrated in the figure below.

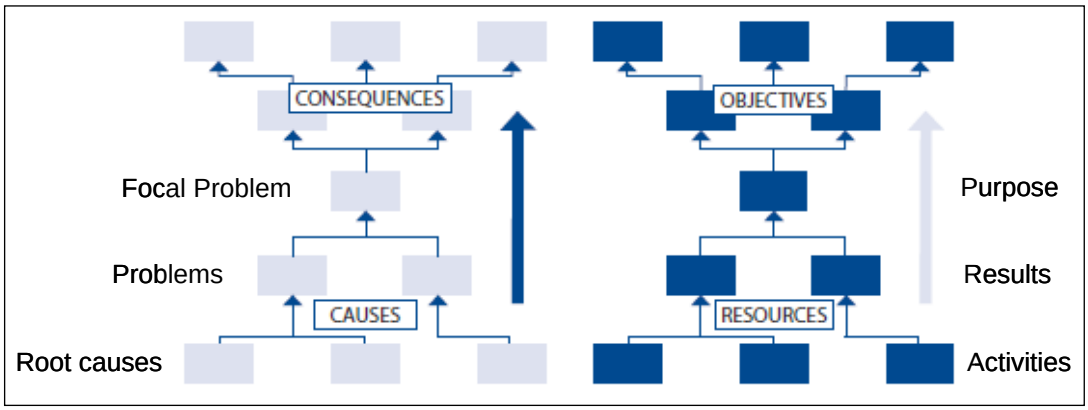


Figure 2: The 'objective-tree' and its relationship with the 'problems-tree'

The 'objective table' for the EE/DSM sector of Mauritius is presented in the following table 4.

EE measures	Objectives	Ultimate Goals
Establishment of an Energy Efficiency/Renewable Energy Financing Scheme	Facilitate access to finance especially for SMEs	Energy efficiency investments are carried out by large, medium and small companies in all sectors Energy efficiency investments are carried out by households Information on EE/DSM is easily accessible The planning in the EE/DSM sector is improved The culture for sustainability has been built in all generations
	Improve the feasibility of EE investments so more will be implemented	
	Open the market for energy services and technologies	
	New financial products that fit better to SMEs are present	
Establishment of an information centre on EE for companies	Reduce the cost and effort for finding targeted information	
	Facilitate entities to have access to EE information sources	
Creation of the Energy Information System (EIS)	Systematise and organise the collection, processing and provision of energy data to other models	
	Provide a mechanism for the monitoring of the EE sector and the implementation of the EE strategy, policies and action plans	
	Develop a tool for decision support in energy policy and planning	
Creation of a system for conducting data collection surveys	Data to make informed policy decisions and monitor policies and action plans are collected and systematically organised	
	The planning and monitoring mechanisms are improved	
Update of building codes/establishment of compliance scheme and	Standards that define the minimum requirements of material, equipment and systems in buildings are defined	

respective regulation	Open the market for more efficient materials, equipment and systems and more efficient buildings are constructed
Establishment of the Energy Audit Management Scheme	Methodologies for conducting energy audits and managing the data they include are realised
Training and certification of energy auditors	Auditors with high quality skills are introduced in the EE/DSM market
	Energy audits are of high quality
Introduction of the concept of energy performance contracting (EPC)	Financing mechanisms to motivate the implementation of EE investments are created
	Create the rules for EPC
	Introduce EPC into the market
Market search and display of certified energy efficient products	Open the market for more efficient materials, equipment and systems
	Provide the mechanism to present EE material, equipment and systems to consumers
Development of the skills of craftsmen through training programmes	Increase the quality of the installations thus, increasing energy savings
	Create trust to the EE technologies and the support schemes
Establish co-operation between EEMO and SMEDA for training EE in SMEs	Increases the levels of awareness information and knowledge to SMEs
Establishment of a centre for EE/DSM training within EEMO	Increase the capacities of local engineers to identify new EE/DSM projects
	Improve the quality of projects and energy services provided to end users
Establishment of EE/DSM working groups in the subsectors and networking	Increase co-operation and communication among stakeholders
	Increase the quality, transparency and ownership of the planning
	Increase knowledge used in the planning process
Introduction of EE/DSM in school curricula	Increase the awareness in EE
	Create a lifestyle that respects resources in the young generation
Set up a twinning project to enhance the capacities of EEMO	Provide the capacity building to EEMO that is in line with the skills required to implement its mandate
	Create networking and co-operation with more advanced institutions
Establish technical specifications for solar water heaters (SWH) entering the Mauritian market	Raise the quality of the SWHs, their reliability and the resulting energy savings
	Increase the credibility of the support mechanism for SWHs

New Solar Water Heater Scheme for households	Reduce the capital cost of SWHs and motivate its usage by households
Development of minimum energy performance standards (MEPS) for electric appliances and the enforcement mechanism	'Cuts off' the worst performing models from the market for a particular product because importers are forced to import models that pass the minimum performance level
Energy labels	Inform consumers about energy consumption of appliances
	Stimulate consumers to buy energy efficient appliances
	Stimulate importers to import energy efficient appliances
Establishment of voluntary agreements	Motivate industries to implement EE measures
	Increase awareness on EE
	Enhance the skills of the industry and the local engineers in developing and implementing EE/DSM projects
	Open the market for more efficient materials, equipment and systems and energy services
	Provide data from industry to make informed planning
Design and carry out energy efficiency awareness and information campaign for buildings of services sector	Raise awareness
	Identify new EE/DSM opportunities in residential buildings
Design and conduct a study to assess the technicalities and feasibility of disconnecting hotels from the grid and generate the electricity they need locally at system peak times	Provide CEB with solutions in engaging in DSM and mitigate peak demand
Design and conduct a study to assess the technicalities and feasibility of hotels or service businesses using Building Energy Management Systems (BEMS) to lower consumption during system peak hours	
Establishment of Governmental Programme for financing EE interventions in residential buildings	Provide a mechanism for funding EE measures in households
	Raise the awareness of the households in EE
	Open the market for energy services and technologies
	Raise the capacities of local engineers

Design and carry put energy efficiency awareness and information campaign for households	Raise awareness and provides information on EE	
Appointment of energy managers in public buildings	The public sector sets the example for the private sector by implementing EE/DSM projects	
	Improvement of capacities in EE in the public sector	
	Open the market for energy services and technologies	
Development of action plan for EE interventions in public schools	Open the market for energy services and technologies Increase of the capacities of local engineers The public sector sets the example Provide example and motivation for the private sector Reinforce the capacities of EEMO which manages the action plans	
Development of action plan for EE interventions in local authorities buildings		
Development of action plan for EE interventions in public buildings of central Government		
Energy efficiency in street/public area lighting	Create the plans to invest in more energy efficient street/public area lighting to reduce the cost of energy for municipalities	
Energy efficiency in water pumping	Create the plans to invest in more energy efficient water pumps and reduce the electricity cost	
Financial incentives to promote electric vehicles	Reduce the up-front cost of electric vehicles and motivates users to buy them	
Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (more efficient vehicles, vehicles fuelled by biofuels and hybrid vehicles)	Reduce the taxes of efficient hybrid and biofuel vehicles and motivates private users to buy them Provide incentives to replace the older cars	

Table 4: The measures and objectives relationship of the EE/DSM sector in Mauritius

An objective may need more than one measure to be achieved. A measure may achieve more than one objective simultaneously. The relationships that are not 1-1 are coloured. The table above describes the measures to achieve the objectives. So, the measure-objective relationship is established.

In order to derive the 'objective-table from the 'problem-table the procedure below was applied:

- Restating the negative aspects of the problem-tree as the targeted, realistic objectives. Every cause-effect relationship does not automatically turn into means-end relationship but work may be needed in the formulation of the statement. Means are the EE/DSM measures proposed in the case of the EE/DSM Master Plan while the ends are the objectives. Therefore, the means-end relationship describes the measures required to achieve the objectives (the measures-objectives relationship).
- Checking whether the means are realistic and sufficient to establish the ends and also check the completeness of the hierarchy. Adding means if necessary to complete the hierarchy. Adding also new objectives if these seem to be relevant and necessary to

achieve the objective at the next higher level. Deleting objectives which do not seem suitable or necessary.

- Working from the bottom upwards to ensure that cause-effect relationships have become measures-objectives relationships.

The mapping that was applied between the elements of the 'objective-table from the 'problem-table was the following:

- The effects are transformed into the ultimate goals.
- The consequences are transformed into objectives.
- The problems and causes are transformed into measures.

The completed objective table provides a summary picture of the desired future situation, including the indicative means by which ends can be achieved.

6. Logical Framework Approach

The Logical Framework Approach (LFA) is an analytical process used to support project planning and management. It is used extensively by the European Commission in designing, implementing and monitoring projects and large programmes which include a lot of projects[19]. It provides a set of interlocking concepts which are used to aid structured and systematic analysis of a project or programme idea. The LFA should be thought of as an 'aid to thinking'. It allows information to be analysed and organized in a structured way, so that important questions can be asked, weaknesses identified and decision makers can make informed decisions based on their improved understanding of the project or programme rationale, its intended objectives and the means by which objectives will be achieved. The product of the LFA is the Logical Framework Matrix (LFM). The method involves the presentation of the results of analysis in such a way that it is possible to set out the programme's or project's objectives in a systematic and logical way. This should reflect the causal relationships between the different levels of objectives, to indicate how to check whether these objectives have been achieved, and to establish what assumptions outside or inside the control of the programme or project may influence its success.

The LFM (or more briefly the Logframe) consists of a matrix with four columns and four (or more) rows, which summarise the key elements of a programme or project plan, namely:

- The project's hierarchy of objectives (Project Description or Intervention Logic);
- The key external or internal factors critical to the project's success (Assumptions); and
- How the project's achievements will be monitored and evaluated (Monitoring indicators and Sources of Verification).

The LFA has various uses in the lifetime of a programme or project:

- it is used to help analyse the existing situation, investigate the relevance of the proposed programme or project and identify potential objectives and strategies
- it supports the preparation of an appropriate programme or project plan with clear objectives, measurable results, a risk management strategy and defined levels of management responsibility;
- it provides a key management tool to support contracting, operational work planning and monitoring;
- it provides a summary record of what was planned (objectives, indicators and key assumptions), and thus provides a basis for performance and impact assessment. Is also provides a framework of objectives, indicators (and targets) and sources of information which could be used as monitoring system.
- it provides a list of key assumptions which must be monitored as part of the project's risk management arrangements.

[19] European Commission, Project Cycle Management Guidelines, March 2004

- it is a clear and consistent reference point and structure for completing progress reports.

A more informative introduction to the LFA, its capabilities if used correctly, and how it can be used to plan a programme or project is provided in Annex XI.

The LFA is used to establish the hierarchy of objectives, from the Overall Objective of the EE/DSM Master Plan and the desired Purposes which contribute to the Overall Objective to the Results which are a product of the Activities and contribute to the achievement of the Purposes. By using the LFA the consistency of the proposed EE/DSM measures with the desired Results, the consistency of the Results with the desired Purposes and the consistency of the achievement of the Purposes with their contribution in the achievement of the Overall Objective was tested and, finally, ensured. In other words, the consistency of the above was tested by answering to the following questions which form the basics of structuring the intervention logic:

- If we wish to contribute to the Overall Objective, what Purposes must we achieve?
- If we wish to achieve the Purposes, what Results must we deliver?
- IF we wish to deliver the Results, what EE/DSM measures must be implemented?

In addition, the LFA is used as tool to describe the monitoring plan of the EE/DSM Master Plan. Qualitative and/or qualitative indicators are proposed to assess the level and quality of achievement of each Activity, Result, Purpose and the Overall Objective. The Indicators were selected to be SMART, namely:

- **S**pecific to the objective they are supposed to measure
- **M**easurable (either quantitatively or qualitatively)
- **A**vailable at an acceptable cost
- **R**elevant to the information needs of monitors and planners
- **T**ime-bound – so the monitors and planners know when they can expect the objective/target to be achieved.

The Sources of Verification are also described for each of the above, so that the entities responsible for monitoring can search for data to quantify the indicators or to assess them qualitatively.

In addition, at the level of Activities in the LFM, the barriers that are confronted by each Activity are presented.

The complete Logical Framework Matrix of the EE/DSM Master Plan is presented in Annex XII.

7. The proposed EE/DSM measures of the EE/DSM Master Plan

The EE/DSM measures that are included in the EE/DSM Master Plan 2016-2030 are allocated to the following categories:

- Horizontal measures: affect more than one sector or not closely linked to specific sectors and encompass institutional, strategic, management and technological aspects.
- Measures in industry: affect industrial consumers.
- Measures in services: affect consumers in the services sector.
- Measures in households: affect residential consumers.
- Measures in the public sector: affect public entities.
- Measures in transport: affect private or public vehicles, routes, roads, access to areas and transport behaviour.

Measures that are already under implementation and included in the Energy Action Plan 2011-2025 are also included on the EE/DSM Master Plan 2016-2030 to achieve completeness. The EE/DSM measures are presented below per category.

7.1 Horizontal measures

The horizontal measures presented include the proposed new measures:

- H1: Establishment of an Energy Efficiency/Renewable Energy Financing Scheme
- H2: Establishment of an EE Information Centre for companies
- H3: Energy Information System
- H4: System for data collection surveys
- H6: Introduction of energy performance contracting
- H7: Market research and display of certified energy efficient products
- H8: Development of the skills of installers
- H9: Establish co-operation between EEMO and SMEDA for training of SMEs in EE
- H10: Establishment of a centre for EE/DSM training within EEMO
- H11: Introduction of EE in school curricula
- H12: Twinning project to enhance the capacities of EEMO
- H13: Establish specification for solar water heaters entering the Mauritian market
- H16: Establishment of EE/DSM working groups and networking in different subsectors for EE/DSM planning.

The horizontal measures under implementation are:

- H5: Energy performance of buildings – Update of building codes
- H14: Development of minimum energy performance standards (MEPS) for electric appliances
- H15: Energy labelling.

A detailed presentation of the horizontal measures is provided further below in this section.

Title of the measure	Establishment of an Energy Efficiency/Renewable Energy Financing Scheme[20]
Code	H1
Category	Financial measure
Timeframe	The implementation of the EE/RE Financing Scheme should start after the development of the energy audit management scheme. The establishment of the EE/RE Financing Scheme will start with a pilot phase during the period 2016-2018. The pilot phase will last for two years and then the normal operation of the Financing Scheme will start. The results of the pilot phase will be assessed before the decision to continue is made.
Purpose	The EE/RE Financing Scheme will be the instrument to provide funding for EE/DSM measures, incentive programmes to support EE investments and other support mechanisms that contribute to the growth of the EE sector and market. It also aims at promoting and enhancing the commercial financing for EE projects and creating a sustainable market for the development and financing of EE investments. The support of the Financing Scheme will mainly target SMEs but not excluding larger companies.
Brief description	The development of the EE sector needs financial resources to provide the funding for EE measures that will develop the EE sector, including

[20] Annex XVIII includes a note on the EE/RE Financing Scheme which explains the philosophy behind this proposed measure.

	those of the Master Plan. So, it requires a mechanism to integrate and manage these resources. The Financing Scheme will also integrate and manage the funds for RE projects in order to avoid duplicating structures. Furthermore, the funding of the EE/DSM and RE measures will be facilitated if the friction among priorities that claim funds from the governmental budget is alleviated. The Financing Scheme can contribute to that by separating the funds targeted to EE/DSM measures as well as RE measures from the rest of the governmental budget lines. The funds of the Financing Scheme could come from governmental budget appropriations, grants of international donors, taxes, public benefit charges[21], or any other source. A wide array of initiatives can be financed: the Master Plan, other incentives, pilot projects, research and development projects, EE/DSM and RE projects in the public sector and other initiatives. Three financial products can be funded and managed by the Managing Committee of the Financing Scheme: • Partial credit guarantees to commercial banks for loans that are targeted to finance EE investments in all sectors. • Subsidies of the interest of the loans that are provided by commercial banks to project developers and ESCOs for EE investments in all sectors. • Subsidies to energy audits for SMEs. In addition, technical assistance to the lenders and the project developers can be provided to assist them use the financial products or any other support programme associated with the Financing Scheme.
Target end use(s)	All energy end uses
Target groups	All sectors
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The development of the EE sector needs the allocation and provision of the appropriate funds. This means that the EE measures of the Master Plan as well as other measures, incentives and support programmes need sustainable funding sources. In light of this, the Financing Scheme will accumulate, integrate and manage all funding resources that can be used to fund the EE sector. It can have these functions as regards the RE sector as well. Moreover, with the Financing Scheme resources will be managed and be channelled to the appropriate financial products that support the implementation of EE investments and audits. These financial products will be designed to alleviate the respective financial barriers of the EE sector which have been analysed in sections 3.2 and 4.2. In practise, the Financing Scheme could be a distinct budget line or account within the governmental budget combined with a managing committee that decides how the funds will be spent, manages and monitors the funds

[21] The public benefit charges are explained in Annex III.

	and the financial products operation. The objectives of the EE/RE Financing Scheme will be the following: • Provide the necessary funding sources for the implementation of measures that will contribute to the development of the EE/DSM sector and market. • Financing of measures of the EE/DSM Master Plan, • Financing EE/DSM measures in the public sector, • Promotion of EE concept and the increase of EE investments in Mauritius, • Encouragement mainly of SMEs to make energy audits and invest in EE/DSM, • Funding and facilitation of EE/DSM pilot projects or studies, • Funding and facilitation of research on innovative EE/DSM technologies • Technical assistance and information provision to stakeholders (the public sector, private businesses, technology vendors, civil society) and the general public on EE/DSM and facilitation of the provision of in-depth information to them about EE/DSM, • Encouragement of EE in transport sector by facilitating relevant EE initiatives. Financial products that support the private sector in realising EE audits and investments are associated with the Financing Scheme. The latter provides the funding for the financial products and manages them through its managing committee. The financial products that will be associated with the Financial Scheme will be the following: • Partial credit guarantees to lenders for loans that are targeted to finance EE investments in all sectors. The partial credit guarantees will support mainly loans targeted to SMEs without totally excluding larger companies. Loans to ESCOs will also be eligible for a partial credit guarantee. The partial credit guarantees will cover a percentage of the potential losses of the commercial banks in case of loan defaults, thus reducing the perceived risk of the banks towards EE projects. This product could complement the SUNREF credit line by being applied to loans given under SUNREF. It could also be combined with other loans not linked to SUNREF. • Subsidies targeted to the interest of the loans (soft loans) that are provided by commercial banks to SMEs and ESCOs for EE investments in all sectors. The subsidies to the loan interest will lower the interest rate, thus making the loans more attractive. This product could complement the SUNREF credit line and apply to loans given under it. It could also be combined with other loans not linked to SUNREF. It can also complement the NEEP, so that SMEs can get the subsidy of 60% of the cost of the energy audit and get a loan for the remaining 40% with lower than the market interest rate. • Subsidies to energy audits for SMEs (that are not covered by NEEP). The Financial Scheme's resources can also be used to finance other

	policy initiatives in the EE sector besides the financial products. Funds can be targeted to: • The implementation of pilot projects, • The implementation of research and development projects, • Finance support programmes that involve incentives, technical assistance, etc, • The implementation of measures of the EE/DSM Master Plan. Moreover, the Financial Scheme's products could be combined with the existing financial support schemes for EE investments (NEEP or PNEE and SUNREF) in order to offer more advanced financial products to investors. In addition, technical assistance can be provided by EEMO to the private sector companies that would like to use the financial products or any other support programme associated with the Financing Scheme. The technical assistance to the project developers will target the following activities: • Identify EE opportunities, • Select EE technologies or vendors, • Make feasibility studies for EE projects and structure the financial package of them in order to receive financial support, • Draft the required documents for applying for financial assistance to the Financial Scheme financial products, • Provide information to the companies on EE, technologies, suppliers, audits, auditors, implementation of EE measures, Technical assistance could also be provided to the lenders to: • Deploy project financing tools, • Assess the risks of EE investments, • Make due diligence of the EE investments that apply for financial support, • Operationalise funding models for ESCOs.
Budget and financial source	Alternative funding sources could be combined and channel resources into the Financial Scheme[22]: • National budget appropriations, • Donations/grants from donors, international or local financial institutions, natural or legal persons, • A public benefits charge on the electricity bills, • Taxes, • Loans or other financial instruments from donors, international or local organizations, financing institutions and banks, as well as from natural persons and/or from legal persons, • Financing from bilateral and multilateral donors, • Financing by local financial institutions, • Accrued interest on current accounts or bank deposits opened by the government, • Potential fees or contributions accrued by the nature of the

[22] The ability of the mechanisms to generate resources for the Financing Scheme should be assessed by the Ministry of Finance.

	activities of the Financial Scheme, • Other earnings in conformity with the Financial Scheme's nature and activity. The budget required to support financially EE investments in all sectors until 2030 is estimated to be[23]: • Total estimated required budget until 2030 is MUR 18,318,993,600, • Estimated average annual budget is MUR 1,221,266,240.
Implementing body	MEPU and Managing Committee of the EE/RE Financing Scheme[24]
Monitoring body	MEPU and Managing Committee of the EE/RE Financing Scheme
Potential energy savings	The energy savings cannot be calculated precisely because the establishment of the Financing Scheme is a policy measure and as such the technologies, nature and size of the EE investments which will be carried out as a result of the Financing Scheme support are not a priori known.

Title of the measure	**Establishment of an EE Information Centre for companies**
Code	H2
Category	Informational measures
Timeframe	Starting in 2017 and the establishment of the information centre will last for two years. Its operation shall be on-going.
Purpose	Establish an information centre to provide information and guidelines in EE for the private sector.
Brief description	Establish an information centre on EE for companies and especially for SMEs; exploit the experience and networking of business associations and NGOs, tender the creation of an information centre by business associations and NGOs
Target end use(s)	All end uses
Target groups	Industrial companies Companies in the services sector SMEs in industry and services sector

[23] The methodology and assumptions for the estimation of required budget are described in Annex I. This cost is optimistic and should be perceived as an upper limit. The allocations of budget to the Financial Scheme to support the EE investments should be based on the pace funds are collected. The ability of the public benefit charge and the taxies to collect funds should be assessed with an economic study. The budget allocations to the Financial Scheme could also be staggered depending on the availability of funds.

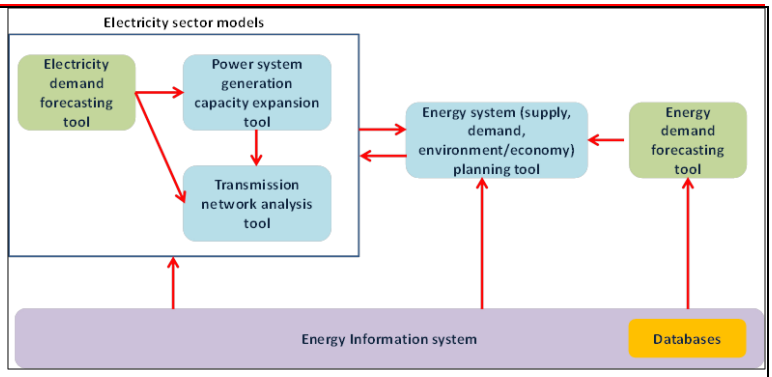
[24] The Managing Committee of the EE/RE Financing Scheme will be the body that manages and monitors the funds and decides how these will be spent. It also manages and monitors the operation of the financial products or other support programmes associated to the Financing Scheme.

Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The private companies and especially the SMEs need organised and tailored technical information on EE technologies, opportunities, costs, suppliers and energy audits in order to engage in EE audits and investments. Such information is costly and cumbersome to find and consumes time. Therefore, a source that can provide such information to the private sector and especially to the SMEs could be the solution. Such a source can be an information centre on EE. The establishment of the information centre will be tendered by the government. It shall be decided by the government on a competitive basis. Eligible bidders can be business associations of industry and services sectors, non-profit organisations or non-governmental organisations that work with companies and especially SMEs in the industry and the services. The reason this is proposed is that such eligible entities work with the private companies and SMEs and they have an everyday connection, cooperation and contact with them. Furthermore, they have an already established network of private companies and SMEs to address to. So, they can easily approach the private companies and SMEs. The government can provide the funds for the establishment of the information centre. The EEMO will prepare, launch and manage a public bid for the establishment of the information centre. Only the strongest proposal that will meet the measure's objectives will be funded. Furthermore, EEMO will have the role of monitoring and evaluate the centre's operation and provide technical assistance to it if requested[25]. The information centre should have sustainable funding sources even after the end of the grant funding. The information centre will systematically create, collect, organise, update, provide and disseminate information on EE to companies in the industry and services sector. A successful information centre under the measure will provide quality information that comes from trusted sources and is delivered in a manner that meets the needs of a time and resource strained audience. In this way, the centre will to empower industry and services private sector to make informed decisions about energy efficiency – and thereby reduce their operational energy costs. The measure will directly support the research, development, organisation, update, provision and dissemination and evaluation of energy efficiency information by trusted sources. Funding for physical work (e.g. energy efficiency retrofits, equipment upgrades, etc) and for broader sustainability issues (e.g. water and waste reduction) is beyond the scope of this measure.
Budget and financial source	The estimated funds allocated to finance the grants will be MUR 120,000,000. Funding sources may be: donor funds, EE/RE Financing Scheme, public

[25] EEMO has also quite a few duties to perform according to its mandate so keeping the role of the monitor and the evaluator of the performance of the information centre would free some of EEMO's resources for other activities.

	budget appropriations
Implementing body	MEPU and EEMO
Monitoring body	EEMO
Potential energy savings	Not applicable

Title of the measure	**Energy Information System**
Code	H3
Category	Technical measure
Timeframe	The implementation of the measure can start after the MEPU, EEMO and CEB have fluent knowledge of the energy demand forecasting tools (MAED-2) and the power system generation capacity expansion tool (WASP) and they have used them to gain experience. The development of the EIS will start in the beginning of 2018. The duration of the EIS development will be approximately 24 months.
Purpose	The Energy Information System (EIS) will be the central informational hub for storing, using, processing and displaying all information used in the planning and monitoring of the EE/DSM sector.
Brief description	Development of EIS that will be used as central data point for energy planning and energy information dissemination.
Target end use(s)	All energy end uses
Target groups	All sectors
Geographical application	Entire Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	Development of an Energy Information System that will operate as: • a central point for providing data to the models for decision support in energy policy and planning, • a mechanism for the monitoring of the energy sector and the implementation of the strategies, policies and action plans through the provision of statistics and indicators, • a central information point for providing energy information services to all interested parties nationally and internationally (national stakeholders, donors, investors, public etc.). The EIS will provide all the necessary input data for the modelling and planning activities but will also provide monitoring data for the ex-post analysis of the effectiveness of different policies, measures and programs. A macroscopic overview of the concept of the EIS is included in figure below.



The arrows show the flow of data from one tool to the other. The location of the databases indicates that the different databases will become part of the EIS.

The list of possible operations that could be performed by the EIS should include:

- Customised reports for the quantitative information of the energy sector.
- Multi-level menus to present energy time series and indicators.
- Data entry forms for the quantitative information.
- Standardised reports as defined by international organisations (e.g. energy efficiency indicators, energy balances etc.).

The goal of providing energy related information to all interested parties will be achieved through the development of a web portal which will present only the non-classified data that exist in the system. This web portal could be used for the dissemination of all relevant information of the energy sector.

The experience of the Statistics Mauritius in the collection and processing of the energy sector data is valuable and should be included in the development of the EIS.

The main categories of information to be included in the EIS should cover at least the following:

1. Data required for the input to the energy demand forecasting tools, the electricity demand forecasting tools, the power system generation capacity expansion tools, the supply-side planning tools by MEPU and CEB, the transmission network analysis tools.
2. Data from the energy audits in industry, services, households, public buildings (building topologies, specific consumption for cooling, water heating, cooling, lighting, appliances, U-values, fuels per energy use, types of appliances, energy classes of appliances, types of light bulbs, etc)
3. Data on technologies used in industry, services, households, public buildings (Annex IV)
4. Investment cost and operational and maintenance cost of technologies used in industry, services, households, public buildings (Annex IV),
5. Timeseries data:
    - For each energy commodity time series data for imports, exports, production, transformation and

	consumption. The time resolution (daily, monthly, annually) will be determined by the time resolution of the data collection process. • International energy prices of petroleum products, updated on a daily basis from international sources. • Energy prices and tariffs per type of consumer. • Stock data for the energy sector technologies (e.g. power plant installed capacity, installed capacity per renewable energy technology) and activity data for these technologies (efficiency, availability etc). • Macroeconomic data. • Demographic data. 6. Indicators: • Energy sector indicators calculated from the time series data. • EE indicators calculated from the timeseries data. The indicators should be compatible with international best practice (e.g. EU-ODYSSEE, IEA). • Environmental and sustainability indicators related to the energy sector. • International indicators to be used for comparison. 7. Predefined reports, tables • Annual Energy balance (in the form of tables, or excel files). 8. Units • Energy units and possibility to change the energy units used for reporting. • Conversion tool for the energy units. 9. Meta-data • Data sources associated with each one of the other data described above. • Description of methodology for the indicators. • Description of methodology used for the compilation of the predefined reports. International standards in energy statistics[26] and energy indicators[27] should be used in order to ensure the data will be comparable with existing international and regional data. In this way the indicators developed in the framework of the EIS can be used to feed regional and international programmes on energy efficiency indicators and the data can be used for comparison with international databases. The information system for registering energy auditors and the tool to manage the energy audits, collect and analyse the information in

[26] International Energy Agency, Energy Statistics Manual, 2005

[27] ODYSSEE-MURE indicators, http://www.odyssee-mure.eu/; International Energy Agency, Energy Efficiency Indicators: Fundamentals on Statistics, 2014; International Energy Agency, Energy Efficiency Indicators Statistics: Country Practices Database, http://www.iea.org/eeindicatorsmanual/

	them can be part of the EIS.
Budget and financial source	Cost of the EIS development: MUR 20,000,000 Funding sources may be: donor funds, EE/RE Financing Scheme, public budget appropriations.
Implementing body	MEPU/EEMO
Monitoring body	MEPU/EEMO
Potential energy savings	Not applicable

Title of the measure	**System for data collection surveys**
Code	H4
Category	Informational measure
Timeframe	Starting during 2016. Surveys should be repeated every three years at least. This measure is one of the priorities.
Purpose	A system for conducting data collection surveys is established which will be the instrument to gather data on the technologies used in all sectors, the energy characteristics of these technologies as well as the condition of the buildings in Mauritius. Such data will be used in the planning, decision making and monitoring in the EE sector.
Brief description	Creation of a system to conduct surveys in order to periodically collect information on the technologies used and their energy characteristics, shares of fuels in consumption, technical characteristics of technologies, efficiencies of the systems and the energy consumption per system types and end-uses in all sectors. Surveys should also collect data on the building envelope characteristics and the systems used in the buildings. Co-operation between Statistics Mauritius and EEMO.
Target end use(s)	All uses of energy
Target groups	All sectors
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The integrated energy planning and decision making should be based on a solid foundation of data. Moreover, the monitoring of policies and action plans once they have been adopted requires the collecting and processing of a quite significant amount of data. Therefore, disaggregated data on energy consumption and data at the level of the transformation of energy (e.g. burning of oil in boilers to produce steam, burning of sugar cane in boilers to produce steam that drives the steam turbine and produces electricity) and the energy conversion technologies to make informed planning in EE are necessary. Examples include: data on the efficiencies of the technologies used in all

	sectors; data on the appliances used in households and services; data on the thermodynamic properties of building envelope, data on the technologies used in buildings, age of buildings, building typologies, etc. Statistics Mauritius has professional experience of periodically conducting surveys for collecting data and also of collecting energy data. This experience is invaluable so EEMO should seek a tight co-operation with Statistics Mauritius to conduct the surveys. Furthermore, the experience of Statistics Mauritius in developing questionnaires to be used for collecting data should also be exploited for the energy data surveys. EEMO shall provide its expertise on the type of data that should be collected. Statistics Mauritius shall put its experience in a) designing the survey templates, b) sampling the population in order to get the representative sample, and c) collecting the information. The processing and organisation of the information shall be a joined activity of EEMO and Statistics Mauritius.
Budget and financial source	The cost of the surveys is estimated to MUR 8,000,000 Funding source: public budget appropriations.
Implementing body	MEPU, EEMO, Statistics Mauritius
Monitoring body	EEMO and Statistics Mauritius
Potential energy savings	Not applicable

Title of the measure	**Energy performance of buildings – Update of building codes**
Code	H5
Category	Institutional and regulatory measure
Timeframe	The implementation of the measure has started in July 2015 and is expected to be completed in March 2016
Purpose	The building codes set minimum performance requirements for the buildings. These requirements are obligatory and they facilitate the reduction of the energy demand of the building stock. The regulatory instrument that imposes the building codes is closely related to them. In parallel with the update of the building codes the measure envisages an enrichment of the regulation that addresses building codes in order to broaden the scope pf their application.
Brief description	Update the building codes, update the technical specifications of new public buildings and update the respective regulations
Target end use(s)	Specifications on the design, envelope and electromechanical installations of buildings
Target groups	New residential buildings with a gross floor area larger than 100 m2 Deep renovations in existing buildings (e.g. conversions and other alterations that are significant in terms of energy, or works which affect equal or more than 50% of the surface of the building envelope)

Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The objectives of this EE measure are: • Update the building codes to match the needs of the country and the market; • Develop the compliance scheme to the codes, the technical details and the administrative responsibilities and chain; • Update the technical specifications of new public buildings to include EE elements; • Update the Building Control Act, if needed, as required by the changes in the building codes and the creation of the compliance scheme; • Develop the regulations for the codes, the compliance scheme and the Building Control Act. This measure is being implemented through the project 'Support to the Ministry of Public Infrastructure and Land Transport'. The building codes should be enforced to the new non-residential buildings with a gross floor area larger than 500 m2 at the first stage and the buildings with deep renovations at the first stage. As experience in complying with the building codes will grow, they should be enforced to new non-residential buildings with a gross floor area larger than 500 m2 and to residential buildings which undergo deep renovation.
Budget and financial source	The project is funded by UNDP
Implementing body	Ministry of Public Infrastructure and Land Transport
Monitoring body	Ministry of Public Infrastructure and Land Transport

Title of the measure	**Introduction of energy performance contracting**
Code	H6
Category	Technical assistance measure
Timeframe	Starting in 2020 and duration of two years
Purpose	The purpose of the measure is to establish the framework for Energy Performance Contracting (EPC) in Mauritius in order to facilitate the growth of Energy Service Companies (ESCOs).
Brief description	Develop and implement a project to introduce the energy performance contracting: regulatory framework, contract templates, training to private engineering companies, consumers, banks, CEB, IPPs as energy suppliers, pilot projects to demonstrate the ESCO concept
Target end use(s)	All energy uses
Target groups	Industry, services, agriculture, mining, households
Geographical	Mauritius and Rodrigues islands

application	
List and description of energy saving actions substantiating the measure	The establishment of energy performance contracting (EPC) and energy service companies (ESCOs) is a mechanism that can multiply energy savings and, in parallel, increase private business activity and growth in the EE sector. The establishment and operation of the EPC and ESCO should rely on rules that are agreed between the participating parties to the mechanism (the ESCOs, the banks, the energy users). These rules can be established with regulation and/or templates of EPC documents or EPC guides. The primary reason of the existence of these rules is that the survival of an ESCO relies on the achieved energy savings which depend on many factors, other within and other out of the control of the ESCO, and are inherently uncertain. In light of this, the Government of Mauritius should encourage the development of the ESCO market by streamlining the EPC procurement process and standardizing documentation like EPC contracts, energy analysis and methodologies for the measurement and verification of savings. In this regard the following tasks are proposed: • Training of the engineering companies, the private sector consumer, the financial institutions and the public sector on the concept of EPC and ESCOs. The education of the stakeholders can be realised by EEMO and performed through meetings and training workshops. • The banking sector will be trained on the concept of EPC and the way EPC and ESCOs work. The banks will also be trained on the different models of EPC, how the banks are involved in these models and the risk assessment from their side. The banks will be educated on the types of EPC models[28] used for EPC and understand their role in these contracts. • Set up a working group of stakeholders that comprise of MEPU, EEMO, banks, private engineering companies and business associations to discuss and decide on the features of the EPC. The process will be driven by EEMO. • The stakeholders in the EPC market will discuss and agree on which types of EPC contract will be operational in the EPC market[29]. After the agreement has been reached, contract templates[30] can be developed for every type of EPC contract that is agreed to participate in the EPC market. • Development of the template and contents of the energy audit and energy analysis study that should be carried out by the ESCO. • Establishment of the methodologies for measurement and verification of energy savings. Standardisation of the methodologies for various EE measures.

[28] Type of EPC models in Annex I

[29] Links to existing contract templates can be found in Annex II Resources

[30] Links to contract templates are provided in the resources of Annex II

	• The determination and standardisation of the procurement process of EPC project by public entities. A procurement guide will be developed. In sum, the main document templates, which, at least, need to be developed in order to standardise the EPC process are the following[31]: • EPC contract template • Energy audit template • Energy analysis study template • Energy audit and energy analysis contract (if not embodied in the EPC contract) • Measurement and verification report template • Expression of Interest (EOI) template32 • Request for Proposal (RFP) template • Evaluation template for screening the companies during the EOI • Evaluation template for assessing proposals during the RFP • EE measure technical specifications template • EPC scope of work template • General EPC guide • EPC procurement guide for public entities • Guidelines for measurement and verification. After the determination and standardisation of procedures and documents of the EPC market, the public sector can further promote the EPC concept by implementing pilot projects in public buildings with the EPC method.
Budget and financial source	The cost of the project for development of the EPC framework is estimated to 24,000,000 MUR. EPC pilot projects' costs depend on the nature and extend of each project. Funding sources can be the donors, EE/RE Financing Scheme, governmental budget appropriations.
Implementing body	MEPU/EEMO
Monitoring body	EEMO
Potential energy savings	Not applicable

Title of the measure	**Market research and display of certified energy efficient products**
Code	H7
Category	Awareness and information measure
Timeframe	The EE measure can commence in 2018 after the commencement of

[31] Additional templates and documents may need development depending on the particular processes of EPC agreed among the stakeholders and on the legislative and regulatory framework of Mauritius.

[32] The role of the EOI will be explained in the

	the labelling scheme. The website should be constantly updated.
Purpose	Provide information to the consumers on the products that have some form of certification in EE (energy label, CE marking, other certificate or making that implied improved energy performance) and their suppliers/retailers. Motivate the importers and retailers to sell more energy efficient product to be able to be marketed for that.
Brief description	Research the market for certified or labelled products and display these products and their suppliers/retailers on a website in order to inform the public, engineers and contractors
Target end use(s)	All energy uses
Target groups	Residential and services sectors
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The goal of the EE measure is to search the market for certified products that meet certain specifications as regards EE and display these products and their suppliers/retailers on a website in order to inform the public, engineers and contractors. Analytically, the tasks of the measure are: • Collect and register the information on a) the technical characteristics, b) the cost, and c) the contacts the suppliers/retailers of equipment and/or materials that have some certification related to EE (energy label accompanied with the proper certification documentation, CE marking, any other making that reflects advanced EE performance). Apart from the requirement of certification or labelling, performance criteria can be set for the registration and display of the products (e.g. energy class greater than C). • The display of the information above in a dedicated website in order to inform the public, engineers, building owners and contractors and facilitate the dissemination of this information. The interested parties can find the information readily available and have easy and no-cost access to it. This will help them choose equipment/materials with certification and known technical characteristics. This information will assist the public in finding the suppliers/retailers of certified equipment/materials with better EE performance. • Negotiate price reductions of the equipment/materials offered with the suppliers/retailers who are promoted on the website and enjoy indirect 'advertisement'. The following can be achieved with the aforementioned tasks: • Organisation of the information on energy efficient equipment and materials • Facilitate the development of the market for energy efficient equipment and materials • Promotion (free of charge)of suppliers/retailers that provide certified products and thus, to incentivise the suppliers who do not sell certified products to do so • Stimulate competition in the market for energy efficient

	equipment and materials via promotion of the certified products and their suppliers • Contribution to the wider use of certified products that can bring down the energy consumption • Encouragement of consumers to consider the energy characteristics of products as part of their selection process. The products under investigation will be: A) For households • Glassing • Window frames • Solar water heaters • Cool materials • Insulation materials for roofs • Insulation materials for walls • Air conditions • Lighting B) Commercial buildings • Glassing • Window frames • Solar water heaters • Cool materials • Insulation materials for roofs • Insulation materials for walls • Ventilation and air conditioning systems • Building energy management systems • Lighting • Lighting controls. For a product to be presented in the website it should a) have a certification which renders it energy efficient or label which displays the energy class and/or consumption and b) fulfil the certification criteria related to the technical requirements (for example energy class above C, COP greater than 3 etc,).
Budget and financial source	The budget of the measure is estimated to MUR 6,000,000 to make the initial surveys and the website and pay the cost of the quality control of the installation works during the first year. The update of the website during the subsequent years is estimated to MUR 80,000 per year. The funding sources could be the EE/RE Financing Scheme or government budget appropriations.
Implementing body	MEPU/EEMO and MPI/ESD
Monitoring body	EEMO and ESD
Potential energy savings	Not applicable

Title of the measure	**Development of the skills of installers**

Code	H8
Category	Capacity building measure
Timeframe	Starting in 2017, duration of two years (this would not include the development of the certification scheme). The development of the certification scheme will commence after the development of the training courses and its evaluation.
Purpose	The measure aims at enhancing the skills of installers of energy efficient technologies in order to achieve systems of better quality that could generate more energy savings.
Brief description	Develop and delivery of training schemes for installers in technologies for the building envelope (insulation, efficient windows etc.), HVAC, lighting, solar water heaters, industrial technologies, etc.
Target end use(s)	All energy uses
Target groups	Installers in building construction, installers of building systems and industrial systems
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The realisation of the Energy Strategy and the Energy Efficiency Action Plan 2016-2030 would require a workforce of installers that has highly quality skills in installing, operating and maintaining EE technologies in the residential, industrial and commercial buildings. This would result in constructions and renovations that are performing as planned, have a longer lifetime creating more energy savings and provide comfort and indoor air quality. In light of the tasks included in the measure are: • Analysis of the current situation in terms of qualifications of the existing installers in the EE sector (building construction and cooling, lighting, HVAC, cooking , water heating, solar water heating systems) • Analysis of the current situation in terms of vocational training courses that are currently provided for installers in the EE sector • Analysis of the scenarios for the future building construction and renovation trends • Identification of the future needs for a) professions in the building construction and renovation b) installers and the needs for qualifications of the installers in the EE sector • Identification of the qualifications the installers are required to have currently and in the future • Identification of the training subjects that will be needed to raise the skills and qualifications of the installers to the required level • Identification of the entities teaching these skills and qualifications and the activities they need to carry out to accomplish this task • Communication of the installers for the scheme and the possibilities it offers for capacity building • Delivery of training courses for installers • Identification of certification options, how the certification scheme can be achieved and which entities will operate it;

	development of a roadmap for enhancing the qualifications of the installers and design of a certification scheme • Development of a certification scheme for installers or adoption of an existing certification scheme and application of this in Mauritius. The co-operation of EEMO with Mauritius Institute of Training and Development as well as with all the implementing bodies is essential for the success of the measure.
Budget and financial source	The indicative budget is estimated to be MUR 32,000,000. The funding could come from donor grants or the EE/RE Financing Scheme
Implementing body	MEPU/EEMO, Ministry of Education and Human Resources, Tertiary Education and Scientific Research, Ministry of Labour, Industrial Relations, Employment and Training, Ministry of Public Infrastructure and Land Transport, Mauritius Institute of Training and Development (MITD), Mauritius Qualifications Authority, Mauritius Accreditation Service MAURITAS
Monitoring body	MEPU/EEMO, Mauritius Qualifications Authority
Potential energy savings	Not applicable

Title of the measure	**Establish co-operation between EEMO and SMEDA for training SMEs in EE**
Code	H9
Category	Capacity building measure
Timeframe	Starting in 2017 and on-going thereafter
Purpose	Enhance the knowledge and the capacities of SMEs in techniques of saving energy and EE technologies and strengthen the cooperation between EEMO and SMEDA to provide in-depth information to SMEs on EE.
Brief description	Use existing structures for business support like SMEDA that already deliver training to their member to include training in EE and energy management to the managers of SMEs. Co-operation between EEMO and SMEDA. Sign a Memorandum of Understanding (MOU) between EEMO and SMEDA in order to undertake joint action to assist SMEs in making energy audits and EE interventions. SMEDA will provide the networking with the SMEs and be the point of communication while EEMO will provide the technical information and advice.
Target end use(s)	All energy end uses
Target groups	SMEs
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving	The Small and Medium Enterprises Development Authority (SMEDA) is a parastatal body that operates under the aegis of the Ministry of

actions substantiating the measure	Business, Enterprise and Cooperatives and is committed to support and facilitate the development of entrepreneurship and SMEs in Mauritius. The role of SMEDA is to: • Assist and provide information on setting up, organizing and starting an SME • Provide core support services, particularly entrepreneurship development, business facilities, counselling and mentoring services • Assistance in preparing business plans • Facilitate access to industrial space, finance and other productive resources • Support with financing schemes managed by SMEDA • Support in expansion/modernization of an existing business • Assistance in networking, promotion of products, organization of events • Provide market research and counselling • Train SMEs • Improve technological and managerial capabilities of SMEs. SMEDA organizes training programmes and seminars, workshops and conferences. These programs are aimed at improving knowledge and competencies in the technical, marketing, financial, compliance, policy, regulatory, legal, commercial and other important functions of enterprises. SMEDA provides training on two aspects: Entrepreneurship and Small Business Management Programs and Skill-based Training. The management-based programs help to improve major performance indicators such as productivity, quality, competitiveness and sustainability etc. The results include improvement in communication skills and marketing, human resource development and managerial capacity building etc. These programs help decreasing the level of mortality of SMEs and increased efficiency. The Entrepreneurship Development Programme is providing training in basic management, costing and pricing, marketing and selling techniques, information technology and several other business related fields. SMEDA has achieved a successful record of support activities among SMEs and its capacities and reputation have grown over the years. In the past SMEDA has managed programmes of financial support to SMEs to modernise equipment. SMEDA has gained a vast knowledge of the situation and the needs of SMEs. SMEDA's staff has also excellent experience in training SMEs and the network of them that have cooperated or cooperate with SMEDA is extensive. However, although SMEDA trains SMEs in technical and operational subjects, the matter of EE has not been considered so far. However, EE in SMEs can enhance competitiveness of business by reducing the production cost. EEMO will cooperate with SMEDA in two fields: • insert EE topics in the current training programmes or develop dedicated training programmes for EE in the SMEs, and • signing of a Memorandum of Understanding (MOU) and

	establish a strong partnership to undertake joined action in disseminating of information and knowledge on EE practises, technologies, auditors, suppliers of equipment, installers, etc. The advantages of partnering with SMEDA are: a) SMEDA has experience in the needs and the operation of SMEs, b) SMEDA has a vast network of SMEs that can be trained, c) the EE concept can be disseminated in a large number of SMEs, d) SMEDA has a very good reputation as business assistant of SMEs and the latter trust it and e) SMEDA has already an establish training system that is operating effectively so, the development and launching of the training courses in EE will not take long. This will motivate and facilitate the enterprises to implement EE interventions. This measure will also reduce the cost of finding information on EE technologies, opportunities, costs, auditors and suppliers/installers for the enterprises. The measure will utilise the existing networks of SMEDA with the enterprises and the existing training and disseminating structures that SMEDA is already using to communicate with them. The commitment and close co-operation of EEMO and SMEDA is a prerequisite for the success of this measure.
Budget and financial source	The cost of the measure is estimated to MUR 4,000,000.
Implementing body	EEMO, SMEDA
Monitoring body	EEMO, SMEDA
Potential energy savings	Not applicable

Title of the measure	**Establishment of a centre for EE/DSM training within EEMO**
Code	H10
Category	Capacity building measure
Timeframe	The training centre should be established after EEMO receives the long-term capacity building. If this is completed in 2018 the training centre can start operation in the same year. Its operation should be on-going.
Purpose	The training centre will deliver training courses to engineers, energy managers, energy auditors, suppliers of technologies, and, generally in energy efficiency professionals in order to elevate their skills making them able to increase the quality of their services.
Brief description	A training centre would be established within EEMO in order to provide professional training for professionals in EE (energy auditors, energy managers, engineers, suppliers of technologies, etc.) to cover the needs of the Mauritian market.
Target end use(s)	All energy end uses

Target groups	Professionals in the EE sector
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The market for EE services in Mauritius is not large. However, functional EE services should be based on EE service providers, entities and individuals, who have a certain level of knowledge and professional experience to provide quality services. Furthermore, the knowledge and professional experience should be sustained and their enrichment should be on-going in the EE services market as practices, policies and technologies improve over time. The EE policies that are now being forged will contribute to the expansion of this market and this will create the need to make available training to professionals in the public sector, engineers, technical staff of companies, suppliers and EE professionals, in general. EEMO can develop training courses on EE which can be suitable and desirable for the engineers and other professionals in the EE market. EEMO could receive a fee for the provision of its training services targeted to cover the operational costs of the training centre. In this way the sustainability of the training centre will be ensured. Thus, the delivery of training will be integrated in the business philosophy of EEMO. The centre will provide training in EE in industry, services, residential sectors as well as training related to specific technologies (i.e. HVAC, lighting, boilers, industrial fans and pumps, etc). The subjects of the training will depend on the demand from potential trainees. Before the official launching of the training centre, it would be useful to define the knowledge gaps and the training needs. Therefore, discussion workshops will be organised by EEMO with the participation of managers and technical staff from industry and services as well as engineers that are active in the EE market of EE services in all sectors (i.e. Institute of Engineers, Association of Architects, etc). The workshops will provide the forum in which the needs of EE professionals in industry, services and households will be discussed. For EEMO to provide the training, it should be itself knowledgeable on the training subjects. This is the reason this EE measure should come as a follow up of the EE measure 'Set up a twinning project' that is included in the EE Action Plan 2016-2030. During the twinning project, EEMO will be trained in various scientific subjects in EE and its staff will also be trained as trainers. The training material that will be developed in the twinning project will also be given to EEMO so that the latter can use it for future trainings. The training centre will also have dedicated webpages within the website of EEMO to display its services. There, the training programmes will be uploaded and be freely accessible and downloadable by interested users. The training material would be downloadable with a fee. In order to test the functionality of the centre, the response of the target groups and the demand for training services, the pilot

	operation of the centre for four months is proposed. According to the results of the pilot phase, the decision to proceed with the establishment of the centre or not will be taken by EEMO.
Budget and financial source	The cost of this measure is estimated to be MUR 4,000,000 if the EEMO is supported by an external consultant to prepare the training material. The development of the webpages will cost MUR 200,000 while their update MUR 40,000 per year. The cost for the preparation of the training material will be null if they are prepared by EEMO. After the commencement of the operation of the training centre, the compensation for the training services will ensure the sustainability of the centre.
Implementing body	EEMO
Monitoring body	EEMO
Potential energy savings	Not applicable

Title of the measure	**Introduction of EE in school curricula**
Code	H11
Category	Capacity building measure
Timeframe	Starting in 2016, on-going thereafter
Purpose	Educate the pupils about EE and cultivate a culture of conservation and sustainable development to the young generations.
Brief description	Introduce EE in educational curricula in schools as the follow up of the awareness campaigns in co-operation with the Ministry of Education.
Target end use(s)	All energy end uses
Target groups	Pupils of primary and secondary schools
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	To enhance the level of EE in society, the culture of energy efficiency should be cultivated early in life. Primary and secondary education is a powerful means to nourish the ideas and practices of energy efficiency in the every-day life in the next generation. EEMO has grasped these ideas and since 2014 has implemented awareness campaigns in public primary and secondary schools. The campaigns included competitions for students in painting, essay writing and EE project implementation. As a follow up of these awareness campaigns, the introduction of EE education in primary and secondary school curricula can give the pupils a chance to learn more about how to save energy and cultivate in them a spirit of energy conservation and sustainable development. Since the pupils will be the adult citizens of tomorrow educating them on EE may envisage a new way of lifestyle in them: one that cares about resources and about the well-being of the community.

	The introduction of EE elements in the educational curricula has to be carried out by experts in the science of teaching. The right messages to pupils have to be communicated to them through the most effective means and the most influential way in order to become understandable by them and affect their everyday lives. That is the reason combined experience on EE and educational material design is needed to design courses. In addition, the teachers also need training to be able to teach the EE courses to the primary and secondary school pupils. Therefore, a working team having this experience should be established comprising at least of: • MEPU and EEMO, • Ministry of Education and Human Resources, Tertiary Education and Scientific Research, • Mauritius Institute of Education (MIE). One of the roles of this working team would be to define the subjects of EE to be included in the educational curricula. The EEMO can give the information needed for the EE. This information should be easily understood by teachers and pupils and be influential to affect the attitude and beliefs of the latter. So, the selection of the pieces information to be taught depends on a series of parameters that relate to the lifestyle, attitudes, beliefs of the pupils as well as parameters related to the capacities of teachers to transmit the information. These dimensions are out of the mandates of EEMO and it is where the collaboration with the institutions that are experienced in teaching and developing education material for pupils is imperative. These institutions will guide EEMO in selecting the most appropriate pieces of information to be taught to the pupils, will design the educational material and teach teachers how to communicate the information to the class.
Budget and financial source	The cost to identify the training subjects, design the educational material and train the teachers is estimated to be MUR 12,000,000.
Implementing body	EEMO, Ministry of Education and Human Resources, Tertiary Education and Scientific Research, Mauritius Institute of Education (MIE)
Monitoring body	EEMO, Ministry of Education and Human Resources, Tertiary Education and Scientific Research, Mauritius Institute of Education (MIE)
Potential energy savings	Not applicable

Title of the measure	**Twinning project to enhance the capacities of EEMO**
Code	H12
Category	Capacity building measure
Timeframe	Starting in 2016 and last for at least two years
Purpose	Strengthen the capacities of EEMO to be able to carry out its mandate

Brief description	Twinning is defined as a long-term co-operation commitment in science and/or research between two or more institutions with similar characteristics or roles. The objective is to build institutional capacities and professional capacities and also to exchange knowledge, experience and technologies. Twinning uses a wide variety of instruments to achieve results. It could include, for example, capacity building, training, implementation of common projects, guidance, study visits, internships, co-operation for submitting project proposals for funding, etc. The partners in a twinning project commit themselves to work towards commonly agreed results in a joint project implementation process.
Target end use(s)	Not relevant
Target groups	EEMO
Geographical application	Not relevant
List and description of energy saving actions substantiating the measure	EEMO's capacities to cope with the activities that are assigned to it according to its mandate need improvement[33]. EEMO's mandate is described in the Energy Efficiency Act 2011. EEMO needs to enhance its capacities not only by hiring more professionals but also participate is an extensive training programme. This will give to EEMO the proper knowledge and skills to carry out its mandate during the future years and develop the EE sector. The capacity building of EEMO should also be planned as a long term initiative because experience is gained by practical application of the knowledge and this takes time to be organised and implemented. Furthermore, new staff added in subsequent years as the organisation expands or to replace staff who leave will need the same opportunities to develop that are offered to current staff. EEMO should be capable to develop, evaluate and monitor EE policies and plans as well as to engage in the implementation of complex and multi-disciplinary technical projects which usually require specialised technical skills[34]. In addition, capacity building activities have to take into account the small size of the market of EE professionals in Mauritius and the opportunities to benefit from regional or bilateral co-operation. Regional or bilateral co-operation can deliver some of the advantages of economies of scale. Specifically, EEMO can benefit from the experience of France which is the closest developed country and a strong financial and cultural supporter. Institutions in other countries can also be investigated. In the light of the needs for a long term capacity building of EEMO, structuring a twinning project and seeking finance from international donors can be the answer. EEMO can exploit the following

[33] See 'Report on the Consolidated Assessment of Potential for Energy Efficiency and Demand Side Management in Mauritius, and Current Incentive Structures', Maxwell Stamp 2015

[34] Examples are given in the 'Report on the Consolidated Assessment of Potential for Energy Efficiency and Demand Side Management in Mauritius, and Current Incentive Structures', Maxwell Stamp 2015

	opportunities to organise the design and implementation of a twinning project: • International donors are very interested to support financially the energy sector in Mauritius and, especially the EE sector. International Technical Assistance Programmes that can fund such twinning projects are present in the region. • Mauritius lies close to Reunion Island which is part of France. Reunion is more developed in EE than Mauritius and its EE institutional structure is more mature and experienced. The sharing of experience and co-operation can only be advantageous for EEMO. • France is a developed country, belongs to the EU, is very close to Mauritius both in financial support and culture and Mauritius can benefit from the French and EU experience in EE. • China and India have also financial and cultural support to Mauritius and their example in EE can also beneficial. • There are quite a few institutions that can, potentially, co-operate with EEMO in this measure and act as counterpart institutions (examples include the L'Agence Régionale Energie Réunion (ARER), Agence de l'environnement et de la maîtrise de l'énergie (ADEME) of France, National Energy Conservation Centre of China, Bureau of Energy Efficiency of India, National Environment Agency of Singapore, Cyprus Energy Agency, Cyprus Institute of Energy, Centre for Renewable Energy Sources and Savings (CRES) of Greece[35], etc) • Harmonising the EE framework with that of the EU, China or India (which are very large in influential countries) may create economies of scale. The objectives of the twinning project will be: • Elevate the capacities of EEMO both theoretically and practically in the respective subjects to gain the knowledge and experience to accomplish its mandate. • Establish strong and long term co-operation channels with the counterpart institution(s) to jointly develop and implement EE projects. • Establish a long-lasting co-operation with the counterpart institution(s) so that EEMO can have a source of constant support, if needed. The twinning project should comprise both theoretical and practical training. Theoretical training will be delivered through the traditional training workshops with presentations. Practical training will be carried out with the co-operation of EEMO with the counterpart institution(s). EEMO and the counterpart institutions will jointly carry out studies and technical projects. Furthermore, practical training will be delivered through the organisation of working missions for staff of EEMO in the facilities of the counterpart institution(s).

[35] Greece and Cyprus have similarities with Mauritius. Cyprus is a non-interconnected island dependent on energy imports while Greece has hundreds of large and small non-interconnected islands. Greece and Cyprus have similarities with Mauritius.

	In addition, the twinning project will include the following: • Organisation of joined events, • Joint development of new projects and applications for funding, • Determination of the infrastructure needed to EEMO's tasks and tendering of it, • Support of EEMO to draft a business plan, • Drafting and signing of a Memorandum of Understanding between EEMO and the counterpart institution(s) to build sustainable and long term co-operation, • Train of trainers. The counterpart institution(s) will train EEMO staff to become trainers once they get trained.
Budget and financial source	Sources of funding: International donors Budget of the twinning project: MUR 97,957,000
Implementing body	EEMO and counterpart institution(s)
Monitoring body	EEMO
Potential energy savings	Not relevant

Title of the measure	**Establish technical specification for solar water heaters entering the Mauritian market**
Code	H13
Category	Regulatory measure
Timeframe	Starting in 2016. The specifications for solar thermal systems should be set during one year after the commencement of the measure.
Purpose	Control the quality of the solar thermal systems imported to protect consumers from low quality systems and generate more energy savings.
Brief description	Set or adopt technical specifications for the energy performance and quality of the SWHs imported in Mauritius.
Target end use(s)	Solar water heating
Target groups	Importers, retailers, engineers and installers of solar water heaters
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	Currently, the quality of the SWH systems that are imported to Mauritius and installed is not controlled. As a result of this, systems of low quality are being sold and installed. Therefore, technical specifications for the components and/or systems that are imported should be set or adopted from already established standards. To set or adopt the technical specifications, standards shall be studied. These standards can be the EU ones or the standards of South Africa or any other standard. However, the neighbourhood island Reunion uses the EU standards and this is a motivation for Mauritius to use these standards in order to create harmonised specification with Reunion. This would facilitate the creation of economies of scale and attract

	also manufacturers who supply Reunion to supply also Mauritius. The manufacturers who supply Reunion sell products with comply with the EU standards and Mauritius can benefit from that. The following EU standards can be studied: • EN 12975-1. Thermal solar systems and components - Solar collectors - Part 1: General Requirements. • EN 12975-2:Thermal solar systems and components -Solar collectors - Part 2: Test methods • EN 12976-1. Thermal solar systems and components - Factory made systems - Part 1: General requirements. • EN 12976-2. Thermal solar systems and components - Factory made systems - Part 2: Test methods. • EN 12977-1 Thermal solar systems and components - Custom built systems - Part 1: General requirements for solar water heaters and combisystems • EN 12977-2 Thermal solar systems and components - Custom built systems - Test methods for solar water heaters and combisystems • EN 12977-3 Thermal solar systems and components - Custom built systems - Part 3: Performance test methods for solar water heater stores • EN 12977-4 Thermal solar systems and components - Custom built systems - Part 4: Performance test methods for solar combistores • EN 12977-5 Thermal solar systems and components - Custom built systems - Part 5: Performance test methods for control equipment • prEN12975-3-1: Qualification of solar absorber surface durability International standards that can be studied are: • ISO 9806-1: Test methods for solar collectors - Part 1: Thermal performance of glazed liquid heating collectors including pressure drop • ISO 9806-2: Test methods for solar collectors - Part 2: Qualification test procedures • ISO 9806-3: Test methods for solar collectors - Part 3: Thermal performance of unglazed liquid heating collectors (sensible heat transfer only) including pressure drop • ISO 9459-1:1993: Solar heating -- Domestic water heating systems -- Part 1: Performance rating procedure using indoor test methods • ISO 9459-2:1995: Solar heating -- Domestic water heating systems -- Part 2: Outdoor test methods for system performance characterization and yearly performance prediction of solar-only systems • ISO 9459-3:1997: Solar heating -- Domestic water heating systems -- Part 3: Performance test for solar plus supplementary systems • ISO 9459-4:2013 : Solar heating -- Domestic water heating systems -- Part 4: System performance characterization by

	means of component tests and computer simulation • ISO 9459-5: Solar heating -- Domestic water heating systems - Part 5: System performance characterization by means of whole-system tests and computer simulation South African standards that can be studied are: • SANS 6211-1: Domestic solar water heaters Part 1: Thermal performance using an outdoor test method • SANS 6211-2: Domestic solar water heaters Part 2: Thermal performance using an indoor test method • SANS 6210: Domestic solar water heaters - Mechanical qualification tests • SANS 10106: The installation, maintenance, repair and replacement of domestic solar water heating systems • SANS 9459-2: Solar heating - Domestic water heating systems Part 2: Outdoor test methods for system performance characterization and yearly performance prediction of solar-only systems • SANS 1307: Domestic storage solar water heating systems • SANS 6211: Domestic solar water heaters - Thermal performance • SANS 60287-2-2: Electric cables - Calculation of the current rating Part 2-2: Thermal resistance - A method for calculating reduction factors for groups of cables in free air, protected from solar radiation • SANS 9459-2: Solar heating - Domestic water heating systems Part 2: Outdoor test methods for system performance characterization and yearly performance prediction of solar-only systems. To study the standards a working group of experts in the fields of solar thermal systems and standardisation is required. The private sector should also participate. This working group will comprise: • EEMO, • Mauritius Standardisation Bureau, • Institute of Engineers, • Association of Architects, • Engineers from the private sector companies in solar thermal systems, • Joint Economic Council, • a representative of the tourism sector, • a representative of the manufacturers, • a representative of the SMEs, • a representative of the academic and research sector being an expert in solar thermal systems. The standards set or adopted will result in specifications that the imported solar thermal systems in Mauritius will have to comply with. Furthermore, the importers of solar thermal systems will be obliged to import systems with the CE marking. The CE marking is a key indicator of a product's compliance with EU legislation whether they are manufactured in the EU or in another country. The manufacturer, whether established inside or outside the EU, is the

	entity ultimately responsible for the conformity of the product with the provisions of the EU legislation and for the affixing of the CE marking. The CE marking indicates that the products complies with the EU Directives and regulations as regards mechanical resistance and stability, safety in the case of fire, hygiene, health and the environment, safety in use, protection against noise, energy economy and heat retention, weather tightness[36]. The importers will be obliged to submit to the EEMO all documents that prove the compliance of the product with the CE marketing requirements. Test results can be also provided or requested by EEMO or Mauritius Standardisation Bureau. All documentation has to be drafted by an accredited body (certification body, test laboratory). The Mauritius Standardisation Bureau, using the documentation provided by the importers, will

[36] The CE marking indicates compliance with the a series of EU legislation for:

- Regulation (EU) No 305/2011 Construction Products Regulation
- Directive 97/23/EC on pressure equipment (PED)
- Low Voltage Directive (LVD) 2014/35/EU.
- The restriction of the use of certain hazardous substances in electrical and electronic equipment (Directive
- 2011/65/EU)
- Appliances burning gaseous fuels (Directive 2009/142/EC)
- Ecodesign requirements for energy-related products (Directive 2009/125/EC)
- Simple pressure vessels (Directive 2009/105/EC)
- Toys' safety (Directive 2009/48/EC)
- Electrical equipment designed for use within certain voltage limits (Directive 2006/95/EC)
- Machinery (Directive 2006/42/EC)
- Electromagnetic compatibility (Directive 2004/108/EC)
- Measuring instruments (Directive 2004/22/EC)
- Non-automatic weighing instruments (Directive 2009/23/EC)
- Cableway installations designed to carry persons (Directive 2000/9/EC)
- Radio equipment and telecommunications terminal equipment (Directive 1999/5/EC)
- Active implantable medical devices (Directive 90/385/EEC)
- Medical devices (Directive 93/42/EEC)
- In vitro diagnostic medical devices (Directive 98/79/EC)
- Pressure equipment (Directive 97/23/EC)
- Transportable Pressure equipment (Directive 2010/35/EU)
- Aerosol Dispensers (Directive 75/324/EEC as amended)
- Lifts (Directive 95/16/EC)
- Recreational craft (Directive 94/25/EC)
- Equipment and protective systems intended for use in potentially explosive atmospheres (Directive 94/9/EC)
- Explosives for civil uses (Directive 93/15/EEC)
- Pyrotechnics (Directive 2013/29/EU)
- Efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels (Council Directive 92/42/EEC)
- Personal protective equipment (Directive 89/686/EEC)
- Marine equipment (Directive 96/98/EC)
- Noise emission in the environment by equipment for use outdoors (Directive 2000/14/EC)
- Emissions from non-road mobile machinery (Directive 97/68/EC as amended)
- Energy labelling (Directive 2010/30/EU)

	assess the compliance of the product with the national specifications and the CE marking. In the case of non-compliance, these products will not be allowed to enter the Mauritian market. If there is doubt about the actual specifications of the products, whatever the source of the doubt, the Mauritius Standardisation Bureau can order the testing of a sample of products at an accredited test lab at the expense of the importer.
Budget and financial source	The cost of the setting or adopting specifications is estimated to be MUR 4,000,000. These costs can be covered by national budget appropriations or donor funding.
Implementing body	Mauritius Standardisation Bureau
Monitoring body	Mauritius Standardisation Bureau
Potential energy savings	Not applicable

Title of the measure	**Development of minimum energy performance standards (MEPS) for electric appliances**
Code	H14
Category	Regulatory measure
Timeframe	Started in July 2015
Purpose	Eliminate models that perform worse than the MEPS from the market
Brief description	Development of MEPS for refrigerators, electric oven, dish washer, air-conditioner, tumble dryer, electric lamps, and washing machines
Target end use(s)	Refrigeration, washing, lighting, cooling, cooking
Target groups	Residential users and users of electric appliances
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	Minimum energy performance standards for the refrigerators, electric ovens, dish washers, air-conditioners, tumble dryers, electric lamps, and washing machines are being developed within the project 'Technical Support to the Energy Efficiency Management Office'. The project is funded by UNDP and has started in July 2015. The development and the establishment of a mechanism for enforcement of the minimum energy performance standards is also funded by the project as well as a market survey for the above appliances.
Budget and financial source	The project is UNDP funded
Implementing body	EEMO and Mauritius Standards Bureau in co-operation with the international consultant of the project
Monitoring body	EEMO and Mauritius Standards Bureau

Potential energy savings	Not applicable

Title of the measure	**Energy labelling**
Code	H15
Category	Regulatory measure
Timeframe	Starting May/June 2016, on-going thereafter
Purpose	Reduce the energy consumption of electrical appliances by informing consumers to make rational choices.
Brief description	Enforcement of energy labels for refrigerators, dishwashers and electric ovens
Target end use(s)	Refrigerators and wine storage appliances, dishwashers and electric ovens
Target groups	Residential users and users of electric appliances
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The launch of the official centralized labelling scheme is planned for May/June 2016. The Mauritian regulation for energy labelling which describes the obligations of importers and retailers as well as the appliance registration procedure has been prepared. The energy labels for refrigerators and wine storage appliances, dishwashers and electric ovens have also been prepared. The EU label format has been adopted. EEMO has completed the Regulation on Energy Labelling which defines the format of the label for household refrigerating appliances, household electric dishwashers and household electric ovens. It also defines the registration procedure of products that bare labels to the EEMO. The respective Mauritian standards have also been developed by the Mauritius Standards Bureau. The measure is supported by an awareness campaign which has already launched in October 2015 and another one that will be launched i parallel or just before the launching of the scheme. EEMO will implement both campaigns.
Budget and financial source	The project is funded by the Government
Implementing body	EEMO and Mauritius Standards Bureau
Monitoring body	EEMO and Mauritius Standards Bureau
Potential energy savings	Energy savings will be estimated after the awareness campaigns by a survey to evaluate of the impact of the awareness campaign on the energy consumption of the appliances of consumers

Title of the measure	**Establishment of EE/DSM working groups and networking in different subsectors for EE/DSM planning**
Code	H16
Category	Policy measure
Timeframe	Starting in 2017, on-going thereafter
Purpose	Strengthen the communication between stakeholders in the EE sector in order to improve decision making and planning
Brief description	Set up and management of working groups by EEMO in the subsectors to exchange experience, lessons learned and information, as well as to initiate a structured approach for regularly engaging stakeholders in planning
Target end use(s)	All energy end uses
Target groups	All sectors
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The design of EE policies necessitates strong communication and co-operation with stakeholders on a regular basis, especially with private sector consumers, the civil society financing organisations, to identity the way they use energy, their needs and concerns and intervene accordingly. Furthermore, quality planning should consider each subsector of a sector which may have differences in the use of energy and different needs than other subsector. The planning process should not be confined only at the level of sector but should examine and analyse energy usage, gaps and needs at the level of the subsector. This will ensure that the planning balances the interests of the state and the needs of the consumers and will enhance quality, transparency and ownership. The collection of data can also be facilitated if these are collected at the level of the subsector. Therefore, a participatory, transparent and structured approach is needed to engage in planning at the depth of the subsector. This measure proposes the establishment and management of working groups in each subsector of the sectors (e.g. textile industry working, food industry working group, hotel working group, restaurant working group, large textiles industries working group, small/medium textile industries working group, large hotel working group, small/medium hotel working group, etc). The working groups can be established having as criteria a) the subsector and b) the level at which the needs and energy use are differentiated within the subsector; this can be the size, the number of employees, number of companies, energy consumption, technologies used, etc. The establishment of the working groups will also take into account the meaningfulness of the level chosen to establish them (e.g. working groups representing a small number of SMEs in a sector can be merged in larger working groups). The working groups shall meet regularly (two or three times a year) and the discussions will be led by EEMO. The meetings would be the forums for the representatives of the subsectors in the working

	groups to: • express their needs in EE and DSM • testify their views on existing EE/DSM policies and measures • propose new EE/DSM policies and measures • exchange knowledge and experience. • feel the level of ownership of the policies and the level of responsibility they have in engaging in EE/DSM. For EEMO the working groups would be the tool to hear all views from the representatives of the subsectors, collect opinions and options and analyse them and increase its knowledge on the problems and the energy use in subsectors' consumers. The working groups will also facilitate the communication of EEMO with the stakeholders. Such a participatory, transparent and collective approach will enhance the quality of the planning in the EE sector.
Budget and financial source	Cost of the each meeting is estimated to MUR 20,000
Implementing body	MEPU/EEMO
Monitoring body	MEPU/EEMO
Potential energy savings	Not applicable

7.2 Measures in industry

The measures in industry include the I1: Establishment of voluntary agreements.

A detailed presentation of this measure is provided further below in this section.

Title of the measure	**Establishment of voluntary agreements**
Code	I1
Category	Support mechanisms
Timeframe	Starting in 2016, on-going thereafter. Each agreement should last for at least 10 years.
Purpose	Reduce the energy consumption of the large companies mainly in the industrial sector and, at a second phase, in the services sector by engaging in long-term voluntary agreements.
Brief description	Establishment and operation of voluntary agreements with companies which are large consumers in the industry and the services sectors to reduce energy consumption.
Target end use(s)	All energy uses
Target groups	Large consumers in the industry and services sector. Large consumers in the industry sector are those with annual electricity consumption of more than 300,000 kWh, while for the services those with annual electricity consumption of more than 300,000 kWh[37]. The priority will

[37] Both thresholds, for industry and services sectors, were based on the definition of large consumers in the report 'Mapping of Energy Efficiency in industry and tertiary sectors in

	be given to the industrial companies.
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The aim is to reduce the energy consumption of large energy industrial and services consumers. The principles below will govern the voluntary agreements with the industry and services: • The participation in the joining the agreement is voluntary, • The agreement scheme has a long time-frame usually over a decade, • Each company will sign a separate voluntary agreement[38], • There are commitments for the participating companies and the authorities, usually involving some kind of support[39] for the companies that participate and sanctions for not achieved the energy saving targets, • Targets for energy use reduction will be defined, and once a company joins the agreement, the achievement of such targets will be mandatory, • The targets will be company-specific, • There are commitments for the governmental authorities to support the energy target achievement (like for example information provision, award and public recognition of companies that achieve targets, technical assistance to assess the quality of audits and energy plans or get financial support, etc), • There are commitments from the participating companies on monitoring, reporting and assessment of energy savings, • The targets of the companies, the commitments of the Government and the companies and the sanctions to the companies will be a product of negotiation, dialogue and consensus, • Environmental impact assessments or environmental permits will be required for those EE measures for which assessments or permits are required by law, • The negotiation process should be open so that other the corresponding business associations, other companies in the same market, the civil society and the public are invited to comment on the target thus, avoids the conclusion of 'close' deals cut between the Goverment and industry, which may endorse little more than the business-as-usual as energy savings target. Today's information networking technology makes easy a public consultation procedure over internet. • Sanctions to the companies if the targets are not met should be

Mauritius', Final Report, AETS, 2012.

[38] Some examples of voluntary agreements are given in Annex XVI

[39] Incentives can be for example, a tax exemption or tax credit, a lower cost of environmental permits, technical assistance in getting financing. Penalties can be an increased tax rate, an energy tax, a carbon tax, removal of tax exemptions, more stringent environmental requirements, etc. The type and how the incentives and penalties will be applied will be defined during the negotiations for the voluntary agreements.

	negotiated between the government and the companies. Alternatively, tax credits could be provided to the companies if the targets are met. The voluntary agreements will address the energy intensive industries and large energy users of the services sector. This is due to the complexity of the EE in larger industries and large services enterprises because of the largely diversified mix of energy uses and energy-using equipment. In industry, the major part of the savings is in industrial processes and thus saving potentials are specific to each process and plant. In the services sector, the energy savings can be found in uses like ventilating and cooling, lighting and cooking as well as hot water use. The application of the measure will start from the industrial sector and, depending on the results, it will expand to the services sector. • In order to cover the full range of the actions needed to implement EE measures and achieve sustainable energy savings the following options that could lead to commitments for the participating companies could be negotiated: Carry out energy audits to identify the baseline, and cost-effective EE measures, • Determine cost-effective, clear and quantifiable energy saving targets through to the energy audits, • Develop an energy conservation plan at least every three years, • Meet the energy targets by implementing the cost-effective EE measures identified in the audits or other measures within a determined time period with a specified timetable, • Establish and operation of Energy Management System (EMS) which include an energy management, recording and monitoring procedure within three years after the signing of the voluntary agreement, • Use the EMS to continuously manage energy, identify EE opportunities and monitor energy consumption and savings, • Report regularly of the activities done to save energy and their results, • Comply with the agreed sanctions, if the targets are not met. From the side of the Government, the commitments could be the following: • Provide technical assistance to the companies in order to: o get financial support for the audits and the investments in EE measures, o find certified energy auditors, o find suppliers of equipment with the proper specifications and certifications, o find installers with the proper certification, o provide them tools, documents, guides, templates and advise them on their usage, o measure and verify energy saving, o train on EE technologies, practises, energy management. • Monitor the implementation of each agreement and monitor the progress towards the achievements of the targets for each participating company, • Assess the quality of the audits in order to assess the credibility

	and feasibility of the targets, • Assess the quality of the energy conservation plans of the companies and the monitoring reports, • Publicly recognise the achievement of the EE targets by the companies, • Ensures that the sanctions (if their enforcement is agreed between the government and the companies) are applied correctly and fairly.
Budget and financial source	The cost for the government for the establishment of a voluntary agreement scheme can be estimated to around MUR 5,440,000[40]. The establishment of a computerized data-based monitoring system is an additional cost of MUR 8,000,000. The management and operation cost of the voluntary scheme is estimated to be MUR 14,000,000 per year. Funding sources for the establishment and management of the voluntary agreement scheme: governmental budget appropriations, donor funds, EE/RE Financing Scheme.
Implementing body	MEPU/EEMO
Monitoring body	EEMO
Potential energy savings	Not applicable

7.3 Measures in services

The measures in services include:

- S1: Energy efficiency awareness and information campaign for buildings and technologies used of the services sector.
- S2: Design and conduct a feasibility study on self-generation for hotels.
- S3: Design and conduct a feasibility study on the use of Building Energy Management Systems (BEMS) in hotels and commercial buildings to reduce energy consumption.

A detailed presentation of this measure is provided further below in this section.

Title of the measure	**Energy efficiency awareness and information campaign for**

[40] The report 'WP2 Deliverable 2: Toolkit requirements' of the project 'EIE/07/057/SI2.466696 - EU LTA UPTAKE European uptake of successful implementations of Industrial SME LTAs as a part of Voluntary Agreements' provides international experience in establishing and operating voluntary agreement schemes. It suggests that the cost of establishing the voluntary agreement scheme is around 250-300 work days (total for authority, energy agency and business associations) and an additional 30-60 work days for the authority and energy agency per sector. Thus, it is assumed that 250 working days plus 90 working days are needed by the governmental authorities (MEPU and EEMO) for the establishment of the scheme in industry and services. It is also assumed that the cost of work per working day for the government is MUR 16,000. So, the cost of establishing the voluntary scheme is 340 working days x MUR 16,000= MUR 5,440,000. Further, the establishment of a data-based monitoring system is an additional cost of 150,000 – 200,000 euros (MUR 6,000,000 – 8,000,000), depending on the level of monitoring. Typically voluntary agreements scheme administration, management, monitoring and reporting and implementation costs are approximately 300,000 to 350,000 euros (MUR 12,000,000 - 14,000,000) per year.

	buildings and technologies used of the services sector
Code	S1
Category	Awareness and information measures
Timeframe	Starting during 2017 and the duration of the EE measure at least one year
Purpose	Raise the awareness and provide information on EE to a significant part of the services sector: communication/call centres, banks, healthcare, recreational and cultural entities
Brief description	Campaign to raise awareness and provide information to private entities about energy efficiency techniques and technologies for the building envelope and the systems used in the buildings. The receivers of the campaign will be commercial sites such as communication/call centres, banks, healthcare, recreational and cultural entities.
Target end use(s)	All energy uses
Target groups	Commercial sites of the services sector (communication/call centres, banks, healthcare, recreational and cultural entities)
Geographical application	Mauritius and Rodrigues
List and description of energy saving actions substantiating the measure	The electricity consumption in private sector office buildings, communication/call centres, banks, healthcare buildings, recreational and cultural buildings represents around 29% of the electricity consumption in the services sector[41]. The raising of awareness and the provision of information to owners or operators of these types of buildings is important to exploit their energy efficiency opportunities. Therefore, this measure would have as objective to make these consumers aware of their opportunities to reduce their energy consumption, and then to give them the information to do so. The activities under this measure are the following: • Organisation of regular meetings with representatives/associations of the business sectors and with their managers and technical staff which will inform them of energy savings opportunities. Meetings can be organised per type of consumers. A consumer type is such that the consumers of this type are active in the same market and use similar technologies, • Organisation of workshops per type of consumers. • Production of endorsement letter and leaflet per type of consumer and post it to the management of each consumer. The leaflet can include information on EE opportunities as well as no or low cost EE measures for each specific type of consumer, • Production of a EE guide per type of consumer which will inform them on:

[41] Own calculation based on statistical data from Statistics Mauritius and the report 'AETS, Mapping of Energy Efficiency in industry and services sectors in Mauritius, Final Report, June 2012'

	a) EE technologies that can be used to reduce consumption b) Cost of these technologies and ways to apply them c) Suppliers and installers of these technologies d) Contacts of certified energy auditors e) EE best behavioural practices f) Financial incentives that can be used by each type of consumer g) Information provision about the voluntary agreement scheme.
Budget and financial source	The budget of the awareness and information campaign is estimated to MUR 11,771,845. The funding sources could be the EE/RE Financing Scheme or governmental budget appropriations.
Implementing body	MEPU/EEMO
Monitoring body	EEMO
Potential energy savings	Not applicable
Comments	In the estimation of the cost of the awareness and information campaign, only the large establishments (defined by Statistics Mauritius as the companies with more than 10 employees) were regarded as potential audience of the campaign. The reason for choosing only the large establishments is that the savings in these are substantially more than the enterprises with less than 10 employees. The design and implementation of the awareness and information campaign should be performed by professionals in communication and marketing. EEMO will procure the campaign and cooperate closely with the contractor as well as monitor the progress of the campaign's implementation.

Title of the measure	**Design and conduct a feasibility study on self-generation for hotels**
Code	S2
Category	Technical DSM measures
Timeframe	Starting in 2018 and last for one year
Purpose	Investigate the feasibility of disconnecting hotels from the power supply of the grid so that they generate their own electricity during peak demand hours.
Brief description	Design and conduct a study to assess the technicalities and feasibility of disconnecting hotels from the grid and generate the electricity they need locally at system peak hours.
Target end use(s)	Use of electricity
Target groups	Hotels which have private generators

Geographical application	Mauritius and Rodrigues
List and description of energy saving actions substantiating the measure	The hotels which have private generators can disconnect from the grid and produce their own electricity supply in times of high peak demand. However, in order to do that, they should have compensation from CEB which will cover the cost of the fuel used for electricity generators in the private generation sets. This compensation can take the form for example of a discount in the tariffs, a fixed amount, or other. However, to disconnect the hotels and the latter to generate their own electricity, a study is needed. Before implementing the measure in full scale, a pilot project engaging a selected representative sample of consumers should be carried out to assess the feasibility of the measure. The study should answer at least to the following questions: 1) Whether it is profitable for CEB to implement such a DSM measure 2) If not profitable for CEB, what would be the compensation that CEB should receive from the public budget to be profitable 3) What would be the cost of the measure for CEB 4) How the cost of CEB will be recovered 5) Which would be the consumers in which the measure will apply 6) What would be the benefits in terms of demand savings 7) What would be the cost for the consumers who engage in the DSM measure 8) What would be the compensation and in what form for the consumers which participate in the measure 9) What would be the technicalities of the disconnection and the response of the power system to the disconnection 10) What would be the procedure that CEB will apply to inform the hotels for the upcoming peak demand in order the latter to be ready to start their generators 11) How CEB would monitor the implementation of the DSM measure 12) How the pilot project will be implemented 13) What would be the cost of the pilot project.
Budget and financial source	The budget for the drafting of the study is estimated to MUR 8,000,000
Implementing body	CEB, hotels with private generators
Monitoring body	CEB
Potential energy savings	The potential energy and peak demand savings will be estimated in the study

Title of the measure	**Design and conduct a feasibility study on the use of Building Energy Management Systems (BEMS) in hotels and commercial buildings to reduce energy consumption**
Code of the measure	S3

Category	Technical DSM measures
Timeframe	Starting in 2019 and last for one year
Purpose	Investigate the feasibility of hotels programming their Building Energy Management Systems (BEMS) to lower consumption during system peak hours
Brief description	Design and conduct a study to assess the technicalities and feasibility of hotels or service businesses using Building Energy Management Systems (BEMS) to lower consumption during system peak hours.
Target end use(s)	Use of electricity
Target groups	Hotels which have private generators
Geographical application	Mauritius and Rodrigues
List and description of energy saving actions substantiating the measure	The hotels and other service company buildings which have building energy management systems (BEMS) or any other programmable control system can programme them and reduce peak demand during peak hours but not reduce the quality of service. For example, usually by shutting down refrigerators for a couple of hours the food is kept intact or by shutting down air condition in an already air conditioned space for the same time, the comfort is not compromised. A before implementing the measure in full scale a study and a pilot phase is needed. The study should assess at least the following: 1) Whether it is profitable for CEB to implement such a DSM measure 2) If not profitable for CEB, what would be the compensation that CEB should receive from the public budget to be profitable 3) What would be the cost of the measure for CEB 4) How the cost of CEB will be recovered 5) Which would be the consumers to which the measure will apply 6) What would be the benefits in terms of demand saving and energy demand reduction 7) What would be the cost for the consumers who engage in the DSM measure 8) What would be the compensation and in what form for the consumers which take part in the measure (e.g. this compensation can take the form for example of a discount in the tariffs, a fixed amount, or other) 9) What would be the technical procedures and possible infrastructure installed in the facilities of hotels and businesses to programme the BEMS 10) What would be the procedure that CEB will apply to inform the participating consumers for the upcoming peak demand in order the latter to be ready to programme their BEMS 11) How CEB and would monitor the implementation of the DSM measure 12) How the pilot project will be implemented 13) What would be the cost of the pilot project.
Budget and financial	The budget for the drafting of the study is estimated to MUR

source	8,000,000
Implementing body	EEMO, CEB, hotels and service businesses with building energy management systems or any other programmable control system
Monitoring body	CEB
Potential energy savings	The potential energy and peak demand savings will be estimated in the study

7.4 Measures in households

The measures in households include the new proposed measures:

- HL1: Governmental Programme for financing EE interventions in residential buildings
- HL2: Energy efficiency awareness and information campaign for households

They also include the measure HL3: New Solar Water Heater Scheme for households which is under implementation.

A detailed presentation of the measures in households is provided further below in this section.

Title of the measure	**Governmental Programme for financing EE interventions in residential buildings**
Code	HL1
Category	Financial measure
Timeframe	The design and launch of the Programme is subject to certain prerequisites (described below). Without the implementation of these prerequisites, the Programmes risks not reaping the maximum benefits. To achieve this, the Programme should be designed and launched after 2018. It will last for at least three years. The subsequent duration will depend on its annual results and the availability of funds.
Purpose	Give incentives to the residential sector to implement EE interventions to the households and realise deep energy savings.
Brief description	Governmental Programme for financing EE interventions in residential buildings after the buildings codes have been approved by the government and after certification of auditors. Application of a combination of subsidy and soft loans for supporting the implementation of the energy audits and EE measures. The level of support varies with income level. Energy audits are implemented before and after the interventions. Eligible technologies as well as maximum limits of eligible expenses are defined.
Target end use(s)	Building envelope including shading Cooling Cooking Hot water Lighting Electric appliances

Target groups	Residential household owners
Geographical application	Entire Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The ultimate goal of the Programme is to reduce the energy consumption of the residential sector and promote EE interventions that will sustain the reduction over time. In order to accomplish this, the Programme's objective is to address the high up-front cost of EE measures for a household which is a barrier that prevents households to implement EE measures by providing financial incentives to the households to implement EE measures. Furthermore, the Programme will alleviate the barrier of limited awareness on EE the households have and the limited information on EE measures that is available for them. The Programme's beneficiaries will be the households. The Programme also aims at opening the residential market for EE services, materials, systems, equipment and energy efficient appliances. The programme will distinguish three categories of households depending on their income. An upper limit of income will be set above which no incentive will be given. The incentives that will be provided are a) a subsidy of the eligible up-front cost of the EE interventions, b) a loan for the share of the final total eligible up-front cost of the EE measures not covered by the subsidy, and c) a subsidy of the interest of the loan. The level of incentives will vary per income category. The Programme focuses on the energy efficiency interventions as well as the energy efficient behaviour of the building and its residents combined as an integrated concept. The eligible residential buildings are: • Single apartment buildings, • Multi-storey buildings, • Apartments in multi-apartment buildings. A list of eligible interventions will be developed. In order to determine the EE interventions to be implemented in a building or apartment, a first energy audit is conducted by a certified energy auditor. The energy efficiency interventions are eligible and can be financed by the Programme if they are included in the list, be proposed by the certified energy auditor during the first audit of the building or apartment and be included in the first audit report or the building energy performance certificate[42]. The combination of individual energy efficiency interventions that are proposed by the energy auditor should result in a 30% of final annual energy savings compared to the situation before the interventions are implemented, in order to be eligible[43]. In case of a multi-storey building that applies as dwelling multi-storey building[44], the criterion is the 30% reduction

[42] When the building energy performance certificate is applicable.

[43] If the building performance certificates are institutionalised, the requirement that envisages the energy class if the building or apartment to be improved by one energy class can be added as an alternative energy saving target.

[44] The term 'dwelling multi-storey building' that is going to be used in this report means the part

	of final energy consumption of the sum of the apartments that participate in the application as dwelling multi-storey building. These are the EE targets of the Programme and each project should achieve them in order to be eligible for financial support. There will be an upper limit set to the total eligible cost of EE interventions per building or apartment. The programme sees the building as an organism in which building envelope, equipment, systems and energy uses are interrelated and interact. That is the reason the Programme's objective is to promote integrated EE interventions and not just replacements of a particular equipment or appliance or only interventions in the building envelope. Deeper energy savings can be achieved with integrated solutions. The eligible EE interventions are the following: • Replacement of windows (window frames and glazing) and installation of shading systems (external or internal) • Installation of insulation to the walls, roofs and floor surfaces. • Replacement of inefficient air conditioning units (ACs) • Replacement of inefficient lighting • Installation of automated Building Energy Control Systems (BEMS) • Installation of solar water heaters • Installation of energy efficient cookers • Replacement of inefficient appliances with new ones having an energy label and belonging to higher energy classes. After the completion of the installation of the EE interventions, the beneficiary selects a certified energy auditor to conduct a second energy audit. The second energy audit's objective is to verify the installation of the EE interventions, to calculate the energy savings and to verify that the EE targets of the Programme have been met. The EEMO and the selected financial institution assess the second energy audit report along with the invoices of the suppliers and/or contractors and if they abide with the rules of the Programme, the incentives are disbursed to the beneficiary. The Programme's manager would be a Committee comprising of experts from the Ministry of Infrastructure and Land Transport and EEMO. Role of the Programme manager would be to: • Supervise the implementation of the Programme and monitor the allocation of funds, the EE interventions installed and estimates the energy savings achieved by the Programme. • Assess the completeness, quality and eligibility of the application of each potential beneficiary. • Assess the quality of the energy audits, the consistency of the costs of the interventions with the Programme requirements, the energy audit reports, the proposed EE interventions and their installation. • Decide on the eligibility of applications and the costs and the disbursement of the financial incentives.

of the multi-storey buildings that is used as dwellings.

	• Communicate and disseminate information about the Programme. In order the Programme to be set up, the participation of the local financial institutions is essential. The beneficiary selects a financial institution that participates in the Programme to cooperate with. The role of the local financial institutions would be the following: • Give soft loans to beneficiaries and co-sign the loan contracts, • Assess the applications and the energy audit reports of the potential beneficiaries, • Evaluate the estimated cost per beneficiary, • Disburse the incentives to the accounts of the beneficiaries, • Monitor the spending of funds. Prerequisites for designing and launching the Programme: • The Buildings Codes have been completed and tested and the respective regulation in force, • The management scheme for energy audits in residential buildings has been developed, • The energy labelling scheme and the respective regulation in force and tested, • The system of training and certifying energy auditors has been developed and is in force, • The information system for the management of energy audits has been developed and is operational, • The EEMO has gained capacities to a) manage the Programme and b) assess the quality of energy audits. A pilot phase to test the implementation and impacts of the Programme and its acceptability by the residential sector would be useful before its full-scale implementation.
Budget and financial source	Sources of funding: the EE/RE Financing Scheme, international donors The total cost of EE measures until 2030 can be estimated to MUR 23,040,000,000. The annual average cost, assuming 15 years until 2030, is estimated to be MUR 1,536,000,000[45].
Implementing body	Committee of the Ministry of Infrastructure and Land Transport and EEMO, local financial institutions
Monitoring body	Committee of the Ministry of Infrastructure and Land Transport and EEMO
Potential energy savings	The potential savings in final energy consumption in households as a result of this measure are 13.01 ktoe in 2030. These savings represent 7.93% improvement in comparison to the baseline in 2030[46] which is

[45] The methodology and assumptions for the estimation of required budget are described in Annex VII. This cost is optimistic and should be perceived as an upper limit. If the Programme for the households is going to be funded by the EE/RE Financing Scheme, the allocation of budget to the Programme should be based on the availability of funds and the ability of the EE/RE Financing Scheme to collect funds. The ability of the public benefit charge and the other mechanisms to collect funds should be assessed with an economic study by the Ministry of Finance.

[46] The methodology for the estimation of the savings by this measure in households is represented in Annex VIII.

	the final energy consumption in households of the base case scenario. The potential savings in electricity consumption in households as a result of this measure are 102.52 GWh in 2030. These savings represent 9.47% improvement in comparison to the baseline in 2030 which is the electricity consumption in households of the base case scenario. The potential savings in fossil fuels consumption in households as a result of this measure are 5.72 ktoe in 2030. These savings represent 9.10% improvement in comparison to the baseline in 2030 which is the fossil fuels consumption in households of the base case scenario.

Title of the measure	**Energy efficiency awareness and information campaign for households**
Code	HL2
Category	Awareness and information measures
Timeframe	The measure should start when the Governmental Programme for financing EE interventions in residential buildings will be launched. The awareness and information campaign should last at least for one year.
Purpose	Inform the public about the Governmental Programme for financing EE interventions in residential buildings
Brief description	Awareness and information campaign for households to promote the Governmental Programme for financing EE interventions in residential buildings
Target end use(s)	Building envelope including shading Cooling Cooking Hot water Lighting Electric appliances
Target groups	Residential sector
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The awareness and information campaign should be linked to the Governmental Programme for financing EE interventions in residential buildings and its objective is to sensitise and inform the residential sector of the EE opportunities and technologies and the Programme and how the households can benefit from it. The awareness tools that are going to be used to inform the public about the EE and especially about the Programme are the following: • A TV spot giving information on EE. The information would be of a general nature.

	• A TV spot giving information on the Programme and how the households can apply and benefit from it, what are the incentives for the households, what interventions can be installed and what would be the energy and cost gains • A radio spot on EE information of general nature • A radio spot explaining the Programme like the TV spot • A TV show presenting an example of a household that has applied to the Programme and is implementing the EE interventions. It is important to select a household in which the works for the installation of the EE measures are on-going (not finished yet) in order to show the process to the viewers. Interviews with the household owners are also important to present their experience to the public. • A section on the website of EEMO to present the Programme in full detail and list and make downloadable the documents of the Programme • Press releases in the newspapers and news websites • Leaflet in the electricity bill envelope that CEB is distributing to the households.
Budget and financial source	The budget of the awareness and information campaign is estimated at MUR 24,990,000. The funding sources could be the EE/RE Financing Scheme or governmental budget appropriations.
Implementing body	MEPU/EEMO
Monitoring body	EEMO
Potential energy savings	Not applicable
Comments	The design and implementation of the awareness and information campaign should be performed by professionals in communication and marketing. EEMO will procure the campaign and cooperate closely with the contractor as well as monitor the progress of the campaign's implementation.

Title of the measure	**New Solar Water Heater Scheme for households**
Code	HL3
Category	Financial measure
Timeframe	Started in 2014. The completion depends on the availability of funds.
Purpose	Incentivise the residential sector to install solar water heaters and replace electrical or LPG fired ones
Brief description	Programme for providing subsidy to the initial cost of solar water heaters for the residential sector
Target end use(s)	Water heating
Target groups	Residential sector

Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The New Solar Water Heater Scheme for residential buildings has already been launched in 2014 as a follow up of the three phases of the Solar Water Heater scheme for households. The incentives for the New SWH Scheme have been reviewed as follows: • Grant of MUR 10,000 to a householder (husband and spouse) whose salary does not exceed MUR 25,000; • Grant of MUR 5,000 to a householder whose salary exceeds MUR 25,000; • SWHs with all fittings and connection to be installed on new houses of the National Empowerment Foundation (NEF) and NHDC houses (only SWH) being built by the Ministry of Housing and Lands for 2015-2016. In the budget for 2014, an amount of MUR 100 million has been provided for a New Solar Water Heater Scheme, out of which a budget of MUR 25 million has been earmarked for 1,400 new Houses of the National Housing Development Company (NHDC). An additional budget of MUR 75 million has been provided on an exceptional case.
Budget and financial source	The measure is already funded by the Government with a budget of MUR 100 million
Implementing body	Ministry of Public Infrastructure and Land Transport, National Empowerment Foundation (NEF), Ministry of Housing and Lands
Monitoring body	Ministry of Public Infrastructure and Land Transport, National Empowerment Foundation (NEF), Ministry of Housing and Lands
Potential energy savings	Energy savings will be calculated after the installation of sufficient number of SWHs in households which have applied to participate and receive the subsidy

7.5 Measures in the public sector

The proposed measures in the public sector are:

- P1: Appointment of energy managers in public buildings
- P4: Development of action plan for EE/DSM interventions in public schools
- P5: Development of action plan for EE/DSM interventions in local authority buildings
- P6: Development of action plan for EE/DSM interventions in public buildings of Central Government

The measures in the public sector also include the measures under implementation:

- P2: Energy efficiency in street/public area lighting
- P3: Energy efficiency in water pumping

A presentation of the measures in the public sector is provided further below in this section.

Title of the measure	**Appointment of energy managers in public buildings**
Code	P1
Category	Support measure
Timeframe	Starting in 2016, on-going thereafter. The energy managers' concept

	should be established in a continuous fashion.
Brief description	Introduce energy managers in all public buildings; train existing technical staff as energy managers on monitoring and managing energy in buildings and developing energy management plans
Target end use(s)	All uses of energy in public buildings
Target groups	Public buildings
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	To reduce the energy consumption of the public buildings, energy managers are assigned to the buildings of the public sector. An energy manager can be responsible for one or several buildings depending on the operational needs, the existing staffing, the surface area and use of the building. For each public hospital at least one dedicated energy manager is required. The existing technical staff of the public buildings can be trained and at least one of them can be appointed as energy manager. The training will be conducted by EEMO. Before the training of the energy managers, EEMO should be trained as a trainer. This will be accomplished within the measure H12: Twinning project to enhance the capacities of EEMO. So, the measure H12 will have as priority to train EEMO as trainer to the energy managers. The energy managers are appointed by the line Ministry responsible for each public building after the recommendation of EEMO. EEMO will assess the qualifications of each candidate energy manager according to his/her CV and interview. The responsibilities of the energy managers are the following: • The collection of energy data for the consumption of electricity, oil, LPG and other energy carriers, • The development and use of a database of historical energy consumption per energy use and fuel • The implementation of preliminary energy audits in the buildings of the public sector • The drafting of an annual report that indicates the areas and technologies which need a detailed energy audit, • The identification of measures to reduce energy consumption in the public sector buildings, • The operation and maintenance of energy and electromechanical systems with the target to reduce the energy consumption • The advice on the purchase of energy efficient appliances, equipment and office equipment, • The training of the personnel in implementing behavioural measures and no-cost measures to the systems to reduce energy consumption, • The development and budgeting of an annual energy management plan of the facility(ies) that includes needed energy efficiency interventions, their costs, funding sources and scheduling. The energy management plans are submitted and assessed by the EEMO,

	• The monitoring of the maintenance works and the installation works of EE interventions.
Budget and financial source	Funding source: Public budget appropriations. The cost of the measure will be included in the public budget appropriations allocated to the implementing entities.
Implementing body	MEPU/EEMO and line Ministries responsible for each public building
Monitoring body	EEMO
Potential energy savings	Not applicable

Title of the measure	**Energy efficiency in street/public area lighting**
Code	P2
Category	Technical measure
Timeframe	Starting in 2016. Estimated completion in 2018
Purpose	Improve the efficiency of street and public are lighting and the visual comfort
Brief description	The main objective of this measure will be to get a standard and a design guideline for Mauritius for street and lighting in external lighting of public areas
Target end use(s)	Street lighting
Target groups	Municipal users
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The project's tender is over and a consultant has been appointed. The main objective of this measure will be to get a standard and a design guideline for Mauritius for street and lighting in external lighting of public areas. A design guideline shall also be prepared for retrofitting of existing street and public area lighting systems. The design guideline shall, among others, specify the type of lamps that can be used (to ensure efficient use of energy), their ratings, optimal distance between lamp posts and at which height optimal lighting can be obtained, with due consideration to the local context and road characteristics. The design guideline shall also cover the use of solar systems for street/public area lighting. This will ensure (i) consistency in the design of street and public area lighting by the relevant authorities and (ii) that the most energy efficient lighting systems are used with due regard to the specific requirements of each type of road/public area in the country. The most important activities of the project include: • assessment of the existing systems in Mauritius for street lighting for all types of roads (and for public area lighting; • development of a standard for street and public area lighting or customization of an existing international standard; • development of a design guideline and technical specifications

	for new energy efficient lighting systems for street and public areas, including the use of solar systems; • implementation of a pilot project for each type of road and public area lighting to demonstrate the suitability of the use of such lighting systems. It is proposed the MEPS become more stringent in the future. The Government should announce that well before the MEPS are revised in order to motivate importers to import appliances that comply with the more stringent MEPS even before these are enforced anticipating the future situation.
Budget and financial source	The project will be funded by Government of Mauritius and its ToR is currently under development.
Implementing body	EEMO and municipalities
Monitoring body	EEMO
Potential energy savings	Will be estimated by the contractor

Title of the measure	**Energy efficiency in water pumping**
Code	P3
Category	Technical measure
Timeframe	Starting in 2015. Estimated completion in 2017
Purpose	Improve the efficiency of water pumping
Brief description	Development of an action plan for EE in water pumping
Target end use(s)	Water pumping
Target groups	Municipal users
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The Central Water Authority is investigating the efficiency of water pumps used for irrigation, water treatment, waste water and other uses and will develop a plan for the improvement of their efficiencies.
Budget and financial source	The project is funded by Government of Mauritius
Implementing body	Central Water Authority and municipalities
Monitoring body	Central Water Authority
Potential energy savings	Not estimated yet since the study is at the beginning phase.

Title of the measure	**Develop an action plan for EE/DSM interventions in public schools**

Code	P4
Category	Technical measure
Timeframe	The development of the action plan will start in 2016 and last for one year. If this is not possible, the implementation of the measure can start after the Building Codes will be enforced and last for one year. The reason is that the public buildings should be retrofitted in accordance with the Building Codes or with better specifications.
Purpose	Improve the energy performance of public schools and contribute to the growth of the market for energy services
Brief description	Create an action plan for EE interventions in public schools. A large spectrum of interventions can be eligible in the building envelope: the envelope, systems, the energy management, monitoring and targeting, as well as the behavioural change. This will result in mature EE projects to be financed.
Target end use(s)	All end uses
Target groups	Public schools
Geographical application	Mauritius and Rodrigues
List and description of energy saving actions substantiating the measure	The action plans to retrofit public school buildings will come as a follow up of the competitions that EEMO organised in public schools. The eligible interventions can cover a wide span. In this way integrated retrofits are promoted in order to achieve deeper energy savings. The eligible interventions will include: • Interventions in the envelope (insulation, cool materials, cool paintings, shading, etc) • Interventions in the systems (air conditioning, lighting, etc) • Solar water heaters • Energy management and monitoring • Installation of building energy management systems • Behavioural measures and training of teachers and pupils to conserve energy in the buildings. All interventions should follow the specifications of the Building Code or better specifications. The development of the action plan will be procured by EEMO and the eligible engineering companies which will undertake the works would come from the private sector. In order to procure the action plan development, EEMO will conduct preliminary energy audits in the public school buildings in order to identify their energy consumption and outline possible EE measures to be implemented and their approximate cost. Having this information, EEMO will have a picture of the potential measures and their costs in each public school building. This information will not be detailed but it will be sufficient to draft the tender documents and allocate the needed funds for the implementation of the detailed energy audits and the technical interventions. The official software for the energy audits shall be used in both the preliminary and the detailed energy audits.

	At the first phase, the tender will envisage the development of the action plan. In order to do this the tender should foresee the implementation of detailed energy audits in public school buildings by the contractor. The detailed cost of each measure in each school building will be included in the action plan. At the second phase, a tender to procure the installation of EE interventions at the public schools buildings will be drafted by EEMO based on the provisions of the action plan. The two-stage procedure is selected because the action plan may suggest interventions beyond the available budget. At the second stage EEMO and MEPU can choose which public school buildings to procure according to the expected energy savings, the estimated cost and other factor specific to each case.
Budget and financial source	Approximate cost of the development of the action plan is MUR 32,000,000. This cost may be refined by EEMO after the preliminary energy audits. The budget for the EE interventions will be specified by EEMO based on the preliminary energy audits and refined by the contractor based on the detailed energy audits they will conduct. Sources of financing can be the public budget, the EE/RE Financing Scheme and/or the donor projects.
Implementing body	MEPU and EEMO
Monitoring body	EEMO
Potential energy savings	The potential energy savings will be estimated in the action plan.

Title of the measure	**Develop an action plan for EE/DSM interventions in local authority buildings**
Code	P5
Category	Technical measure
Timeframe	The development of the action plan will start in 2016 and last for one year. If this is not possible, the implementation of the measure can start after the Building Codes will be enforced and last for one year. The reason is that the public buildings should be retrofitted in accordance with the Building Codes or with better specifications.
Purpose	Improve the energy performance of buildings of the local government and contribute to the growth of the market for energy services
Brief description	Create an action plan for EE interventions in local authority buildings. A large spectrum of interventions can be eligible in the building envelope: the envelope, systems, the energy management, monitoring and targeting, as well as the behavioural change. This will result in mature EE projects to be financed.
Target end use(s)	All end uses
Target groups	Local authority buildings in the local authorities of Mauritius and Rodrigues

Geographical application	Mauritius and Rodrigues
List and description of energy saving actions substantiating the measure	The action plans to retrofit local authority buildings will fund eligible interventions that can cover a wide technological span. In this way integrated retrofits are promoted in order to achieve deeper energy savings. The eligible interventions will include: Interventions in the envelope (insulation, cool materials, cool paintings, shading, etc) Interventions in the systems (air conditioning, lighting, etc) Solar water heaters Energy management and monitoring Installation of building energy management systems Behavioural measures and training of building managers and users to conserve energy in the buildings. The development of the action plan will be procured by EEMO and the eligible engineering companies would come from the private sector. In order to procure the action plan development, EEMO will conduct preliminary energy audits in the local authority buildings in order to identify their energy consumption and outline possible EE measures to be implemented and their approximate cost. Having this information, EEMO will have a picture of the potential measures and their costs in each public school building. This information will not be detailed but sufficient to draft the tender documents and allocate the needed funds for the implementation of the detailed energy audits and the technical interventions. The selection of which buildings to include in the action plan will be based on three criteria: the approximate potential energy savings (historical consumption-projected energy consumption with measures), the cost and the usage of the buildings. The official software for the energy audits shall be used in both the preliminary and the detailed energy audits. At the first phase, the tender will envisage the development of the action plan. In order to do this the tender should foresee the implementation of detailed energy audits in the selected local authority buildings by the contractor. The detailed cost of each measure in each building will be included in the action plan. At the second phase, a tender to procure the installation of EE interventions at the buildings will be drafted by EEMO based on the provisions of the action plan. The two-stage procedure is selected because the action plan may suggest interventions beyond the available budget. At the second stage EEMO and MEPU can choose which buildings to procure according to the expected energy savings, the estimated cost and other factor specific to each case.
Budget and financial source	Approximate cost of the development of the action plan is MUR 32,000,000. This cost may be refined by EEMO after the preliminary energy audits. The budget for the EE interventions will be specified by EEMO based on the preliminary energy audits and refined by the contractor based on the detailed energy audits they will conduct.

	Sources of financing can be the public budget, the EE/RE Financing Scheme and/or the donor projects.
Implementing body	MEPU and EEMO
Monitoring body	EEMO
Potential energy savings	The potential energy savings will be estimated in the action plan.

Title of the measure	**Develop an action plan for EE/DSM interventions in public buildings of Central Government**
Code	P6
Category	Technical measure
Timeframe	The development of the action plan will start in 2016 and last for one year. If this is not possible, the implementation of the measure can start after the Building Codes will be enforced and last for one year. The reason is that the public buildings should be retrofitted in accordance with the Building Codes or with better specifications.
Purpose	Improve the energy performance of the buildings of the central government and contribute to the growth of the market for energy services
Brief description	Create an action plan for EE interventions in public buildings of Central Government. A large spectrum of interventions can be eligible in the building envelope: the envelope, systems, the energy management, monitoring and targeting, as well as the behavioural change. This will result in mature EE projects to be financed.
Target end use(s)	All end uses
Target groups	Public buildings of Central Government
Geographical application	Mauritius and Rodrigues
List and description of energy saving actions substantiating the measure	The action plans to retrofit public buildings of Central Government will fund eligible interventions that can cover a wide technological span. In this way integrated retrofits are promoted in order to achieve deeper energy savings. The eligible interventions will include: Interventions in the envelope (insulation, cool materials, cool paintings, shading, etc) Interventions in the systems (air conditioning, lighting, etc) Solar water heaters Energy management and monitoring Installation of building energy management systems Behavioural measures and training of building managers and users to conserve energy in the buildings. The development of the action plan will be procured by EEMO and the eligible engineering companies would come from the private sector. In

	order to procure the action plan development, EEMO will conduct preliminary energy audits in the Central Government buildings in order to identify their energy consumption and outline possible EE measures to be implemented and their approximate cost. Having this information, EEMO will have a picture of the potential measures and their costs in Central Government building. This information will not be detailed but sufficient to draft the tender documents and allocate the needed funds for the implementation of the detailed energy audits and the technical interventions. The selection of which buildings to include in the action plan will be based on three criteria: the approximate potential energy savings (historical consumption-projected energy consumption with measures), the cost and the usage of the buildings. The official software for the energy audits shall be used in both the preliminary and the detailed energy audits. At the first phase, the tender will envisage the development of the action plan. In order to do this the tender should foresee the implementation of detailed energy audits in the selected Central Government buildings by the contractor. The detailed cost of each measure in each building will be included in the action plan. At the second phase, a tender to procure the installation of EE interventions at the buildings will be drafted by EEMO based on the provisions of the action plan. The two-stage procedure is selected because the action plan may suggest interventions beyond the available budget. At the second stage EEMO and MEPU can choose which building to procure according to the expected energy savings, the estimated cost and other factor specific to each case.
Budget and financial source	Approximate cost of the development of the action plan is MUR 32,000,000. This cost may be refined by EEMO after the preliminary energy audits. The budget for the EE interventions will be specified by EEMO based on the preliminary energy audits and refined by the contractor based on the detailed energy audits they will conduct. Sources of financing can be the public budget, the EE/RE Financing Scheme and/or the donor projects.
Implementing body	MEPU and EEMO
Monitoring body	EEMO
Potential energy savings	The potential energy savings will be estimated in the action plan.

7.6 Measures in transport

The proposed measures in transport include:

- T1: Financial incentives to promote electric vehicles
- T2: Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (more energy efficient vehicles, vehicles fuelled by biofuels and hybrid vehicles)

A presentation of the measures in transport is provided further below in this section.

Title of the measure	**Financial incentives to promote electric vehicles**

Code	T1
Category	Financial support measure
Timeframe	Starting 2017, on-going thereafter. The duration depends on the availability of funds.
Purpose	Introduce electric vehicles in Mauritian market to replace conventional ones
Brief description	Provision of financial incentives for facilitating the purchase and use of electric vehicles (passenger cars, motorcycles, bicycles, heavy vehicles) and construction of vehicle recharging points (RE-powered and/or conventional)
Target end use(s)	Public and private vehicles
Target groups	Public and private vehicle users
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The measure involves the provision of favourable tax incentives and subsidies for the purchase of electric vehicles of any type for private motorists and public agencies operation vehicle fleets. Besides the financial support to purchase electric vehicles, the measure will also introduce a subsidy for the construction of public and private vehicle recharging points, powered mainly by renewable sources and/or conventional sources. The subsidy will be set at the purchasing price of the electric car and a maximum threshold will be set.
Budget and financial source	The financial source of the measure can be EE/RE Financing Scheme or public budget allocations. The budget will depend on the foreseen growth of the vehicles until 2030 and the foreseen penetration of electric vehicles. A study is needed to establish the budget.
Implementing body	Ministry of Public Infrastructure and Land Transport, National Transport Authority
Monitoring body	Ministry of Public Infrastructure and Land Transport, National Transport Authority

Title of the measure	**Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (more energy efficient vehicles, vehicles fuelled by biofuels and hybrid vehicles)**
Code	T2
Category	Financial support measure
Timeframe	Starting 2017, on-going thereafter. The duration depends on the availability of funds.
Purpose	Replace old and inefficient vehicles with more efficient ones
Brief description	The purpose of the measure is to provide financial and tax incentives to replace old energy-intensive vehicles with new, state-of-the-art

	ones and to promote energy efficient vehicles.
Target end use(s)	Private vehicles
Target groups	Private vehicle users
Geographical application	Mauritius and Rodrigues islands
List and description of energy saving actions substantiating the measure	The measure provides: Tax incentives for alternative technology vehicles (biofuel vehicles, hybrid vehicles), and vehicles or improved engine specifications. Taxes can be adjusted and calculated based on the engine capacity and the environmental pollution caused by the engine of vehicles. Financial incentives for scrapping of old private cars. A subsidy is provided for vehicle scrapping. The amount of subsidy depends on the engine capacity of the vehicle withdrawn.
Budget and financial source	The financial source of the measure can be the EE/RE Financing Scheme or public budget allocations. The budget will depend on the foreseen growth of the vehicles until 2030. A study is needed to establish the budget of the measure.
Implementing body	Ministry of Public Infrastructure and Land Transport, National Transport Authority
Monitoring body	Ministry of Public Infrastructure and Land Transport, National Transport Authority

7.7 Impact of measures per sector

Using the MAED-2 model the impact of the measures on energy consumption in each sector was estimated. The estimation of the impact considers the measures that apply to a particular sector (horizontal and sector-specific).

7.7.1 Residential sector

As regards the energy demand in the residential sector only:

- The potential savings in final energy consumption in households as a result of this measure are 13.01 ktoe in 2030. These savings represent 7.93% improvement in comparison to the baseline in 2030[47] which is the final energy consumption in households of the base case scenario.
- The potential savings in electricity consumption in households as a result of this measure are 102.52 GWh in 2030. These savings represent 9.47% improvement in comparison to the baseline in 2030 which is the electricity consumption in households of the base case scenario.
- The potential savings in fossil fuels consumption in households as a result of this measure are 5.72 ktoe in 2030. These savings represent 9.10% improvement in comparison to the baseline in 2030 which is the fossil fuels consumption in households of the base case scenario.

As regards the energy demand in all sectors:

[47] The methodology for the estimation of the savings by the measures that impact the households is represented in Annex VIII.

- The potential savings in final energy consumption in all sectors as a result of this measure are 13.01 ktoe in 2030. These savings represent 1.32% improvement in comparison to the baseline in 2030 which is the final energy consumption in all sectors of the base case scenario.
- The potential savings in electricity consumption of all sectors as a result of this measure are 102.52 GWh in 2030. These savings represent 2.62% improvement in comparison to the baseline in 2030 which is the electricity consumption of all sectors of the base case scenario.
- The potential savings in fossil fuels consumption of all sectors as a result of this measure are 5.72 ktoe in 2030. These savings represent 2.72% improvement in comparison to the baseline in 2030 which is the fossil fuels consumption of all sectors of the base case scenario.

7.7.2 Industry sector

As regards the energy demand in the industrial sector only:

- The potential savings in final energy consumption in industry as a result of the all the measures that apply in industry are 40.91 ktoe in 2030. These savings represent 13.77% improvement in comparison to the baseline in 2030[48] which is the final energy consumption in industry in the base case scenario.
- The potential savings in electricity consumption in industry as a result of all the measures that apply in industry are 131.2 GWh in 2030. These savings represent 9.37% improvement in comparison to the baseline in 2030 which is the electricity consumption in industry in the base case scenario.
- The potential savings in fossil fuels consumption in industry as a result of all the measures that apply in industry are 19.04 ktoe in 2030. These savings represent 15.36% improvement in comparison to the baseline in 2030 which is the fossil fuel consumption in industry in the base case scenario.
- The potential savings in modern biomass (bagasse) consumption in industry as a result of all the measures that apply in industry are 10.58 ktoe in 2030. These savings represent 22.4 % improvement in comparison to the baseline in 2030 which is the modern biomass (bagasse) consumption in industry in the base case scenario.

As regards the energy demand in all sectors:

- The potential savings in final energy demand in all sectors as a result of all the measures that apply in industry are 40.91 ktoe in 2030. These savings represent 4.16% improvement in comparison to the baseline in 2030 which is the final energy demand in all sectors in the base case scenario.
- The potential savings in electricity consumption in all sectors as a result of all the measures that apply in industry are 131.2 GWh in 2030. These savings represent 3.35% improvement in comparison to the baseline in 2030 which is the electricity consumption of all sectors in the base case scenario.
- The potential savings in fossil fuels consumption of all sectors as a result of all the measures that apply in industry are 19.04 ktoe in 2030. These savings represent 9.05% improvement in comparison to the baseline in 2030 which is the fossil fuel consumption of all sectors in the base case scenario.
- The potential savings in modern biomass (bagasse) consumption of all sectors as a result of all the measures that apply in industry are 10.58 ktoe in 2030. These savings represent 22.4 % improvement in comparison to the baseline in 2030 which is the

[48] The methodology for the estimation of the savings by the measures that apply in industry is represented in Annex XIII.

modern biomass (bagasse) consumption of all sectors in the base case scenario.

7.7.3 Services sector

As regards the energy demand in the services sector only:

- The potential savings in final energy consumption in services as a result of the all the measures that apply in this sector is 18.5 ktoe in 2030. These savings represent 11.91% improvement in comparison to the baseline in 2030 which is the final energy consumption in services of the base case scenario[49].
- The potential savings in electricity consumption in the services as a result of the measures that apply in the services sector are 182.48 GWh in 2030. These savings represent 12.75% improvement in comparison to the baseline in 2030 which is the electricity consumption in the services in the base case scenario.
- The potential savings in fossil fuels consumption of in the services as a result of the measures that apply in the services sector are 6.32 ktoe in 2030. These savings represent 26.85% improvement in comparison to the baseline in 2030 which is the fossil fuel consumption in the services in the base case scenario.

As regards the energy demand in all sectors:

- The potential savings in final energy consumption all sectors as a result of the all the measures that apply in services is 18.5 ktoe in 2030. These savings represent 1.87% improvement in comparison to the baseline in 2030 which is the final energy consumption in all sectors of the base case scenario.
- The potential savings in electricity consumption of all sectors as a result of the measures that apply in the services sector are 182.48 GWh in 2030. These savings represent 4.66% improvement in comparison to the baseline in 2030 which is the electricity consumption of all sectors in the base case scenario.
- The potential savings in fossil fuels consumption of all sectors as a result of the measures that apply in the services sector are 6.32 ktoe in 2030. These savings represent 3% improvement in comparison to the baseline in 2030 which is the fossil fuel consumption in all sectors in the base case scenario.

7.7.4 Transport sector

As regards the energy demand in the transport sector only:

- The potential savings in final energy consumption in transport as a result of the all the measures that apply in this sector is 26.56 ktoe in 2030. These savings represent 7.17% improvement in comparison to the baseline in 2030 which is the final energy consumption in transport of the base case scenario[50].
- The potential savings in motor fuels consumption of in transport as a result of the measures that apply in the transport sector are 26.56 ktoe in 2030. These savings represent 7.17% improvement in comparison to the baseline in 2030 which is the motor fuel consumption in in transport in the base case scenario.

As regards the energy demand in all sectors:

- The potential savings in final energy consumption all sectors as a result of the all the measures that apply in transport is 26.56 ktoe in 2030. These savings represent 2.69%

[49] The methodology for the estimation of the savings by the measures that apply in services sector is represented in Annex XIV.

[50] The methodology for the estimation of the savings by the measures that apply in transport sector is represented in Annex XV.

improvement in comparison to the baseline in 2030 which is the final energy consumption in all sectors of the base case scenario.

- The potential savings in motor fuels consumption of all sectors as a result of the measures that apply in in transport sector are 26.56 ktoe in 2030. These savings represent 7.12% improvement in comparison to the baseline in 2030 which is the motor fuel consumption in all sectors in the base case scenario.

7.7.5 Savings of peak demand

The reduction in peak capacity (MW) that is created by the measures in the EE/DSM Master Plan for the three scenarios, Low, Base and High[51] is depicted in the following table

YEAR	LOW SCENARIO	BASE SCENARIO	HIGH SCENARIO
2015	3	3	3
2016	7	7	7
2017	10	11	11
2018	14	14	15
2019	18	18	19
2020	21	21	23
2021	26	26	28
2022	30	31	33
2023	34	35	39
2024	38	40	44
2025	43	44	49
2026	48	50	56
2027	53	55	63
2028	58	61	71
2029	62	66	77
2030	67	71	84

Table 5: The reduction in peak capacity (MW) as a result of the EE/DSM Master Plan

The estimation of the peak demand reduction was based on the following steps:

[51] The scenarios are defined in the 'Report on forecast scenarios and supply options':

Low Scenario – the economy will exhibit a steady growth at the rate of the most recent years, GDP will grow at a constant rate of 3.5%, lifestyle will follow a normal income trend.

Base Scenario – no major structural change will be observed in the economy, GDP will grow at a rate of 3.5% - 4%, lifestyle will follow a normal to high income trend.

High Scenario - the economy will follow the Mauritius Vision 2030 path, GDP will grow at a rate of 5.5% after 2015, lifestyle will follow a high income trend.

- The electricity demand forecasts for the scenario without the EE/DSM Master Plan measures and the scenario with the measures until 2030 were conducted using MAED-2 model[52]
- The peak demand forecasts which are related to the forecasted electricity demand were calculated using the CEB[53] and World Bank[54] approaches for the two scenarios
- The mean peak demand of the two approaches was calculated for each scenario
- The difference of the mean peak demand between the scenarios resulted in the peak demand reduction presented in Table 5.

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Annex I Methodology and assumptions for the estimation of required budget of the EE/DSM Measure H1 Establishment of the EE/RE Financing Scheme

Required budget for large enterprises

According to 2007 census of economic activities of Statistics Mauritius for large establishments in all sectors (companies with 10 or more employees) the number and breakdown of companies per sector is given in Table 6.

Industry group	2002		2007	
	Number of establishments	Percentage	Number of establishments	Percentage
Total	**2,109**	**100.0**	**2,170**	**100.0**
Mining and quarrying	4	0.2	5	0.2
Manufacturing	930	44.1	775	35.7
Electricity, gas and water supply	5	0.2	7	0.3
Construction	89	4.2	104	4.8
Wholesale and retail trade, and repairs	359	17.0	358	16.5
Hotels and restaurants	157	7.4	152	7.0
Transport, storage and communications	102	4.8	112	5.2
Financial intermediation	60	2.8	140	6.5
Real estate, renting and business activities	156	7.4	237	10.9
Education	128	6.1	158	7.3
Health and social work	34	1.6	34	1.6
Other services	85	4.0	88	4.1

Table 6: Distribution of large establishments by sector

Source: 2007 census of economic activities of Statistics Mauritius for large establishments

In addition, the distribution of establishments according to their number of employees is given in Table 7.

Industry group	Number of establish-ments	Employment size								
		<20	20 - 29	30 - 49	50 - 99	100 - 199	200 - 499	500 - 999	1000+	Total
		Percentage								
Total	**2,170**	**38.3**	**13.2**	**15.4**	**15.6**	**8.1**	**6.2**	**1.8**	**1.4**	100.0
Mining and quarrying	5	-	80.0	20.0	-	-	-	-	-	100.0
Manufacturing	775	32.9	15.2	18.1	16.8	7.2	5.9	1.5	2.3	100.0
Electricity, gas and water supply	7	-	-	42.9	28.6	-	-	-	28.6	100.0
Construction	104	43.3	7.7	14.4	12.5	12.5	2.9	3.8	2.9	100.0
Wholesale and retail trade, and repairs	358	46.4	12.3	15.4	15.1	6.4	3.4	1.1	-	100.0
Hotels and restaurants	152	32.9	12.5	7.9	11.8	6.6	23.0	5.3	-	100.0
Transport, storage and communications	112	33.0	15.2	10.7	15.2	9.8	8.9	2.7	4.5	100.0
Financial intermediation	140	64.3	7.1	5.0	7.9	8.6	5.0	1.4	0.7	100.0
Real estate, renting and business activities	237	47.3	13.9	13.9	8.9	9.3	4.2	2.1	0.4	100.0
Education	158	18.4	8.9	24.7	36.7	11.4	-	-	-	100.0
Health and social work	34	29.4	14.7	20.6	20.6	11.8	2.9	-	-	100.0
Other services	88	42.0	17.0	12.5	9.1	6.8	11.4	1.1	-	100.0

Table 7: Distribution of large establishments per number of employees

Source: 2007 census of economic activities of Statistics Mauritius for large establishments

Assumptions for the calculation:

- The average cost per EE investment for the enterprises is 150,000 euros or MUR 6 million,
- Only enterprises with less than 200 employees are considered. Enterprises with more than 200 employees are not considered SMEs.
- The percentage of large enterprises that will benefit from the financial products associated to the EE/RE Financing Scheme until 2030 is 30% of the total number of large enterprises.

The calculations to estimate the required budget to support the investments in EE by large enterprises are depicted in Table 8.

	Large establishments					
1	**Total number of large establishments**	**2170**				
2	**Number of employees**	**<20**	**20-29**	**30-49**	**50-99**	**100-199**
3	Percentage of establishments	38.3%	13.2%	15.4%	15.6%	8.1%
4	Number of enterprises (1x3)	831	286	334	339	176
5	Cost per investment (euro)	150,000	150,000	150,000	150,000	150,000
6	Total cost (euro) until 2030 (4x5)	124,666,500	42,966,000	50,127,000	50,778,000	26,365,500
7	Percentage of beneficiaries until 2030	30%	30%	30%	30%	30%
8	Total cost (euro) with beneficiaries percentage until 2030 (6x7)	37,399,950	12,889,800	15,038,100	15,233,400	7,909,650
9	Total cost until 2030 (euros)	88,470,900				
10	Total cost until 2030 (MUR)	3,538,836,000				
11	Total cost/year (euros)	5,898,060				
12	Total cost/year (MUR)	235,922,400				

Table 8: Calculations to estimate the required budget to support the investments in EE by large enterprises

The results are the following:

The required annual budget for EE investments in large scale establishments is MUR 235,922,400 assuming 15 years until 2030,

The required budget until 2030 for EE investments in large scale establishments is MUR 3,538,836,000.

Required budget for small enterprises

According to 2013 census of economic activities of Statistics Mauritius for small establishments in all sectors (companies with less than 10 employees) the number and breakdown of companies per sector is given in Table 9.

Industry group	2007		2013		% Increase from 2007 to 2013
	Number of units	Percentage	Number of units	Percentage	
Total	**92,390**	**100.0**	**125,000**	**100.0**	**35**
Manufacturing	12,750	13.8	15,240	12.2	20
Construction	9,560	10.3	12,940	10.4	35
Wholesale and retail trade; repair of motor vehicles and motorcycles	33,810	36.6	46,780	37.4	38
Transportation and storage	15,750	17.1	20,920	16.7	33
Accommodation and food service activities	7,750	8.4	10,710	8.6	38
Information and communication	180	0.2	560	0.4	211
Financial and insurance activities	150	0.2	180	0.1	20
Real estate activities	300	0.3	600	0.5	100
Professional, scientific and technical activities	1,760	1.9	2,260	1.8	29
Administrative and support service activities	1,330	1.4	1,720	1.4	28
Education	1,920	2.1	1,850	1.5	-3
Human health and social work activities	1,200	1.3	1,710	1.4	43
Arts, entertainment and recreation	1,170	1.3	3,410	2.7	191
Other services	4,760	5.2	6,120	4.9	29

Table 9: Distribution of small establishments per sector

Source: 2013 census of economic activities of Statistics Mauritius for small establishments

The distribution of small establishments per floor area is depicted in Table 10.

Industry group	Number of production units	Floor area (m²)					
		Less than 25	25 - 49	50 - 99	100 - 199	200 - 299	300 or more
Total	**100.0**	**47.4**	**18.3**	**14.7**	**2.5**	**1.1**	**16.0**
Manufacturing	100.0	50.1	23.2	14.4	2.3	0.9	9.0
Wholesale and retail trade; repair of motor vehicles and motorcycles	100.0	49.3	15.6	11.7	2.2	0.8	20.4
Transportation and storage	100.0	25.8	9.7	48.3	3.2	3.2	9.7
Accommodation and food service activities	100.0	39.8	17.3	19.7	3.3	3.0	16.9
Information and communication	100.0	66.1	14.0	14.2	1.3	-	4.5
Financial and insurance activities	100.0	51.4	26.3	14.3	2.9	2.9	2.9
Real estate activities	100.0	50.0	12.5	12.5	-	-	25.0
Professional, scientific and technical activities	100.0	56.2	24.0	14.1	2.7	0.8	2.2
Administrative and support service activities	100.0	30.4	23.0	27.3	1.1	1.8	16.4
Education	100.0	21.9	32.5	31.3	6.4	1.0	6.9
Human health and social work activities	100.0	55.1	25.5	12.7	2.1	2.3	2.3
Arts, entertainment and recreation	100.0	19.2	16.0	29.6	5.4	1.3	28.4
Other services	100.0	62.3	22.2	9.8	1.3	0.2	4.2

Table 10: Distribution of small establishments per sector and floor area

Source: 2013 census of economic activities of Statistics Mauritius for small establishments

Further, the distribution of small establishments operating within buildings by group and floor area is depicted in Table 11.

							Number
Industry group	Number of production units	Floor area (m²)					
		Less than 25	25 - 49	50 - 99	100 - 199	200 - 299	300 or more
Total	**91,739**	**43,495**	**16,815**	**13,457**	**2,261**	**1,011**	**14,700**
Manufacturing	**15,241**	**7637**	**3540**	**2199**	**353**	**137**	**1374**
Food and beverages	3,265	1,719	530	373	93	20	538
Ice cream	*65*	*31*	*6*	*6*	-	*3*	*19*
Grain mill - spices	*483*	*300*	*52*	*105*	-	-	*26*
Bread and pastries	*525*	*143*	*150*	*133*	*66*	*17*	*17*
Other food products	*1,943*	*1,033*	*305*	*103*	*26*	-	*476*
Wearing apparels (tailoring)	3,479	2,078	753	422	-	35	190
Wood and wood products, except furniture	374	179	65	80	-	-	50
Paper products and Printing	325	125	81	88	19	-	13
Chemicals and chemical products	69	23	34	-	11	-	-
Other non-metallic mineral products	94	41	6	23	-	-	23
Fabricated metal product, except machinery	2,340	840	776	520	51	26	128
Furniture	2,960	1,312	850	432	84	56	225
Other	2,337	1,320	445	261	95	-	207
Wholesale and retail trade; repair of motor vehicles and motorcycles	**46,776**	**23,056**	**7,298**	**5,492**	**1,024**	**364**	**9,541**
Sale of Motor vehicles and spare parts	809	264	262	206	26	9	43
Repair and maintenance of motor vehicles	2,842	853	650	825	261	127	127
Sale of automotive fuel(filling) station	175	29	29	39	29	39	10
Wholesale(Commission agent,auctioneer,etc)	4,512	1,370	1,056	977	289	112	708
General Retailer-Foodstuff and non foods	5,892	2,653	1,775	1,307	99	-	59
Fruits and vegetables	547	442	63	-	-	-	41
Fish and meat	1,672	1,324	221	126	-	-	-
Supermarket	271	-	25	99	74	49	25
Tobacco shops	63	63	-	-	-	-	-
Pharmaceutical products	425	158	128	128	10	-	-
Textiles,clothing and footwear	1,020	641	204	107	39	10	19
Household appliances and furniture	850	235	278	259	39	19	19
Hardware and timber(Quincaillerie)	1,100	163	312	502	95	-	27
Bookshops	683	248	327	108	-	-	-
Jewellery	175	109	66	-	-	-	-
Computer hardware and software	350	110	170	70	-	-	-
Retail sale via stalls and markets	18,038	11,002	141	-	-	-	6,895
Retail sale not in stores, stalls and markets	1,563	104	-	-	-	-	1,458
Other	5,791	3,288	1,591	739	63	-	109
Transportation and storage	**599**	**155**	**58**	**290**	**19**	**19**	**58**
Activities allied to transport	464	136	58	213	-	19	39
Other	135	19	-	77	19	-	19
Accommodation and food service activities	**10,699**	**4,261**	**1,849**	**2,108**	**353**	**317**	**1,812**
Hotel	720	18	12	404	66	59	160
Boarding house	160	-	-	-	53	107	-
Restaurants (small)	1,724	423	364	645	176	117	-
Bars	1,120	560	280	280	-	-	-
Victualler, selling cooked food on and off premises	4,223	2,400	1,120	469	59	-	176
Caterer, other	2,752	860	73	310	-	34	1,476
Information and communication	**557**	**368**	**78**	**79**	**7**	-	**25**
Financial and insurance activities	**175**	**90**	**46**	**25**	**5**	**5**	**5**
Life insurance	14	9	5	-	-	-	-
Activities auxilliary to financial service	39	22	17	-	-	-	-
Activities auxilliary to insurance and pension funding	106	53	19	19	5	5	5
Real estate activities	**600**	**300**	**75**	**75**	-	-	**150**
Professional, scientific and technical activities	**2,263**	**1,270**	**541**	**316**	**58**	**18**	**60**
Legal , accounting, book keeping and auditing activities	500	333	167	-	-	-	-
Architectural, engineering & other professional activities	800	400	200	120	40	-	40
Advertising and marketing activities	200	73	36	55	18	18	-
Other	763	464	138	141	-	-	20
Administrative and support service activities	**1,715**	**522**	**394**	**468**	**19**	**31**	**281**
Rental and leasing activities	784	228	68	242	19	31	195
Travel agency and tour operators	400	126	189	63	-	-	21
Other	531	168	137	163	-	-	65
Education	**1,853**	**406**	**601**	**580**	**119**	**18**	**127**
Pre-primary education	853	104	342	360	47	-	-
Adult and other education	727	182	200	145	55	18	127
Technical and vocational education	152	61	30	61	-	-	-
Other	121	59	29	15	18	-	-
Human health and social work activities	**1,705**	**939**	**434**	**217**	**35**	**40**	**40**
Medical services	697	453	174	35	35	-	-
Dental services	453	279	139	35	-	-	-
Other health services and social work	555	207	121	147	-	40	40
Arts, entertainment and recreation	**3,409**	**654**	**544**	**1,010**	**185**	**46**	**969**
Creative,arts and entertainment activities	192	7	92	46	-	-	46
Gambling and betting activities	400	276	83	41	-	-	-
Sports activities and amusement and recreation activities	2,817	371	369	923	185	46	923
Other services	**6,119**	**3,810**	**1,357**	**597**	**82**	**15**	**258**
Repair of computers and communication equipment	2,020	1,579	185	85	52	-	118
Hairdressing and beauty parlour	3,590	2,014	1,046	436	-	-	95
Funeral and related services	121	61	15	-	15	-	30
Other service activities	388	156	111	76	15	15	15

Table 11: Distribution of small establishments operating within building per sector and floor area

Source: 2013 census of economic activities of Statistics Mauritius for small establishments

Assumptions for the calculation:

- the average cost per EE investment for the enterprises with floor area less than 49 m^2 is 10,000 euros or MUR 400,000,
- the average cost per EE investment for the enterprises with floor area more than 49 m^2 is 20,000 euros or MUR 800,000,
- The percentage of small enterprises that will use the Financial Scheme until 2030 is 30% of the total number of small enterprises.

The calculations to estimate the required budget to support the investments in EE by large enterprises are depicted in Table 12.

	Small establishments							
	Industry group	Number of production units	Floor area (m^2)					
			Less than 25	25 - 49	50 - 99	100 - 199	200 - 299	300 or more
1	Total number of small establishments 2013	91,739	43,495	16,815	13,457	2,261	1,011	14,700
2	Average investment cost (euro)		10,000	10,000	20,000	20,000	20,000	20,000
3	Average investment cost (MUR)		400,000	400,000	800,000	800,000	800,000	800,000
4	Total cost (euro) until 2030 (1x2)		434,950,000	168,149,000	269,146,000	45,216,800	20,210,000	294,008,000
5	Percentage of beneficiaries until 2030		30%	30%	30%	30%	30%	30%
6	Total cost (euro) with beneficiaries percentage until 2030 (4x5)		130,485,000	50,444,700	80,743,800	13,565,040	6,063,000	88,202,400
7	Total cost until 2030 (euros)	369,503,940						
8	Total cost until 2030 (MUR)	14,780,157,600						
9	Total cost/year (euros)	24,633,596						
10	Total cost/year (MUR)	985,343,840						

Table 12: Calculations to estimate the required budget to support the investments in EE by small enterprises

The results are the following:

- The required annual budget for EE investments in small scale establishments is MUR 985,343,840 assuming 15 years until 2030,
- The required budget until 2030 for EE investments in large scale establishments is MUR 14,780,157,600.

Total budget requirements

The total budget requirements considering large and small enterprises in all sectors would be:

- Total cost until 2030 is 18,318,993,600 MUR,
- Average annual cost is 1,221,266,240 MUR.

Annex II Credit Guarantees

(explanation for EE/DSM Measure H1 Establishment of the EE/RE Financing Scheme)

Definition[55]

Credit guarantees provide guarantees on loans to borrowers by covering a share of the default risk of the loan. The primary rationale for a credit guarantees is to induce the participating lenders to increase their lending for EE projects by providing partial coverage of the potential losses from loan defaults. The loans can have a variety of objectives: EE investments, infrastructure investments, expansion of production lines, renewable investments, etc. In case of default by the borrower, the lender recovers the value of the guarantee. Guarantees are usually provided against a fee, covered either by the borrower, the lender or both. In case of a default, the lender usually is obliged to proceed with the collection of the loan and share the proceeds with the guarantor. Credit guarantees allow the partial transfer of credit risk stemming from a loan or a portfolio of loans.

Credit guarantees can be public or private. Public credit guarantees – where funding is provided by the public sector – usually arise from policy initiatives to improve the access to finance for SMEs. Public schemes are the most prevalent type in emerging economies. However, in many developed economies private credit guarantees also exist. These are typically mutual guarantee schemes, based on industry associations, where members jointly provide guarantees on the loans taken by the individual members. Finally, supranational credit guarantee schemes also exist under the aegis of international financial institutions.

Credit guarantees are used in many developed and developing economies to alleviate the constraints facing SMEs in accessing finance. Indeed, financial institutions are usually reluctant to extend uncollateralised credit to SMEs, even at high interest rates, in part because of the high costs of obtaining adequate information on the true credit quality of typical small, young companies. Also, many of these firms do not have the necessary amount and type of assets that could serve as collateral for the loan. As a result, many SMEs with economically viable projects cannot obtain the necessary financing from the regular system of financial intermediation.

Examples of credit guarantees for EE investments

Lithuania[56]

On 18 February of 2015 the Ministry of Finance and the Ministry of Energy together with the Public Investment Development Agency established the Energy Efficiency Fund. The Fund will provide investments in energy efficiency projects using the following financing tools: loans for the modernization of central government buildings and guarantees for loans from commercial banks for the modernization of street lighting projects. Fund manages 79.65 million EUR and the Public Investment and Development Agency was appointed as the Fund manager. The first loans and guarantees from the Fund were provided in summer of 2015.

France[57]

[55] Credit Guarantee Schemes for SME lending in Central, Eastern and South-Eastern Europe, A report by the Vienna Initiative Working Group on Credit Guarantee Schemes, November 2014

[56] http://www.iea.org/policiesandmeasures/energyefficiency/

The Government Crediting and Loan Guarantee for Energy Efficiency and Renewable Energy Investment (FOGIME), a loan guarantee fund for small and medium-sized businesses energy sustainability (efficiency and renewables) investments, was created in November 2000. It is a co-operative effort between the French development bank for SMEs (BDPME) and the French Agency for Environment and Energy Management (ADEME). FOGIME has a budget of approximately 17.8 million Euro, which can guarantee up to 244 million Euro of loans to the private sector. This guarantee is only available for SMEs more than three years old with less than 500 million FF turnover and less than 500 employees (to evolve to 250 million FF and 250 employees to correspond to EU criteria for SMEs). Eligible investments include: high performance production, use, recovery and energy storage equipment; energy efficient modifications of production processes and renewables. The guarantee covers medium and long-term risks (2-15 years) and insures the risk taken by the financial institution providing the loan. The guarantee covers 70% of the principal of the loan.

Hungary[58]

The Hungarian Energy Efficiency Co-finance Programme (HEECP) programme was launched by the International Finance Corporation (IFC) Environmental Projects Unit with a total of US$ 5 million funding for the pilot phase from the Global Environmental Facility (GEF) in 1997.

The funds are allocated: US$ 4.25 million for guarantee reserves, US$ 300,000 for technical assistance and US$ 450,000 for programme administration and operations over a four-year period. After successful termination of the pilot phase, the guarantee facility has been expanded to US$ 16 million. Under the guarantee programme, participating local financial institutions execute Guarantee Facility Agreements with the IFC.

HEECP provides partial guarantee support to credit provided by the financial institutions for energy efficiency projects (50% in the pilot phase and 35% under HEECP-2). The rationale is to overcome barriers to energy efficiency project financing, which are due to credit risk barriers. These include weak or uncertain end-user credit, the gap between perceived and real credit risk and lack of properly structured and credit-worthy projects, coupled with the relatively high transaction costs and risks associated with energy efficiency projects. The guarantee programme addresses the problems associated with credit risk.

The technical assistance component aims to provide expertise and to make small grants available for marketing of services by participating financial institutions, project identification, development and investment preparation, general energy efficiency market promotion activities, and programme evaluation activities.

Technical assistance funds are also provided to ESCOs. HEECP also seeks ways to promote expanded energy efficiency markets in Hungary in co-operation with other commercial, governmental and NGO agencies. Other GEF-financed programmes include the UNDP/GEF Public Sector Energy Efficiency Programme and the IFC/GEF.

[57] http://www.iea.org/policiesandmeasures/pams/france/

[58] http://www.iea.org/policiesandmeasures/pams/hungary/

Annex III Public benefits charge

(explanation for EE/DSM Measure H1 Establishment of the EE/RE Financing Scheme)

Public benefits charge[59,60]

Definition

A public benefits charge is a method of raising funds from the operation of the electricity market, which can then be directed into DSM and energy efficiency activities. A public benefits charge (also often known as a system benefits or 'wires' charge) is a charge imposed on certain participants in the electricity market. It can also be imposed to the consumers or certain categories of consumers. The charge is normally created by government to generate funding for public purpose programs, such as energy efficiency or renewable energy. It is collected by the utility via the electricity bills. An energy efficiency public benefits charge can generate funds to create a new fund, seed credit guarantee funds, support new organisations to implement energy efficiency programs, or to maintain or increase existing energy efficiency programs. It can also be linked to achieving specific energy efficiency goals. Typically a public benefits charge would be created and administered by an existing government authority, or a body that has been specifically created for the task.

The charge is calculated mainly through four approaches:

- a rate per unit quantity of energy delivered to a customer or passing through a network;
- a rate per unit value of energy purchased by a customer or delivered by a network;
- a set charge, e.g. a fixed charge per customer;
- cost recovery charges for specific energy efficiency programs.

Typically a public benefits charge would be based on the quantity of energy traded, but may also be derived (or topped up) by licence fees, participation fees or trading penalties.

A public benefits charge can be collected at various points in the electricity market:

- retail sales;
- distribution network;
- transmission network;
- wholesale pool.

The scope of the charge can vary. It may be the case that the objective of the charge is to sustain or expand existing EE programmes. Then the consumers who are benefited from these programmes should be charged. Alternatively, if the objectives have broader societal benefits, then a uniform public benefits charge could be imposed to all consumers (may leaving out low-income and vulnerable consumers). Some options include:

- a broad based charge that is collected from key market players (e.g. network operators or utilities) and which is then passed on in regulated prices;
- a uniform charge levied on all consumers;
- electricity businesses allowed by governments to charge those customers who choose (or are required by law) to implement DSM or energy efficiency programs to carry out.

[59] International Energy Agency, Energy Efficiency Governance, 2010

[60] International Energy Agency , Research Report No 3 Task VI of the International Energy Agency Demand-Side Management Programme Developing Mechanisms for Promoting Demand-side Management and Energy Efficiency in Changing Electricity Businesses, August 2000

Public benefits charges are administratively simple to establish and collect, and they can raise large amounts of money if they are calculated as a rate per unit of energy. The public benefits charges mechanism has many benefits. It provides a steady large-scale source of funding for long-term, comprehensive, transformational energy efficiency programmes. It is especially well suited for funding long-term trajectories towards low-carbon or lower energy intensity goals. These funding mechanisms benefit customers, create new businesses and promote co-operative activities between utilities, the private sector, customers and third-party energy services providers. Public benefits charge funding mechanisms are also flexible. The funds can be used for many different activities: rebates, loans, education and outreach, technology development, evaluation and measurement, or even agency operating expenses. The public benefits charge funding source also works regardless of who (e.g. utilities, state agencies or third-party programme administrators) is implementing the programmes. In both Vermont and New York, the utilities act as collection agencies, including the public benefits charges in rates, while the revenues flow into a special account administered by a statutory authority under regulatory oversight.

Examples of public benefits charge

Brazil

Brazil's Law 9.991 (2000) established a public benefit charges collected by utilities, and specified that 0.5% of revenues be earmarked for EE activities and clean energy R&D. This funding mechanism resulted in Brazil's utilities directing up to USD 200 million annually toward EE investments on behalf of their customers.

Jordan

In Jordan, the recently enacted Renewable Energy and Energy Efficiency Law (REEEL) will use public benefit charges to generate USD 42 million in annual funding for the Jordan Renewable Energy and Energy Efficiency Fund and the Rural Electrification Fund.

Belgium

The electricity retailers in Belgium have made an agreement with the government to raise their electricity prices and to use the additional revenue to fund energy efficiency programs. The Belgian Government allocates some of these funds to social programs to ensure that disadvantaged groups receive some benefit from the increased electricity prices.

Norway

In Norway, following restructuring in 1991, the government initiated two related programs funded by a small public benefits charge levied on the distribution network businesses: an energy conservation information program; the creation and partial funding of independent regional energy conservation centres to provide energy efficiency services.

Portugal

The Portuguese Government has introduced a levy which is a component of the tariff called "global use of the system" (Uso Global do Sistema) which applies to all users of the transmission network. The objective of the levy is to cover costs of the implementation of energy, environmental or economic policy measures of public interest. These policy measures could include the implementation of DSM and energy efficiency programs.

Connecticut[61]

[61] State and Regional Policies that Promote Energy Efficiency Programs Carried Out by Electric and Gas Utilities, A Report To The United States Congress Pursuant To Section 139 Of The Energy Policy Act Of 2005, U.S. Department Of Energy, 2007

In Connecticut, energy efficiency programs are funded through a public benefit charge and are administered by the state's two large, investor-owned utilities, Connecticut Light & Power and United Illuminating. The energy efficiency programs are subject to review and oversight by the Connecticut Department of Public Utility Control and the Energy Conservation Management Board (ECMB). ECMB was created to advise and assist the utility distribution companies in the development and implementation of comprehensive and cost-effective energy conservation and market transformation plans.

Annex IV Necessary data for future policy planning in EE/DSM

The data below, once collected, can be used to determine the situation of energy use and the efficiencies of the energy transformation technologies. These data are not currently collected in Mauritius.

The data can be collected by surveys and energy audits in a representative number of sites per sector. The determination of data is crucial for informed policy making in the EE subsector. The data can be used not only in MAED but also in other models and methodologies for demand forecasting and energy planning. The data can also be useful to monitor the implementation of policies and action plans. Therefore the collection of such data should be institutionalized, systematized and repeated in regular time intervals.

Boilers in industry and services sector

- Number of boilers
- Types of boilers
- Efficiencies of the boilers
- Fuels used in boilers and their share
- Capacity of boilers
- Operational steam pressure of boiler outlet (kPa absolute)
- Steam temperature at boiler outlet
- Water input temperature in the boiler
- Water evaporation rate (kg/h)
- Percentage of excess air
- Fuel gas temperature
- Use of boilers a) to produce hot water or b) to produce steam
- Fuel flow inputs to the boilers (Lt/h for liquid fuels, kg/h for solid fuels, m3/h for gaseous fuels)
- Higher heating values of the fuels of the boilers
- Energy losses in the boilers are percentage of heating content of fuel input
- Average investment cost of boiler
- Average operational and maintenance cost and fuel cost of boiler

Motors in industry, construction, mining and services sector:

- Number of motors
- Types of motors
- Efficiency of motors at full load
- Efficiency of motors at operational mode
- Load factor of motors as they operate
- Name plate horsepower of motors
- Speed at full load
- Operating hours per day
- Average investment cost of motor
- Average operational and maintenance cost of motor

Fans in industry, construction, mining and services sector:

- Number of fans
- Types of fans and their share (forward curved, radial blade, backward inclined, airfoil fan)
- Flow types (constant, variable, use of inlet damper) and which types of fans are used for each type of flow

- Power input to fan
- Fan efficiency
- Hours of operation of fan
- Average investment cost of fan
- Average operational and maintenance cost of fan

Pumps in industry, agriculture, construction, mining, water pumping and services sector:

- Number of pumps
- Power input to pumps
- Pump efficiencies
- Flow rates
- Total heads
- Operating hours
- Average investment cost of a pump
- Average operational and maintenance cost of pump

Compressed air systems in industry, construction, mining and services sector:

- Number of compressed air systems
- Type of compressors (centrifugal, rotary screw, reciprocating)
- Capacity of compressor (Nm^3 of air delivered/minute)
- Specific power consumption kW/volume flow rate
- Location of air intakes (indoor, outdoor)
- System pressure
- Modes of capacity control of compressors (on/off, variable speed, inlet throttle)
- Average useful air demand
- Average air leakage
- Hours of useful air demand per day
- Operating hours per day
- Average investment cost of a compressed air system
- Average operational and maintenance cost of a compressed air system

Central cooling systems/chillers (used in large buildings in industry, services, public sector)

- Number of chillers
- Cooled area of buildings
- Cooling load for building (W/m^2)
- Type of compressor used in chillers (reciprocating, rotary, centrifugal); absorption chillers
- Capacity of chillers
- Maximum cooling load capacity of chiller
- Fuel used in chiller (electricity, oil, natural gas)
- Coefficient of performance
- Equivalent full load hours
- Average investment cost of a chiller
- Average operational and maintenance cost of a chiller

Air conditioners in households, services sector and public buildings

- Number of ACs
- Cooled area of buildings
- Cooling load for building (W/m^2)

- Capacity of AC
- Maximum cooling load capacity of AC
- Coefficient of performance
- Equivalent full load hours
- Average investment cost of a AC
- Average operational and maintenance cost of a AC

Refrigerators and freezers in services, public sector and households

- Number of refrigerators and freezers
- Cooling load
- Average wattage per age category
- Coefficient of performance per age category
- Duty cycle of the refrigerator/freezer compressor
- Operating hours per day
- Energy consumption per year (for the refrigerators/freezers that have such indication) per age category
- Average cost of a refrigerators/freezers per age category
- Average operational and maintenance cost

Lighting in all sectors

- Number of lamp bulbs
- Average wattage per lamp bulb type
- Average operating hours per day per lamp bulb type
- Average cost per lamp bulb type
- Average wattage of incandescent lamps in all sectors
- Average operation hours of incandescent lamps in all sectors

Street Lighting

- Number of lamp bulbs in street lighting
- Average wattage per lamp bulb type
- Average operating hours per day per lamp bulb type
- Average cost per lamp bulb type

Electrical appliances in services and households

- Number of appliances per type
- Average wattage per appliance type
- Annual electricity consumption
- Average operating hours per day per appliance type
- Average cost per appliance

LPG water heaters in services and households

- Number of LPG water heaters
- Capacities
- Efficiency
- Operating hours
- Fuel consumption
- Average investment cost
- Average operational and maintenance cost

Disaggregated data on annual electricity consumption for:

- Large hotels

- Small hotels
- Large industries
- Small industries
- Large commercial businesses
- Small commercial businesses
- SMEs
- Low-income households
- Households in urban areas
- Households in rural areas

Agriculture, Construction, Mining

Penetration of energy carriers into useful thermal energy for Agriculture

Share of fuels in the production of thermal energy:

- Traditional fuels
- Modern biomass
- Electricity
- Solar
- Fossil fuels

Penetration of energy carriers into useful thermal energy for Construction

- Traditional fuels
- Modern biomass
- Electricity
- Solar
- Fossil fuels

Penetration of energy carriers into useful thermal energy for Mining

- Traditional fuels
- Modern biomass
- Electricity
- Solar
- Fossil fuels

Average efficiency of traditional fuels in thermal uses in Agriculture

- Construction
- Mining

Average efficiency of modern biomass in thermal uses in Agriculture

- Construction
- Mining

Average efficiency of fossil fuels in thermal uses in

- Agriculture
- Construction
- Mining

Annex V Energy Performance Contracting (EPC) models

Shared Savings Model

In the shared savings model, the ESCO provides or arranges for most or all of the financing needed for project implementation. The ESCO may take the credit, i.e. ensure financing of the EPC project in its own name and bears the whole risk of the project failure, even if the cause was out of its control. The customer basically does not meet with the source of financing (usually a bank).

For the customers, such method of financing is appealing; however, for the ESCO, it represents a risk. Problems can occur between the ESCO and the financial institution. To be granted a loan significant amount, the ESCO has to be creditworthy and sufficiently secured in capital. Such a concept is therefore easier to implement for energy suppliers and large producers of energy efficient technologies. However, smaller, management-oriented ESCOs, for whom it would be more difficult to obtain credit to finance EPC projects may use sale of claims to obtain the financing. Sale of claims occurs when an ESCO can sell claims against a customer to a financial institution after implementation of the saving measures. It is anticipated in the contract that the customer repays the instalments stipulated in the contract directly to a bank, while the ESCO guarantees the level of savings and consequent decrease in operational costs. The customer does not bear any additional risk; he just needs to be screened by the respective bank.

The ESPC specifies the sharing of the cost savings (which are measured and verified using a defined protocol) between the ESCO and the host facility during a specific period.

The host facility generally makes no investment in the project and gets a share of the savings during the contract period and 100 percent of the savings after the contract period, thus maintaining a positive cash flow throughout the life of the project.

In this model (see figure 3) the end user enters into an energy services agreement with the ESCO for project financing and implementation. The ESCO specifies the energy user's payment obligation based on project performance, savings, delivered energy, or the value of capital and services provided. The loan is typically on the ESCO's balance sheet. The ESCO assumes the energy user's credit risk and may need lender assistance to assess the risk. The ESCO generally needs to fund a portion of the project with equity, typically 10%–30%, given that the lender is not likely to provide 100% financing. The end user may make a capital contribution of 0–10%. The balance of project financing comes from debt taken out by the ESCO.

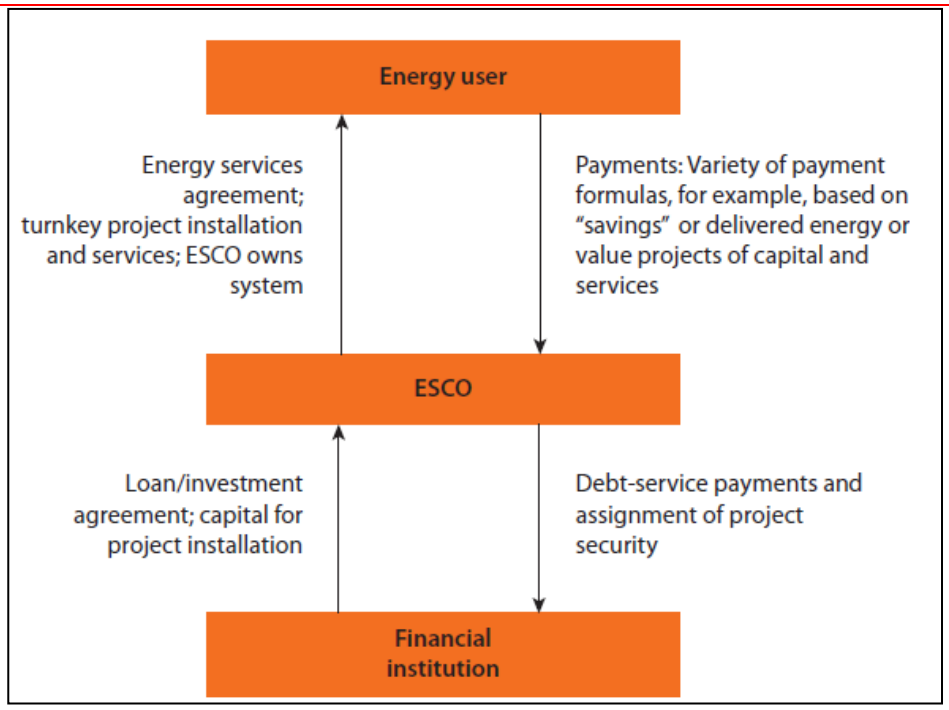


Figure 3: Shared savings model

Sources: USAID ECO-Asia Clean Development and Climate Program. 2009. "DSM Financing Annex: Financing DSM and Energy Efficiency Programs." USAID Regional Development Mission/Asia, Bangkok, Xiaodong Wang, Richard Stern, Dilip Limaye, Wolfgang Mostert, and Yabei Zhang, Unlocking Commercial Financing for Clean Energy in East Asia, World Bank, 2013

Guaranteed Savings Model

In the guaranteed savings model, the client generally takes the loan on its own balance sheet. Loan of the customer presumes that the customer concludes a contract directly with the source of financing (usually bank). The ESCO guarantees certain performance parameters in the EPC contract, and specifies the methods for measurement and verification. Payments are made once the measurement and verification confirms that the project performance parameters have met the guarantees. The typical structure is depicted in figure 4. If the assumed parameters are not achieved owing to the ESCO, the ESCO is obliged to even up the difference between the actual level of savings and the instalment.

The advantages of such an approach include the possibility to obtain a subsidy, which usually only the customer can apply for. If the customer is credible for banks, it may also obtain lower interest rates or implement bigger projects than would otherwise be acceptable for the ESCO. In general, municipalities and towns without excessive debts are usually considered as customers with a good rating and are granted loans under very favourable conditions.

To grant a loan, the bank requires guarantees either in the form of property collaterals, as a third-party guarantee. The bank then assesses the creditworthiness of the client, the quality of the project for which the money is lent and sets the interest rate accordingly. When granting credit, the energy savings and related operational cost savings guaranteed by an ESCO increase the credibility of a customer evaluated by the bank.

The project is implemented under two separate agreements, one for turnkey project implementation services between the energy user and the ESCO (energy services agreement), and the other for project financing (financing agreement) between the client and the lender. The client's credit risks are separated from project performance and project technical risks. The lender

assumes the client's credit risk, whereas technical and performance risks are addressed in the energy services agreement. The client is obligated to make fixed loan payments. The loan payment amount is calculated to amortize the loan regardless of project performance. The client generally assumes responsibility for equipment maintenance and repair. Provision for equipment operations and maintenance services, warranties, and performance guarantees can be included in the EPC contract.

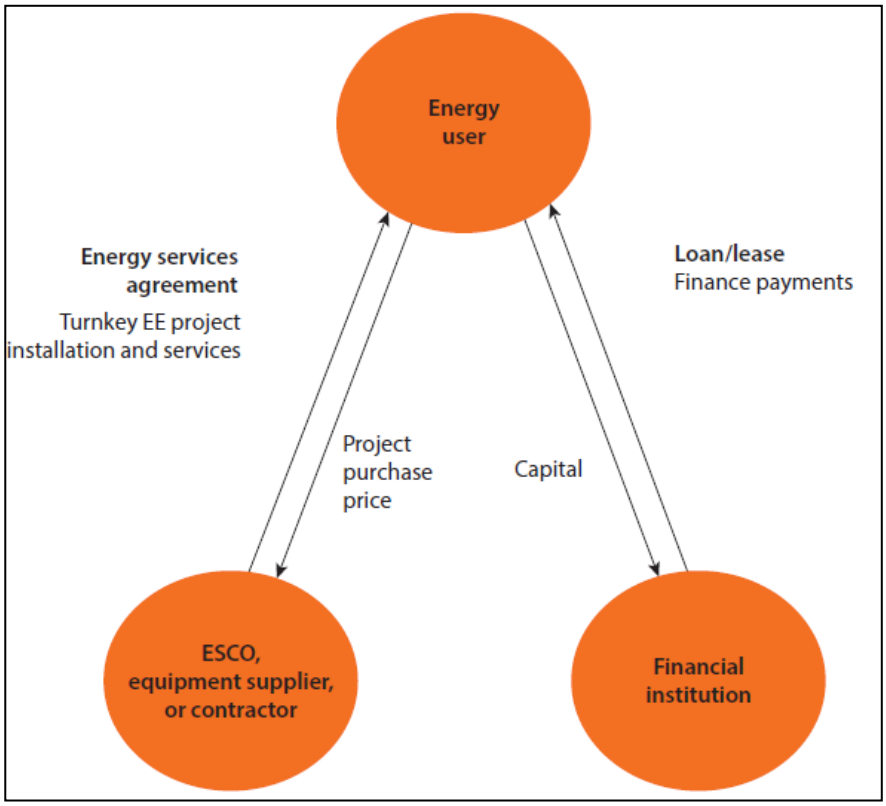


Figure 4: Guaranteed savings model

Sources: USAID ECO-Asia Clean Development and Climate Program. 2009. "DSM Financing Annex: Financing DSM and Energy Efficiency Programs." USAID Regional Development Mission/Asia, Bangkok, Xiaodong Wang, Richard Stern, Dilip Limaye, Wolfgang Mostert, and Yabei Zhang, Unlocking Commercial Financing for Clean Energy in East Asia, World Bank, 2013

Annex VI Methodology and assumptions for the estimation of required budget of the EE/DSM Measure S1 Energy efficiency awareness and information campaign for buildings of services sector

According to 2007 census of economic activities of Statistics Mauritius for large establishments in all sectors (companies with 10 or more employees) the number and breakdown of companies per sector to which the EE measure will be addressed is given in Table 13.

Large establishments (more than 10 employees)	
Industry group	Number
Construction	104
Wholesale and retail trade, and repairs	358
Transport, storage and communications	112
Financial intermediation	140
Real estate, renting and business activities	237
Education	158
Health and social work	34
Other services	88
SUM	**1,231**

Table 13: Distribution of large establishments by sector

Source: Adapted from 2007 census of economic activities of Statistics Mauritius for large establishments

The calculation of the budget of the awareness and information campaign is given in Table 14.

Activity	Cost (MUR/unit)	Unit	Sum (MUR)	Comments
Meeting	20,000	24	480,000	Three meetings per group per year
Workshop	90,000	16	1,440,000	Two workshops per group per year
Leaflet design	10,000	1	10,000	
Leaflet printing	1.5	1,230	1,845	
Guide	8,000	1,230	9,840,000	
SUM			**11,771,845**	

Table 14: Calculation of the budget of the awareness and information campaign in services

Annex VII Methodology and assumptions for the estimation of required budget of the EE/DSM Measure HL1 Governmental Programme for financing EE interventions in residential buildings

According to the Household budget survey 2012 of Mauritius, the number of households in 2014 was 360,000. The following assumptions were used to calculate the required budget to support EE investments in households up to 2030:

- The maximum eligible cost of EE investments per household is 12,000 euros or MUR 480,000,
- The average eligible cost of EE investments per household is 8,000 euros or MUR 320,000. This will be used in the calculation of the budget.
- The percentage of households that will have benefited from the financial support until 2030 would be 20% of the existing number of households, namely 72,000 households[62].

On the basis of these assumptions, the total cost of EE measures until 2030 would be 360,000x8,000x20% = 576,000,000 euros which equal MUR 23,040,000,000. The annual average cost, assuming 15 years until 2030, is 38,400,000 euros or MUR 1,536,000,000.

This cost is optimistic because it assumes that the maximum number of eligible budget will be spent by each household.

[62] As an example, Greece has established buildings codes and also a financial support scheme for EE investments in households since February 2011. The number of application to the scheme until today (December 2015) are around 200,000 which means on average 40,000 per year within the five years of operation. The 200,000 applications by households represent 5.5% of the total number of households in Greece. Assuming the same trend will continue, around 16.5% of households will have benefited until 2030.

Annex VIII Methodology and assumptions for the estimation of the potential energy savings of the measures that impact the residential sector

The estimation of the potential energy savings of this measure will be based on the use of the Model for Analysis of Energy Demand (MAED). In order to estimate the EE potential of the country after a combination of EE measures in implemented, three scenarios were developed and modelled with MAED:

1 The base case scenario,

2. The no measures scenario,

3. The EE scenario.

In order to estimate the potential energy savings of the particular measure the base case scenario and a modified EE scenario will be modelled with MAED and compared.

Estimation of the baseline – the base case scenario

The baseline for the estimation of the potential energy savings is the base case scenario. This scenario is used also to forecast the demand up to 2030. The base case scenario is described in detail in our previous 'Energy sector database report' and 'Report on forecast scenarios and supply options'. The full MAED model for the base case scenario, as well as additional optimistic and pessimistic economic development scenarios, are also included in these deliverables[63].

The base case scenario assumes that all the EE measures described in the Energy Action Plan 2011-2025 will be realised. It includes the activities of the EEMO as these are, in accordance with the Energy Action Plan 2011-2025. This is in line with the current policy of MEPU and EEMO.

The modified EE scenario for households

The 'original' EE scenario assumes that additional measures to the ones included in the Action Plan 2011-2025 will be realised until 2030. The 'original' EE scenario is described in deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'. It assumes that a combination of additional EE measures will be realised until 2030 in addition to the ones proposed by the existing Action Plan 2011-2025. These additional EE measures include the particular measure under study. In order to model the effect of the additional EE measures on energy consumption, it was assumed that the technological efficiencies and the percentages of penetration of energy carriers in all sectors and energy uses will be improved above the base case scenario. It was also assumed that the energy intensities in all sectors will be improved above the base case scenario due to improvement of equipment and the EE/DSM measures.

In order to derive the modified EE scenario, the following have been assumed:

- Only the technological efficiencies and the percentages of penetration of energy carriers and energy uses in the household sector will be improved above the base case scenario. The new figures will be the ones used in the 'original' EE scenario.
- The technological efficiencies and the percentages of penetration of energy carriers and energy uses in the other sectors, besides households, will remain the same as in the base case scenario.
- All other parameters of the model remain the same as in the base case scenario.

The detailed assumptions on households of the modified EE scenario are described in the following

[63] The assumptions for the base case scenario are repeated in Annex I of our previous deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'.

tables.

Households

Factors in households					
Urban households	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Electr. cons. for appliances (kWh/dw/yr)	1,554	1,909	The average electrical consumption per dwelling per years for urban and rural households will be increased by 22% compared to 2014.	This is the result of additional awareness given to the public and to retailers/importers and the revision of the standards and labelling in 5-10 years (2020-2025). The support programme for the residential sector will also contribute.	The electrical consumption of the appliances in households (urban and rural) presents an increasing trend towards 2030, as the number of appliances multiply due to economic growth and the growth of the population. However, implementing EE measures the rate of increase would be less than the one in the base case measures As a measure for comparison, in the base case scenario, average electrical consumption per dwelling per years in the households (urban and rural) will be increased by 38% compared to 2014 to the base case scenario.
Rural households	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Electr. cons. for appliances (kWh/dw/yr)	1,645	2,021	The average electrical consumption per dwelling per years for urban and rural households will be	This is the result of additional awareness given to the public and to retailers/importers and the revision of the standards and labelling in 5-10 years (2020-2025). The support programme for the residential	The electrical consumption of the appliances in households (urban and rural) presents an increasing trend towards 2030, as the number of appliances multiply due to economic growth and the growth of the

			increased by 22% compared to 2014.	sector will also contribute.	population. However, implementing EE measures the rate of increase would be less than the one in the base case measures As a measure for comparison, in the base case scenario, average electrical consumption per dwelling per years in the households (urban and rural) will be increased by 38% compared to 2014 to the base case scenario.

Penetration of energy forms into water heating in urban households (%)					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Traditional fuels	1.9	1.4	The traditional biomass for water heating will be phased out gradually.		A very small percentage of households will use it in 2030.
Electricity	13	9.2	The LPG heaters and the electric heaters will be replaced by SWHs.		The replacement of the LPG heaters will be steeper than the base case due to the additional measures for the households.
Soft solar	10.7	33	The share of SWHs in urban households in 2030 will increase.	This would be the result of the incentive schemes for SWHs, the technical requirements of SWHs which lead to more quality products as well as the result of the residential support programme	The penetration of SWHs will increase in the urban and rural households up to 2030.

Fossil fuels	74.2	56.3	The LPG heaters and the electric heaters will be replaced by SWHs.		The replacement of the LPG heaters will be steeper than the base case due to the additional measures for the households.

Penetration of energy forms into water heating in rural households (%)					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Traditional fuels	1.7	1.3	The traditional biomass for water heating will be phased out gradually.		A very small percentage of households will use it in 2030.
Electricity	13.2	9.3	The LPG heaters and the electric heaters will be replaced by SWHs.		The replacement of the LPG heaters will be steeper than the base case due to the additional measures for the households.
Soft solar	8	25	The share of SWHs in urban households in 2030 will increase.	This would be the result of the incentive schemes for SWHs, the technical requirements of SWHs which lead to more quality products as well as the result of the residential support programme.	The penetration of SWHs will increase in the urban and rural households up to 2030.
Fossil fuels	76.9	64.5	The LPG heaters and the electric heaters will be replaced by SWHs.		The replacement of the LPG heaters will be steeper than the base case due to the additional measures for the households.

Efficiencies for water heating in households

(%)					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Eff. Trad. fuels	30	30			
Eff. Fossil fuels	80	92	The average efficiency of fossil fuels (LPG used for water heating) in the households will increase	This would be the effect of the residential support programme, the awareness measures and the information tools used.	Expectation in better technologies and fuel content The standard LPG boiler efficiency is 80% while the max LPG boiler efficiency is 96% in 2014[64,65].
Solar share	70	70	The solar share in the households sector is 70% during 2015-2030	This is imposed by the Building Code.	

Efficiencies for water heating in households (%)					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Eff. Trad. fuels	30	30			
Eff. Fossil fuels	80	92	The average efficiency of fossil fuels (LPG used for water	This would be the effect of the residential support programme, the awareness	Expectation in better technologies and fuel

[64] Energy Saving Trust, Domestic heating by gas: boiler systems – guidance for installers and specifiers,

[65] https://www.energystar.gov/index.cfm?c=most_efficient.me_boilers

			heating) in the households will increase	measures and the information tools used.	content The standard LPG boiler efficiency is 80% while the max LPG boiler efficiency is 96% in 2014[66,67].
Solar share	70	70	The solar share in the households sector is 70% during 2015-2030	This is imposed by the Building Code.	

Efficiencies for water heating in households (%)					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Eff. Trad. fuels	30	30			
Eff. Fossil fuels	80	92	The average efficiency of fossil fuels (LPG used for water heating) in the households will increase	This would be the effect of the residential support programme, the awareness measures and the information tools used.	Expectation in better technologies and fuel content The standard LPG boiler efficiency is 80% while the max LPG boiler efficiency is 96% in 2014[68,69].

[66] Energy Saving Trust, Domestic heating by gas: boiler systems – guidance for installers and specifiers,

[67] https://www.energystar.gov/index.cfm?c=most_efficient.me_boilers

[68] Energy Saving Trust, Domestic heating by gas: boiler systems – guidance for installers and specifiers,

[69] https://www.energystar.gov/index.cfm?c=most_efficient.me_boilers

Solar share	70	70	The solar share in the households sector is 70% during 2015-2030	This is imposed by the Building Code.	

Efficiencies for water heating in households (%)					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Eff. Trad. fuels	30	30			
Eff. Fossil fuels	80	92	The average efficiency of fossil fuels (LPG used for water heating) in the households will increase	This would be the effect of the residential support programme, the awareness measures and the information tools used.	Expectation in better technologies and fuel content The standard LPG boiler efficiency is 80% while the max LPG boiler efficiency is 96% in 2014[70,71].
Solar share	70	70	The solar share in the households sector is 70% during 2015-2030	This is imposed by the Building Code.	

[70] Energy Saving Trust, Domestic heating by gas: boiler systems – guidance for installers and specifiers,

[71] https://www.energystar.gov/index.cfm?c=most_efficient.me_boilers

Annex IX Methodology and assumptions for the estimation of the budget of the EE/DSM Measure HL2 Energy efficiency awareness and information campaign for households

	Cost	Unit	Sum	Comments
	(MUR/unit)		(MUR)	
A TV spot giving information on EE				
TV spot creation	150,000	1	150,000	
TV spot cost per broadcast	25,000	180	4,500,000	20 spots per month for the first 6 months of the campaign, 10 spots per month for the next six months
A TV spot giving information on the Programme				
TV spot creation	300,000	1	300,000	
TV spot cost per broadcast	25,000	255	6,375,000	30 spots per month for the first 6 months of the campaign, 15 spots per month for the next 3 months and 10 spots per month for the next 3 months
A radio spot on EE information of general nature				
Radio spot creation	50,000	1	50,000	20 spots per month for the first 6 months of the campaign, 10 spots per month for the next six months
Radio spot cost per broadcast	12,000	180	2,160,000	
A radio spot explaining the Programme				
Radio spot creation	50,000	1	50,000	

Radio spot cost per broadcast	12,000	255	3,060,000	30 spots per month for the first 6 months of the campaign, 15 spots per month for the next 3 months and 10 spots per month for the next 3 months
A TV show	2,000,000	1	2,000,000	
A section on the website of EEMO	200,000	1	200,000	
Press releases in the newspapers				
Press release in newspaper	12,000	255	3,060,000	30 releases per month for the first 6 months of the campaign, 15 releases per month for the next 3 months and 10 releases per month for the next 3 months
Publication of press release in news website	10,000	255	2,550,000	30 releases per month for the first 6 months of the campaign, 15 releases per month for the next 3 months and 10 releases per month for the next 3 months
Leaflet in the electricity bill envelope				
Production of leaflets	10,000	1	10,000	
Printing of leaflets	1.5	350,000	525,000	
SUM			24,990,000	

Annex X Interviews conducted

Name	Position / Organisation
R. Mungur	MEPU Chief Planner, EEMO Act. Director
A. Beetun	MEPU Planner / Senior Planner
S. Hosany	EEMO Engineer
H.C. Multra	EEMO Engineer
O. Sewtohul	EEMO Engineer
K. Sooruth	EEMO Technical Officer
S. Mukoon	CEB Production Manager
I. Dreepaul	CEB Corporate Planning Dep.
V. Soondram	MOFED Lead Analyst
D. Balgobin	Statistics Mauritius Statistician
C. Ramnath	Statistics Mauritius Principal Statistician
N. Jaffar	Statistics Mauritius Statistician
K. Elahee	University of Mauritius, Energy Efficiency Committee Chairman
S.A. Carrim	Ministry of Industry, Commerce & Consumer Protection
T. Abdool	Ministry of Environment, Sustainable Development, Disaster and Beach Management
S. Buskalawa	Ministry of Environment, Sustainable Development, Disaster and Beach Management
B. Candassamy	Ministry of Public Infrastructure and Land Transport
M.S. Joomun	Ministry of Local Government Deputy Permanent Secretary
N. Hosany	Ministry of Local Government
Mr Seebuer	Ministry of Housing and Lands
M. Desha	Institution of Engineers (Mauritius)
F. Wong	Mauritius Association of Architects
R. Makoond	Joint Economic Council
M. Apaya	Joint Economic Council

M.Y. Foondun	Mauritius Standards Bureau
R. Nanhuck	Mauritius Standards Bureau
M. Nabiilah	National Transport Authority
S. Ramchurn	UNDP Environment Programme Officer
S. St Mart	Apave Indian Ocean Ltd CEO
N. Ramsohoy	Small and Medium Enterprises Development Authority
J. Kwok	Association of Hotels and Restaurants AHRIM
S. Oxenham	Association of Manufacturers
C. Bheekhun	Mauritius Accreditation Service (MAURITAS) Manager
A. Foogooa	MCB Bank
A. Taher	State Bank Mauritius
Josue Iyempermall	State Bank Mauritius
Atish Doorgakant	State Bank Mauritius
Percy Philips	State Bank Mauritius

Annex XI Introduction to Logical Framework Analysis[72]

The Logical Framework Approach (LFA) is an analytical process used to support project planning and management. It provides a set of interlocking concepts which are used to aid structured and systematic analysis of a project or programme idea. The LFA should be thought of as an 'aid to thinking'. It allows information to be analysed and organized in a structured way, so that important questions can be asked, weaknesses identified and decision makers can make informed decisions based on their improved understanding of the project rationale, its intended objectives and the means by which objectives will be achieved. The product of the LFA is the Logical Framework Matrix (LFM). The method involves the presentation of the results of analysis in such a way that it is possible to set out the programme's or project's objectives in a systematic and logical way. This should reflect the causal relationships between the different levels of objectives, to indicate how to check whether these objectives have been achieved, and to establish what assumptions outside the control of the programme or project may influence its success

The LFM (or more briefly the Logframe) consists of a matrix with four columns and four (or more) rows, which summarise the key elements of a programme or project plan, namely:

- The project's hierarchy of objectives (Project Description or Intervention Logic);
- The key external or internal factors critical to the project's success (Assumptions); and
- How the project's achievements will be monitored and evaluated (Monitoring indicators and Sources of Verification).

The LFA has various uses in the lifetime of a programme or project:

- it is used to help analyse the existing situation, investigate the relevance of the proposed programme or project and identify potential objectives and strategies
- it supports the preparation of an appropriate programme or project plan with clear objectives, measurable results, a risk management strategy and defined levels of management responsibility;
- it provides a key management tool to support contracting, operational work planning and monitoring;
- it provides a summary record of what was planned (objectives, indicators and key assumptions), and thus provides a basis for performance and impact assessment. Is also provides a framework of objectives, indicators (and targets) and sources of information which should be used to further develop and implement the monitoring system.
- It provides a list of key assumptions which must be monitored as part of the project's risk management arrangements.
- It is a clear and consistent reference point and structure for completing progress reports.

The generic format and information contained in the LFM is presented in the following Table.

[72] Adapted from Project Cycle Management Guidelines, European Commission, March 2004 and Manual for Project Cycle Management, European Commission, 2002

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions
Overall objective: The broad development impact to which the project contributes– at a national or sectoral level (provides the link to the policy and/or sector programme context)	Measures the extent to which a contribution to the overall objective has been made. Used during monitoring and evaluation. However, it is often not appropriate for the programme/project itself to try and collect this information.	Sources of information and methods used to collect and report it	Assumptions (factors outside programme or project management's control) that may be conditions for the achievement of the overall objective
Purpose: The development outcome at the end of the programme of project or the expected benefits to the target group(s)	Helps answer the question 'How will we know if the purpose has been achieved'? Should include appropriate details of quantity, quality and time	Sources of information and methods used to collect and report it	Assumptions (factors outside Programme or project management's control) that may impact on the purpose-objective linkage and/or are conditions for the achievement of the purpose
Results: The direct/tangible results (good and services) that the programme or project delivers, and which are largely under programme's project management's control	Helps answer the question 'How will we know if the results have been delivered'? Should include appropriate details of quantity, quality and time.	Sources of information and methods used to collect and report it	Assumptions (factors outside programme or project management's control) that may impact on the result-purpose linkage and/or are conditions for the achievement of the results
Activities: The tasks (work programme) that need to be carried out to deliver the planned results			Assumptions (factors outside programme or project management's control) that may impact on the activity-result linkage and/or are conditions for the successful implementation of the activities

Table 15: The generic format of the LFM and the information it contains

Source: Project Cycle Management Guidelines, European Commission, March 2004

The preparation of a Logframe matrix is an iterative process, not a just a linear set of steps. As new parts of the matrix are drafted, information previously assembled needs to be reviewed and, if required, revised. Nevertheless, there is a general sequence to completing the matrix, which starts with the project description (top down), then the assumptions (bottom-up), followed by the indicators and then sources of verification (working across). This general sequence is illustrated in Table 15.

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions
Overall objective 1	8	9	
Purpose 2	10	11	7
Results 3	12	13	6
Activities 4			5

Table 16: Logframe Matrix – General Sequence of Completion

Source: Project Cycle Management Guidelines, European Commission, March 2004

The explanation of each column of the LFM follows.

First column: Intervention Logic

The first column of the LFM summarises the 'means-end' (or activities-objectives logic) logic of the proposed project (also known as the 'intervention logic').

The four levels of objectives are defined as follows:

- The Overall Objectives of the programme or project explain why it is important to society, in terms of the longer-term benefits to final beneficiaries and the wider benefits to other groups. Usually, the Overall Objectives will not be achieved by the programme or project alone (it will only provide a contribution to the achievement of the Overall Objectives) but will require the contributions of other programmes and projects as well.
- The Programme/Project Purposes are the objectives to be achieved by implementing the programme or project and which are likely to outlive the programme or project. The Purposes should address the core problems, and be defined in terms of sustainable benefits for the target group(s). The Purposes should also express the equitable benefits for women and men among the target group(s).
- The Results are "products" of the activities undertaken, the combination of which achieve the Purposes of the programme or project, namely the start of enjoyment of sustainable benefits by the target groups.
- The Activities are the actions (and means) that have to be taken / provided to produce the Results. They summarise what will be undertaken by the programme or project.

When the objective hierarchy is read from the bottom up, it can be expressed in terms of:

- IF adequate inputs/resources are provided, THEN activities can be undertaken;
- IF the activities are undertaken, THEN results can be produced;
- IF results are produced, THEN the purpose will be achieved; and
- IF the purpose is achieved, THEN this should contribute towards the overall objective.

If reversed, it can be read as:

- IF we wish to contribute to the overall objective, THEN we must achieve the purpose;
- IF we wish to achieve the purpose, THEN we must deliver the specified results;
- IF we wish to deliver the results, THEN the specified activities must be implemented;

and

- IF we wish to implement the specified activities, THEN we must apply identified inputs/resources.
- This logic is tested and refined by the analysis of assumptions in the fourth column of the matrix.

Fourth column: Assumptions

Assumptions are external or internal factors or the programme or project that have the potential to influence (or even determine) the success of it, but lie outside the direct control of programme or project managers. They are the answer to the question: "What external or internal factors may impact on programme or project implementation and the long-term sustainability of benefits, but are outside programme or project management's control?"

The assumptions are part of the vertical logic in the logframe. This works as follows:

- If Assumptions at the level of Activities hold true, then a) the Activities can be implemented and, b) once the Activities are completed, the results will be achieved;
- If Assumptions at the level of Results hold true, then the Project Purpose will be achieved;
- once the Purpose has been achieved and the Assumptions at this level are fulfilled, contribution to the achievement of the Overall Objectives will have been made by the programme or project.

This relationship is illustrated in Figure 5.

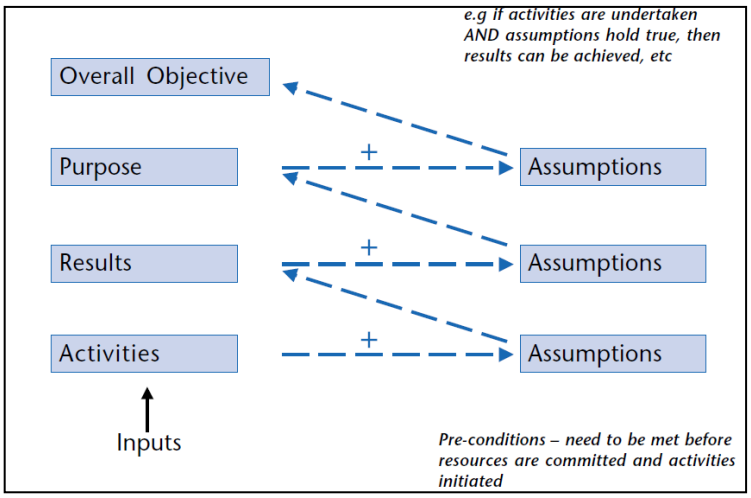


Figure 5: Relation between assumptions and objective hierarchy

Source: Project Cycle Management Guidelines, European Commission, March 2004

Assumptions are usually progressively identified during the analysis of the current situation. The analysis of stakeholders, problems, objectives and strategies will have highlighted a number of issues (i.e. policy, institutional, technical, social and/or economic issues) that will impact on the project 'environment', but over which the programme or project may have no direct control. In choosing activities and strategies for the programme or project, there are also usually some issues that have been identified during the problem and objectives analysis that are not then directly addressed in the programme or project implementation strategy, but which may nevertheless have the potential to impact on the success of the programme or project.

A useful way of assessing the importance of Assumptions during design is with the decision making flowchart shown in Figure 6.

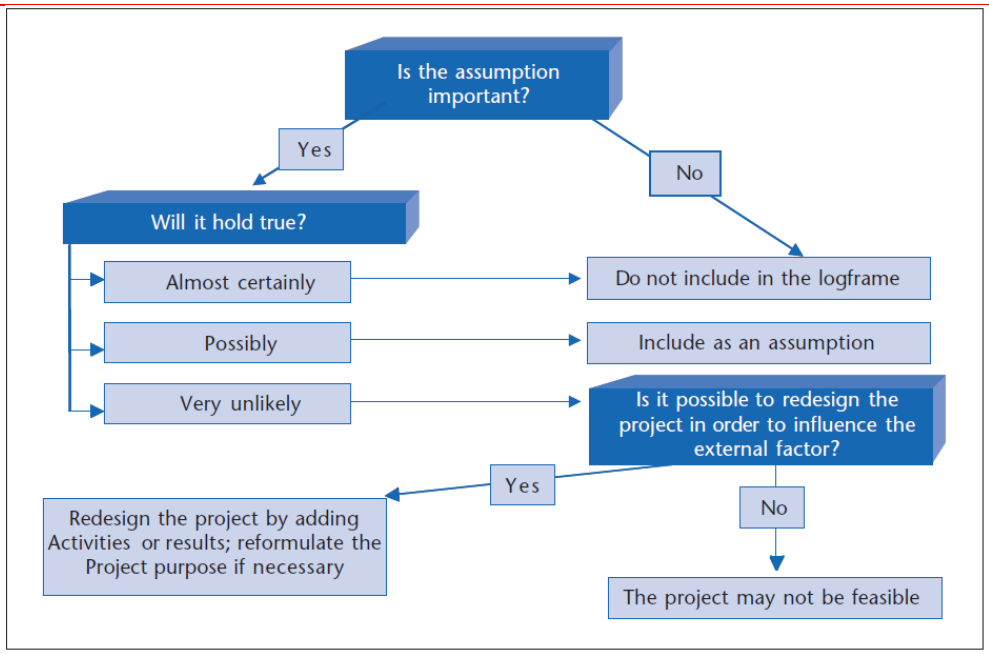


Figure 6: Assessment of Assumptions

Source: Project Cycle Management Guidelines, European Commission, March 2004

Second and third columns: Indicators and Source of Verification

Once the programme or project description and assumptions have been drafted (columns 1 and 4 of the matrix), the next task is to identify indicators that might be used to measure and report on the achievement of objectives (column 2) and the sources of that source information (column 3). Because one reads across the matrix when analysing indicators and means of verification, this is referred to as the 'horizontal logic'.

The Objectively Verifiable Indicators (OVIs) describe the programme/project's objectives in operationally measurable terms. The meaning of an Objectively Verifiable indicator is that the information collected should be the same if collected by different people (i.e it is not open to the subjective opinion/bias of one person). Specifying OVIs helps to check the feasibility of objectives and helps form the basis of the programme/project's monitoring and evaluation system. They are formulated in response to the question "How would we know whether or not what has been planned is actually happening or happened? How do we verify success?" OVIs should be measurable in a consistent way and at an acceptable cost. A good OVI should also be SMART:

- Specific to the objective it is supposed to measure;
- Measurable (either quantitatively or qualitatively);
- Available at an acceptable cost;
- Relevant to the information needs of managers;
- Time-bound – so we know when we can expect the objective/target to be achieved.

It is often necessary to establish more than one indicator for each objective statement. For example one indicator may provide good quantitative information, which needs to be complemented by another indicator focused on qualitative matters (such as the opinions of target groups).

The Sources of Verification (SOVs) should be considered and specified at the same time as the formulation of Indicators. This will help to test whether or not the Indicators can be realistically measured at the expense of a reasonable amount of time, money and effort.

The SOV should specify:

- How the information should be collected (e.g from administrative records, special

studies, sample surveys, observation, etc) and/or the available documented source (e.g. progress reports, project accounts, official statistics, engineering completion certificates etc.)

- Who should collect/provide the information (e.g. field extension workers, contracted survey teams, the district health office, the project management team)
- When/how regularly it should be provided. (e.g. monthly, quarterly, annually, etc.)

Annex XII Logical Framework Matrix

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions
STRATEGY/MASTER PLAN OVERALL OBJECTIVE			
Increase further the contribution of renewable energy in the electricity sector, the introduction of biofuels in the transportation sector and the implementation of EE and conservation measures in all economic sectors, particularly where energy usage is intensive	20% reduction of final energy by 2030[73]	Energy Statistics Reports issued by Statistics Mauritius Energy Observatory issued by the Energy Efficiency Management Office	
STRATEGY/MASTER PLAN PURPOSE			
Reduce the vulnerability of Mauritius with regard to imported fossil fuels and their volatile prices	Households: Electricity consumption per floor area of occupied building Energy consumption per floor area of occupied building Electricity consumption per occupied dwelling Energy consumption per occupied	Energy Statistics Households statistical surveys Transport statistical surveys Industry statistical surveys Housing & Population Census :Census of Economic Activity	Strong and durable commitment of the Government to EE/DSM National and local organisations and consumers actively and continuously involved in EE/DSM EEMO has the adequate staffing and capacities to fulfil its mandate and implement the EE/DSM Master

[73] This indicator is not a target for energy savings. It reflects the energy saving potential estimated by using MAED-2 model and relevant assumptions in the 'Report on the consolidated assessment of potential for energy efficiency and demand side management in Mauritius, and current incentive structures'. The energy efficiency indicators represents the energy efficiency potential between the 'no-measures' scenario which foresees that no measures in EE will be implemented and no support in EE interventions will be given by the government until 2030 and the 'EE scenario which assumes that additional measures to the ones included in the Action Plan 2011-2025 will be realised until 2030. These additional measures are included in the updated EE/DSM Master Plan 2016-2030.

	dwelling Industry: Energy consumption per unit of physical output in each industrial branch Services: Energy consumption per employee Electricity consumption per employee Energy consumption per floor area Electricity consumption per floor area Transport: Energy consumption per passenger-kilometre by vehicle type	All reports provided by Statistics Mauritius	Plan Sufficient resources are available by the Government to facilitate EE/DSM investments in the public and private sector Energy savings are sustained over time in all sectors Energy efficient technologies and behaviour have been adopted in all sectors
Promote economic growth and job creation	Percentage change of the sales of energy efficient technologies Percentage change of the sales of energy efficient appliances Number of new jobs in EE services	Market surveys to identify the sales before the commencement of the implementation of the Master Plan and periodically during its implementation Surveys to identify the jobs created by energy services provision	EE/DSM projects are being implemented giving jobs and income to engineers, installers, craftsmen suppliers The markets for energy efficiency technologies, energy efficient appliances and energy efficiency services have grown
Promote long-term sustainable development	Energy intensities in industry, services, households and transport	Reports of Statistics Mauritius	Data are available to calculate the energy intensities The industry, services and households have adopted more energy efficient technologies and behavior

STRATEGY/MASTER PLAN RESULTS			
The EE/RE Financing Scheme is established and operational	Number and volume of partial credit guarantees given by the respective financial product per time of company (SMEs, large) Number and volume of loans the interest of which is subsidized by the respective financial product per time of company (SMEs, large) Number and volume of energy audit subsidies given by the respective financial product in SMEs Number and budget of implemented investments that received financial support from the respective financial product per time of company (SMEs, large) Energy saved by the investment that received financial support from the respective financial product per time of company (SMEs, large)	Records of the Managing Committee of the EE/RE Financing Scheme which includes a) the data for the partial credit guarantees given, b) the data on the loan interest subsidised, c) the data for the energy audit subsidies, d) the energy studies and the feasibility studies of the investments	The level of the incentives associated with the Financing Scheme is adequate to attract private investments especially from SMEs The Financing Scheme is widely known in the business cycles The level of monetary resources of the Financing Scheme is adequate to support the incentives The methods and sources of raising funds for the Financing Scheme are widely acceptable
The information centre on EE for companies is established and operational	Number of companies that are provided information by the centre Number of companies which participate in the events organised by the centre (workshops, seminars, etc) Number of visitors to the electronic	Records of the information centre Reports of the information centre Curricula and training material List of trainees	The sustainability of the information centre is secured The networking of the information centre with the companies is regular and strong The information centre is well-known to the business cycles

	media used by the centre (websites, blogs, etc) Number per type of written material prepared by the centre Number and type of electronic material prepared by the centre Number and type of events organised by the centre Number and type of trainings delivered Number of trainees		
The Energy Information System is established and operational	Database and web-portal are operational EIS operation team is appointed and trained EIS operation team constantly updates the database input and ensures the operation of the system	Database, web portal, design report, operation manual EIS operation team staffing decisions Curricula and training material List of trainees Database and web-portal with up-to-date data	The team of experts to operate the information system is in place and trained There is technical support for the information system MEPU, EEMO populate and use the information system The data in the information system is regularly updated The information system is used to monitor the energy sector and the implementation of the strategies, policies and action plans The information system central provides energy information services to all interested parties

The System for data collection surveys is established and operational	Number of surveys conducted per sector per year The surveys have collected the missing information	Records of Statistics Mauritius and EEMO Publication of the results of the surveys Survey questionnaires	Co-operation of Statistics Mauritius and EEMO is secured and strong Surveys are conducted and the data are collected The stakeholders from each sector cooperate with EEMO and Statistics Mauritius to give data
Building codes are updated	Preparation of Building Codes Manual	Building Codes Manual	The updated Building Codes are used by engineers in their energy studies to construct or renovate buildings achieving energy efficiency The products with the technical specifications identified in the Building codes are present in the market The construction companies construct buildings according to the specifications of the Building Codes Engineers are informed and trained on the Building Codes
The compliance scheme to the Building Codes is created	Preparation of the compliance scheme	Compliance scheme manual	The compliance methods are used by the engineers in their energy studies The engineers are trained on the compliance methods

The regulation for the Building Codes and the application of the compliance scheme has been created/updated	Preparation of the regulation	The publication of the regulation in the Governmental Gazette or the decision for the enactment	The regulation is enacted and enforced Penalties foreseen in the regulation for non-compliance with the Building Codes are imposed
Energy Audit Management Scheme has been established	Preparation of the Energy Audit Management Scheme Upgrade and customize an existing Energy Audit Software Tool (MBEAT) Number of training courses on the Energy Audit Management Scheme Number of trainees Number of pilot audits carried out	Manual for of the Energy Audit Management Scheme Upgraded and customized MBEAT Curricula and material of the training courses Lists of trainees Pilot audit reports	EEMO has developed the capacity to operate the Energy Audit Management Scheme EEMO has the appropriate information systems to operate the Energy Audit Management Scheme
Energy auditors are trained and certified	Number of certified energy auditors Number of energy audits conducted by certified energy auditors per year Quality of energy audits	Certificate of the auditors Database of energy audits operated by EEMO Sampling of energy audits submitted in the audit database and quality assessment	A certification bodies have been approached and co-operation with them has been established Trainers with the adequate qualifications have been contracted A team of future local trainers has been set up and trained to ensure sustainability
Building codes are enforced	Number (and %) of new buildings constructed according to the Building Codes per year Number (and %) of buildings renovated according to the Building	Records of the offices of the local government which issue the building permit Surveys/interviews with engineers, architects and builders	Government enforces the Building Codes Ministry of Infrastructure select appropriate representative new buildings for demonstration

	Codes per year Number of checks for compliance carried out on the buildings per year Number (and %) of cases of non-compliance Number (and %) of cases in which penalties have been imposed % of engineers and architects that apply energy-efficient techniques and constructions in their design % of builders that adopt energy-efficient techniques during construction		projects Ministry of Infrastructure implement the pilot projects in due time
The framework for energy performance contracting has been institutionalised	Preparation of EPC model contract Establishment of the methodologies for measurement and verification of energy savings Preparation of the General EPC guide Preparation of EPC procurement guide for public entities Number of training of the engineering companies, the private sector consumer, the financial institutions and the public sector on the concept of EPC and ESCOs Number of trainees	EPC contract template Guidelines for measurement and verification General EPC guide EPC procurement guide for public entities Curricula and material of training courses per target group Lists of trainees Pilot project EPC contracts signed Measurement and verification reports of the pilot projects EPC projects contracts signed	The framework for EPC is used to implement projects with EPC The Government designs pilot projects to be carried out as EPC projects EEMO as well as banks and engineers and engineering companies are trained on EPC

	Number of pilot projects carried out with EPC Energy savings from the pilot EPC projects Number of projects procured as EPC by public authorities Energy savings from the EPC projects procured	Measurement and verification reports of the EPC projects	
The website which displays certified products and the contacts of relevant suppliers has been online	Development of the website Number of energy efficient products displayed per type of products Number and % of consumers who purchase energy efficient products from the suppliers	Website Products database that is part of the website operated by EEMO Surveys/interviews of the suppliers of energy efficient products registered on the website	The website receives a significant number of visitors to be informed about the energy efficient products The users of the website actually buy energy efficient products The website is adequately advertised to become known to the public The website is regularly updated and maintained
Training programmes aiming at improving the skills of craftsmen are developed and operational	Number of training courses delivered per year per category of craftsmen Number of trainees participating in the training courses Development of a certification scheme	Curricula and training material of the training courses Lists of trainees Certification scheme manual and procedural guides and documents Certification team establishment decision Training curricula and material of the	Adequate number of craftsmen show interest in the training programmes and participate The theoretical and practical training is delivered with high quality The certification scheme is developed The training programmes have

		certification team	sustainable funding sources The training programmes are adequately advertised
EE topics has been inserted into the training for SMEs and training in EE is being delivered	Number of training courses on EE in SMEs delivered by SMEDA Number of trainees MoU between EEMO and SMEDA	Curricula and training material of the training courses Lists of trainees Signed MoU	SMEs are interested to receive training in EE/DSM SMEs apply the knowledge they received by the training to save energy The new EE topics have been adequately advertised to the SMEs The MoU is activated and co-operation in practise has began
A centre for EE/DSM training has been established and is operational	Number of training courses on EE in SMEs delivered by EEMO Number of trainees	Curricula and training material of the training courses Lists of trainees	The sustainability of the funding for the centre has been secured Engineers from industry, services or energy service providers are interested and follow training courses The centre and its services have been adequately advertised A fee for the services of EEMO has been established and EEMO collects it on its own behalf
EE/DSM working groups in the subsectors have been established and functioning	Establishment of the working groups	Minutes of meetings	Regular meetings with these working groups are organized All stakeholders are represented, including the public, and have an

			equal opportunity to express their opinion The outputs of the meetings are taken into account by the decision maker in the energy sector and contribute to the improvement of the planning in the EE/DSM sector and the mitigation of barriers to EE/DSM
EE topics in schools curricula have been introduced	Number of chapters in school books disseminating knowledge about EE in primary and secondary schools Number of lectures per year for EE in schools	School books School lectures	Teachers are trained on the training techniques to pass the knowledge on EE/DSM to pupils The pupils are interested in the topic of EE/DSM Pupils apply the knowledge on EE/DSM they learned in their everyday lives
The capacities of EEMO have been improved	Number of training courses delivered to EEMO Number of staff of EEMO trained Number of secondments for staff from the EEMO in the facilities of the counterpart institution(s) Number of common projects developed and implemented with the co-operation of EEMO and the counterpart institution(s) Number of studies developed jointly	Curricula and training material per course List of trainees Reports of the secondments Progress reports of the measure Reports of the common projects and deliverables Documents of the joined studies Documents of joined action plans	EEMO applies the theoretical and practical knowledge and experience gained to implement the EE/DSM Master Plan measures, complex technical projects, pilot projects, contribute to EE/DSM planning and, in general, fulfilling its mandate EEMO retains the staff that has been trained for a reasonably long time Establishment of a long-lasting co-operation of EEMO with the

	Number of action plans developed jointly Number of events organised jointly Number and type of equipment acquired by EEMO	Agendas/programmes of joined events Invoices of equipment purchased	counterpart institution(s) from other countries Establishment of long-lasting co-operation with Mauritian institutions EEMO establishes a knowledge management database
Specifications for solar water heaters entering the Mauritian market have been establish and enforced	Standards adopted or adjusted Specifications drafted Number of importers and suppliers complying with the specifications Number and % of the installed SWHs that comply with the specifications and have CE marking Number of suppliers that have received a penalty for non-compliance	Decision for the adoption of the standards by the Mauritius Standardisation Bureau Document of the specifications Survey that assesses the importers and suppliers to identify those that have SWHs that comply with the specifications and have CE marking and the number of those SWHs sold Decisions of Mauritius Standardisation Bureau for penalties imposition	The importers and retailers of SWHs are sufficiently informed about the technical specifications The specifications are enforced The penalties for non-compliance are imposed
Minimum energy performance standards (MEPS) for electric appliances have been developed or adopted and the enforcement mechanism is in place	Number of appliances in which MEPS have been developed or adopted Change in the average energy consumption of the appliances per type in the market from the previous period Change of the sales of energy efficient appliances from the previous period	Market surveys before and after the enforcement of MEPS	The MEPS are enforced The enforcement team has been trained on the MEPS and has the power to impose penalties of non-compliance

Energy labelling	Number of labelled models currently in market as percent of all models sold and percent increase/decrease from previous period Number of importers and retailers participating in labelling program and percent increase/decrease from previous period % of change sales of appliances per energy class from previous period Number of importers, retailers and distributors attending the training sessions for the energy labels Changes in costs of efficient appliances from previous period Number of penalties imposed for non-compliance Average efficiency of all labelled models in market and percent increase/decrease from previous period[74]	Market surveys before and after the enforcement of labels to identify the change of the sales of energy efficient appliances and the change in their price Surveys before and after the application of the energy labels: a) survey to evaluate the extent of the behavioral change of consumers in making purchasing decisions as a result of the awareness campaign, b) survey to evaluate the depth of the understanding of retailers in the content and use of the energy labels, and c) survey to evaluate of the impact of the awareness campaign on the energy consumption of the appliances of consumers[75]	Evaluation of the impacts of the energy labels can be made by carrying out the surveys described in the 'Report On Awareness Campaign On Energy Labelling' The energy labels are enforced and penalties are imported for non-compliance The awareness campaigns on labelling are implemented Regular checks in the market for assessing the compliance of the retailers with the labelling scheme are conducted

[74] Other qualitative or quantitative indicators can supplement the monitoring of the energy labels:

- Level of awareness of the energy label
- Degree of influence that the label has on purchase decision
- Level of consumers' understanding of the energy label
- % of change on household energy consumption attributed to the appliances from previous period
- The level of awareness of importers, retailers and distributors

[75] The contents and questionnaires of such surveys are described in the deliverable 'Report On Awareness Campaign On Energy Labelling'

Voluntary agreements have been signed	Number of voluntary agreements signed Number (and %) of companies in industry and services sectors that signed voluntary agreements % of total sectoral energy consumption accounted for by participants in the VA Volume of targeted energy savings Number of energy conservation plan developed by the participating companies per year Number and % participating companies that implement appropriate EE measures and meet the targets Number and % participating companies that implement appropriate EE measures Type and cost of implemented EE measures Number of participating companies which establish an Energy Management System (EMS) per year Energy savings achieved per year with the implemented projects of the voluntary agreements	Voluntary agreements' signed documents Voluntary agreement reports issued by the participating companies Energy monitoring reports by the participating companies Progress reports of the voluntary agreements issued by EEMO	The parties (industry and public sector) that participate in the voluntary agreements carry out their responsibilities according to the agreements The companies implement EE/DSM investments The companies report the achieved energy savings Targets of the voluntary agreements are met by the companies The companies perceive the voluntary agreements as a positive long-term commitment Support from the government is provided to the participating companies

Energy efficiency awareness and information campaign for buildings of services sector has been carried out	Number of meetings of representatives/associations of the business sectors and with managers and technical staff of these consumers Number of participants per type of consumer in the meetings Number of workshops organised per consumer type Number of leaflets per type of consumer distributed Number of EE guides per type of consumer distributed Level of knowledge of managers on EE	Minutes of meetings Records and progress reports of the implementation of the awareness campaign by EEMO Interviews with company managers	The companies in the services sector are aware of methods and technologies to achieve energy savings The companies implement EE/DSM measures The results of the campaign will be assessed through surveys The companies understand the message of the campaigns Frequent co-operation between the companies and EEMO is established to exchange information The companies report the energy savings they achieved as a result of the awareness campaign
Study to assess the technicalities and feasibility of disconnecting hotels from the grid and generate the electricity they need locally at system peak times has been conducted	Drafted study	Document of the study	CEB is interested in implementing DSM measures The study provides the basis to implement a DSM programme The DSM programme is enforced and monitored by CEB The DSM programme rules changes if needed to improve energy and peak demand savings in agreement with the participant
Study to assess the technicalities and	Drafted study	Document of the study	CEB is interested in implementing

feasibility of hotels or service businesses using Building Energy Management Systems (BEMS) to lower consumption during system peak hours has been conducted			DSM measures The study provides the basis to implement a DSM programme The DSM programme is enforced and monitored by CEB The DSM programme rules changes if needed to improve energy and peak demand savings in agreement with the participant
Governmental Programme for financing EE interventions in residential buildings has been established	Number of eligible households which have applied to the Programme per category of income per year Number of rejected applications per year Number of households which have taken loans to implement EE interventions per year Volume of loans per year Volume of subsidies given per year Number of households which have implemented the EE interventions per year Average energy consumption per floor area before and after the implementation of EE interventions funded by Programme	Ministry of Infrastructure and EEMO records and progress reports of the Programme Records and progress reports of the Programme Energy audits before and after the interventions	Eligible EE interventions, materials, equipment and systems comply with the Building Codes and the respective regulations and all systems, materials and equipment have certification and/or energy label or are even better House owners use the Programme to renovate their homes Energy audits are collected and analysed by EEMO to a) determine the baseline and b) determine the energy savings of the Programme The Programme receives sustainable and continuous funding The procedures for applying and benefitting from the Programme are simple and easily understandable Readily available information about

			the Programme, its rules and procedures is provided free of charge in the EEMO website and the website of the Ministry of infrastructure Feedback from the house owners is collected and used to improve the Programme The Programme is adequately advertised to become widely known
Energy efficiency awareness and information campaign for households has been carried out	Percentage of household consumers that are aware of the Governmental Programme for financing EE interventions in residential buildings Number of TV spots broadcasts Number of radio spots broadcasts Number of press releases publishes Number of leaflets distributed A TV show presenting an example of a household that has applied to the Programme	Survey to assess the percentage of household consumers who are aware of the Governmental Programme for financing EE interventions in residential buildings EEMO records and reports of the implementation of the awareness campaign	Household owners are interested to the awareness campaign The households are aware of methods and technologies to achieve energy savings The households implement EE/DSM measures The results of the campaign will be assessed through surveys
New Solar Water Heater Scheme for households has been launched	Number of SWH installations Amount of funds for the grant	Number of applications for the grant Records of the expenditures for the provision of the grant	The Scheme has already been launched
Energy managers in public buildings appointed and trained	Number of energy managers sufficient to cover all buildings	Records of the Ministry of Public Infrastructure and Land Transport on	Government is committed to support the institutionalising of

	Training to the energy managers Number of energy management plans developed by the energy managers per year Number of public buildings in which EE interventions are installed per year Energy consumption per floor area per building	the appointment of energy managers Records of line Ministries responsible for the public buildings Interviews with the users of the public buildings Training curricula and material Energy management plan documents Contracts with the contractors for EE intervention installation Measurement and verification reports of public buildings in which interventions were installed	energy managers in the public buildings The energy managers are trained Energy managers cooperate with EEMO and the Energy Services Division to develop EE plans for the public buildings they manage The energy managers are monitoring the energy consumption and implement EE measures in the buildings The funds for the installation of EE measures are available
Action plan for EE interventions in public schools has been created	Drafting of the action plan Implementation of the interventions Energy savings achieved	Document of the action plan which includes the detailed interventions Contract with the constructor Measurement and verification reports	The funds for implementing the EE interventions suggested by the action plans are available The EE interventions are installed with the highest quality The energy savings are monitored
Action plan for EE interventions in local authorities buildings has been created	Drafting of the action plan Implementation of the interventions Energy savings achieved	Document of the action plan which includes the detailed interventions Contract with the constructor Measurement and verification reports	The funds for implementing the EE interventions suggested by the action plans are available The EE interventions are installed with the highest quality The energy savings are monitored
Action plan for EE interventions in public buildings of central Government has been	Drafting of the action plan	Document of the action plan which	The funds for implementing the EE interventions suggested by the

created	Implementation of the interventions Energy savings achieved	includes the detailed interventions Contract with the constructor Measurement and verification reports	action plans are available The EE interventions are installed with the highest quality The energy savings are monitored
The inefficient lamps in street/public area lighting are replaced with new efficient ones	Number of inefficient lamps replaced Number and wattage of efficient lamps Energy savings from the replacement of lamps	Invoices of the purchases of the efficient lamps from the municipalities Studies of the project 'Energy efficiency in street/public area lighting' Study to estimate the energy savings Manuals and technical specifications of the new lamps	The funds for the replacement of inefficient lamps in street lighting and public areas are allocated The new efficient lamps comply with the standards and specifications
The inefficient water pumps have been replaced with new efficient ones	The number of inefficient water pumps replaced The efficiency of the new water pumps The energy savings achieved	The action plan for the replacement of the inefficient water pumps The study to determine the energy savings The manuals of the new pumps	The action plan for energy efficiency in water pumping is developed The funds for the improvement in efficiency in water pumps are allocated
Electric vehicles have been introduced to the market	Number of electric vehicles purchased per year % of electric vehicles to the total vehicles Number of vehicle charge stations constructed per year Number of vehicle charge stations powered by RE constructed per year	Invoices/records of car selling companies Official statistics reports of the Statistics Mauritius Records of National Transport Authority Progress reports of the incentive scheme	The Government is committed to reduce the energy demand in transport The funds for the incentives are available

	Energy savings achieved		
More energy efficient vehicles are purchased replacing the old ones	Number of new efficient cars % of hybrid vehicles to the total vehicles Average energy intensity of new cars Number of hybrid cars % of hybrid vehicles to the total vehicles Number of cars fuelled by biofuels % of biofuel fuelled vehicles to the total vehicles Energy savings achieved	Official statistics reports of the Statistics Mauritius Records of National Transport Authority Progress reports of the incentive scheme	The Government is committed to reduce the energy demand in transport The funds for the incentives are available
ACTIVITIES	**Assumptions**		**Barriers addressed**
Establishment of an EE/RE Financing Scheme	The Government recognises the usefulness of the EE/RE Financing Scheme fund the development of the EE/DSM sector, open the EE market and support private investments The Government is committed to maintain the EE/RE Financing Scheme for long term and provide it with sufficient resources for funding the development of the EE sector Local banks are interested to cooperate with the Government and use the products associated with the EE/RE Financing Scheme The Managing Committee of the EE/RE Financing Scheme is staffed with qualified members		Weak financial capabilities of SMEs to undertake EE projects Inability of majority of the SMEs and some large ones to give guarantees or collateral to the banks to get loans for EE projects Absence of a financial support scheme targeted to the needs of the SMEs
Establishment of an information centre	The business associations of industry and services sectors, non-profit		Need for improvement of

on EE for companies	organisations or non-governmental organisations show interested in organising an information centre The proposals for the sustainability of the centre are realistic	mechanisms to provide access to information in EE/DSM
Creation of the Energy Information System (EIS)	There is a system to collect the data to be included in the EIS The required personnel for the operation and possible future enhancements of the EIS is hired and trained The operation of the EIS to be included in the annual budget of MEPU in order to ensure its long term viability	Lack of integrated tool for the policy making and monitoring of EE
Creation of a system for conducting data collection surveys	The co-operation between EEMO and Statistics Mauritius is smooth Statistics Mauritius accepts to share its survey tools/templates with EEMO	Lack of data to make informed policy decisions and monitor policies and action plans
Update of building codes/establishment of compliance scheme and respective regulation	The engineers and architects have been consulted and informed on the requirements of the building codes and the compliance scheme Other stakeholders like suppliers of construction products are informed about the required characteristics of the products imposed by the Codes Energy consumers in services and residential sector are also informed about the Building Codes	There are no rules to construct new buildings or renovate buildings The market for energy efficient construction is limited
Establishment of the Energy Audit Management Scheme	The engineers and architects as well and consumers have been consulted and informed	Absence of energy audit management scheme
Training and certification of energy auditors	The qualifications for the selection of candidate energy auditors have been set There are enough candidates in the local market to be trained The training curricula matches the needs of Mauritius If needed, co-operation with international certification bodies is established	Absence of trained and certified auditors

Introduction of the concept of energy performance contracting (EPC)	Support by the Government for introducing EPC to the EE market Consensus between Government, local banks, engineering companies and the private sector on the rules of the EPC Support of EPC by the local banks since they are the source of capital Banks, engineering companies and the private sector are well informed about the rules of EPC	Absence of regulation and enabling framework for energy performance contracting (EPC) and ESCOs The market for EPC does not exist Engineering companies, banks and consumers are not familiar with EPC concept
Market search and display of certified energy efficient products	The importers and suppliers cooperate and are willing to give data about their products The importers and suppliers are informed about the market search before it begins The importers and suppliers are informed about the incentive the measure provides to them The website that displays the energy efficient products is user friendly and its access is free The suppliers who provide energy efficient products agree on reduction of their price	Retailers do not represent energy efficient technologies to clients The provision of information on energy efficient products needs improvement
Development of the skills of craftsmen through training programmes	The stakeholders in the area of vocational training are willing to give information for the current situation analysis Existence of capable trainers to deliver training to the craftsmen The Planning Advisory Committee (PAC) which will take vital decisions on the measure is established and fulfilling its roles The co-operation of EEMO with the Ministry of Education and Human Resources and Mauritius Institute of Training and Development is smooth The training topics are linked well to the needs of the trainees	Low quality installations of EE/DSM technologies undermine the effort for EE/DSM and incentive schemes Low quality installations do not produce foreseen energy savings, cost more and have smaller lifetime

Establish co-operation between EEMO and SMEDA for training EE in SMEs	SMEDA is willing to cooperate with EEMO	The communication and co-operation of EEMO communications with stakeholders needs improvement
Establishment of a centre for EE/DSM training within EEMO	EEMO's capacities have been reinforced significantly Managers and technical staff from industry and services as well as engineers are willing to cooperate with EEMO in identifying the knowledge gaps The centre is adequately advertised to become known to the engineers	Low capacities of local engineers The mechanism to provide systematic training courses specialised for EE/DSM needs improvement
Sign a Memorandum of Understanding between EEMO and SMEDA to undertake joint action to assist SMEs in making energy audits and EE interventions	SMEDA and EEMO find useful ground for co-operation and are willing to cooperate	The communication and co-operation of EEMO communications with stakeholders needs improvement
Establishment of EE/DSM working groups in the subsectors and networking	EEMO is committed to drive the process of establishing and working with EE/DSM working groups as a means to achieve better planning The members of the working groups are knowledgeable of the issues of their subsector and are willing to contribute with proposals	The communication and co-operation of EEMO communications with stakeholders needs improvement
Introduction of EE/DSM in school curricula	MEPU and EEMO, Ministry of Education and Human Resources, Tertiary Education and Scientific Research and Mauritius Institute of Education (MIE) cooperate, share experiences and design the adequate school curricula to introduce EE/DSM The introduction of EE/DSM elements in the educational curricula is carried out by the experts in the science of teaching The school curricula is designed in order to address the needs and the maturity level of the pupils and affect their attitude and beliefs Teachers are trained on the training techniques to pass the knowledge on	The awareness for EE/DSM needs improvement

	EE/DSM to pupils	
Set up a twinning project to enhance the capacities of EEMO	The Government and MEPU are committed to reinforce the capacities of EEMO as it is the driving force in the EE/DSM sector MEPU and EEMO are successful in finding the funding mechanism(s) to set up and implement the twinning project Co-operation with more advanced neighbouring states is sought EEMO commits adequate human resources to be trained The co-operation of EEMO and the counterpart institution(s) is smooth and fruitful Strong co-operation links are development between EEMO and the counterpart institution(s) The capacity building Programme is delivered by professionals which have theoretical and practical experience in the issues covered by the mandate of EEMO	The capacities of EEMO need reinforcement to cope with its mandate
Establish technical specifications for solar water heaters (SWH) entering the Mauritian market	The working group that will be formed to establish the specifications has the adequate capacities and it is working smoothly	Low quality of imported SWHs results in unreliable systems, lower energy savings, low quality of service and discouragement of the energy users for the adoption of the technology
Development of minimum energy performance standards (MEPS) for electric appliances and the enforcement mechanism	Information to the MEPS in other countries is available or can be obtained with low cost The technical experts who can develop and analyse MEPS are present in Mauritius Mauritius Standards Bureau actively participates in the analysis of international MEPS and the development of Mauritius MEPS and be trained to enforce them	Lack of MEPS Lack of the enforcement mechanism of MEPS Dominance of inefficient models in the market

	The enforcement of MEPS is realised Awareness of the importers, retailers and consumers of the MEPS is raised	
Energy labelling	The two awareness campaigns to raise awareness in energy labelling are successfully implemented The surveys for the evaluation of the impact of the awareness campaigns are carried out: a) survey to evaluate the extent of the behavioral change of consumers in making purchasing decisions as a result of the awareness campaigns - before and after the campaigns, b) survey to evaluate the depth of the understanding of retailers in the content and use of the energy labels, and c) survey to evaluate of the impact of the awareness campaign on the energy consumption of the appliances of consumers Evaluate the impact of the energy labels on the level of energy efficiency of the appliances, the sales and the energy consumption and revise the labelling requirements every 5-7 years	Dominance of inefficient models in the market The control in the market of household electric appliances needs improvement
Establishment of voluntary agreements	The large consumers in industry and services are willing to negotiate voluntary agreements The large consumers are committed to implement EE/DSM measures in compliance with the voluntary agreement Involvement of all parties right from the start of the design of the voluntary agreement scheme (government, energy agency, business associations, companies) The participating companies are committed on monitoring, reporting and assessment of energy savings Credible energy audits, procedure to estimate energy savings Credible monitoring and reporting procedure Negotiation process should be transparent Financial support schemes are operating to facilitate the funding of the	The motivation of large industries and companies in the services needs improvement The awareness for EE/DSM needs raising The mechanisms to provide access to information in EE need improvement Lack of data to make informed policy decisions and monitor policies and action plans The capacities need improvement

	investments – combination with other policy instruments EEMO provide technical assistance to participating companies Government make known the companies that participate in the scheme and have achieved their targets to the public The marketing of the voluntary agreements by MEPU/EEMP is sufficient The agreements promote energy efficiency without harming competitiveness The target setting procedure is fair and transparent and based on the scientific evidence of the audit	
Design and carry out energy efficiency awareness and information campaign for buildings of services sector	The design and implementation of the awareness and information campaign in the services sector is performed by professionals in communication and marketing Strong co-operation of the managers and the technical staff of the companies with EEMO EEMO provides its experience in awareness campaigns The owners/managers of these buildings participate in the events organised under the campaign The dissemination material is created and posted to the recipients in a timely manner	The awareness for EE/DSM needs raising
Design and conduct a study to assess the technicalities and feasibility of disconnecting hotels from the grid and generate the electricity they need locally at system peak times	CEB's interest in participating DSM initiatives is growing CEB assists in the study CEB creates a fair compensation fee for the hotels which disconnect There is consensus of the rules of this measure between the hotels and CEB A sufficiently high penalty to the participating hotels which do not disconnect is imposed	Limited CEB interest in EE and DSM Technically feasible methods for DSM with the current technology of the consumers are not utilised

Design and conduct a study to assess the technicalities and feasibility of hotels or services businesses using Building Energy Management Systems (BEMS) to lower consumption during system peak hours	CEB's interest in participating DSM initiatives is growing CEB assists in the study CEB creates a fair compensation fee for the hotels/other businesses which programme their BEMS There is consensus of the rules of this measure between the hotels/other businesses and CEB A sufficiently high penalty to the participating hotels/other businesses which do not programme their BEMS is imposed	Limited CEB interest in EE and DSM Technically feasible methods for DSM with the current technology of the consumers are not utilised
Establishment of Governmental Programme for financing EE interventions in residential buildings	The EEMO has gained capacities to a) manage the Programme and b) assess the quality of energy audits The Buildings Codes have been completed and tested and the respective regulation in force The management scheme for energy audits in residential buildings has been developed The energy labelling scheme and the respective regulation in force and tested The system of training and certifying energy auditors has been developed and is in force The information system for the management of energy audits has been developed and is operational The local banking system is interested to participate in the Programme The Programme receives sufficient advertisement addressing households by Ministry of Infrastructure and EEMO Detailed economic study is conducted to determine the level of incentives	Absence of financial support scheme to assist households to engage in integrated EE/DSM measures
Design and carry put energy efficiency awareness and information campaign for	The design and implementation of the awareness and information campaign is performed by professionals in communication and marketing	The awareness for EE/DSM needs improvement

households	EEMO provides its experience in awareness campaigns The dissemination material is created and transmitted or posted to the recipients in a timely manner	
New Solar Water Heater Scheme for households	Strict technical specifications for SWHs are adopted to ensure high quality of products Audits are made to samples of installed SWHs to ensure the products' quality	There is considerable potential for SWHs which remains untapped
Appointment of energy managers in public buildings	Government is committed to appoint and train energy managers Regulation which appoints energy managers is prepared and enacted The responsibilities of the energy managers are clear	Lack of the professional energy managers in public buildings
Development of action plan for EE interventions in public schools	The EEMO undertakes preliminary audits to schools The EEMO prepares and issues the public tenders for the detailed energy audits and development of the action plan The schools cooperate with the EEMO Interested engineering companies develop the action plans	Public sector needs to set a good example but has not engaged in actual technical measures in its buildings, yet Low capacities of local engineers The capacities of EEMO need reinforcement The awareness in EE/DSM needs improvement
Development of action plan for EE interventions in local authorities buildings	The EEMO undertakes preliminary audits to the buildings of the local authorities The EEMO prepares and issues the public tenders for the detailed energy audits and development of the action plan The local authorities cooperate with the EEMO Interested engineering companies develop the action plans	Public sector needs to set a good example but has not engaged in actual technical measures in its buildings, yet Low capacities of local engineers The capacities of EEMO need reinforcement

		The awareness in EE/DSM needs improvement
Development of action plan for EE interventions in public buildings of central Government	The EEMO undertakes preliminary audits to the buildings of the central Government The EEMO prepares and issues the public tenders for the detailed energy audits and development of the action plan The managers/users of the buildings cooperate with the EEMO Interested engineering companies develop the action plans	Public sector needs to set a good example but has not engaged in actual technical measures in its buildings, yet Low capacities of local engineers The capacities of EEMO need reinforcement The awareness in EE/DSM needs improvement
Energy efficiency in street/public area lighting	The tender of the measure is developed and launched A contractor is selected to implement the measure Data on street and public area lighting are available from the municipalities The staff of the municipalities is trained on the standards and the design guide and specifications for the street/public area lighting	As a general trend, inefficient lamps are used for street/public area lighting There is no standard for lamps in street and public area lighting in Mauritius
Energy efficiency in water pumping	The data on the water pumps are available	The energy efficiency potential of water pumps remains untapped
Financial incentives to promote electric vehicles	The Government is committed to increase the efficiency of the vehicles in transport The funds for the incentives and the construction of charging stations are available	The current fleet of cars needs improvement in terms of energy efficiency and environmental performance There is a lot of energy saving potential in the transport which

		needs to be utilised
Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (more efficient vehicles, vehicles fuelled by biofuels and hybrid vehicles)	The Government is committed to increase the efficiency of the vehicles in transport The funds to provide the incentives are available The system to provide the incentive is simple and with low transaction costs Energy and environmental requirements are placed for the new cars of the participants	The current fleet of cars needs improvement in terms of energy efficiency and environmental performance There is a lot of energy saving potential in the transport which needs to be utilised

Annex XIII Methodology to estimate the EE/DSM savings of the measures that impact the industrial sector

The estimation of the potential energy savings of the measures that impact the industrial will be based on the use of the Model for Analysis of Energy Demand (MAED). In order to estimate the EE potential of the country after a combination of EE measures is implemented, three scenarios were developed and modelled with MAED:

1 The base case scenario,

2. The no measures scenario,

3. The EE scenario.

In order to estimate the potential energy savings of the measures that impact the industrial sector, the base case scenario and a modified EE scenario will be modelled with MAED and compared.

Estimation of the baseline – the base case scenario

The baseline for the estimation of the potential energy savings is the base case scenario. This scenario is used also to forecast the demand up to 2030. The base case scenario is described in detail in our previous 'Energy sector database report' and 'Report on forecast scenarios and supply options'. The full MAED model for the base case scenario, as well as additional optimistic and pessimistic economic development scenarios, are also included in these deliverables[76].

The base case scenario assumes that all the EE measures described in the Energy Action Plan 2011-2025 will be realised. It includes the activities of the EEMO as these are, in accordance with the Energy Action Plan 2011-2025. This is in line with the current policy of MEPU and EEMO.

The modified EE scenario for industry

The 'original' EE scenario assumes that additional measures to the ones included in the Action Plan 2011-2025 will be realised until 2030. The 'original' EE scenario is described in deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'. It assumes that a combination of additional EE measures will be realised until 2030 in addition to the ones proposed by the existing Action Plan 2011-2025. These additional EE measures include the particular measures under study. In order to model the effect of the additional EE measures on energy consumption, it was assumed that the technological efficiencies and the percentages of penetration of energy carriers in all sectors and energy uses will be improved above the base case scenario. It was also assumed that the energy intensities in all sectors will be improved above the base case scenario due to improvement of equipment and the EE/DSM measures.

In order to derive the modified EE scenario, the following have been assumed:

Only the technological efficiencies and the energy intensities in the industry sector will be improved above the base case scenario. The new figures will be the ones used in the 'original' EE scenario.

The intensities, technological efficiencies and the percentages of penetration of energy carriers and energy uses in the other sectors, besides industry, will remain the same as in the base case scenario.

All other parameters of the model remain the same as in the base case scenario.

The detailed assumptions on industry of the modified EE scenario are described in the following tables.

[76] The assumptions for the base case scenario are repeated in Annex I of deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'.

Manufacturing

Energy intensities of Motor fuels (kWh/US$)			
Industry	2014	2030	Comments
Agriculture	0.092	0.089	Although it has negligible scope, assumption that it will be decreased as a result of the more efficient motors that will be sold in the market due to the additional measures

Energy intensities of electricity in industry (kWh/US$)			
Industry	2014	2030	Comments
Agriculture	0.091	0.095	More automation in agriculture will increase the electricity consumption but at a slightly lower pace as in the base case due to more efficient equipment in the market
Construction	0.039	0.036	Decrease due more efficient equipment in the market
Mining	0.025	0.023	Decrease due more efficient equipment in the market
Textile	0.155	0.124	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures
Food Processing	0.193	0.153	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures
Sugar Production	2.066	1.955	In 2014 the sugar industry is already moving towards more efficiency equipment, so its awareness, information and financing capability is adequate to invest in EE.
Others	1.281	1.023	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures

Energy intensities of thermal uses in industry[77] **(kWh/US$)**			
Industry	2014	2030	Comments
Textile	0.158	0.127	The energy intensity is reduced in 2030 by compared to 2014 due to the measures in the Action Plan and the additional measures
Food Processing	0.314	0.250	The energy intensity is reduced in 2030 by compared to 2014 due to the measures in the Action Plan and the additional measures
Sugar Production	18.775	17.804	In 2014 the sugar industry is already moving towards more efficiency equipment, so its awareness, information and financing capability is adequate to invest in EE.
Others	1.201	0.964	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures

Efficiencies in industry **(%)**					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Eff. of Fossil F., steam gen.	79.7	95	The average efficiency of fossil fuels (oil and coal) for the production of steam (is the efficiency of the steam boilers) across the sector is going to increase from 79.7% in 2014 to 95 % in 2030.	Programme for audits in SMEs Information centre for SMEs EE/RE Financing Scheme Information provision Training of industry managers and technical staff	The efficiency for 2014 was calculated as the average efficiency of boilers together with the steam distribution systems taking as source the existing the audit reports.

[77] The thermal uses in agriculture, construction and mining are negligible

				Investments in EE boilers, new heat exchangers, boiler controls, waste heat recovery, efficiency steam distribution systems etc. as a result of the technical assistance measures to industry and financial support programs Energy performance contracting	
Eff. of Fossil F., furn./dir. heat	60	90	The average efficiency of fossil fuels (oil and coal) for direct heating (this is the efficiency of the furnaces and dryers) across the sector is going to increase from 60% in 2014 to 90 % in 2030	Programme for audits in SMEs Information centre SMEs EE/RE Financing Scheme Information provision Training of industry managers and technical staff Investments in EE boilers, new heat exchangers, boiler controls, waste heat recovery, efficiency steam distribution systems etc. as a result of the technical assistance measures to industry and financial support programs Energy performance contracting	Direct heating furnaces or dryers usually have lower efficiency than boilers for steam water that produce steam due to high losses in flue gas and environment. Average efficiency is 60% for a coal fired furnace% according to MAED manual. Mostly coal in Mauritius is used for direct heating. According to Energy Star requirements[78] the efficiency of furnaces should be higher that 85%, so for 2030 the figure 90% was chosen to factor in the technological improvement as a conservative estimate
Eff. of Fossil F., sp./w heating	80	95	The average efficiency of fossil fuels (oil and coal) water heating across the sector is going to increase from 80% in 2014 to 95 % in 2030	Programme for audits in SMEs Information centre for SMEs EE/RE Financing Scheme	Typical efficiency of fossil fuel fired boilers that produce hot water is 80% currently. The Energy Star requirement[79] is set at efficiencies higher than 85%. Boilers today can easily

[78] Technical Reference Manual, State of Pennsylvania, Act 129 Energy Efficiency and Conservation Program & Act 213 Alternative Energy Portfolio Standards, June 2015
[79] Technical Reference Manual, State of Pennsylvania, Act 129 Energy Efficiency and Conservation Program & Act 213 Alternative Energy Portfolio Standards, June 2015

				Information provision Training of industry managers and technical staff Investments in EE boilers, new heat exchangers, boiler controls, waste heat recovery, efficiency steam distribution systems etc. as a result of the technical assistance measures to industry and financial support programs Energy performance contracting	reach 90% efficiency, so considering the technological change and the additional measures the value of 95% was chosen for 2030.
Eff. of Trad. F., sp./w heating	80	92	Average efficiency of traditional fuels in the production of water heating across the sector is going to increase from 80% in 2014 to 92%in 2030	Programme for audits in SMEs Information centre for SMEs EE/RE Financing Scheme Information provision Training of industry managers and technical staff Investments in EE boilers, new heat exchangers, boiler controls, waste heat recovery, efficiency steam distribution systems etc. as a result of the technical assistance measures to industry and financial support programs Energy performance contracting	Boilers that use woodfuel for space heating and hot water can reach, today, efficiencies of more than 87%[80]. Conservative assumptions were made for the efficiency of the boilers in 2014 and 2030, respectively, taking into account the evolution of technology.

[80] I. Papamichail, Centre for Renewable Energy Sources and Savings of Greece, Energy from Biomass, Raw Materials, Perspectives, Technological Applications, Bio-energy Expo-Conference, 7 October 2012, Athens, Greece (in Greek)

Eff. of Mod. Bio., steam gen.	70[81]	95	Average efficiency of modern biomass (bagasse) for steam generation across the sector: in 2014 the efficiency is 70% and in 2030 will reach 95%	The industry is quite efficient today. Two inefficient boilers are going to be replaced by one with efficiency of more than 97% soon.	The same efficiency will be included in the all scenarios because the margin for further improvements above 95% efficiency is low and the sugar industry has already realised the benefits of EE and knows how to carry out EE projects.

[81] I. Papamichail, Centre for Renewable Energy Sources and Savings of Greece, Energy from Biomass, Raw Materials, Perspectives, Technological Applications, Bio-energy Expo-Conference, 7 October 2012, Athens, Greece (in Greek)

Annex XIV Methodology to estimate the EE/DSM savings of the measures that impact the services sector

The estimation of the potential energy savings of the measures that impact the services sector will be based on the use of the Model for Analysis of Energy Demand (MAED). In order to estimate the EE potential of the country after a combination of EE measures is implemented, three scenarios were developed and modelled with MAED:

1 The base case scenario,

2. The no measures scenario,

3. The EE scenario.

In order to estimate the potential energy savings of the measures that impact the services sector, the base case scenario and a modified EE scenario will be modelled with MAED and compared.

Estimation of the baseline – the base case scenario

The baseline for the estimation of the potential energy savings is the base case scenario. This scenario is used also to forecast the demand up to 2030. The base case scenario is described in detail in the deliverables 'Energy sector database report' and 'Report on forecast scenarios and supply options'. The full MAED model for the base case scenario, as well as additional optimistic and pessimistic economic development scenarios, are also included in these deliverables[82].

The base case scenario assumes that all the EE measures described in the Energy Action Plan 2011-2025 will be realised. It includes the activities of the EEMO as these are, in accordance with the Energy Action Plan 2011-2025. This is in line with the current policy of MEPU and EEMO.

The modified EE scenario for services

The 'original' EE scenario assumes that additional measures to the ones included in the Action Plan 2011-2025 will be realised until 2030. The 'original' EE scenario is described in deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'. It assumes that a combination of additional EE measures will be realised until 2030 in addition to the ones proposed by the existing Action Plan 2011-2025. These additional EE measures include the particular measures under study. In order to model the effect of the additional EE measures on energy consumption, it was assumed that the technological efficiencies and the percentages of penetration of energy carriers in all sectors and energy uses will be improved above the base case scenario. It was also assumed that the energy intensities in all sectors will be improved above the base case scenario due to

[82] The assumptions for the base case scenario are repeated in Annex I of deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'.

improvement of equipment and the EE/DSM measures.

In order to derive the modified EE scenario for services, the following have been assumed:

Only the technological efficiencies for thermal uses and air conditioning, the energy intensities and the shares of penetration of energy forms in thermal uses other than space heating in the services sector will be improved above the base case scenario. The new figures will be the ones used in the 'original' EE scenario.

The energy intensities, technological efficiencies and the percentages of penetration of energy carriers and energy uses in the other sectors, besides services, will remain the same as in the base case scenario.

All other parameters of the model remain the same as in the base case scenario.

The detailed assumptions on services of the modified EE scenario are described in the following tables.

Services

Energy intensities of electricity in services (kWh/US$)			
Services	2014	2030	Comments
Tourism	0.333	0.254	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures
Trade	0.074	0.056	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures
Others	0.076	0.057	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures

Energy intensities of thermal uses in services (kWh/US$)			
Services	2014	2030	Comments
Tourism	0.251	0.197	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures
Trade	0.055	0.044	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures
Others	0.019	0.014	The energy intensity is reduced in 2030 compared to 2014 due to the measures in the Action Plan and the additional measures

Penetration of energy forms into Other thermal uses in services (%)				
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure
Traditional fuels	0.4	0.096	The traditional fuels will be gradually phased out for environmental protection	
Electricity	38.7	32	The share of electricity in thermal uses in the services sector will decrease because of substitution of electric heaters with SWHs.	
Soft solar	16.5	42	In the services sector solar water heaters (SWHs) will multiply and will gradually gain more share than electric water heaters and LPG heaters up to 2030.	The incentive schemes for SWHs will continue to operate Technical specifications for SWHs will be adopted and the SWHs imported will be tested for compliance with the technical specifications. A lab for testing SWHs will be established. So, good quality SWHs will dominate the market up to 2030
Fossil fuels	44.3	25.8	The share of LPG in thermal uses in the services sector will decrease because of substitution of LPG boilers with SWHs	

Efficiencies in services (%)					
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure	Comments
Eff.	30	30	There will be no policy for		

Trad. fuels			increasing the efficiency of traditional biomass in the services sector		
Eff. Fossil fuels	80	92	The average efficiency of fossil fuels (LPG used for water heating) across the sector in the services will increase from 80% in 2014 to 92% in 2030.	This would be the effect of the EE projects implemented in the service enterprises and the public sector due the programmes for SMEs, the creation of the information centre for SMEs, the awareness and information campaign for private sector office buildings, communication/call centres, banks, healthcare buildings, recreational and cultural buildings. The EE/RE Financing Scheme will also facilitate the investments.	Expectation in better technologies and fuel content The standard LPG boiler efficiency is 80% while the max LPG boiler efficiency is 96% in 2014[83,84].
Solar share	70	70	The solar share in the services sector is 70% during 2015-2030	This is imposed by the Building Code.	The solar share measures the percentage of the needs of hot water covers by the solar water heating system.
COP of electric ACs	2.5	3.6	The average COP of air conditioning across the services sector will be 3.6 in 2030	The replacement of ACs with more efficient models will be the result of labelling as well as the revision of the labelling energy classes considering the technological improvements.	The A+++ class of the ACs in Europe in 2014 imposes the COP to be equal or larger than 3.6. This means that AC models of 2014 and 2015 can achieve this COP. Due to the continuous technological improvement in ACs, it is most probable that the COP of 3.6 on average will be common in 2030.

[83] Energy Saving Trust, Domestic heating by gas: boiler systems – guidance for installers and specifiers,
[84] https://www.energystar.gov/index.cfm?c=most_efficient.me_boilers

Annex XV Methodology to estimate the EE/DSM savings of the measures that impact the transport sector

The estimation of the potential energy savings of the measures that impact the transport sector will be based on the use of the Model for Analysis of Energy Demand (MAED). In order to estimate the EE potential of the country after a combination of EE measures is implemented, three scenarios were developed and modelled with MAED:

1 The base case scenario,

2. The no measures scenario,

3. The EE scenario.

In order to estimate the potential energy savings of the measures that impact the transport sector, the base case scenario and a modified EE scenario will be modelled with MAED and compared.

Estimation of the baseline – the base case scenario

The baseline for the estimation of the potential energy savings is the base case scenario. This scenario is used also to forecast the demand up to 2030. The base case scenario is described in detail in the deliverables 'Energy sector database report' and 'Report on forecast scenarios and supply options'. The full MAED model for the base case scenario, as well as additional optimistic and pessimistic economic development scenarios, are also included in these deliverables[85].

The base case scenario assumes that all the EE measures described in the Energy Action Plan 2011-2025 will be realised. It includes the activities of the EEMO as these are, in accordance with the Energy Action Plan 2011-2025. This is in line with the current policy of MEPU and EEMO.

The modified EE scenario for transport

The 'original' EE scenario assumes that additional measures to the ones included in the Action Plan 2011-2025 will be realised until 2030. The 'original' EE scenario is described in deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'. These additional EE measures include the particular measures under study. In order to model the effect of the additional EE measures on energy consumption, it was assumed that the technological efficiencies and the percentages of penetration of energy carriers in all sectors and energy uses will be improved above the base case scenario. It was also assumed that the energy intensities in all sectors will be improved above the base case scenario due to

[85] The assumptions for the base case scenario are repeated in Annex I of deliverable 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'.

improvement of equipment and the EE/DSM measures.

In order to derive the modified EE scenario for transport, the following have been assumed:

- Only the Energy intensity of freight transportation, Energy intensity of intracity passenger transportation and the Energy intensity of intercity passenger transportation will be improved above the base case scenario. The new figures will be the ones used in the 'original' EE scenario.
- All other parameters of the model remain the same as in the base case scenario.

The detailed assumptions in transport of the modified EE scenario are described in the following tables.

Freight transportation

Energy intensity of freight transportation (l/100tkm)				
	2014	2030	Assumption	Justification/Relevant proposed additional EE measure
Boat	1.3	1.1	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Big Truck	3.6	3.2	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Small Truck	8.0	6.7	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines

Intracity passenger transportation

Energy intensity of intracity passenger transportation					
	Unit	2014	2030	Assumption	Justification/Relevant proposed additional EE measure
Car Diesel	[l/100km]	6.6	5.3	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines

Car Gasoline	[l/100km]	6.6	5.3	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Car LPG	[l/100km]	12.6	10.5	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Car Alcohol	[l/100km]	12.0	11.6	Same as base case	There will no more measures for more efficient cars running on ethanol
Car Electric	[kWh/100km]	25.0	21.2	Same as base case	There will no more measures for more efficient electric cars
Motorbike	[l/100km]	4.0	3.3	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Big Bus	[l/100km]	35.0	28.9	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Small Bus	[l/100km]	25.0	21.0	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines

Intercity passenger transportation

Energy intensity of intercity passenger transportation					
	Unit	2014	2030	Assumption	Justification/Relevant proposed additional EE measure
Air plane	[l/1000seatkm]	7.0	6.6	Same as base case	There will no more measures for more efficient air travel
Car Diesel	[l/100km]	5.0	4.4	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Car Gasoline	[l/100km]	5.0	4.4	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Car LPG	[l/100km]	9.0	7.6	10% more efficient that the base case in	Economic incentives to replace polluting and inefficient

				2030	engines
Car Alcohol	[l/100km]	9.0	8.6	Same as base case	There will no more measures for more efficient cars running on ethanol
Car Electric	[kWh/100km]	25.0	21.2	Same as base case	There will no more measures for more efficient electric cars
Motorbike	[l/100km]	3.0	2.6	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Big Bus	[l/100km]	27.0	23.5	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Small Bus	[l/100km]	18.0	15.2	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines
Boat	[l/100km]	126.6	91.8	10% more efficient that the base case in 2030	Economic incentives to replace polluting and inefficient engines

Annex XVI Examples of voluntary agreements

Sweden[86]

The first Swedish VA program for efficient energy use in industrial companies was called EKO Energy scheme (1995-2003). It was setting a list of prerequisites (performance and management standards for energy efficiency) to be satisfied by participants, who in return received a subsidy covering the cost of the energy audit and a logo[87]. Swedish industry was exempt from the carbon tax introduced in the early 1990s. Due to EU tax harmonisation this tax exemption was suspended in 2004.

A new VA program for energy-intensive industry called Programme for Energy Efficiency was launched in January 2005. The program is based on 5-year agreements between individual companies and the National Energy Agency (STEM). To be eligible to sign an agreement the individual company has to implement an accredited energy management system, carry out an energy audit and implement all identified measures with a payback period less than 3 years. The scheme also includes requirements of the individual company to implement certain routines for energy-efficient purchasing and maintenance. In return the company receives exemption of tax on process related electricity consumption. Non-compliance means loss of tax reduction[88].

United Kingdom[89]

In 1997 the government reached an agreement with the chemical industry: the sector committed to a 20 % CO2 emission reduction by 2005 compared to 1990. In 2001 the UK launched voluntary agreements to reduce GHG emissions in the energy-intensive sectors. These agreements are part of a comprehensive policy, the UK Climate Change Programme presented in 2000. The overall programme plans to reduce GHG emissions by 23 % in 2010 compared to 1990 levels with industry contributing no less than 50% of the total expected reductions (in 2000 industry contributes 20 % of total emissions). A peculiarity of the UK programme is the use of a broad range of policy instruments: market-based instruments (energy tax, emission trading, auctions), command and control regulations (minimum renewable energy use requirement, energy efficiency objectives) and negotiated agreements. Agreements essentially consist in quantitative objectives of energy use reduction to be met by 2010.

By mid-2004, 44 trade associations have signed a Climate Change Levy Agreement (CCLA) covering the emissions of more than 10,000 industrial sites. As their name suggests, these agreements are intimately linked with a tax launched in April 2001: the Climate Change Levy. By signing a CCLA the participating firms receive a 80% tax rebate[90]. Participants in CCLA can use the

[86] Silvia Rezessy, Paolo Bertoldi, Agneta Persson, Are voluntary agreements an effective energy policy instrument? Insights and experiences from Europe, Joint Research Centre, Institute for Energy and Transport (IET), 2005

[87] Chidiak, M. 1999. "Voluntary agreements for energy efficiency in five EU countries". Proceedings of the European Council for Energy Efficient Economy (ECEEE) summer study. Stockholm: ECEEE

[88] Persson, A. and E. Gudbjerg, E. 2005. "Do voluntary agreements deliver? Experiences from Energy Management Systems and schemes". In Proceedings of the European Council for Energy Efficient Economy (ECEEE) summer study. Stockholm: ECEEE

[89] Silvia Rezessy, Paolo Bertoldi, Agneta Persson, Are voluntary agreements an effective energy policy instrument? Insights and experiences from Europe, Joint Research Centre, Institute for Energy and Transport (IET), 2005

[90] de Muizon G. and M. Glachant, M. 2004 "The UK Climate Change Levy Agreements: Combining negotiated agreements with tax and emission trading". In Baranzini, A. and P. Thalmann (ed.)

UK Emission Trading Scheme to buy and sell allowances.

The Netherlands[91]

Within the framework of energy efficiency policy in the Netherlands, the voluntary agreement (Long-Term Agreement – LTA as they called in Netherlands) on energy efficiency was introduced in 1992, which resulted in agreements with branch organizations and individual organizations in the industrial, commercial and non-profit building sectors. Each agreement is a contract under civil law and is legally binding. The goal of the voluntary agreements was to save primary energy, decreasing the energy intensity of the national industry and also reducing emissions without compromising the economic growth or competitiveness of the participating companies. Agreements cover all industrial branches (the minimum industrial branch coverage for an agreement to be valid is 80%) and some services (banking, airlines). They explicitly include individual firm commitments and mandatory reporting at firm level. Industry is exempt from the carbon tax introduced in 1996 and agreements were the sole instrument for climate change mitigation in the industrial sector till the introduction of the EU Emission Trading System (ETS) scheme.

Apart from the carbon tax exemption, by agreeing to additional efforts industry gets facilitated access to environmental permits. Non-compliance brings companies back under the standard operation permit system. In the Netherlands, 31 voluntary agreements, also known as covenants, were concluded between the government and industry branches by the end of the 1990s.

The overall target of the voluntary agreements on energy efficiency introduced in 1992 was energy efficiency improvement in the industry sector of 20% (on average) in 2000 compared to 1989. Companies that join the voluntary agreement commit to improve EE as technically and economically possible, thus contributing to the achievement of the target of the industrial sector. They also agree to prepare energy conservation plans[92]. Companies in sectors consuming more than 1 PJ/year also committed to mandatory reporting of their energy condition, EE measures and their impacts. for sectors. Companies joining an voluntary agreement received support from the energy agency Novem and could apply for financial support for investments in measures with several subsidy schemes and fiscal measures.

A report from the Dutch Ministry of Economic Affairs indicated that the Dutch agreements delivered 2% per annum efficiency improvement in the period 1990–2000. The initial voluntary agreements with industry ended in 2000; they achieved an energy efficiency improvement of 22.3% between 1989 and 2000, surpassing the 20% goal.

The Dutch authorities have discussed with industry annual efficiency improvement target of 2.2% for the period 2000–2010. Two types of agreements have been established for the period 2001–2012: for the energy intensive sectors (International Benchmarking) and for the remaining industry sectors and service/tertiary sector (the terminology is Long-Term Agreement 2 (LTA2)). Medium-sized (and sometimes smaller) enterprises are taking part in LTA2, which constitutes of three 4-year periods, ending in 2012. To qualify for participation in LTA2, a sector must use at least 1 PJ of energy annually, 80% of which should be consumed by the sector's constituent

"Voluntary Approaches to Climate Protection. An economic assessment of private-public partnership". Cheltenham: Edward Elgar.

[91] Paolo Bertoldi, Silvia Rezessy, Voluntary Agreements for Energy Efficiency: Review and Results Of European Experiences, European Commission, Directorate General Joint Research Centre, Institute for Environment and Sustainability, Central European University, Environmental Sciences and Policy Dept, 2007

[92] Signe Krarup, Stephan Ramesohl, Voluntary Agreements in Energy Policy-Implementation and Efficiency, Final Report from the project Voluntary Agreements – Implementation and Efficiency (VAIE), January 2000

companies. As of 1 January, 2005, 988 companies were taking part in the LTA2s.

The larger energy-intensive companies have not signed LTA2 but are instead participating in the Covenant on Benchmarking Energy Efficiency, whereby companies commit to achieve the best class of energy efficiency of process installations amongst comparable companies. The top energy efficiency level is specified as having 90% of the best installation or at least 10% less energy efficient than the best performing installation. The companies commit to take action as soon as possible, but ultimately by 2012. The implementation began in 2004; benchmarked companies that are not yet estimated to be among the best in the world, will have to take all energy conservation measures that generate enough savings to cover the costs of borrowed capital. If a company is not in the world top class in 2008 it can choose between taking additional energy efficiency measures or finding trade offs through the Kyoto Mechanisms. In 2004, 152 companies participated in the Benchmark Covenant, presenting 85% of the industrial consumption. In addition to this 33 power generation plants were included.

The LTAs in the Netherlands are linked with several other policy instruments providing financial support for concrete investments, including subsidy programmes, grants from the Environmental Action Plan (MAP) of energy companies, subsidy scheme and fiscal measures established by the government. In the voluntary agreements framework the Minister of Economic Affairs agrees to provide support to the program, including financial instruments aiming at industry, such as financial assistance within the framework in the form of various subsidy schemes that can be increased if the program is more promising than expected, detailed audits of the industries' facilities, and co-ordination of regulatory measures aimed at energy efficiency in industry, including requirements to obtain permits and energy taxes.

The Dutch energy agency SenterNovem and consultants are doing sectoral monitoring related to LTA implementation. There is a requirement for an annual report by company, checked for procedural compliance by SenterNovem and by the Environmental Permitting Authority. LTA2 participants are required to report each year on the progress of their activities relating to the covenant, in each sector, the corporate monitoring reports are aggregated. A corporate monitoring report in relation to LTA2 provides a yearly insight into the company's progress with implementing the LTAs, regarding the implementation of the Energy Conservation Plan (distinguishing measures for each facility in process efficiency and the so-called expansion themes) and the implementation of systematic energy care in the company. The report must contain data on the improvement in energy efficiency in the relevant facility/facilities compared to 1998 (reference year), and the realized emissions reduction of CO_2.

Finland[93,94,95,96,97]

The voluntary agreements in Finland during the period 2008-2016 aims at reducing the average final energy consumption by 9% by 2016. The target is based on the average energy consumption for 2001–2005. The VAs also aim at accelerating the deployment of new energy-efficient technology, as well as to increase the use of renewable energy. The agreement scheme plays a central role in the national Climate and Energy Strategy (2008), which is the response to the international obligations set for Finland in the effort to combat the climate change.

The VAs cover the following sectors:

[93] http://www.energiatehokkuussopimukset.fi/en/
[94] Energy Efficiency Agreement for Industries, Company Accession Document, for the Action Plan for the Energy-Intensive Industry
[95] Energy Efficiency Agreement for Industries, Company Accession Document, for the Action Plan for the Technology Industries
[96] Framework Agreement on the Improvement of Energy Efficiency in Industries
[97] Energy Efficiency Agreements in Finland – Results 2008-2014

- industries (industrial, energy and private service sectors)
- municipal sector
- oil sector
- building sector
- transport (goods and public)
- agriculture

The Finnish VAs aim at establish a framework of systematic and continuous guidance of companies to become more energy efficient. Continuous improvement is envisaged in the VAs as a principle.

A framework agreement has been established between the Ministry of Trade and Industry and the Confederation of Finnish Industries, the Finnish Food and Drink Industries' Federation, the Finnish Energy Industries, the Finnish Chemical Industry, the Finnish Hospitality Association, the Finnish Forest Industries Federation, the Finnish Plastic Industries Federation, the Federation of Finnish Commerce, and the Federation of Finnish Technology Industries. Each individual company that would like to join the agreement commits itself with a separate accession document. The framework agreement started its operation in 2007 and will remain valid until end of 2016.

The energy –intensive industries are defined as those with one or more sites with an annual end consumption of energy of at least 100 GWh. By joining the agreement they assume the following responsibilities:

- Introduce and use an energy management system (called Energy Efficiency System) whose specifications are given by the Ministry of Trade and Industry. The Energy Efficiency System includes the procedures on the implementation of continuous improvement, energy efficiency improvement targets, a plan to improve energy efficiency, taking energy efficiency into account when choosing appliances and systems throughout their life cycle, and monitoring of energy consumption and annual reporting,
- Incorporate energy issues in the existing management system 12 months of joining the agreement scheme,
- In accordance with the Energy Efficiency System, ensure that they have implemented the activities for energy conservation that are emanated from the Energy Efficiency System and have incorporated energy-efficient practises to their practical activities,
- Commits itself to using the Energy Efficiency System throughout the agreement period.

Based on the operation of the Energy Efficiency System, the energy –intensive industries will implement the following actions:

- Define its energy policy,
- Appoint a person in charge of energy issues,
- Create, maintain and use procedures to monitor energy consumption, identifies the factors that influence the energy consumption, identify energy saving opportunities and concrete projects and identifies the possibilities of improving energy efficiency in the long term,
- Define the energy efficiency target,
- Develop an energy efficiency action plan which is updated annually,
- Report annually on their energy use and measures they have implemented to improve efficiency

Furthermore, the energy –intensive industries aim to introduce new energy-efficient technology whenever it is economically possible, taking safety and environmental aspects into consideration, and to enhance the energy efficiency of transport by improving logistics and energy use in transport in co-operation with companies providing these services.

The companies with no sites exceeding a maximum annual energy consumption of 100 GWh are

classified into the medium-sized industry and private service sector. The target of this branch is to reduce energy consumption by 9% by end of 2016. This target can be transferred to the individual companies. The primary objective of the VAs in medium-sized industry and private service sector is to establish a continuous improvement of EE and promotion of the use of renewable energy sources as part of the management systems used or to be introduced by the individual company. The individual company commits itself to the implement EE measures to improve its EE when these are economically and technically possible taking safety and environmental aspects into account. The concrete commitments an individual company should make in order to join the agreement are:

- Appoint a company-specific person in charge of energy and/or persons in charge of energy for chains and/or various places of business,
- Draw up an energy efficiency improvement plan,
- Carry out regular assessment of the implementation and impact of the actions included in the energy efficiency improvement plan and, when necessary, update its targets and plan,
- Within one year of joining the agreement:
- Monitor its energy use in each chain of business and/or place of business
- Set the EE improvement target,
- Define the responsibilities of the EE implementation activities,
- Within two years of joining the agreement:
- Carry out an energy audit or analysis or other similar survey to identify EE economic and feasible EE opportunities,
- Set targets for improving the efficiency of energy use for each chain and/or place of business,
- Draw up a schedule for the implementation of cost-effective energy efficiency improvement measures.
- Implement the EE measures according to the planned timeschedule,
- Monitor the energy consumption, the progress of the EE measures and their impacts on EE savings,
- Report each year the on the energy use of the previous year, the progress of the implementation of EE improvement measures and other activities of the energy efficiency improvement plan, their cost and impacts,
- Train its personnel to acquire the required skills to carry out the commitments of the agreement and embody EE in the company's operations,
- Include EE criteria as part of the company's procurement procedures,
- Introduce new energy-efficient technology whenever it is technically and economically possible taking safety and environmental aspects into consideration,
- Improve the energy efficiency of transport and storage related to its activities in cooperation with service providers,
- Increase the use of renewable energy sources whenever it is technically and economically possible.

The Ministry of Trade and Industry commits to the following as part of its obligations in the agreement:

- Support the energy audits and analyses concerning the energy conservation and use of RE by companies with financial aid.
- Financially support the implementation of EE and RE investments established in the energy audits and analyses of the company or in similar studies,
- Participate in the development of the agreement scheme together with the Industry Associations, the Confederation and companies which have joined the agreement scheme,
- Allocate resources for the technical agency in the energy sector (Motiva Oy) so that it

can monitor the implementation of the EE plans, participate in the development of the agreement scheme, the compiling of annual reports, the implementation of development and trial projects and the production of communication and training material suitable for the companies.

As far as the Ministry of Employment and the Economy is concerned, energy subsidies to businesses, local authorities and other organisations for investment and feasibility RE and EE projects are granted. Subsidies for energy audits and analyses are also granted to micro and SME businesses and municipal authorities.

At the end of 2014, the energy use of companies and communities signed up to the agreement scheme covered over 65 % of Finland's total final energy use. Over 600 companies and their 5000 sites have joined the voluntary agreements. Since 2008, energy audits and analyses have been conducted at more than 2,400 sites or buildings. The annual impacts of implemented measures at end of 2014 is:

- savings of heating energy and fuels 8.76 TWh,
- electricity savings 3.27 TWh,
- savings in energy costs 440 million €,
- carbon dioxide emissions reduced by 3.6 million tonnes.

The savings equal 3.2% of Finland's total energy consumption (372 TWh in 2014).

During 2008-2014, Over 600 Finnish companies and their 5000 sites from the energy-intensive industry, medium-sized industry, private service sector, property and building sector and the energy sector have signed up to voluntary agreements. They have implemented 11,959 EE measures which resulted in 1,107 TWh annual energy savings, 421 mil. € annual cost savings and 4.2 mil. tonnes of annual CO_2 reduction. In industry over 90 % of all energy audits carried out are linked to the agreements. The energy-intensive industry has joined the agreements with 39 companies and their 130 sites until the end of 2014. They have implemented 1,081 EE projects which have led to 8,057 GWh of annual energy savings, 254 mil. € of annual cost savings and 2.7 mil. tonnes of annual CO_2 reduction. In the tourism industry, 55 companies and their 227 sites have signed up to the agreements. This created 418 EE measures, 20.8 GWh of annual energy savings, 1.5 mil. € of annual cost savings and 8 kilotonnes of annual CO_2 reduction.

In the private service sector, about two-thirds are carried out in companies signed up to the agreements. During 2008- 2014, subsidies have been granted for over 700 EE projects, €72.2 million in total. At the end of 2014, energy efficiency had been incorporated in the management or environmental systems in almost 90 % of the energy-intensive industry sites and 80 % of the energy production sites.

Denmark[98,99,100]

The voluntary agreements (VAs) in Denmark were introduced in 1996 as part of the Green Tax Package. The main objective of the Package was to reduce the CO_2 and sulphur dioxide SO_2 emissions from trade, services and industry. The Package defines three taxes: CO_2 taxes, energy

[98] Danish Energy Agency, The Danish Agreements on Energy Efficiency, May 1999
[99] Danish Energy Agency, The Danish voluntary agreement scheme, Memo, October 2011
[100] Karin Ericsson, Evaluation Of The Danish Voluntary Agreements Of Energy Efficiency In Trade And Industry, Active Implementation of the European Directive on Energy Efficiency (AID-EE), Energy Intelligence for Europe program, Contract number EIE-2003-114, April 2006

taxes and sulphur taxes. These taxes are applied to heavy processes, light processes and space heating. The objective of the VA scheme is twofold; firstly to encourage energy efficiency in industry, trade and services in order to reduce the CO_2 emissions and secondly to ensure that the competitiveness of Danish industry is not weakened by the increased green taxes. To qualify for a lower CO_2 tax rate (subsidies are given to the companies which comply with the VAs), energy-intensive companies can enter into a VA with the Danish Energy Agency which is valid for up to three years. Agreements must be renewed after three years. Agreements can be made for both light and heavy processes. All companies with heavy processes are defined as energy intensive, and have the right to enter into an agreement with the Danish Energy Agency. Companies with light processes are defined as energy intensive – and obtain this right – only if the yearly tax on their energy use amounts to at least 3% of their value added.

The companies that join the VAs commit to the following:

- Conduct energy audits which should be completed within 6 months. The energy audits are obligatory before the signing of the agreement. The energy audits will identify all energy- saving projects and the payback times for these projects are to be described.
- All identified EE investments with payback periods of less than 4 years (heavy process agreements), or 6 years (light process agreements), are considered as being profitable and should be carried out as part of the agreement.
- If the energy audits result in areas which need special investigations, which may emerge in case of development projects and complicated processes and/or involve implementation of new energy-efficient technology in the energy- intensive processes, the company should proceed with the study of these special investigations.
- Establishment and operation of an energy management system. The energy management system ensures that energy savings achieved in daily operations can be maintained in the long run, intervention will occur at inefficient operations and that new possibilities for improved energy efficiency are continuously assessed.
- Development of an action plan for scheduled EE measures based on the energy audit. The action plans are negotiated with the Danish Energy Agency.
- Annual reporting to the Danish Energy Agency documenting the progress of their EE measures and the status of their energy management systems.

All audit reports are verified by an independent organisation. The control of their technical quality is conducted by independent expert chosen by the Danish Energy Agency.

Subsidies are to be returned if the Danish Energy Agency concludes that an agreement is not being fulfilled. In cases of non-compliance, the CO_2 tax will be imposed in full.

The above scheme was the initial one. This has lasted from 1996 up to July 2002. Between 1996 and 2002 more than 400 agreements have been made with companies, covering approx. 60% of trade and industrial energy consumption. The total effect of the scheme over the period 1996–2000 of approximately 2.7 percent per year of the total energy consumption of involved companies; this corresponds to yearly energy savings of 0.1 TWh (electricity, oil and district heating).

The newest revision of the scheme, valid since January 2010, foresees that the companies will not get a tax rebate on the CO2 tax on fuel consumption but only on the CO_2 tax on electricity consumption and space heating. Actually, the rebate on CO_2 tax on electricity consumption is applied only to heavy industrial processes. The reason for this change was changes in the regulation of CO_2 emissions for industry, related to the Emissions Trading System (ETS). Under the current scheme, the participating companies are obliged to the following activities:

- Be certified in the energy management standard DS/EN16001 (which will be replaced by the international ISO50001 standard). The companies are also committed to consider energy efficiency when they invest in new equipment. Compliance with these additional

requirements is evaluated parallel with the energy management certification process.
- Carry out special investigations and projects, including productivity analyses, optimisation analyses and analyses of the control of the central process equipment.
- Implement all energy efficiency projects with a simple payback time of four years or less.

Only energy-intensive companies can enter agreements. A company can be classified as energy-intensive if:

- The company carries out one or more heavy processes identified on a "process list". They include among others production of cement, paper and condensed milk,
- The company has a green tax liability of more than 4 per cent of value added.

Failure to comply with the requirements in the agreement results in termination of the agreement and nullification of the tax rebate.

Until 2010, there were about 230 voluntary agreements covering about two thirds of the fuel consumption and between a third and a fourth of the electricity consumption in Danish industry, corresponding to about 8-9% of the national gross energy consumption. After 1st of January 2010 there are about 110 voluntary agreements covering electricity for processes and space heating.

South Africa[101,102,103]

In South Africa agreements (or pledges) to reduce energy consumption have been operationalised within the Energy Efficiency Leadership Network (EELN) which started in 2005. EELN was established at COP17 in Durban in December 2011. EELN is a partnership, which consists of more than 40 businesses, government departments/ agencies and business associations who make up the signatory network. The membership in EELN is voluntary. The aim of the EELN is to be a vehicle for its members to share their EE experiences and keep them updated on the latest EE best practices and technologies. The EELN is also a forum which brings together the government and the business to speak openly about energy efficiency as well as energy strategy and policy implementation. The EELN constitutes an important partner to help government implement the National Energy Efficiency Strategy (NEES). This partnership is evidence through a long-standing relationship with the Department of Energy (DoE) and increasingly good interaction with other government departments. Collectively the EELN companies consume more than a quarter of South Africa's thermal and electrical energy, therefore in 2011 these signatory companies signed a pledge committing themselves to continuous improvements in energy efficiency under the auspice of the EELN.

The signatories to the EELN voluntary agree to:

- Develop a road map/plan for improved EE in their operations, supported by the implementation of an appropriate energy management system,
- Develop internal EE targets that are appropriate to their operations and activities and which respond proactively to, and are aligned with appropriate Government policies and strategies,
- Report appropriately on efforts to promote EE and progress made towards setting EE improvement targets in their operations within the framework of national legislation;

[101]Industrial Efficiency Policy Database website, http://iepd.iipnetwork.org/policy/national-energy-efficiency-leadership-network-eeln-previously-called-energy-efficiency-accord

[102] National Business Initiative (2013). EELN Membership website, http://www.nbi.org.za/Focus%20Area/ClimateAndEnergy/EELNSS/Pages/EELN_Membership.aspx

[103]Draft Second National Energy Efficiency Strategy Review, Notice 1000 of 2012 Department of Energy (2012), http://www.info.gov.za/view/DownloadFileAction?id=179403

- Work with stakeholders on EE related issues to build capacity and develop the required skills to implement EE programmes and drive the required behavioural changes.

The EELN supports its members to establish their energy baselines and monitor their EE achievements. The members should report their achievements to the National Energy Efficiency Monitoring System. At COP 17, 45 companies signed onto the EELN and currently the network consists of 58 companies including Eskom, Chevron, ABB, De Beers, BP and others. Members of EELN benefit through access to best practices, technical expertise, public recognition, improved understanding of role of energy efficiency, improved competitiveness, and energy cost savings.

Annex XVII Methodology for the estimation of the cost of the measure H12 Twinning project to enhance the capacities of EEMO

Activities	Unit	Mandays per unit	Fee per manday (euro)	Fee per manday (MUR)	Cost (euro)	Cost (MUR)
Training sessions						
Energy system models, their structure, components, abilities, operation and usage,	1	10	900	36,000	9,000	360,000
Least cost optimization in energy modelling,	1	10	900	36,000	9,000	360,000
Development and analysis of scenarios for the development of the energy system	1	10	900	36,000	9,000	360,000
Integrated resource planning methodologies and tools	1	10	900	36,000	9,000	360,000
Methodologies for setting targets for EE and the development of action plans for the introduction of EE in the energy system	1	10	900	36,000	9,000	360,000
Energy policy formulation using energy modelling and planning tools,	1	10	900	36,000	9,000	360,000
Decision support tools in energy planning,	1	10	900	36,000	9,000	360,000
Best practices in energy policy measures and inventive measures,	1	10	900	36,000	9,000	360,000
Design of policies and incentive measures (market, financial, economic, regulatory, information and	1	10	900	36,000	9,000	360,000

education, research and development instruments) that promote the private investments in EE,						
EE legislation, regulation and codes	1	10	900	36,000	9,000	360,000
Regulation of smart metering	1	10	900	36,000	9,000	360,000
EE building codes and building certification schemes	1	10	900	36,000	9,000	360,000
Demand side management and mechanisms to reduce demand	1	10	900	36,000	9,000	360,000
Pricing policies for demand side management	1	10	900	36,000	9,000	360,000
Demand response-definition, policies, techniques	1	10	900	36,000	9,000	360,000
Social impacts of EE technologies and policies	1	10	900	36,000	9,000	360,000
Financing mechanisms of EE investments	1	10	900	36,000	9,000	360,000
Methodologies for the assessment of performance of policies and energy action plans and respective targets' achievement	1	10	900	36,000	9,000	360,000
Labelling scheme design, management and monitoring and evaluation	1	10	900	36,000	9,000	360,000
Operation of Energy Service Companies, policy and regulatory measures for creating the market of energy performance contracting	1	10	900	36,000	9,000	360,000

Communication and marketing – design and monitoring of awareness campaigns	1	10	900	36,000	9,000	360,000
Methodologies for EE through energy consumer behaviour change- energy feedback models- behavioural change policies and programmes	1	10	900	36,000	9,000	360,000
Social behaviour analysis of energy consumption.	1	10	900	36,000	9,000	360,000
Heat transfer	1	10	900	36,000	9,000	360,000
Building envelope and energy efficiency - thermal analysis of buildings	1	10	900	36,000	9,000	360,000
Sustainability and passive buildings- nearly zero energy buildings	1	10	900	36,000	9,000	360,000
Passive solar energy and	1	10	900	36,000	9,000	360,000
Building energy modelling	1	10	900	36,000	9,000	360,000
Electrical energy management in buildings	1	10	900	36,000	9,000	360,000
Heating, Ventilating, and Air Conditioning Systems	1	10	900	36,000	9,000	360,000
Electric motor systems	1	10	900	36,000	9,000	360,000
Energy-efficient lighting	1	10	900	36,000	9,000	360,000
Heat pumps and air conditioning	1	10	900	36,000	9,000	360,000
Refrigeration	1	10	900	36,000	9,000	360,000
Pumps and fans	1	10	900	36,000	9,000	360,000
Compressed air systems	1	10	900	36,000	9,000	360,000
Boilers and furnaces	1	10	900	36,000	9,000	360,000

Cooling towers	1	10	900	36,000	9,000	360,000
Steam and condensate systems	1	10	900	36,000	9,000	360,000
Steam distribution and utilisation in industry	1	10	900	36,000	9,000	360,000
Waste-heat recovery	1	10	900	36,000	9,000	360,000
Industrial heating and cooling processes	1	10	900	36,000	9,000	360,000
Industrial energy efficiency management and audits	1	10	900	36,000	9,000	360,000
Building energy management and building energy control systems	1	10	900	36,000	9,000	360,000
Methodologies and tools for energy audit	1	10	900	36,000	9,000	360,000
Measurement and verification of energy savings	1	10	900	36,000	9,000	360,000
Energy monitoring and targeting	1	10	900	36,000	9,000	360,000
Design, engineering, feasibility studies and monitoring of EE projects	1	10	900	36,000	9,000	360,000
Minimum energy performance standards of electrical appliances,	1	10	900	36,000	9,000	360,000
Smart metering technologies,	1	10	900	36,000	9,000	360,000
Technologies for demand response	1	10	900	36,000	9,000	360,000
Technologies that impact energy consumption through energy consumer behavioural change – energy feedback technologies	1	10	900	36,000	9,000	360,000
Development of	1	10	900	36,000	9,000	360,000

energy balances						
Usage of energy statistics and energy balances for energy planning	1	10	900	36,000	9,000	360,000
Methodologies for the collection, organisation and processing of energy statistics	1	10	900	36,000	9,000	360,000
Information systems for accumulating, managing and processing energy statistics	1	10	900	36,000	9,000	360,000
Energy indicators for energy efficiency, their usage and development.	1	10	900	36,000	9,000	360,000
Secondments						
20 secondments	20	20	900	36,000	360,000	14,400,000
Work on common projects						
Cooperation in common projects	4	150	900	36,000	540,000	21,600,000
Organisation of common events						
Cooperation in common events	4	30	900	36,000	108,000	4,320,000
Specification for infrastructure						
Preparing specifications for EEMO infrastructure	1	80	900	36,000	72,000	2,880,000
Infrastucture					100,000	4,000,000
EEMO business plan and indentification of funding sources						
Development of the business plan and indentification of funding sources	1	40	900	36,000	36,000	1,440,000
Memorandum of Understanding						

Development of the Memorandum of Understanding	1	5	900	36,000	4,500	180,000
Sum of activities cost					1,733,500	69,340,000
Management (one full time manager for two years)	1	440	900	36,000	396,000	15,840,000
Contingencies (5% of the management and activities cost)					106,475	4,259,000
Incidentals (10% of the management and activities cost)					212,950	8,518,000
Total Sum					**2,448,925**	**97,957,000**

Annex XVIII A note on the philosophy of the proposed EE/RE Financing Scheme

The EE sector, as any sector, in its early stages of development, needs funding to development further, create the markets for EE and DSM services and technologies that will bring new jobs and growth. These funding resources should be sustainable, continuous and allocated to initiatives that alleviate barriers in the expansion of the EE sector. Without sufficient funding, any plans for the development of the EE sector will remain only on paper. Often, different priorities within the governmental decision making process fight for allocation of funds from the big basket of the national budget. In this process, some sector get sufficient funds and other do not depending on the political priorities, the political agenda, the timing and a myriad of other parameters. In such a distribution of funds, the EE sector may not receive the appropriate attention and be underfunded. The same applies also to the RE sector. Therefore, the EE/RE Financing Scheme could function as a separate and distinct budget line or account in which funds dedicated to EE and RE sectors are accumulated and integrated. A Managing Committee can be set up to manage these funds, decide how the funds will be spent, manage and monitor the funds and the operation of the financial products associated with the Financing Scheme. The Financing Scheme, as a dedicated budget line or account in EE and RE sectors, will prompt the government to allocate sufficient funds by reinforcing its commitment in these sectors.

Further, based on the interviews with the local financial institutions, the majority of the SMEs and a few large ones are unable to give guarantees or collateral when they apply for loans for EE projects. So, the banks reject their projects even when they are of high technical quality and produce adequate energy savings to pay back the loans. The recent experience from NEEP and SUNREF indicates that mostly larger companies reap benefits of both funding mechanisms due to their ability to find funds to co-finance audits, the engineering studies and investments. The SMEs seem unable to exploit these funding mechanisms mainly due to lack of awareness, information and limited financial capabilities. According to the interviews of the business associations, SMEs are not willing to even pay for a subsidized energy audit. In the case of NEEP, although SMEs are offered 60% of subsidy for a professional energy audit which, on average costs, 4,000 € or MUR 160,000, they do not have the financial means to provide the remaining 40%. In addition, the number of the SMEs that applied for the financial assistance of SUNREF is much lower than the number of larger firms which applied (approximately 6 applications from SMEs in 32 in total).

Further, in the first round of the financial assistance from SUNREF, 32 EE projects were funded. Out of the 32 EE projects, the industrial projects and the projects in hotels were about one third each while the projects in the retail sector covered the 19% of the projects in EE. In terms of budget, 38% of the total budget for EE was devoted to projects in industry, another 38% to EE projects in hotels and 21% to projects in the retail sector. The average size of projects in industry, hotels and retail sector is 1.1 million € with 9 projects having exceeded this amount and 8 projects with budget between 500,000€ and 1 million €. Only 12 projects had a budget below 500,000€ (9 of them below 250,000€, 3 out of 9 very close to 250,000€). The sample maybe too small and not representative, but this fact indicates a trend which dictates that larger companies can finance EE projects while smaller ones find difficulties. According to average EU prices, an EE project of 250,000€ can hardly be considered a small scale project for a small or medium enterprise.

From the above, it is clear that banks regard that the risk of default is high when SMEs with limited creditworthiness apply for loans to fund EE investments, even when the EE investments will produce positive cash inflows and are profitable. Therefore, a mechanism to reduce the perceive default risk of the banks is needed. In addition, since the SMEs find difficulties to finance energy audits, a mechanism that subsidizes energy audits for SMEs and/or incentivizes local

commercial banks to provide loans with an interest rate below the market rate would prompt SMEs to get loans for funding energy audits or to co-finance energy audits from their equity. Such mechanisms could be associated with the EE/RE Financing Scheme. The association means that the mechanisms are funded by the Financing Scheme and are managed by its Managing Committee. In addition, the Financing Scheme has the flexibility to fund not only incentive mechanisms but a wider spectrum of EE measures:

- Pilot projects,
- The measures of the EE/DSM Master Plan and/or the RE Master Plan,
- EE and RE projects in the public sector,
- Research and development projects.

The governmental budget can be one of the sources of funds within the Financing Scheme. Other resources of the Financing Scheme could come, for example, from a public benefits charge on the electricity bill, taxes or levies (carbon tax or energy tax in industries), donations/grants from donors, international or local financial institutions, or any other source that is unrelated to the governmental budget. If non-governmental sources are chosen, the governmental budget is not burdened with cost of the initiatives funded by the Financing Scheme. The funds can also be combined with donor funding to design bigger and more influential projects.

Annex XIX A note on EEMO

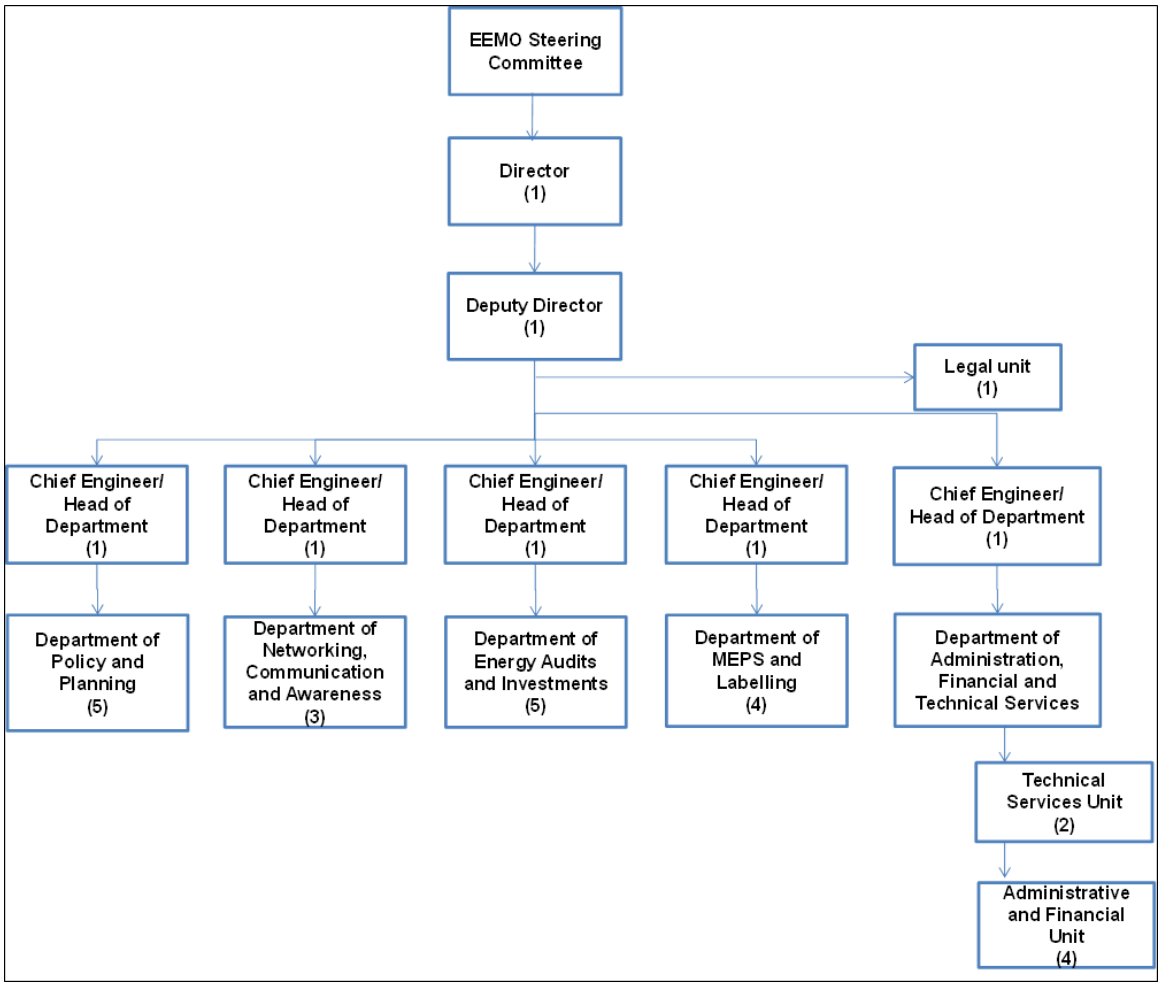
EEMO is the entity that should have a leading role in implementing the EE/DSM Master Plan and continuously provide the driving forces for the development and growth of the EE sector in Mauritius. To achieve this, EEMO needs long-term capacity building that includes both theoretical and practical training. It also needs additional scientific staff both senior and junior. Existing and new staff should be trained. Close cooperation and networking with institutions of the same or similar statute and mandate from other countries will be an opportunity to gain experience and transfer know-how and should be pursued.

When the capacities of EEMO will increase and its experience will multiply, it could start to apply for international competitive projects. Such projects are procured by international organisations like the EU, the World Bank, or other donor agencies. The required networking with other organisations to apply for such projects will be cultivated during the capacity building of EEMO and through its cooperation with other institutions of the same or similar statute and mandate. The advantage of such projects is that not only build the capacities and experience of EEMO but are a source of funds for EEMO and the government.

As the EEMO will build capacities and gain more experience, and, in parallel, the scientific requirements of the measures of the EE Master Plan will increase, EEMO would need to attract more staff with knowledge and experience and persuade the existing staff to continue working in EEMO. When EEMO has gained experience and can pursue projects or initiatives that can bring financial resources to the organisation, a mechanism to raise the salaries of the staff of EEMO should be considered. This will provide financial incentives to a) attract more qualified staff and b) convince the existing staff of EEMO to continue working for it and not be directed to the private sector.

Annex XX Phased recruitment of EEMO staff

The proposed draft organisational structure of EEMO is included in the 'Report On The Consolidated Assessment Of Potential For Energy Efficiency And Demand Side Management In Mauritius, And Current Incentive Structures'. The draft organisational structure is based on the assumption that EEMO has to achieve its mandate according to the EE Act. The draft organisational structure is repeated below.



The measures that are being implemented currently are the following:

- H5: Energy performance of buildings – Update of building codes
- H14: Development of minimum energy performance standards (MEPS) for electric appliances
- H15: Energy labelling.
- P2: Energy efficiency in street/public area lighting,
- P3: Energy efficiency in water pumping.

Furthermore, EE measures that are considered as priorities are:

- H1: Establishment of an EE/RE Financing Scheme
- H4: System for data collection surveys
- H12: Twinning project to enhance the capacities of EEMO
- I1: Establishment of voluntary agreements.
- P1: Appointment of energy managers in public buildings
- P4: Develop an action plan for EE/DSM interventions in public schools

- P5: Develop an action plan for EE/DSM interventions in local authority buildings
- P6: Develop an action plan for EE/DSM interventions in public buildings of Central Government

These measures start during 2016. As regards the staffing of EEMO, the finalisation of the organogramme should be the priority. Based on the proposed organogramme and on the technical requirements of the on-going measures and the priorities, for the years 2016-2018 the proposed new additions to the staff of EEMO are the following:

Department of Policy and Planning

- Head of the Department (with more than 10 years expertise in EE policy and planning)
- Engineer for policy development and planning,
- Engineer for energy modelling,
- Engineer for energy statistical data.

Department of Networking, Communication and Awareness

- Head of the Department (communication/marketing expert with more than 10 years of experience)
- Communication/marketing expert for design and implementation of awareness campaigns.

Department of Energy Audits and Energy Efficiency Projects

- Head of the Department (engineer with more than 10 years of experience in energy audits and energy efficiency technologies),
- Engineer for management of the energy audits,
- Engineer for managing the energy auditors scheme,
- Engineer for managing the energy audit management scheme.

Department of MEPS and Labelling

- Head of the Department (engineer with more than 10 years of experience in designing and managing energy labelling schemers and/or MEPS schemes)
- Engineer for managing the MEPS.
- Engineer for managing the energy labelling scheme.

Technical Services

- Computer engineer for technical maintenance of information systems, databases, computer network, internet network, phone network and information security services and technical equipment (computers, projectors, screens, etc).

Administrative Services

- One administrative support staff.

During the years 2019-2020, the rest of the staff proposed in the organogramme will be recruited:

Department of Policy and Planning

- Engineer for policy development and planning,
- Economist who will assess the financial impacts of the policies.

Department of Networking, Communication and Awareness

- Communication/marketing expert for design and implementation of awareness campaigns,

- Social behaviour scientist who will assess the behaviour of the users regarding use of energy.

Department of Energy Audits and Energy Efficiency Projects

- Engineer for management of the energy audits,
- Engineer for managing the energy audit management scheme.

Department of MEPS and Labelling

- Engineer for managing the MEPS,
- Engineer for managing the energy labelling scheme.

Department of Administration, Financial and Technical Services

- The Head of the Department (scientist with more than 8 years of experience in management of public administration organisations/units).

Technical Services Unit

- Computer engineer or scientist for technical maintenance of information systems, databases, computer network, internet network, phone network and information security services and technical equipment (computers, projectors, screens, etc).

Administrative and Financial Unit

- One administrative support staff,
- One accountant,
- One economist.

Legal Unit

- Lawyer who can be full-time or part-time.

Annex XXI Yearly energy savings of EE measures of the EE Action Plan

This Annex includes:

- The yearly energy savings of total final energy consumption of all the EE measures of the EE Action Plan
- The yearly energy savings per sector and fuel as a result of the EE measures of the EE Action Plan per sector.

The negative values for solar appear in households and services. This indicates that the share of solar thermal system increases as compared to the base case scenario due to the replacement of LPG and electric water heaters with SWHs.

The negative values of motor oil in industry (which includes manufacturing, agriculture, construction and mining) indicate a slight increase in the use of motor oil in agriculture.

MAED-2 model calculates the energy savings in 2015, 2020, 2025, 2030. The values in the years in-between are calculated using linear interpolation.

The yearly savings are presented as follows.

Households

Item	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Electricity	GWh	5.978	12.178	18.378	24.577	30.777	36.977	43.486	49.996	56.505	63.015	69.524	76.124	82.724	89.325	95.925	102.525
Soft solar	ktoe	-0.088	-0.182	-0.275	-0.369	-0.463	-0.557	-0.660	-0.764	-0.867	-0.970	-1.073	-1.182	-1.290	-1.398	-1.507	-1.615
Fossil fuels	ktoe	0.437	0.841	1.246	1.650	2.055	2.459	2.813	3.167	3.521	3.874	4.228	4.527	4.825	5.124	5.423	5.721
Total	ktoe	0.868	1.716	2.565	3.413	4.262	5.111	5.926	6.742	7.558	8.373	9.189	9.952	10.715	11.479	12.242	13.006

Industry

Item	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Traditional fuels	ktoe	0.006	0.010	0.014	0.018	0.022	0.026	0.028	0.030	0.031	0.033	0.034	0.033	0.031	0.030	0.028	0.027
Modern biomass	ktoe	0.556	1.149	1.742	2.335	2.928	3.521	4.185	4.849	5.514	6.178	6.842	7.589	8.336	9.082	9.829	10.576

Electricity	GWh	5.343	11.800	18.257	24.715	31.172	37.630	45.908	54.186	62.464	70.741	79.019	89.456	99.893	110.329	120.766	131.202
Solar	ktoe	0.001	0.006	0.011	0.017	0.022	0.027	0.043	0.058	0.074	0.089	0.105	0.134	0.164	0.194	0.223	0.253
Fossil fuels	ktoe	1.120	2.247	3.374	4.501	5.629	6.756	7.952	9.149	10.346	11.542	12.739	13.999	15.259	16.520	17.780	19.040
Motor fuels	ktoe	-0.012	-0.026	-0.040	-0.054	-0.068	-0.081	-0.098	-0.115	-0.132	-0.149	-0.165	-0.185	-0.205	-0.225	-0.245	-0.264
Total	ktoe	2.129	4.400	6.671	8.942	11.213	13.484	16.057	18.630	21.203	23.776	26.349	29.262	32.174	35.087	38.000	40.912

Services

Item	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Traditional fuels	ktoe	0.002	0.004	0.006	0.007	0.009	0.011	0.012	0.013	0.014	0.015	0.017	0.016	0.016	0.016	0.015	0.015
Electricity	GWh	6.722	14.941	23.160	31.379	39.599	47.818	59.182	70.545	81.909	93.273	104.637	120.205	135.772	151.340	166.908	182.475
Soft solar	ktoe	-0.168	-0.358	-0.549	-0.739	-0.929	-1.120	-1.346	-1.572	-1.798	-2.024	-2.250	-2.506	-2.762	-3.018	-3.274	-3.530
Fossil fuels	ktoe	0.301	0.637	0.973	1.309	1.645	1.981	2.380	2.780	3.179	3.578	3.977	4.446	4.915	5.384	5.853	6.322
Total	ktoe	0.713	1.567	2.421	3.276	4.130	4.984	6.135	7.287	8.438	9.589	10.741	12.292	13.843	15.395	16.946	18.497

Transport

Item	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Motor fuel	ktoe	1.357	2.832	4.307	5.782	7.257	8.732	10.412	12.092	13.773	15.453	17.133	19.019	20.906	22.792	24.678	26.564
Total	ktoe	1.357	2.832	4.307	5.782	7.257	8.732	10.412	12.092	13.773	15.453	17.133	19.019	20.906	22.792	24.678	26.564

Total final energy demand

Item	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Traditional fuels	ktoe	0.008	0.014	0.020	0.026	0.031	0.037	0.040	0.043	0.046	0.048	0.051	0.049	0.047	0.045	0.043	0.042
Modern biomass	ktoe	0.556	1.149	1.742	2.335	2.928	3.521	4.185	4.849	5.514	6.178	6.842	7.589	8.336	9.082	9.829	10.576
Electricity	GWh	18.043	38.919	59.795	80.672	101.548	122.425	148.576	174.727	200.878	227.029	253.180	285.785	318.389	350.994	383.598	416.203
Solar	ktoe	-0.255	-0.534	-0.813	-1.092	-1.371	-1.650	-1.963	-2.277	-2.591	-2.905	-3.219	-3.553	-3.888	-4.223	-4.558	-4.892
Fossil fuels	ktoe	1.857	3.725	5.593	7.461	9.329	11.196	13.146	15.096	17.045	18.995	20.944	22.972	25.000	27.028	29.056	31.084
Motor fuels	ktoe	1.345	2.806	4.267	5.728	7.189	8.650	10.314	11.977	13.641	15.304	16.968	18.834	20.701	22.567	24.434	26.300
Total	ktoe	5.067	10.515	15.964	21.413	26.862	32.310	38.531	44.751	50.971	57.192	63.412	70.525	77.639	84.752	91.866	98.980

Annex XXII Additional analysis of the proposed measures of the EE/DSM Master Plan

The additional analysis of the proposed EE measures regards the analysis of the following:

- the indirect impacts per measure,
- the complexity of each measure; the factors that contribute to the complexity of the implementation and add difficulty to it,
- the technical skills required to implement each measure,
- the sustainability; the factors that can make the measure or its results last long and generate energy savings.

The aim of this analysis is to give more information and insight to the impacts of the measures and what is required for their implementation.

Measures	Indirect impacts[104]	Complexity	Technical skills required	Sustainability	Cost (MUR)
H1: Establishment of an Energy Efficiency and Renewable Energy Financing Scheme	Creates the mechanism to finance incentives, pilot projects, research, measures in EE/RE for the development of the EE/RE sectors. If other funding resources are used than the governmental budget, it detaches the financial means required to fund the development of the EE/RE sectors from the governmental budget. Channels liquidity into the EE/RE market facilitating EE/RE project financing. Attract and leverage private and/or donor funds towards EE/RE investments. Provide access to capital in SMEs where energy savings are untapped and ESCOs which can generate EE/RE projects.	Decision by the Government is required. Establishment of the Managing Committee is required. The decision on which mechanism to be used to raise funds is required. Cooperation with local banks is required.	Financial management and control. Accounting Investment development, financing, credit and risk assessment and management. EE/RE technologies. Development and technical and economic/financial assessment of EE/RE projects.	If the sources of the finds within the Financing Scheme are sustainable, the operation of the latter will be a long term one.	18,318,993,600 (total estimated budget requirements until 2030)

[104] Indirect impacts are those that do not directly generate energy savings but create the conditions for the generation of energy savings and/or the progress to a sustainable economy or result in benefits other than energy savings.

	Soft loans increase the cost of borrowing for EE/RE investments. Partial credit guarantees induce lenders to increase their lending for EE/RE projects by providing partial coverage of potential losses from loan defaults. Energy audit subsidies incentivise SMEs to conduct them.				
H2: Establishment of an EE Information Centre for companies	Provision of analytical, detailed and tailored technical information of EE in companies, especially in SMEs. Reduction of the cost, time and effort of finding information on EE. The information empowers industry and services private sector to make informed decisions about energy efficiency, facilitate audits, investments and energy management.	Public tender to call interested entities to submit proposals for establishing the Information Centre should be developed and managed. The operation of the Centre and the quality of information should be monitored.	Energy technologies. Energy management. Tender management.	If the Information Centre has sustainable funding sources its long-term operation can be achieved.	120,000,000
H3: Energy Information System	Facilitate the population of the existing energy models and the periodic update of their data inputs saving time and effort. Increase the quality of monitoring the progress and effectiveness of EE measures and policies. Be a hub to provide readily available energy information.	Complexity is manageable for information technology professionals who will develop the System.	Information technology. Information system development and management. Energy modelling. Energy indicators and statistics.	After its development, the system can produce results for the long-term, depending on its use.	20,000,000
H4: System for data collection surveys	Develops the baseline for the EE sector. The baseline is the prerequisite for developing effective EE measures and policies.	Statistics Mauritius already has the capacity to make surveys.	Capacity to develop questionnaires and make statistical surveys. Capacity to process the	The measure is sustainable because Statistics Mauritius and EEMO have the	8,000,000

	Facilitates the monitoring of the progress and effectiveness of EE measures and policies. Assists decision makers to make informed decisions.	EEMO has the capacity to identify the data that need to be surveyed.	data from the surveys. Capacity to identify the data to be surveyed.	capacities to carry it out. Surveys need to be made regularly to update the data.	
H6: Introduction of energy performance contracting	ESCOs provide a complete range of services related to implementation and financing of EE projects and assume much of the technical and performance risk. ESCOs facilitate access to external capital for project implementation. ESCOs provide information to energy users and to banks. ESCOs generally provide operation and maintenance services to ensure that the installed equipment continues to perform at a high efficiency level. The ESCO provides breadth and depth of capabilities as well as training to the staff of the customers. Demand for energy services and EE technologies, growth for ESCOs business and for the economy.	Training of the engineering companies, the private sector consumer, the financial institutions and the public sector on the concept of EPC is needed. A working group of stakeholders to discuss and decide on the features of the EPC is necessary. Drafting of regulation, methodologies, contracts, templates is needed. Pilot projects are needed. EPC needs to be boosted by the public sector to kick-start.	Expertise in: • EPC issues. • EE project financing. • EPC models. • Energy performance contracts. • Measurement and verification methodologies.	EPC, once operational, can increase the number of EE investments for long periods, thus generating energy savings for long-term because uses guaranteed energy savings to pay back loans for EE investments.	24,000,000
H7: Market research and display of certified energy	Information on energy efficient products and their suppliers is readily available with free access to	Negotiations and cooperation with the suppliers of products is	Basic understanding of EE technologies and the energy characteristics of	If the relevant website will be hosted by EEMO will	6,000,000 (surveys, development of

efficient products	everyone. Information is provided to consumers to make more informed choices. Eventually, consumers will choose more energy efficient products. Competition is created for the suppliers to offer and sell more energy efficient products due to free marketing. Facilitation of the development of the market for energy efficient products.	required to collect information on their products and negotiate price reductions.	products.	be operational for the long-term. The website needs to be updated regularly. Once the consumers learn to regard energy efficiency in their choices, long-term energy savings can be achieved.	website) 80,000 (yearly for website update)
H8: Development of the skills of installers	Increase the quality of installations thus, they last longer, have fewer problems and produce more energy savings.	Study is required to assess the current qualifications of the existing installers, the current courses provided, the needs for professions and the required qualifications of installers. This study can be procured by MEPU. The development of a certification scheme for installers or adoption of an existing certification scheme needs also to be studied.	Trainers need expertise in installation of various energy efficient equipment applied to the building envelope, cooling and ventilating systems, lighting, hot water, cooking.	Capacity building by nature produces results that last for a long periods. The capacity building should be repeated to ensure installers' skills are up-to-date.	32,000,000
H9: Establish co-	Raise the awareness of SMEs in EE.	Need for cooperation	The skills required are	Sustainability can	4,000,000

operation between EEMO and SMEDA for training of SMEs in EE	Improve the knowledge of SMEs in EE opportunities. Reduce the cost and efforts of finding information on EE technologies, opportunities, costs, auditors and suppliers/installers for the enterprises. Motivate SMEs in undertaking EE investments.	between SMEDA and EEMO.	knowledge and experience in EE technologies, energy management and energy audits. EEMO will have such capacities after the completion of its training programme. SMEDA has already experience in training SMEs.	be achieved with the continuous cooperation between EEMO and SMEDA.	
H10: Establishment of a centre for EE/DSM training within EEMO	The local engineers can increase and/or update their knowledge and skills. With improved capacities the local engineers can make studies of better quality and identify more EE opportunities.	The EEMO needs to be trained as a trainer first and increase its capacities.	The technical skills required for EEMO would be given to its staff via the training they will receive. The measure 'Set up a twinning project' will provide such training.	EEMO could receive a fee for the provision of its training services targeted to cover the operational costs of the training centre. The EEMO staff should receive continuous training and update their skills regularly.	The cost of development of the training material is estimated to be MUR 4,000,000 if the EEMO is supported by an external consultant to prepare it. The development of the webpages will cost MUR 200,000 while their update MUR 40,000 per year. All these equal to MUR 4,800,000 until 2030
H11: Introduction of EE in school curricula	Raise awareness. Integrate the principles of EE into the every-day lives of the young generation and create a culture of promoting EE. Make the young generation more informed about EE.	A working team needs to be established comprising of MEPU and EEMO, Ministry of Education and Human Resources, Tertiary Education and	Cooperation between the institutions is required. Basic knowledge of EE practises and teaching methods is required. Such knowledge exists in EEMO and in the teachers	The impacts to the pupils will be permanent and they will change their energy behaviour. The sustainability of the measure	12,000,000

	Change behaviour in energy use and exercise EE practises in every-day life.	Scientific Research, Mauritius Institute of Education (MIE). The teachers need training to be able to teach the EE courses to pupils.	working with pupils.	depends on the will of the institutions to implement it for long-term.	
H12: Twinning project to enhance the capacities of EEMO	The EEMO will gain the needed scientific, both theoretical and practical, capacities and knowledge to accomplish its mandate according to the EE Act and further drive the development of the EE sector. The EEMO will have the capacities to implement its role in the EE Action Plan. The EEMO staff will be trained as trainers and provide the respective services. Create networking and co-operation with more advanced institutions.	Counterpart institution(s) that can train EEMO and establish cooperation with it should be identified. Funding from international donors should be ensured to implement the twinning project.	Managerial skills are needed from the Mauritian institutions need to have to implement the project. The counterpart institution(s) should have solid and advanced capacities in EE.	Once the EEMO staff receives training from the twinning project, they can train new staff so that the capacities are past from the senior to the new professionals which have been recruited after the twinning project's completion.	97,957,000
H13: Establish technical specification for solar water heaters entering the Mauritian market	Raise the quality of the SWHs, their reliability, their operational life and the resulting energy savings.	In order to set, technical specifications for SWH components and/or systems that are imported standards need to be studied. To study the standards, a working group of experts in the fields of solar thermal systems and standardisation is	Technical skills as regards the technology of SWHs, and the standards.	The technical specifications needs to be reviewed and updated because of the improvement of technology.	4,000,000

		required.			
H16: Establishment of EE/DSM working groups and networking in different subsectors for EE/DSM planning	Strengthen the communication and cooperation between stakeholders in the EE sector in order to improve decision making and planning. Improve the transparency of the planning process thus, improving its quality. Improve quality of planning by making the procedure more participatory.	Need to convince the stakeholders to participate in the working groups. This is not complex as the stakeholders can realise that the participation of for their benefit.	Management of the working groups. Energy efficiency planning skills. Such skills already exist in EEMO and MEPU and are being improved.	Since the quality of the planning in EE will be improved, the working groups will continue to operate.	20,000 per meeting
I1: Establishment of voluntary agreements	Governments ensure that EE investments will be carried out in energy-intensive industries contributing to the achievement of national EE and/or environmental policies The number of energy audits in large consumers is increased. Awareness and information to large consumers. The number of cost-effective EE investments increases. Boost in the demand for EE services and technologies. The competitiveness of the large companies which participate increases. Structured dialogue process with large consumers and the government. Increases knowledge on profitable energy efficiency options, learning, communication, exchange of experience, dissemination of best practise.	Negotiations and consensus between government and large consumers is necessary. Profound analysis of energy consumption of companies for target setting is required. A monitoring mechanism for energy savings and an administrative mechanism are necessary.	Energy audits. Analysis of EE potentials. EE technologies. EE project feasibility studies. Development of EE action plans. Apply and operate energy management schemes. Reporting and monitoring of EE. Negotiations and cooperation. Provision of technical support, information and incentives.	The voluntary agreements should be based on negotiation and consensus between government and large consumers so they can be sustainable and produce long-term energy savings. Cost-effective and profitable EE investments will be carried out by the companies, so their competitiveness will be unharmed, if not improved. The production cost for the companies	Establishment of a voluntary agreement scheme: MUR 5,440,000 establishment of a computerized data-based monitoring system: MUR 8,000,000 Management and operation cost of the voluntary scheme MUR 14,000,000 per year

	Improved energy management practises and capacities. Increase awareness and motivation of top management. Long-term commitments to save energy based on consensus. More efficient energy management and monitoring of energy consumption in enterprises. The implementation of voluntary agreements can be a tool for investigating new EE policies.			will fall. The voluntary agreements can also change attitudes and awareness of managerial and technical staff regarding EE due to the element of continuous improvement and learning that they embody. The long-term nature of the voluntary agreement facilitates training and learning of company staff in energy management, EE technologies and practises.	
S1: Energy efficiency awareness and information campaign for buildings and technologies used of the services sector	Raise awareness for EE opportunities and energy management. Provide information about energy efficiency techniques and technologies. Stimulate energy audits and EE investments.	The design and implementation of the awareness and information campaign should be performed by professionals in communication and	Skills in designing awareness and information campaigns, communication and marketing. EEMO has the skills to provide information on EE and also to manage and	Awareness and information should be provided continuously. The campaign should be evaluated and improved over time.	11,771,845

		marketing; this work should be procured and monitored by EEMO. EEMO is experienced with awareness and information campaigns.	monitor the campaign.	The improved campaign should be carried out when the policy makers deem necessary.	
S2: Design and conduct a feasibility study on self-generation for hotels	The study will define the details of how the hotels will be disconnected from the grid and generate their own power during peak demand periods. The study will investigate if this is feasible and cost-effective for both CEB and the hotels. The study will detail how the DSM activity will be designed.	CEB is experienced on such kind of studies. The study combines the technical issues with the economic analysis. The study is not too complex so that complexity can be a barrier. The complexity of the implementation of the DSM activities will be revealed by the study.	Technical knowledge of the operation of the grid and the technicalities of disconnecting consumers. Load management. Economic and feasibility analysis. CEB has experience in all the above.	The pilot phase of the DSM activities will investigate whether and how they can be sustainable in the long-run.	8,000,000
S3: Design and conduct a feasibility study on the use of Building Energy Management Systems (BEMS) in hotels and commercial buildings to reduce energy consumption	The study will define the details of how hotels and other service company buildings which have building energy management systems (BEMS) or any other programmable control system can programme them and reduce peak demand during peak hours. The study will investigate if this is feasible and cost-effective for both CEB and the hotels and the companies in services sector. The study will detail how the DSM activity will be	CEB is experienced on such kind of studies. The study combines the technical issues with the economic analysis. The study is not too complex so that complexity can be a barrier. The complexity of the	Technical knowledge of the operation of the BEMS and other programmable controls. Load management. Economic and feasibility analysis. CEB has experience in all the above.	The pilot phase of the DSM activities will investigate whether and how they can be sustainable in the long-run.	8,000,000

	designed.	implementation of the DSM activities will be revealed by the study.			
HL1: Governmental Programme for financing EE interventions in residential buildings	Accelerate the implementation of integrated EE interventions that will sustain the energy reductions over time. Create markets for energy auditors, residential market for EE services, technologies, materials, systems, equipment and energy efficient appliances and generate growth. Provide awareness and information to household owners on EE. Raise the capacities of local engineers in feasibility, EE technologies applications studies and energy audits.	Needs detailed design of financial support levels and procedures. Cooperation between MEPU/EEMO and local banks. Establishment of a Committee comprising of experts from the Ministry of Infrastructure and Land Transport and EEMO to manage the measure is required. Quality control of energy audits, the applications to participate, the installation of EE measures in the buildings, monitoring of the allocation of funds, and assessment of the impacts are required. All parties need to understand their roles. There are prerequisites	Management of support Programmes and funds. Energy auditing. Building envelope and energy efficiency - thermal analysis of buildings. EE technologies and their applications. Heating, Ventilating, and Air Conditioning Systems (HVAC) Energy management in buildings. Building energy management systems and controls. Economic analysis.	The sustainability of the measure will depend on the evaluation of the results of the pilot phase. If the results of the pilot phase are promising, the sustainability of the measure will be thrusted by the participation of the households, the growth in the markets and the resulting energy savings.	23,040,000,000 (required funds until 2030)

		for designing and launching the Programme. A pilot phase could be useful to assess and make improvements.			
HL2: Energy efficiency awareness and information campaign for households	Inform the public about the Governmental Programme for financing EE interventions in residential buildings. Accelerate the participation rate in the Programme.	The design and implementation of the awareness and information campaign should be performed by professionals in communication and marketing; this work should be procured and monitored by EEMO. EEMO is experienced with awareness and information campaigns.	Skills in designing awareness and information campaigns, communication and marketing. EEMO has the skills to provide information on EE and also to manage and monitor the campaign.	The campaign's purpose is to inform the public of the Governmental Programme on residential buildings. If the evaluation of the Programme is not encouraging as regards participation, the awareness campaign may be repeated.	24,990,000
P1: Appointment of energy managers in public buildings	Can achieve quick energy savings. Give the example to the private sector of how energy is managed in buildings. Implementation of behavioural measures and no-cost measures to reduce energy consumption in the public buildings. Raise the awareness of the users of the buildings.	Before EEMO trains the energy managers, EEMO staff has to be trained as trainers. This can be realised within the measure H12: Twinning project to enhance the capacities of EEMO.	Energy use in buildings. Energy management and designing an energy management program. Technologies and techniques for reducing energy consumption. Energy monitoring, targeting and reporting.	Sustainability will be achieved via the political will to maintain energy managers in public buildings. Once energy managers are trained, their experience will follow a learning	The cost of the measure will be included in the existing public budget appropriations already allocated to the implementing entities. The cost depends on the numbers and salaries

			The energy audit process. Economic analysis and life cycle costing. Energy Performance indicators and benchmarks. Standards and labelling.	curve, thus resulting in accelerating energy savings. EEMO should support the energy managers if requested.	of the energy managers.
P4: Develop an action plan for EE/DSM interventions in public schools	The private sector is engaged in energy audits, development of action plan and implementation of EE interventions, thus creating the EE market. Improvement of private sector capacities. Demonstration of EE technologies and the implementation of EE interventions set the examples. The private sector will be stimulated to invest in EE. The measure involves the public sector and can achieve quick energy savings.	EEMO makes preliminary energy audits and procures the development of the action plan at the first phase and then the implementation of the EE interventions at the second phase. EEMO monitors both activities.	Energy audits. Energy use in buildings. Energy management and designing an energy management program. Technologies and techniques for reducing energy consumption. Energy monitoring, targeting and reporting.	The measure will trigger additional EE investments from the private sector and the market for EE will grow. After the installation of EE interventions is completed, the need for maintenance will create additional demand for EE services. When the EE technologies installed will surpass their operational life will need replacement, thus contributing to	32,000,000

				the market growth.	
P5: Develop an action plan for EE/DSM interventions in local authority buildings	The private sector is engaged in energy audits, development of action plan and implementation of EE interventions, thus creating the EE market. Improvement of private sector capacities. Demonstration of EE technologies and the implementation of EE interventions set the examples. The private sector will be stimulated to invest in EE. The measure involves the public sector and can achieve quick energy savings.	EEMO makes preliminary energy audits and procures the development of the action plan at the first phase and then the implementation of the EE interventions at the second phase. EEMO monitors both activities.	Energy audits. Energy use in buildings. Energy management and designing an energy management program. Technologies and techniques for reducing energy consumption. Energy monitoring, targeting and reporting.	The measure will trigger additional EE investments from the private sector and the market for EE will grow. After the installation of EE interventions is completed, the need for maintenance will create additional demand for EE services. When the EE technologies installed will surpass their operational life will need replacement, thus contributing to the market growth.	32,000,000
P6: Develop an action plan for EE/DSM interventions in public buildings of Central Government	The private sector is engaged in energy audits, development of action plan and implementation of EE interventions, thus creating the EE market. Improvement of private sector capacities. Demonstration of EE technologies and the implementation of EE interventions set the	EEMO makes preliminary energy audits and procures the development of the action plan at the first phase and then the implementation of the	Energy audits. Energy use in buildings. Energy management and designing an energy management program.	The measure will trigger additional EE investments from the private sector and the market for EE will	32,000,000

	examples. The private sector will be stimulated to invest in EE. The measure involves the public sector and can achieve quick energy savings.	EE interventions at the second phase. EEMO monitors both activities.	Technologies and techniques for reducing energy consumption. Energy monitoring, targeting and reporting.	grow. After the installation of EE interventions is completed, the need for maintenance will create additional demand for EE services. When the EE technologies installed will surpass their operational life will need replacement, thus contributing to the market growth.	
T1: Financial incentives to promote electric vehicles	Introduction of electric vehicles and charging points. Reduction in motor fuels. Increase in power consumption required for charging the vehicles (unless the charging points use RE power source).	Design of the incentives. Development of the management system to apply, manage and monitor the incentives. Evaluation of the impacts.	Expertise in electric vehicle technology. Expertise in transport and mobility policies and development of incentive programmes. Expertise in construction of charging points with RE and grid-connected. Economic analysis.	The sustainability of the measure depends on the evaluation of the impacts and the acceptability by the vehicle users.	A study is needed to establish the budget
T2: Incentives for the replacement of	Introduction of more energy efficiency vehicles. Introduction of vehicles of alternative technology	Design of the incentives.	Expertise in vehicle technology.	The sustainability of the measure	A study is needed to establish the budget

private vehicles and to promote the use of energy-efficient vehicles (more energy efficient vehicles, vehicles fuelled by biofuels and hybrid vehicles)	(biofuel vehicles, hybrid vehicles). Reduction of emissions.	Development of the management system to apply, manage and monitor the incentives. Evaluation of the impacts.	Expertise in transport and mobility policies and development of incentive programmes. Economic analysis.	depends on the evaluation of the impacts and the acceptability by the vehicle users.	