STRATEGIC PROGRAM TO PROMOTE RENEWABLE ENERGY AND ENERGY EFFICIENCY INVESTMENTS IN THE ELECTRICITY SECTOR OF SAO TOME AND PRINCIPE

IMPLEMENTATION FRAMEWORK FOR ENERGY EFFICIENT LIGHTING AND APPLIANCES IN SAO TOME AND PRINCIPE

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SUMMARY

LIST OF ACRONYMS

AC	Air Conditioning
AFAP	Agência Fiduciária de Administração de Projectos em São Tomé e Príncipe
AfDB	African Development Bank
AGER	General Regulatory Authority
AENER	Santomean Association of Renewable Energies
ARP	Autonomous Region of Principe
ATEFER	Association of Cold Technicians and Renewable Energies
BSTPPTC	Brazil-São Tomé and Príncipe Professional Training Centre
CCIAS	Chamber of Commerce, Industry, Agriculture and Service
CEMAC	Economic and Monetary Community of Central Africa
DGA	Directorate General of Environment
DGRNE	General Directorate of Natural Resources and Energy
DRCAE	Directorate for Regulation and Control of Economic Activities
ECCAS	Economic Community of Central African States
EDP	Energias de Portugal (EDP)
ECGCF	Green Climate Fund
ECOWAS	Economic Community of West African States
EE	Energy Efficiency
EELA	Energy Efficient Lighting and Appliances
EER	Energy Efficiency Rate
EMAE	Water and Electricity Company
IDDA	Industrial Development Decade for Africa
ISO	International Organization for Standardization
GEF	Global Environment Facility
INA	International Fund for Agriculture
LDCs	Least Developed Countries
LED	Light-Emitting Diode
LRACs	Lighting, refrigerators and air conditioners
MEPS	Minimum Energy Performance Standards
MIRN	Ministry of Infrastructure and Natural Resource
MNECC	Ministry of Foreign Affairs, Cooperation and Communities, São Tomé and Príncipe
NGO	Non-governmental organization
NSEP	National Sustainable Energy Platform
PANA	National Climate Change Adaptation Plan
PANEE	National Energy Efficiency Action Plan
PANER	National Renewable Energy Action Plan
PIQAC	Quality Infrastructure Programme for Central Africa
PNDS	National Sustainable Development Plan of the STP
RECs	Regional Economic Communities
RES	Renewable Energy Sources
RISE	Regulatory Indicators for Sustainable Energy
RJSE	Legal Framework of the Electricity Sector
SENAPIQ	National Service of Intellectual Property and Quality
SIDS	Small Island Developing States
SMEs	Small and Medium Enterprises
STP	Sao Tome and Principe
TESE	Association for Development
UNDP	United Nations Development Program
UNEP	United Nation Environment Program
UNIDO	United Nations Industrial Development Organization

1 INTRODUCTION

São Tomé and Príncipe (STP) is a country consisting of two main islands situated in the Gulf of Guinea, that has an exclusive economic zone of 160,000 km^2 and is a member of the Economic Community of Central African States (ECCAS). With an area of 1001 km^2, STP is a Small Island Developing States (SIDS), which means that STP is facing different challenges, due its size, its remoteness, its low economic development level, and is considered a least developed country (LDCs).

The country has developed the following documents to guide its economic growth:

- *2030 Vision: "São Tomé e Principe 2030: the country we need to build"*, which aims to transform the country into a climate-resilient and vibrant island hub for blue economy business, financial services and tourism;
- *National Development Plan (PND) 2020 – 2024*, which has the Government Program as the basis for its conception and elaboration and aligns with the United Nations 2030 Agenda for sustainable development, the accelerated implementation modalities of the Samoa Roadmap and the 2063 Africa We Want Agenda

The aim is to develop a climate resistant archipelago, and therefore it is necessary to develop its energy sector, especially the electricity sector, to develop renewable energy (RE) sources and promote energy efficiency (EE).

The success of these policy documents depend heavily on the reform of the energy sector and a transformational shift of the entire energy system from an almost complete reliance on imported fossil fuels to RE and EE. Such a transition will lead to a significant reduction in fossil fuel import costs and free up scarce monetary resources for social and economic development (e.g., education, health, transport, export diversification and development of Small and Medium Enterprises (SMEs) and adaptation to climate change). In addition, it will help the island's main industries and income generating activities (e.g., water supply, agriculture, food processing, tourism, fisheries and the blue economy in general) to become more productive and competitive.

To answer these challenges, several projects are on the way, for instance the Global Environment Facility (GEF) project *"Strategic program to promote renewable energy and energy efficiency investments in the electricity sector of São Tomé and Príncipe"*. The Green Climate Fund (GCF) funded by the UNIDO project *"Building institutional capacity for a renewable energy and energy efficiency investment programme for Sao Tome and Principe was already approved and started its implementation."* Both projects are implemented by UNIDO in partnership with DGRNE/MIRN.

This UNIDO project aims to decrease electricity demand-side losses, through the introduction and implementation of **MEPS (Minimum Energy Performance Standards) and energy labels, for three main electric appliances: lighting, refrigerators and air conditioners (LRACs).**

The promotion of energy efficiency measures can offer great opportunities early on, to reduce overall electricity demand and peak electricity demand. It will also enable electricity to reach out to a greater proportion of the population and improve the economic activities in the country.
It is expected that the successful implementation of minimum energy performance standards (MEPS) and a corresponding labeling scheme will:

- Reduce electricity peak demand and thereby reduce the pressure on the electricity network. Also, the new electrification plans being developed will reach a higher percentage of the population, and consequently reduce government future public expenditures;
- Reduce overall electricity consumption and bills for consumers, who will spend a smaller fraction of their incomes on energy. This is especially important for low-income households, for which the high price of electricity is a barrier to meeting their basic needs;
- MEPS and labeling of household appliances can serve as a powerful tool to inform consumers about differences in energy performance. This will direct consumers towards purchase of more efficient appliances.

The overall objective of the project is to contribute to increasing national capacity to uptake energy efficient appliances in compliance with quality standards.

2 EXECUTIVE SUMMARY

Background

UNIDO is supporting São Tomé and Príncipe (STP) on project that aims to decrease electricity demand-side losses in São Tomé and Príncipe (STP), through the introduction and implementation of Minimum Energy Performance Standards (MEPS) and energy labels, for three main electric appliances: lighting, refrigerators and air conditioners.

This report presents the Implementation Framework for energy standards and labels of appliances in STP. An implementation framework for energy-efficient appliances is critical to support the implementation and monitoring of national initiatives on energy efficiency in STP, and to drive the STP market transformation through the promotion of efficient use of energy in lighting, refrigerators and air conditioners.

Review of Energy Efficiency Policy and Regulations

Currently, there is no regulatory framework governing MEPS and energy labeling at STP. Regulation of the energy sector in STP is still very recent. However, several frameworks exist on EE such as:

- National Energy Efficiency Action Plan (PANEE)
- Law 4/2021 Great Options Plan (GOP):
- The Third National Communication on Climate Change
- The National Sustainable Development Plan of the STP 2020-2024
- The National Climate Change Adaptation Plan (PANA)

The PANEE details several regulatory and legal measures and also incentive mechanisms concerning MEPS and labels.

Few EE initiatives have been implemented in STP and, indeed, almost all have been in the context of replacing incandescent bulbs with efficient ones.

The major institutions of the energy sector are:

- Ministry of Infrastructures and Natural Resources (MIRN);
- Directorate General of Natural Resources and Energy (DGRNE);
- Autonomous Region of Príncipe (RAP);
- General Regulatory Authority (AGER);
- National Intellectual Property and Quality Service (SENAPIQ);
- National Energy Certification Body (ENCE);
- National Energy and Water Utility (EMAE);
- National Petroleum Agency (ANP);
- Directorate General for Environment (DGA); and
- Importers, distributors and retailers of EE appliances.

Project Components and Expected Results

The Project has six components and ten outcomes designed to contribute to the project objectives. Each outcome includes a number of specific outputs and a series of planned activities.

Component 1. Energy Efficiency Policy Enhancement. This component will focus on supporting the MIRN to set up a policy dialogue platform and to establish the necessary legal and institutional framework to phase out incandescent lamps and inefficient refrigerators and air conditioners in STP, including the preparation of an enabling EE law with associated regulations.

Component 2. Technical and Managerial Capacity Building for EE Appliance Market Development. Public institutions and private sector players in the EE market have a crucial role to play in transforming the market for more energy-efficient products. Therefore, this component will work with EE appliance importers/distributors/retailers to increase their capacity to deliver an adequate supply of good-quality energy-efficient products in STP. The capacity building will also benefit public institutions, particularly Government ministries, departments and agencies involved in the project implementation. It will also focus on supporting the Project Management Unit (PMU) and strengthening the institutional and operational capabilities of the standard enforcement agencies in STP.

Component 3. Appliance Quality Improvement. This component will focus mainly on activities of the standard authority (SENAPIQ) and other partners towards the national adoption of:

i) EE standards and labels of appliances
ii) Procedures for enforcing EE regulations for appliances
iii) Procedures for testing energy-efficient appliances
iv) Procedures for monitoring that all traded appliances meet quality, environmental and energy performance standards.

Component 4. Energy Appliance Dissemination. This component will focus on delivering mobilization, outreach and training activities for public utilities, private distributors and installers to fully involve them in the dissemination of energy-efficient lighting, refrigerators and air conditioners (LRACs). The component will also support significant improvements in the sale of EE LRACs and reducing the sales of incandescent lamps and inefficient refrigerators and air conditioners through demonstration projects in households, public buildings and street lighting. Environmentally-sound waste management schemes for used LRACs will also be established.

Component 5: Consumers Education and Awareness. This component will focus on outreach activities to increase information to consumers in the household, public and commercial sectors as well as policy makers and the private sector about the benefits of energy-efficient appliances.

The Logical Framework Analysis of Project Resuts are presented. The Project Implementation Plan is also provided presenting the project components, the programmed activities, the key implementing agency and the supporting agency in the period 2022-2025.

The project management arrangement is expected to consist of the following:

- The Project Steering Committee (PSC)
- The National Project Director (NPD)
- The Project Management Unit (PMU)
- The Technical Working Group (TWG) within the National Sustainable Energy Platform (NSEP)

Business Model for Energy Efficient Lighting, Refrigerators and ACs in STP

A business model to facilitate the promotion of EE lighting, refrigerators and ACs in STP is proposed, after conducting an analysis of different financial mechanisms, and the Baseline Assessment of Market Conditions of Lighting, Air Conditioners and Refrigerators in STP, as well as discussions with local stakeholders.

The key elements of the proposed business model to promote EE LRACs in STP are:

- Bulk rebate negotiation for price reduction on LRACS;
- Strong supply chain with last mile service delivery to ensure availability and servicing of LRACs at local retail shops in STP;
- Information Management System (IMS) for efficient coordination between the various actors;
- Effective consumer engagement to create awareness about the EE program and the product benefits among stakeholders; and
- Financial incentives and financing options to make it easier for consumers to purchase the higher-priced EE LRACs in STP.

The PMU will ensure that women are encouraged to take advantage of the opportunities offered through the setting up of micro franchises to mobilise the participation of local retailers in the supply chain.

Communication Strategy to Promote Energy-Efficient LRACs in STP

A Communication Strategy has also been developed for promoting awareness, target group uptake, and stakeholders' commitment towards the promotion of energy-efficient appliances in STP. Awareness activities and engagement under the Strategy will contribute to maximize energy efficiency gains under the EE program and help to ensure that target groups adopt and sustain the use of energy efficient appliances. Project Management Unit (PMU.

The Communication Strategy on the Promotion of Efficient Appliances (CS-PEA) in STP provides the general roadmap to update all stakeholders regularly on activities and outcomes of the program to promote energy-efficient appliances in STP. It also provides guidelines to enhance communication among stakeholders of the program. The content of the communication will include success stories and case studies on energy efficiency interventions in STP and similar countries. The CS-PEA is expected

to raise the awareness of the program and will have the potential to impact positively on other national policies and on the media.

Conclusion - Recommendations

A **dedicated financing fund** in the form of a National Fund financed by international financial institutions and/or regional initiatives should be established to finance EE projects. **Companies and financial institutions** have to begin **to invest in companies that have environmental, social and governance (ESG) impacts**, including EE. STP should seek to leverage environmental, social, and governance (ESG) investments for the implementation of EE and the attraction of private capital.

Reliable, timely and detailed data on energy end-uses, markets, technologies and energy conservation opportunities in all sectors should also be collected for the development of effective EE strategies and policies in STP. The DGRNE should undertake a review of best practices in data collection for EE.

Gender mainstreaming in the EE appliance program in STP is also critical for the success of the program. It is important to **integrate gender aspects** into the program, to achieve the significant gender benefits and positive impacts on women and girls of the EE measures in households as well as in industries such as agriculture, textiles and clothing, fisheries, aquaculture, and several rural enterprises.

Digitalization and New Business Models should be incorporated in the implementation of the EE appliance program. Digital trends in energy should be considered fundamental to ensuring faster and more efficient growth in the sector and ultimately improving the efficiency of energy development, distribution and use. Digital innovation will ultimately enable greater reach in access to RE with EE design.

As other critical factors, testing, inspection, and certification of appliances are essential to support the implementation of MEPS in STP. However, methodologies for testing electrical devices are not yet developed.

Policy, Regulation and Standards are also very important factors for the success of the EE appliance program in STP. Considering that the policy and regulatory framework in STP is still in its infancy, EE is generally not among the priority options. In the absence of targets and policies, regulations and standards for EE appliances and projects that help effectively achieve EE goals and objectives are also largely absent. Regulation can ensure minimum performance appliances or eliminate very poor-quality appliances from the market.

O projeto visa diminuir as perdas do lado da procura de eletricidade em São Tomé e Príncipe, graças à introdução de um mecanismo bem provado, as Normas Mínimas de Desempenho Energético (MEPS) e etiquetas energéticas, para três aparelhos elétricos principais: iluminação, ar condicionado e refrigeração.

Este relatório contém o plano de implementação das normas e rótulos energéticos em STP.

3 OBJECTIVES OF THE REPORT

This report presents the Implementation Framework for energy standards and labels of appliances in STP.

An implementation framework for energy-efficient appliances is critical to support the implementation and monitoring of national initiatives on energy efficiency in STP, and to drive the STP market transformation through the promotion of efficient use of energy in lighting, refrigerators and air conditioners.

This implementation framework seeks to facilitate harmonization and clear alignment with MEPS, in the ECCAS region through adequate harmonized energy efficiency policies, which will enhance cross-border trade of efficient products, adoption of the best practices, and technological comparisons, and thereby accelerate energy savings and reduction of carbon emissions through the use of efficient appliances in STP. The major underlying factors of the implementation framework include the specific socio-economic and cultural island context of STP, so as to ensure long-term sustainability and inclusiveness of the framework.

The development of the implementation framework has been guided by the “three pillars” that serve as the foundation to success of an energy efficiency programme - the Pathway, the Partners and the Process (3Ps). Thus, the sequencing steps of the implementation pathway is defined, the key governmental and non-governmental institutions that will contribute to the success of the project are then defined followed by defining the cyclic process of project implementation, as summarized in Figure 1.

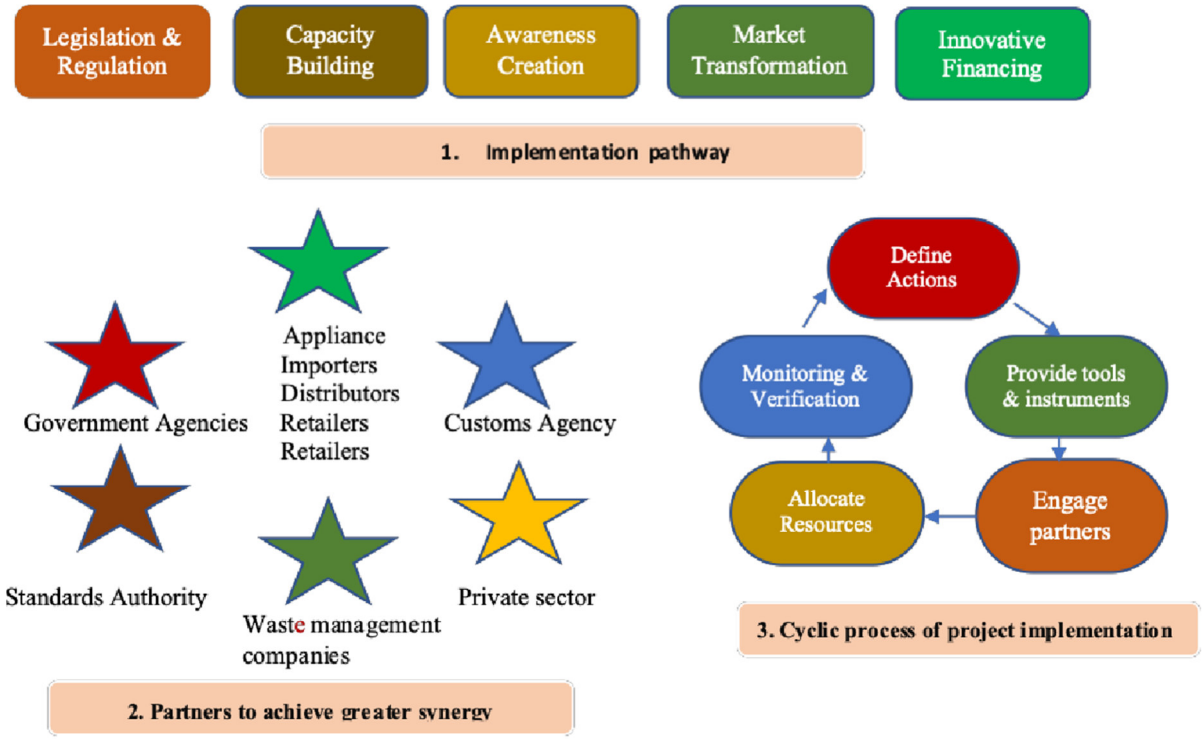


Figure 1: The 3 pillars - Pathway, Partners and Process (3Ps) - foundation to EE programmes

Adapted from: ESCAP, UN (2011) Guidelines for Strengthening EE Planning & Management in Asia *& the Pacific*

This implementation framework aims **to phase out inefficient appliances** (lighting, refrigerators and air conditioners) and reinforce energy efficiency policies in STP.

The implementation framework was developed through the following activities:

- Desk study to review and evaluate relevant reports, data and other information on energy efficiency policies and regulations and standards in place or planned for STP.
- Consultation during two missions to STP with key stakeholders related to the import, distribution, retail, use and regulation of appliances for further collection and validation of data/information, to gather their opinions/needs, and to confirm the most relevant appliances and the relevant actions for increasing the market up-take of their energy-efficient versions. This consultation of stakeholders included the Directorate-General for Natural Resources and Energy (DGRNE), the General Regulatory Authority (AGER), the National Water and Electricity Company (EMAE), the Chamber of Commerce, Industry, Agriculture and Service (CCIAS), and business associations.
- Identification of the institutional capacity and responsibilities to support the implementation of MEPS and labeling schemes as well capacity development needs of the institutions.
- Additionally, a Communication Strategy was developed to enhance effective information exchange with stakeholders, including models for information, awareness-raising, and demonstrations targeting both men and women.

A workshop was organized to validate the implementation framework. The work carried out during this workshop is detailed in another report.

4 REVIEW OF ENERGY EFFICIENCY POLICY AND REGULATIONS

○ 4.1 General context

The economy of STP is heavily dependent on International Development Assistance (IDA), which financed 97.3% of the 2019 state budget. The economic sector is still fragile and not very diversified, and consists mainly of production and export of cocoa which represents about 90% of total export earnings. The tertiary sector of the economy, largely informal, represents around 60% of GDP, employing 60% of the working population. The energy profile of STP is characterized by the high use of biomass (firewood and charcoal) for domestic consumption and the consumption of diesel, which is generally used for power generation. STP does not produce fossil fuels and therefore all those consumed in the country are imported, which makes the country dependent on imports and international price fluctuations.

Currently, households and professional energy consumers consume fossil fuels such as diesel (for the production of electricity), kerosene (for lighting and cooking) and LPG (for cooking). In the case of lighting, candles and battery lanterns are also used in some places.

Few initiatives or projections have investigated the potential of EE and the rational use of energy in STP. The initiatives mainly concern the replacement of incandescent bulbs. The National Energy Efficiency Action Plan (PANEE) also points out that there is enormous potential for savings in terms of behavior change, for example by turning off air conditioners and lights at night in empty public buildings.

In terms of education, some training has been provided at the local level during the implementation of renewable energy projects (local technicians). In terms of research, certification and auditing, there are no initiatives.

In the National Sustainable Development Plan 2020-2024, STP undertook to promote, in coordination and in partnership with local authorities, national energy autonomy and to encourage EE in public and private, commercial and industrial buildings. In addition, there is a regulatory provision to incorporate appropriate RE and EE in the projects of public and private real estate infrastructure.

STP has enormous potential especially when it comes to reducing the electricity consumption of air conditioning equipment and replacing common incandescent lamps and compact fluorescent lamps, in addition to using more efficient stoves for cooking, as well as reduction of network losses.

In the implementation of Vision 2030 “São Tomé and Príncipe 2030: the country we must build”, the government intends to achieve, among others, the following objective: ensure the substantial improvement of the country's EE through the implementation of the PANEE. In this sense, the Government aims to strengthen the coordination of EE support programs and to support innovation and technology transfer.

The approximate cost of importing diesel for power generation in the business-as-usual scenario by 2050 could reach over US$ 1 billion from US$ 23.6 million in 2019 (PANEE).

○ 4.2 Energy efficiency regulatory and legal frameworks

Currently, there is no regulatory framework governing MEPS and energy labeling at STP. Regulation of the energy sector in STP is still very recent. However, several frameworks exist on EE such as:

- 2021: **National Energy Efficiency Action Plan (PANEE)** which sets specific objectives and targets for the EE sector with the main objective of increasing the energy efficiency of the country. Regarding electrical appliances, the PANEE sets targets for replacing incandescent bulbs with LED lamps in public and residential / commercial lighting, as well as labeling of household appliances and other equipment.
- 2021: **Law 4/2021 Great Options Plan (GOP):** the government expresses that it aims to accelerate the energy transition in STP. Certain measures aim to regulate energy efficiency rules, regulate the inspection of poor-quality electrical equipment and develop energy mapping studies.

- 2019: **The Third National Communication on Climate Change 2019** identified mitigation options in the energy sector which notably include EE initiatives (equipment and adoption of efficient lighting, energy efficient building materials, energy efficient appliances).
- 2019: **The National Sustainable Development Plan of the STP 2020-2024** (PNDS) published by the STP government in 2019. In the field of energy, the Plan underlines the need to reverse the current situation with the implementation of EE measures.
- 2006: **The National Climate Change Adaptation Plan (PANA)** contained the introduction of technologies that reduce the consumption of wood for energy production, for example through the implementation of EE measures such as improved stoves, and with nationally accessible technologies and knowledge.

The PANEE details several regulatory and legal measures and also incentive mechanisms concerning MEPS and labels, as summarized below and presented in detail in Appendix 1.

Table 1: Main regulatory and legal measures planned in PANEE

	Category	No. of Measures	Target Group	Entry into Service
1	Development of Prior Studies and Collection of Information (Policy and Technical)	1	Decision makers in the public and private sectors	2021-2025
2	Organizational strengthening (Institutional)	2	Public Sector / Energy Service Companies	2021-2025
3	Market development (Regulatory and Legal)	7	General public/ Construction professionals / Building users and owners/ Industry/ Hotel sector/ Customs Officials/ DGRNE/DGA/ Traders	2021-2030
4	Creation of incentive mechanisms and guarantees (Financial and Fiscal)	2	General population/ Private sector	2021-2030
5	Transparency and Decision Support (Policy and Information)	2	DGRNE/Policymakers Political and business decision makers/ /Population in general	2020-2030
6	Qualification and Certification Initiatives (of products and services) in EE	9	Energy sector professionals/ EE-related associations and organizations/ Universities and vocational training centers/ Researchers	2020-2050

7	Development of programs and action plans	3	Residences / Commercial and industrial buildings / Public administration / Electricity Sector	2021-2023
8	Information and Awareness Initiatives	5	General population, commercial and tourism sectors	2020-2050

Source: MIRN, São Tomé and Príncipe (2021) National Energy Efficiency Action Plan (PANEE)

○ 4.3 Objectives and targets on EE

The PANEE sets **specific objectives and targets for the EE** sector with the main objective of increasing the energy efficiency measures in the country. Regarding electrical appliances, the PANEE sets targets for replacing incandescent bulbs with LED lamps in public and residential / commercial lighting, labeling of household appliances, and other equipment (see Table 3).

In addition to the goals and targets, the PANEE defines **trajectories and identifies all measures and programs** that should be implemented to achieve the targets.

The plan also identifies the needs in terms of **specific legislation and regulations for the introduction of incentive mechanisms for the promotion of EE** (financing and access to financing, in particular for the population to acquire devices), **institutional strengthening measures** (for example, the creation of the EE department in the DGRNE), as well as the **training needs of technical and professional staff** (including support and coordination of local and foreign universities), the **dissemination of information and public awareness**, as well as **additional studies aimed at improving the local availability of information on the potential of EE in the country, as well as the definition of specific programs in the education sector**.

Table 3: Main EE targets contained in the PANEE, STP

Indicators	2019	2030	2050
Final energy intensity (final energy consumption /GDP) kWh/USD constant prices 2010)	2,25	1,98	1,74
Final energy consumption per inhabitant (kWh/inhabitant/year)	2.923	3.166	4.121
Annual electricity consumption per inhabitant (kWh/inhabitant/year)	459	313	603
Energy intensity (kWh/USD @ constant prices 2010)	0.35	0.20	0.26
Electrification rate (%)	84%	100%	100%

Source: MIRN, São Tomé and Príncipe (2021) National Energy Efficiency Action Plan (PANEE)

The PANEE sets **EE targets**: **8.7% and 12.9% demand reduction by 2030 and 2050.** Regarding electrical appliances, the following sector targets and measures are detailed in the PANEE:

- **EE in public and domestic lighting:** reduction of electricity consumption associated with public lighting by replacing more than 600,000 inefficient lamps with low consumption lamps (LED). In addition, PANEE offers energy labeling measures for electrical appliances with the aim of increasing consumption efficiency and reducing demand.

STP predicts a significant increase in energy consumption by 2030. It is expected that 100% of the country's population will have access to electricity with more efficient energy. EE macroeconomic indicators have also been defined in the PANEE.

○ 4.4 Energy efficiency of household equipment and appliances: national labeling system

The PANEE sets the establishment of energy standards and / or regulations to which equipment and appliances must comply. Energy labels are a way to provide consumers with information about EE, in particular the energy characteristics of an appliance. An informed consumer is expected to always make more appropriate choices. The regulation applies to products marketed in STP, whether imported or manufactured / assembled locally, and it is expected to come into force at the end of 2022. The labeling standards are expected to be developed during the period 2021-2022 in STP, in particular for three basic appliances: lighting, refrigerators and air conditioning (as these appliances contribute the most to household energy consumption). Other additional appliances (televisions, thermo accumulators, washing machines, etc.) will be included by 2030 (as presented below).

Table 2: National targets on EE labels for appliances

Equipment and appliances *	Labels come into force			
	From 2019	From 2022	From 2030	From 2050
Refrigerators / freezers	No	X		X
Air conditioner	No	X		X
Washing machine	No		X	X
Lamps	No	X		X
Other content in the regulations to be drawn up	No		X	X

* Legend: EE labels and standards in force (indicated in the table with "X" at the time of entry into force, without date of completion)

Source: MIRN, São Tomé and Príncipe (2021) National Energy Efficiency Action Plan (PANEE)

PANEE sets EE targets in public, residential and commercial lighting to reduce energy demand by 2030 and 2050, as presented below.

Table 3: Targets on efficient lighting

Efficient residential, commercial and public lighting	2019 (Base year)	2020-2030	2031-2050	Total replaced / saved
Total number of incandescent (or inefficient) bulbs replaced by LED lamps (low consumption), including:	-	611,750	6,250	618,000
Street lighting (units replaced)	-	*13,750*	*6,250*	*20,000*
Residential or commercial lighting (units replaced)	-	*598,000*	*0*	*598,000*

Energy savings accumulated in public lighting (GWh)	-	13.30	70.50	83.89
Energy savings accumulated in residential lighting (GWh)	-	310.40	855.60	1,166.03

Source: MIRN, São Tomé and Príncipe (2021) National Energy Efficiency Action Plan (PANEE)

4.5 National energy efficiency initiatives

Few EE initiatives have been implemented in STP and, indeed, almost all have been in the context of replacing incandescent bulbs with efficient ones. The following list includes the most relevant projects and programs that have been implemented or are in the process of being implemented:

1. EMAE improvement initiatives implemented by EMAE - completed;
2. Project to relaunch the Electricity sector of STP implemented by BM / BEI - under implementation; (BM, 2020)
3. Project for the promotion of investments in the reset of the EAs in the STP sector implemented by the GEF / UNIDO - under implementation; (FEM, 2018)
4. Projection of LED lighting - EE in the activity and in the management of the demand in STP implemented by BM - in the implementation process.
5. Proposal for "Institutional Capacity Building for a Renewable Energy and Energy Efficiency Investment Program for Sao Tome and Principe" sent to GCF with support from UNIDO, August 2021.

4.6 Investment planned for efficient lighting

One of the main barriers to the implementation of EE projects is the lack of long-term, low-cost financing. The high capital cost of industrial EE products and projects poses a challenge to their affordability by consumers and the risk in the consumer market is high. Local banks are generally unaware of EE technologies and their financial returns and are therefore reluctant to lend to EE projects. The low access to private investment is due to the absence or weakness of private sector development institutions and economic factors that include low capital and lack of appropriate fiscal frameworks.

The ECCAS White Paper indicates that achieving the SEforAll objectives for ECCAS member states will require funding that exceeds the resources available internally with ECCAS countries, particularly for countries with low rates of access to modern energy services. This supports the need to increase domestic and international investor confidence. For this purpose, it was envisaged within this project that STP would participate in the African Energy Forum 2022 and the 1st Sustainable Energy Conference in Sao Tomé, where the energy plans would be promoted as key strategical policies for São Tomé and Príncipe, and to promote the different initiatives and projects foreseen until 2030. This was expected under the partnership with the Lusophone Renewable Energy Association (ALER)

The Community Development Fund (Fonds de développement communautaire or FODEC) of the Economic and Monetary Community of Central Africa (CEMAC) capitalized by tax revenues from CEMAC countries has been established in the region but it does not support EE. The presence of development partner funding has supported the adoption of solar PV markets in the region, but attention must also be focused on EE. Funding for RE projects within the donor community is common, despite the immediate impact on carbon and energy costs that EE measures could have.

Measures are planned in the PANEE to encourage investment in efficient lighting, as presented in the Table below.

Table 4: Investment planned for energy efficiency

Category	Measures			Target Group	Under Implementation / Planned	Entry Into Service
Investment in infrastructure (political and economic)	**M**	**39**	Replacement of approximately 300,000 incandescent bulbs with LED (10 bulbs in 60,000 homes for 10 years)	Residential and commercial sectors	Under implementation	2020-2024
	M	**40**	Replacement of 100,000 conventional lamps with LED lamps in most poor houses (5 lamps in 20,000 houses)	Vulnerable population	Planned	2021-2030
	M	**41**	Replacement of 198,000 incandescent bulbs with LED bulbs in public buildings	Public buildings	Planned	2021-2030
	M	**42**	Replacement of 20,000 inefficient LED bulbs in public lighting	Public lighting	Planned	2021-2035

Source: MIRN, São Tomé and Príncipe (2021) National Energy Efficiency Action Plan (PANEE)

4.7 Energy Efficiency in Sao Tome Principe and the ECCAS region

EE can be an enabling service to achieve energy savings to support existing power generation capacity provide more modern energy services and guidelines for the development of new energy projects.

Referring to the ECCAS-CEMAC White Paper for Universal Access to Modern Energy Services, the level of energy access and reliability of the energy sector is low throughout the ECCAS region and there are low rates of energy access. However, at the national level, countries such as Angola, Cameroon, Sao Tome and Principe, and Rwanda have begun to design and/or develop EE programs and policies.

Available secondary data indicates that EE markets still need to be developed in the ECCAS region, which gives ECCAS clear potential to introduce new policies and projects to the field. This is therefore an opportunity to focus on EE improvements that are innovative and forward-thinking in terms of technology, but also on other measures, such as behavior change and increased awareness.

4.7.1 Energy Intensity in the ECCAS Region

One of the primary measures of EE in an economy is the energy intensity of the economy. Energy intensity measures the number of units of energy required to produce one unit of gross domestic product (GDP). A low energy intensity level could be due to the energy efficiency of the economy. Paradoxically, countries with very low levels of energy access tend to have low energy intensity of GDP because industries are less dependent on energy-intensive activity.

A look at the data below (Figure 2) indicates that the energy intensity of countries such as the Central African Republic (CAR), the Democratic Republic of Congo (DRC), Gabon and Burundi are high. This

is partly due to the presence of hydrocarbons in the economy, which has facilitated access and thus liberal use, and partly due to low levels of EE in the economies. At the other end of the spectrum, the energy intensity of countries such as Angola, Chad, Congo, and Equatorial Guinea is lower, as per the capita income.

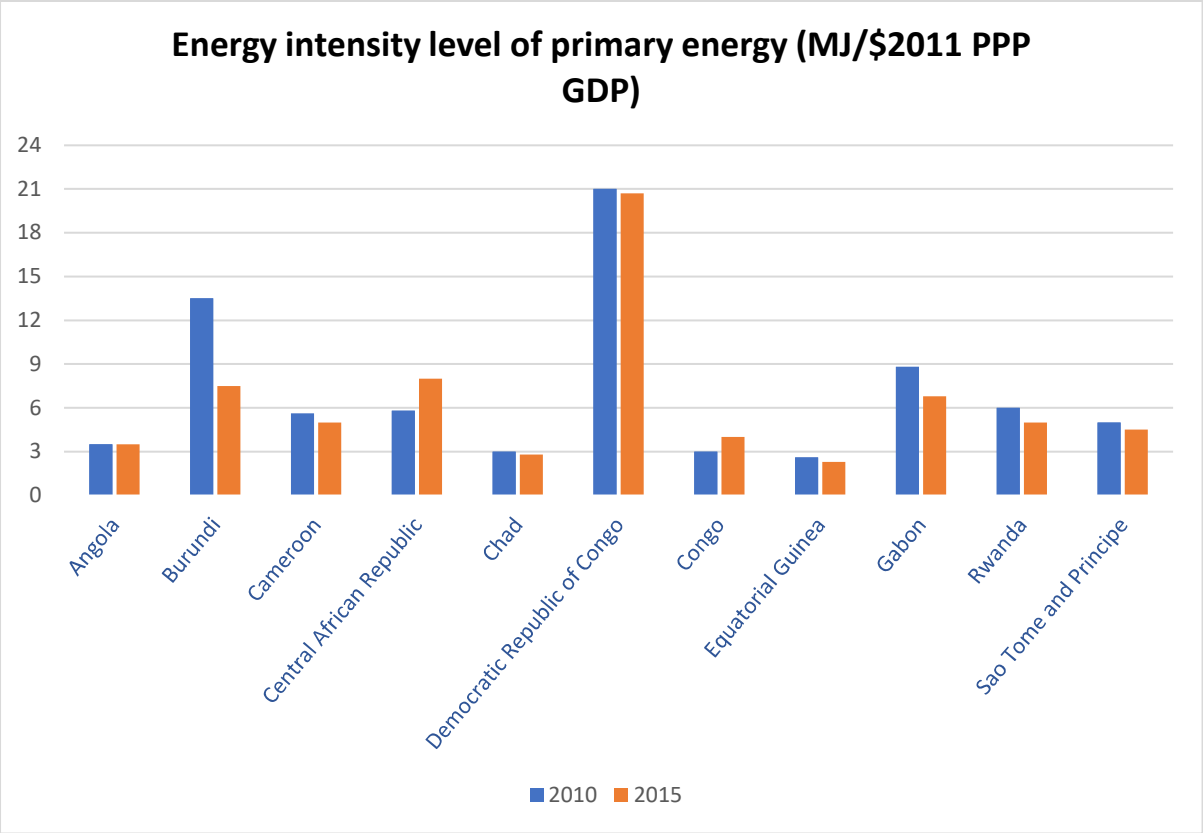


Figure 2: Energy intensity of ECCAS countries between 2010 and 2015

4.7.2 Energy efficiency in electricity generation and distribution

The average annual net growth rate of generation in the whole continent has a wide variation between the different countries in Africa (Figure 3). It appears that South Africa, the largest producer, has a moderate rate of increase close to 1%, while Egypt, the second largest producer, exhibits an increase rate of almost 6%, which is higher than the average in the continent. The highest average growth rates appear in countries which are small or very small producers, as indicated in Figure 3. Looking at the geographical distribution of the higher growth rates, these appear to be in Sub-Saharan Africa mainly on the east and west coasts

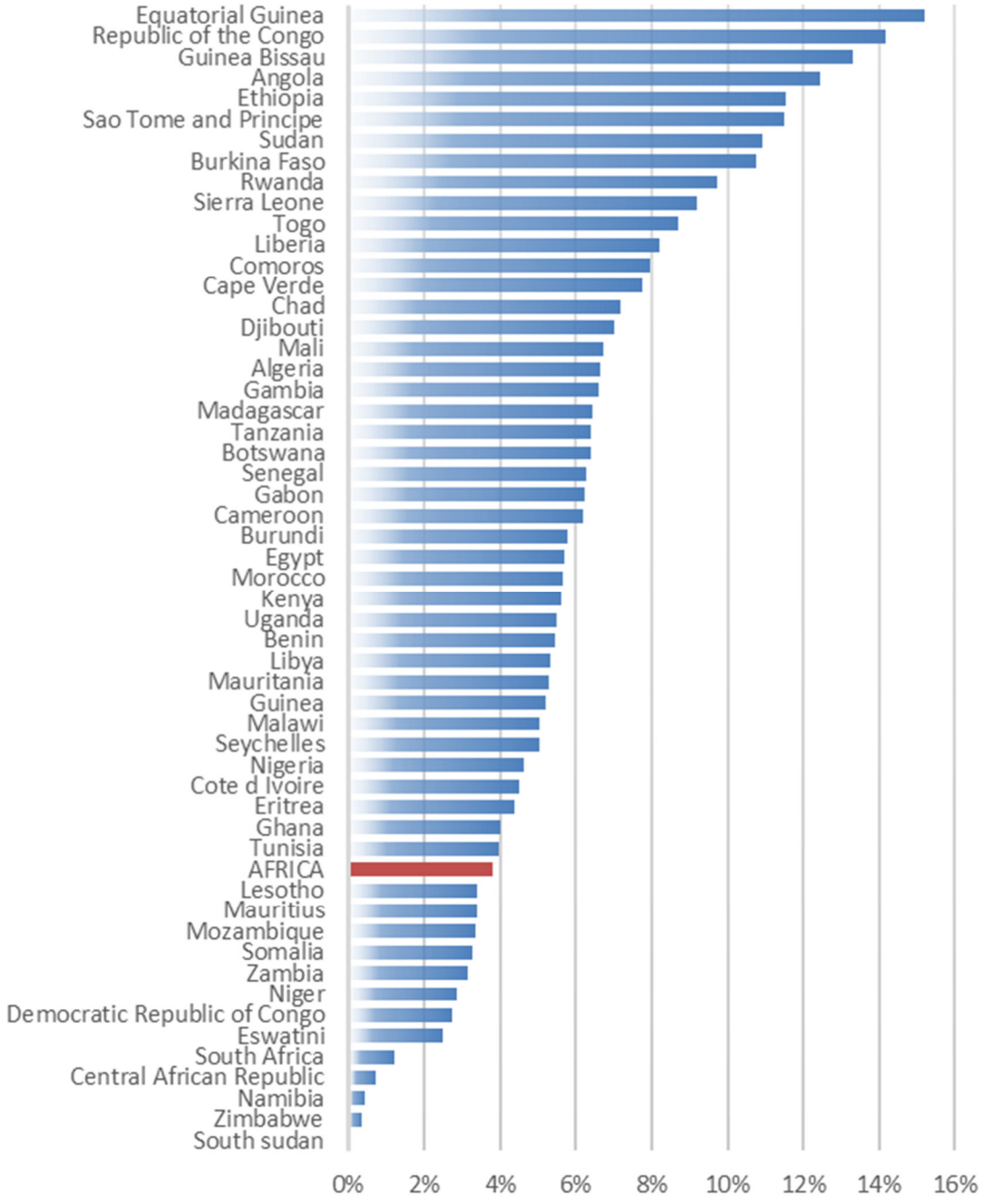


Figure 3: Average Annual Growth Rate of Net Electricity Generation between 2000-2007

Source: AfREC: https://au-afrec.org/Fr/administration/menurequette.php

More specifically, hydroelectric power plants have been the traditional mainstay of electricity generation in ECCAS countries. However, the availability of electricity in the region is low (the regional electrification rate is 13% compared to 90% in North Africa)[1], as is electricity consumption (109 kWh per capita compared to 740 kWh in North Africa). Several hydropower plants need investment in renovation and modernization (R&M) to improve production efficiency. In this regard, agencies such as the Central African Power Pool (CAPP) seek to facilitate and coordinate the implementation of regional power projects.

[1] Information from Africa Energy Outlook Report, 2019

Power transmission and distribution (T&D) losses for ECCAS member states, as shown in Table 5 below, show that average T&D losses in ECCAS countries, with the exception of Cameroon, exceed 20 percent, underscoring the urgent need to reduce losses and increase power output.

Table 5: Transmission and distribution system losses in all ECCAS countries

	Country	Average T&D Losses (Percentage)
1	Angola	40%
2	Burundi	24%*
3	Cameroun	11%
4	République C entrafricaine (RCA)	NA
5	Tchad	30%
6	République démocratique du Congo	21%
7	République du Congo	45%
8	Guinée E quatoriale	NA
9	Gabon	28%
10	Rwanda	NA
11	Sao Tome et Principe	34.5%
* Independent estimates (not endorsed by government documents), available at: https://www.lexology.com/library/detail.aspx?g=8a686f01-c89c-4db6-b973-164b5abda114		

5. INSTITUTIONAL CAPACITY AND RESPONSIBILITIES TO SUPPORT THE IMPLEMENTATION OF MEPS AND LABELING SCHEME

The major institutions of the energy sector are:

- Ministry of Infrastructures and Natural Resources (MIRN);
- Directorate General of Natural Resources and Energy (DGRNE);
- Autonomous Region of Príncipe (RAP);
- General Regulatory Authority (AGER);
- National Intellectual Property and Quality Service (SENAPIQ);
- National Energy Certification Body (ENCE);
- National Energy and Water Utility (EMAE);
- National Petroleum Agency (ANP);
- Directorate General for Environment (DGA); and
- Importers, distributors and retailers of EE appliances.

Ministry of Infrastructure and Natural Resources (MIRN) - The MIRN is responsible for defining government policy on energy efficiency, as well as proposing a legislative framework for implementing EE regulations. Through the **DGRNE**, the Government exercises its policy for the natural resources and energy sectors and is composed of three directorates: Water Directorate, Directorate of Energy and Directorate of Geology and Mining. The Ministry also exercises its responsibility in the **Autonomous Region of Príncipe (RAP)** through the Regional Secretariat for the Environment and Sustainable Development (SRADS). At the local level, the districts only have regulatory powers in the field of energy, but they informally play a very interventional and participatory role in the design of public policies and in the regulation of the sector.

There is also the **Coordinating Committee of the Electricity Sector Transformation Program (CC-PTSE)** and the **Technical Group supporting the Electricity Sector Transformation Program (GT-PTSE),** which support the government in the implementation of the Electricity Sector Transformation Program. In addition, the Decree on the Creation of these coordination platforms designated:

- The *Steering Committee*, as the steering body of the Electricity Sector Transformation Program (CP-PTSE). This Committee comprises the Minister of Planning, Finance, and Blue Economy (MPFEA) and Minister of Infrastructures and Natural Resources (MIRN), RAP, EMAE, AGER, Coordinators and Counselors CT-PTSE and AFAP secretariat. The Committee is expected to have two regular meetings per year.
- The *Technical Coordination* with regular monthly meetings as a technical committee to support the Power Sector Transformation Program (CT-PTSE).

As part of the UNIDO / GEF project, the **National Platform for Sustainable Energy (PNES)** was created. PNES comprises representatives of public and private institutions operating / participating directly and indirectly in the STP energy sector. The PNES, coordinated by MIRN / DGRNE, is expected to meet regularly and bring together the following institutions: MIRN / DGNE, MIRN / DGA, AGER, EMAE, AFAP, D. Indústria, APCI, UNDP, AfDB, European Investment Bank (EIB) and National Institute for the Promotion of Equality and Equity between Women and Men (INPIEG).

The EE strategy detailed in the PANEE is based on creating an adequate market for EE. This is being pursued through the creation, structuring and strengthening of the institutional framework necessary for the surveillance, monitoring, regulation and monitoring of the market. The creation of the facilitating institutional mechanism which is complete and transparent, is proposed through the following two measures:

- The creation and integration of the Energy Efficiency Department within the DGRNE (PANEE, measure n°2);
- The creation of a national energy certification body or entity (ENCE) (PANEE, measure n°3).

5.1 Regulation of the energy sector

5.1.1 Legislative and legal framework of the energy sector

The energy sector of STP has undergone extensive reforms since 2014, with the entry into force of the Legal Framework of the Electricity Sector (RJSE), approved by Decree-Law No. 26/2014 on 31 December 2014. The regulations applicable to the energy sector in São Tomé and Príncipe are still quite limited, reflecting in a way the degree of regulation of the various sectors of the economy. Thus, there is no general law on energy, rather there are several pieces of legislation focused on the various forms of harnessing and using energy. In this area, the most developed sector is electricity, considering its growing role in the economic and social development of the country, regulated by the aforementioned RJSE since December 2014.

The RJSE lays the foundations for the partial liberalisation of the sector, defines and clarifies the responsibilities and competencies of the various sector organisations, defines the tariff principles to be adopted and the consumer protection rules, the spaces for communication between the various service participants and customers and the possibilities for operating isolated power plants. The RJSE also provides for the application of sanctions for illegal acts committed in violation of legal provisions.

Despite the approval of the RJSE, the envisaged organisational model is still not adapted to the existing market model, which indicates the need to strengthen the legal framework and strengthen the capacities and the means of the various players and attract private investment. Thus, regardless of the adoption of the RJSE, EMAE is the entity holding the monopoly of the electricity system in São Tomé and Príncipe.

The RJSE represents the Basic Law of the Electricity Sector in São Tomé and Príncipe because it defines the basis of the system organisation. The RJSE was adopted based on three considerations. The first relates to the need to clarify the regulatory framework to overcome the various challenges facing the sector. These needs specifically include the need to improve the supply of electricity in the country in order to meet growing demand, the successive outages resulting from the fragility of the production system and the weaknesses of the current, very obsolete grid. The second consideration pertains to the definition of a regulatory framework that facilitates private investment with certainty and transparency to complement the energy supply of the traditional producer, EMAE. Also worth noting and without prejudice to other factors that might have contributed to the approval of the RJSE, the third consideration was the strong political will to strengthen the technical and economic regulatory framework of the sector.

The RJSE provides for the general rules applicable to activities in the electricity sector, including the production of electricity from renewable sources (Article 50, et seq.).

However, the rules of the RJSE are mostly prescribed and require development through complementary legislation relating to each aspect of the market organization, such as the rules for the production, transport and distribution of electricity, supply and consumer protection, as well as rules on commercial relations.

5.1.2 Regulation of the electricity sub-sector

The energy sector in general is not attached to a specific regulator. Only the electricity sector is regulated by AGER, created by Decree- Law No. 14/2005. AGER was created as a multisectoral regulatory body for various sectors, in particular telecommunications, water, electricity and postal services. To date, AGER's regulatory activity is clearly more intense in the telecommunications sector, where the legal framework is quite developed.

Although most of AGER's competencies are not presented in detail, the RJSE clearly establishes AGER as the regulatory entity for the electricity sector in the respective Article 9. According to the RJSE, AGER is responsible for the following activities within electricity the sector:

- Regulating the organisation and operation of the electricity generation market (Article 12, al. a);
- Ensuring administrative and technical aspects for the issuance of licences;
- Inspecting the technical conditions laid down in the authorised facilities;
- Penalising any infringements committed (Article 12, al. e);
- Approving regulations falling within its competency (number 2 Article 13);

- Implementing service quality standards in the electricity sector;
- Reviewing and approving the sector's rates (Articles 68, et seq.);
- Stipulating rates and prices consistent with applicable laws and regulations (Article 71);
- Promoting the implementation of cost accounting and the separation of costs from activities in the electricity sector (Article 72).

AGER is currently organised to intervene in the electricity sector with a department within its Technical Directorate, as illustrated in Figure 4. This department has also led to some concrete actions in the development and implementation of regulations in the electricity sector, in conjunction with the respective legal department and other public and private bodies, national or foreign.

AGER is supervised by the Ministry responsible for infrastructures and is granted with legal personality and with technical, administrative, financial, and patrimonial autonomy.

In order to make AGER a strong institution in terms of its contributions to the regulation of the electric sector and in order to satisfy the demands made by the government policy for the energy transition process, the GEF/UNDP project, at AGER's request, funded the engagement of an electrotechnical engineer. This was done to strengthen the staff of the Department of Electricity in order to better satisfy sector demands in terms of regulation analysis (MOPIRNA, 2020).

The World Bank project also strengthened AGER, namely through international expert support for training, structuring regulatory functions, training technicians working in energy sector regulation and development of cooperation procedures among MOPIRNA, EMAE and the regulator and possible future private investors (World Bank, 2016).

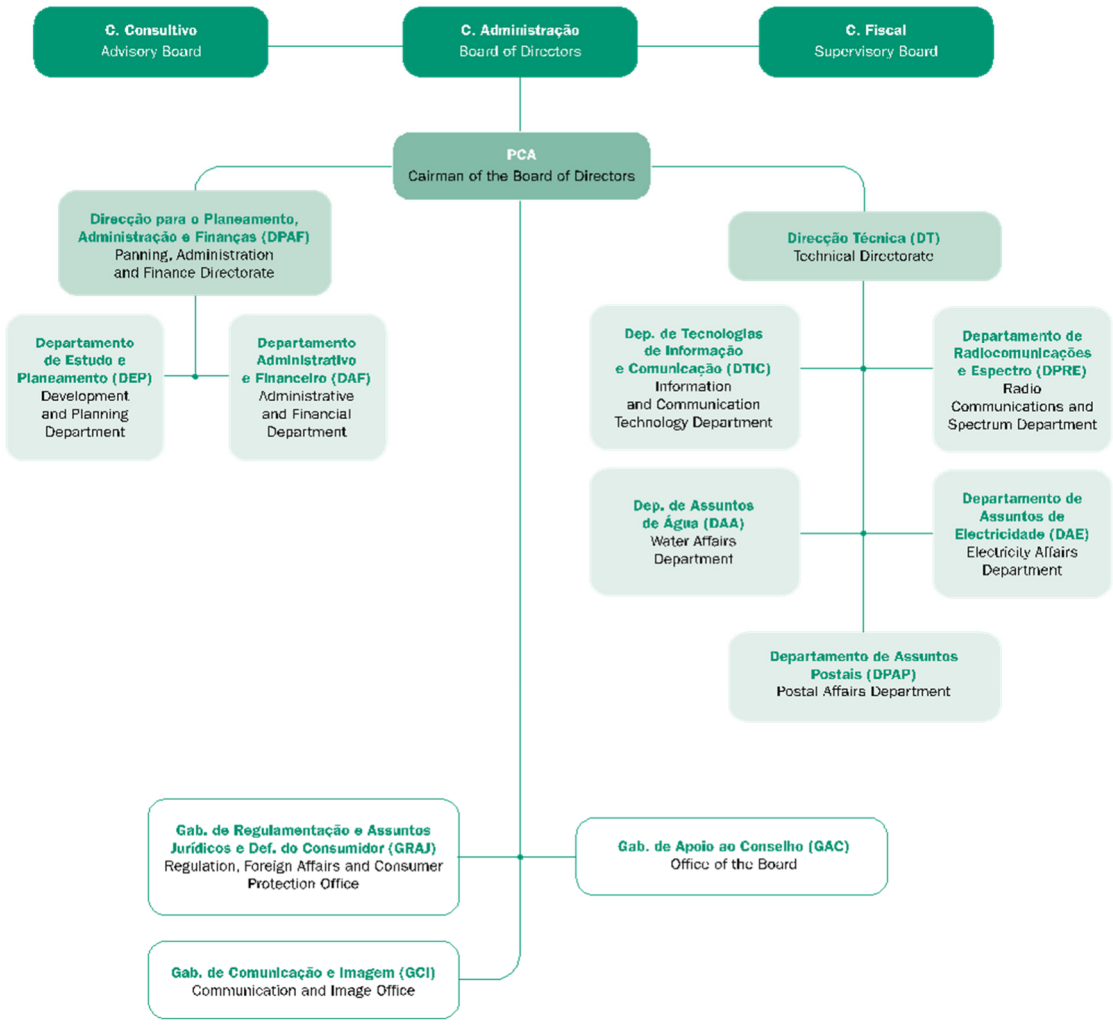


Figure 4: Organigram of General Regulatory Authority (AGER)

Source: Lusophone Renewable Energy Association (ALER) et al. (2020). São Tomé and Príncipe Renewable Energy and Energy Efficiency Status Report

○ 5.2 The proposed Energy Efficiency Department within DGRNE

In the overall process of energy efficiency governance, it is essential to create an Energy Efficiency Department in the sector ministry which serves as an effective agency with the key role of executing government policies and strategies through the coordination of renewable energy and energy efficiency policies and programmes, including programme design, administration, management, monitoring, evaluation, etc. The EE Department is expected to demonstrate strong leadership and have the capacity to coordinate within and across levels of government, and engage key stakeholders in consultative processes to help build consensus (see Table 7). The day-to-day implementation of energy efficiency activities promotion and implementation at the decentralized level are done by government services, regional and local authorities, service sector firms, manufacturers and distributors, households, etc. The role of the EE Department is to take the lead in promoting, supporting, and facilitating the creation of an enabling environment for the above stakeholders to execute activities in order to have the best impacts on the economy, society, and the environment of STP. The EE Department is expected to be creative in the formulation of innovative EE financing mechanisms and EE Business Models.

The proposed EE Department within DGRNE is aimed to oversee energy efficiency in STP. As specified in the PANEE (see Table below), its function will be to mobilize, coordinate the actions and supervise the implementation of the national EE projects in collaboration with the DGRNE and the RE department which will be created under PANER.

Table 6: Establishment of the EE Department at DGRNE

Measure	Establishment of the EE Department at DGRNE
Type	Organizational strengthening
Priority (1, Low To 5, High)	5
Under Implementation /Planned Implementation	Planned
Period	2021-2025
Description	This EE strategy requires the Coordination, Monitoring & Evaluation components, which can be facilitated by the creation and establishment of an EE department. This department will have the function, will mobilize, coordinate the actions and will supervise the implementation on the ground of the projects EE in collaboration with the DGRNE and the RE department which will be created (see PANER). Along with the protection for policy monitoring, it will be the main instrument of intervention and stimulation of the sector, including planning, prospecting, monitoring and introduction of new technologies and processes, as well as capacity building. institutional and human resources. This type of measure refers to the institutional clarification manual for the power sector and should be aligned with it. The emergency department, in close coordination with the EE department, will be responsible, under the supervision of the DGRNE, to ensure the active participation of the

	DGRNE in events, training or other activities related to emergencies and EE. promoted by CEREEAC.
Target Group / Sector	Public sector / Energy service companies, private sector
Executed Body(S)	DGRNE
Expected Results/Impacts	R1. Structured institutional framework. Monitor technical, financial, logistical and other operations

Source: MIRN, São Tomé and Príncipe (2021) National Energy Efficiency Action Plan (PANEE)

The EE Department requires a statutory basis in order to establish an effective energy efficiency institutional structure because it provides legal basis and legitimacy to the Department in terms of its authority, role, and means to carry out the energy efficiency mandate. Experience of energy efficiency promotion in many countries has shown that a strong mandate from the government, consistent policy, and long-term commitment for supporting energy efficiency goals are the essential elements on which the energy efficiency agency can develop and flourish.

The most critical aspect for the success of an EE Department is the people who form the Department. They should have an appropriate background and training suited for the job and should project leadership and professionalism in their day-to-day activities involving interaction with the major stakeholders and beneficiaries. Administrative and management autonomy should be granted, and adequate financial resources should be made available to them not only to cover the organizational expenditures but also initiate programmes and activities in order to achieve the energy efficiency targets set for specific sectors.

The Department should design programmes that are well suited to the targeted economic sectors and empower the partners and stakeholders in making decisions at the decentralized level.

○ 5.2 Proposed National Energy Certification Body

The proposed establishment of the National Energy Certification Body (ENCE) is aimed to establish the legal, regulatory and operational framework for the energy performance requirements in buildings, industries, and electrical appliances as specified in the PANEE (see Table below). The ENCE will also conform to the requirements for the implementation and use of RE / EE systems, with respect to energy performance contracting and the quality of systems.

Table 7: Creation of a National Energy Certification Body (ENCE)

Measure	Creation of a National Energy Certification Body (ENCE)
Type	Organizational strengthening
Priority (1, Low To 5, High)	4
Under Implementation /Planned Implementation	Planned
Period	2021-2025

Description	ENCE aims to establish the legal, regulatory and operational framework for the energy performance requirements of buildings, certain equipment and production facilities, as well as the requirements for the implementation and use of RE / EE systems, both as regards energy performance and the quality of systems. This system will also serve as a basis for training technicians for the installation and maintenance of RE and EE equipment for duly certified buildings.
Target Group / Sector	Public sector / Energy service companies
Executed Body(S)	DGRNE / AGER
Expected Results/Impacts	R1. Structured institutional framework. Creation of conditions for improving the energy performance of buildings and the main energy consuming equipment R3. Increased confidence in the EE market

Source: MIRN, São Tomé and Príncipe (2021) National Energy Efficiency Action Plan (PANEE)

6. PROJECT ACTIVITIES AND EXPECTED RESULTS

○ 6.1 Description of Project Components

The Project consists of activities which aim to facilitate the widespread adoption of energy-saving appliances, improve the energy-efficient appliance market in STP and work towards phasing out incandescent lamps and other inefficient appliances. The Project has six components and ten outcomes designed to contribute to the project objectives. Each outcome includes a number of specific outputs and a series of planned activities.

Component 1. Energy Efficiency Policy Enhancement. This component will focus on supporting the MIRN to set up a policy dialogue platform and to establish the necessary legal and institutional framework to phase out incandescent lamps and inefficient refrigerators and air conditioners in STP, including the preparation of an enabling EE law with associated regulations.

Component 2. Technical and Managerial Capacity Building for EE Appliance Market Development. Public institutions and private sector players in the EE market have a crucial role to play in transforming the market for more energy-efficient products. Therefore, this component will work with EE appliance importers/distributors/retailers to increase their capacity to deliver an adequate supply of good-quality energy-efficient products in STP. The capacity building will also benefit public institutions, particularly Government ministries, departments and agencies involved in the project implementation. It will also focus on supporting the Project Management Unit (PMU) and strengthening the institutional and operational capabilities of the standard enforcement agencies in STP.

Component 3. Appliance Quality Improvement. This component will focus mainly on activities of the standards (standardization) authority (SENAPIQ) and other partners towards the national adoption of:

(i) EE standards and labels of appliances
(ii) Procedures for enforcing EE regulations for appliances
(iii) Procedures for testing energy-efficient appliances
(iv) Procedures for monitoring that all traded appliances meet quality, environmental and energy performance standards.

Component 4. Energy Appliance Dissemination. This component will focus on delivering mobilization, outreach and training activities for public utilities, private distributors and installers to fully involve them in the dissemination of energy-efficient lighting, refrigerators and air conditioners (LRACs). The component will also support significant improvements in the sale of EE LRACs and reducing the sales of incandescent lamps and inefficient refrigerators and air conditioners through demonstration projects in households, public buildings and street lighting. Environmentally-sound waste management schemes for used LRACs will also be established.

Component 5: Consumers Education and Awareness. This component will focus on outreach activities to increase information to consumers in the household, public and commercial sectors as well as policy makers and the private sector about the benefits of energy-efficient appliances.

6.2. Expected project outputs and outcomes

The expected project outputs and outcomes are summarized in the Table 8. Table 9 also presents the Logical Framework Analysis of the project results.

Table 8: Expected project outputs and outcomes

Project component	Programmed Activities	Outcomes and Outputs
Component 1. Energy Efficiency Policy Enhancement	1.1 Draft, promote Government adoption and implement national policy on energy efficiency to create enabling environment for the implementation of PANEE; 1.2 Draft and promote passing of bye-laws concerning the creation, organization and functioning of the EE Department of DGRNE; 1.3 Recruit qualified personnel and provide resources for the functioning of the EE Department of DGRNE; 1.4 Draft and promote passing of law concerning the creation, organization and functioning of the National Energy Certification Body or Entity (ENCE); 1.5. Recruit qualified personnel and provide resources for the functioning of ENCE; 1.6 Hold consultations with Government stakeholders and constitute the PSC; clearly define their functions and establish its work plan; 1.7 Establish the Project Management Unit (PMU) and provide resources for its functioning; 1.8 Establish a Monitoring, Reporting and Verification (MRV) system to monitor and assess the impact of the EE measures (including energy savings from use of EE appliances); MRV indicators will be disaggregated by gender for impact on women; 1.9 Draft and promote passing of law to phase out inefficient lighting, refrigerators and air conditioners (LRACs) in STP, including incentive measures.	Outcome 1.1: Strengthened national energy efficiency policy framework Output 1.1.1: National policy on energy efficiency adopted and implemented Output 1.1.2: EE Department of DGRNE created and functioning Output 1.1.3: ENCE created and functioning Output 1.1.4: Project Steering Committee established and functioning Output 1.1.5: Project Management Unit (PMU) created and operationalized within MIRN Output 1.1.6: MRV system established and functioning Outcome 1.2: Government law adopted to phase out inefficient LRACs Output 1.2.1: Draft law prepared and submitted Government to phase out inefficient LRACs

Component 2: Technical and Managerial Capacity Building for EE Appliance Market Development	2.1 Conduct capacity building workshops for PMU members and EE Department staff on: a) project management; b) policy and legislation preparation; c) energy efficiency standards, quality control and quality assurance of appliances; d) application of the project Communication Strategy; and e) used appliance disposal and recycling; 2.2 Conduct capacity building workshops for key public agencies, including DGRNE, EMEA, SENAPIQ, ENCE, DGA and Customs Directorate on: a) reinforcing administrative and technical capacities; b) development of EE appliance market, including undertaking market feasibility or market readiness studies; 2.3 Conduct capacity building workshops for EE appliance importers, traders and potential manufacturers (from a gender perspective to encourage participation of women) on: a) preparation of bankable business plans to financial institutions; and b) development and application of adaptable business models for EE appliance market transformation including outlining a clear roadmap for STP. 2.4 Conduct capacity building workshop for financial institutions on EE appliance technologies and assessment of \business plans on EE appliance business ventures; 2.5 Conduct capacity building workshop to raise awareness of potential manufacturers, appliance importers, large retailers and financing institutions (from a gender perspective to encourage participation of women) on: a) social and economic benefits of EE appliances; and b) EE appliance financing.	Outcome 2.1: Increased capacity of PMU and EE Department on EE appliance market development Output 2.1.1: Technical and managerial capacity of key public agencies enhanced for EE appliance market development Outcome 2.2: Increased awareness and capacity of private sector players and financial institutions for EE appliance market development Output 2.2.1: Train appliance importers, distributors and retailers and financing institutions on EE appliance financing
Component 3: Appliance Quality Improvement	3.1 Establish and provide resources to Technical Working Group (TWG) on standards and labeling of lamps, refrigerators and ACs (LRACs) within ENCE; 3.2 Adopt, through stakeholder consultation, minimum energy	Outcome 3.1: Enhanced regulatory framework for EE LRACs standard and labeling Output 3.1.1: TWG on LRACs standards and labeling created within ENCE and functioning

	performance standard (MEPS) and labeling of LRACs 3.3 Draft and promote passing of a law to establish a legal framework for enforcement of the EE labeling and standards of LRACs; 3.4 Set up appliance testing procedures for LRACs by customs officials; and establish relationship with testing laboratories in the region; 3.5 Train the trainers of customs officials in technical and vocational institutions in STP; 3.6 Conduct capacity building of customs officers to conduct entry inspections and tests on quality of equipment entering STP; ~~Create and provide equipment and human resource for a testing laboratory in STP or outside STP, for LRACs, through collaboration with national and international universities or training centers;~~ 3.7 Establish a database of market statistics (imports etc.) and registered products on EE LRACs on the STP market, under collaboration with SENAPIQ, ENCE, and Customs Directorate; 3.8 Establish a national quality inspection system for EE LRACs involving the key institutions SENAPIQ, ENCE, AGER, and Customs Directorate	Outcome 3.2: MEPS and labels for EE LRACs established and functioning in STP Output 3.2.1: LRAC MEPS and labels adopted Outcome 3.3: All traded LRACs meet quality, environmental and energy performance standards Output 3.3.1: Procedures for EE LRACs testing developed and adopted Output 3.3.2: Energy efficiency, environmental and technical standards for LRACS are tightened in line with international best practices
Component 4: Energy Appliance Dissemination	4.1 Accelerate replacement of approximately 300,000 incandescent light bulbs with LED (10 light bulbs in 60,000 homes over 5 years) – PANEE Measure 39; 4.2 Replace 100,000 conventional light bulbs with LED light bulbs in the most impoverished households (5 light bulbs in 20,000 households) - PANEE Measure 40; 4.3 Replace 198,000 incandescent light bulbs with LED light bulbs in public buildings -PANEE Measure 41; 4.4 Replace 20,000 inefficient light bulbs for LED in public street	Outcome 4.1: Public utilities and private distributors and installers fully involved in the dissemination of EE lamps Output 4.1.1: Pilot LED lighting project in households, public buildings and streets implemented Output 4.1.2: Pilot projects for the diffusion of LED lamps increased annually Outcome 4.2: Significant improvement in sales of EE LRACs and reduction in the sales of inefficient LRACs

	lighting - PANEE Measure 42; 4.5 Develop a financial incentives mechanism to support EE LRACs sales (e.g. rebates on purchase of energy efficient appliances, taxation/duty free importation, discount for exchanging old LRACs for new EE ones, payment system in installments etc.) and promote for Government adoption and implementation (from a gender perspective to encourage participation of women); 4.6 Develop and implement mechanisms for environmentally sound management of used, destroyed or recycled LRACs.	Output 4.2.1: Based on adoption of suitable financing/purchase models, increased quantities of EE LRACs disseminated in households, commercial, and public services Output 4.2.2: Financial incentives provided to pro-active local importers, distributors and retailers of EE LRACs
		Outcome 4.3: Environmentally sound waste management schemes for EE LRACs are operational
		Output 4.3.1: Ensure LRACs are reused, recycled or destroyed without negative environmental impacts, conforming to best environmental practices/ best available techniques (BAT/BEPs)
Component 5: Consumers Education and Awareness	5.1 Prepare project information flyers and messages to raise awareness of the target audiences on benefits of EE LRACs; 5.2 Consolidate and present all relevant information about EE LRACs at project website; 5.2 Use appropriate channels to give information of EE appliances to the consumers (by EMAE); present “tips on energy savings” on the EMAE website; and join flyers to electricity bills on a regular basis for consumers’ education; 5.3 Designate selected retail shops as show rooms for presentation of EE appliances to consumers (by PMU in association with EMAE).	Outcome 5.1: Increased information to consumers about the benefits of EE LRACs
		Output 5.1.1: National campaign for EE LRACs intensified
		Output 5.1.2: Information on EE LRACs provided through utility channels
		Output 5.1.3: A showroom opened in each town for EE lighting products presentation

Table 9: Logical Framework Analysis of Project Results

Project Strategy	Indicators	Baseline	Target	Means of Verification	Assumptions
<u>Component 1</u>. Energy Efficiency Policy Enhancement					
<u>Outcome 1.1</u>: Strengthened national energy efficiency policy framework	· Appropriate national energy efficiency policy framework is put in place and operational	· Absence of appropriate governmental and national support to transform the lighting, refrigeration, and AC markets in STP towards an EE products	· Adoption of the energy efficiency policy approved and adopted by the Ministry of Energy and industry	· Ministry reports and announcements · Project progress reports · Announcement in the official communication channels e.g. gazette, newspapers, radio, TV	· Government of STP (GovSTP) commitment to agree to the policy and institutional systems and continue to support them in the future
Output 1.1.1: National policy on energy efficiency adopted and implemented	· Stakeholder meetings held prior to preparation of policy formulation and establishment Inter-ministerial Steering Committee for Energy Efficiency promotion established	· At high level of inter-governmental decision making process, no specific task group in charge of energy efficiency promotion in STP	· Establish the Inter-ministerial Steering Committee for Energy Efficiency no later than the end of September 2022 ·	· Publication and announcements · Project progress reports	· GovSTP commitment to constitute the Inter-ministerial Steering Committee for Energy Efficiency and implement its recommendations
Output 1.1.2: EE Department of DGRNE created and functioning	· Department of DGRNE created and functioning has been created and is operational	· Absence of State Government legislation for phasing out inefficient LRACs.	· Adoption and implementation of legislation for the phasing out inefficient LRACs	· GovSTP publications and announcement · Project progress reports	· Adopted policies are acceptable to all stakeholders
Output 1.1.3: ENCE created and functioning	· Department ENCE created and functioning has been created and is operational	· Absence of State Government legislation for the creation of ENCE.	· Passing and implementation of law to establish ENCE	· GoSTP publications and announcement · Project progress reports	· GovSTP committed to establish ENCE as proposed in PANEE

Project Strategy	Indicators	Baseline	Target	Means of Verification	Assumptions
Output 1.1.4 Project Steering Committee established and functioning	· Steering committee created and functioning.	· Lack of adequate technical and managerial capacity for conducting an energy efficiency lighting, AC and refrigerator · No task force created within the Ministry of Industry and Energy for energy efficient products: AC, lighting, refrigeration	· Adoption and implementation of legislation for the creation of steering committee	· Government publications · Project progress report	· Government officials appoint and approve the steering committee
Output 1.1.5: Project Management Unit (PMU) created and operationalized within MIRN	· A Project Management Unit (PMU) has been created and is operational	· No task force created within the Ministry of Mines and Energy for energy efficient lighting products promotion	· Train 100% of the PMU staff by the end of 2022	· Government publications · Project progress report	· Government officials appoint and recruit the PMU staff in time
Output 1.1.6: MRV system established and functioning	· A MRV system created and functioning	· No MRV system in the ministry of energy and industry	· Creation and adoption of MRV system	· Government publications · Project progress report	· Government adoption of MRV system
Outcome 1.2: Government law adopted to phase out inefficient LRACs	· Creation of law for efficient LRAC created and functioning	· No law on LRACs	· Creation of law on LRAC	· Government publications · Project progress report	· Government adoption of law on LRAC
Output 1.2.1: Draft law prepared and submitted Government to phase out inefficient LRACs	· Policy and regulation created and functioning · Law to phase out LRAC, created	· No law created for EE LRAC	· Creation of relevant policy and regulation · Creation of law on EE LRAC	· Government publications · Project progress report	· Government adoption of law on LRAC
Component 2: Technical and Managerial Capacity Building for EE Appliance Market Development					
Outcome 2.1: Increased capacity of PMU and EE Department on LRACS market development	· PMU and EE department with high capacity for LRACS market development	· Inadequate technical capacity to develop the energy-efficient lighting market	· Capacity of PMU and EE department increased	· Government publications · Project progress report	· Government adoption of law on LRAC

Project Strategy	Indicators	Baseline	Target	Means of Verification	Assumptions
Output 2.1.1: Technical and managerial capacity of key public agencies enhanced for EE appliance market development	· Public institutions are trained on all aspects on energy efficient product market development	· Weak capacity of key public sector agencies on energy efficient lighting market development	· Capacity building for 100% of all the key public institutions involved in the project by the end of 20124.	· Project progress report · Government publications · Market study report	· The market development measures are consistent with GovSTP
Outcome 2.2: Increased awareness and capacity of private sector players and financial institutions for EE appliance market development	· Private sector main actors are trained on all aspects on energy efficient product market development	· Weak capacity of private sector main actors · Inadequate capacity of private sector institutions for energy efficiency market development	· Capacity building for 100% of all the key private institutions involved in the project by the end of 2024.	· Project progress report · Government publications · Market study report	· The market development measures are consistent with GovSTP
Output 2.2.1: Train LRACs importers, distributors and retailers and financing institutions on EE appliance financing	· Importers, traders and financing institutions are trained on EE lighting project financing · Number of trainees	· Lack of knowledge continues to exist with regard to EE product and financing	· Build the capacity of at least 75% of LRACs traders and financing institutions by the end of 2024	· Participants lists · Training sessions reports	· Mobilization plan fails to interest the potential trainees

Component 3: Appliance Quality Improvement					
Outcome 3.1: Enhanced regulatory framework for EE LRACs standard and labeling	· A regulatory framework for EE LRACs standard and labeling is developed and adopted	· A regulatory framework for EE LRACs standard and labeling does not exist	· Regulatory framework for the endorsement labeling scheme for EE LRACs adopted and published by June 2023	· Project progress report · Meetings, including TWG and tripartite meetings	· Government and all relevant stakeholders have adopted the new framework and willing to implement it
Output 3.1.1: TWG on LRACs standards and labeling created within NSEP and functioning	· TWG on EE LRACs is created and functioning	· TWG on EE LRACs does not exist	. Adoption and implementation of proposal for the creation of TWG on EE LRACs	· GovSTP publications and announcement · Project progress reports	· MIRN appoints members of TWG on EE LRACs
Project Strategy	**Indicators**	**Baseline**	**Target**	**Means of Verification**	**Assumptions**
Outcome 3.2: MEPS and labels for EE LRACs established and functioning in STP	· # MEPS and Labels for EE LRACs are adopted and enforced	· MEPS and labels do not exist for EE LRACs	· Regulatory framework for MEPS for EE products published by June 2023	· Project progress reports · Government publications	· GovSTP endorses the procedure
Output 3.2.1: LRAC MEPS and labels adopted	· # LRAC MEPS and label accepted and adopted	· No MEPS and labels for EE LRAC Label	· Regulatory framework for EE Labels and MEPS f published by June 2023	· Project progress reports · Government publications	· GovSTP endorses the procedure
Outcome 3.3: All traded LRACs meet quality, environmental and energy performance standards	· # LRACs quality, environmental and energy performance standards are accepted	· Absence of LRACs quality, environmental and energy performance standards	· Regulatory framework for LRACs quality, environmental and energy performance standards by June 2023	· Project progress reports · Government publications	· GovSTP endorses the procedure
Output 3.3.1: Procedures for EE LRACs testing developed and adopted	· # Testing procedures for EE LRACs developed and being used	· Procedures for testing for EE LRACs do not exist	· Regulatory framework for testing procedures with regard to EELRACs adopted and operational by June 2013 · More than 70% of imported EE LRACS meet the quality standards	· Survey · Project evaluation report · Government publications	· GovSTP endorses the testing procedures

Output 3.3.2 Energy efficiency, environmental and technical standards for EE LRACs harmonized with international best practices	· # Standards for EE LRAC products are harmonized with international best practices and operational	· Adequate LRACs standards do not exist and are not harmonized with international best practices	· Environmental and technical standards on LRACs are established and harmonized by June 2023	· Project progress report · Government publications	· GovSTP continues to support the development of such standards
Project Strategy	**Indicators**	**Baseline**	**Target**	**Means of Verification**	**Assumptions**
Component 4: Energy Appliance Dissemination					
Outcome 4.1: Public utilities and private distributors and installers fully involved in the dissemination of EE LRACs	· Number of EE LRACs introduced and distributed has increased	· Almost all the EE LRACs are energy inefficient	· Install EE LRACs in new residential, public and commercial facilities	· Project progress report · Pilot project implementation reports	· GovSTP continues to support the dissemination of EE lighting products
output 4.1.1: Pilot EE LRACs in projects in households, public buildings and streets implemented	· Number of pilot projects	· Large proportion of EE LRACs on STP market are inefficient	· Install EE LRACs in new residential, public and commercial facilities	· Project progress report · Pilot project implementation reports	· GovSTP continues to support the dissemination of EE lighting products
Outcome 4.2: Significant improvement in sales of EE LRACs and reduction in the sales of inefficient LRACs	· Share of EE LRACs on STP appliance market increases significantly	· Share of EE LRACs share on STP appliance market is low	· More than **7**0% of LRACs sold in STP are energy efficient	· Project evaluation reports · National sales volumes · National import volumes · IMS data	· The GovSTP and key stakeholders continue to support the EE lighting products market development policies
Output 4.2.2: Financial incentives provided to pro-active local importers, distributors and retailers of EE LRACs	· # Local importers and traders are provided with financial incentives	· In STP products installed per household	· More than 70% of LRACs sold in STP are energy efficient by the end of June 2023.	· Project evaluation reports · National sales volumes · National import volumes · IMS data	· The GovSTP and key stakeholders continue to support the EE LRAC products market development policies
Component 5: Consumers Education and Awareness					

Outcome 5.1: Increased information to consumers about the benefits of EE LRACs	. Consumers are aware about the benefits of EE LRACs products	· Continual lack of awareness about the benefits of EE LRACs products at a national level	· At least 85% of electricity consumers are aware about the benefits of EE LRACs products	· Survey · Project progress reports	· Campaigns are carried out over sufficiently long periods · Appropriate media are used
Project Strategy	**Indicators**	**Baseline**	**Target**	**Means of Verification**	**Assumptions**
Output 5.1.1: National campaign for EE LRACs intensified	· The PMU has carried out and complete a national campaign for EE LRACs	· Continual lack of awareness about the benefits of EE LRACs products at a national level	· 100% of consumers will adopt EE LRACs products by the end of June 2023	· Project progress reports · Survey	· Campaigns are carried out over sufficiently long periods · Appropriate media are used
Output 5.1.2: Information on EE LRACs provided through utility channels	· Utility channels are used for information dissemination	· Inefficient awareness raising initiatives through utilities channels	· All the utilities participate in EE LRACs awareness raising activities	· Survey · Project progress report	· Appropriate media are used
Output 5.1.3: A show room opened in each town for EE LRACs presentation	· A show room for EE LRACs is opened and operational	· No show room established at the moment	· Establish a show room by June 2023	· Project progress report	· Utilities continue to support the show room concept

7. INSTITUTIONAL FRAMEWORK AND IMPLEMENTATION ARRANGEMENTS

○ 7.1 Project management and supervision

The EE project will be managed and monitored following all standard UNIDO procedures for monitoring and reporting. This includes a mid-term evaluation and an end of project evaluation. It is expected that UNIDO will closely monitor the indicators for outputs and outcomes against the Project Logical Framework to establish global and local benefits, financial and environmental, accrued from the project. Main indicators regarding the project will include CO_2 emissions reduced/avoided (in tCO_2eq), peak load reduced (MW), energy saved (MWh) and market penetration rate for energy-efficient lighting products and tons of chemical pollutants avoided for RAC equipment. The Project Steering Committee (PSC) will monitor the progress of the project, including its impacts and the efficiency in its execution.

The **General Directorate of Natural Resources and Energy (DGRNE)** under the Ministry of Infrastructure and Natural Resources (MIRN) has been designated to supervise the project implementation. Thus the DGRNE will be accountable to the Government of STP and UNIDO for ensuring (i) the proper achievement of Project objectives; (ii) the monitoring and evaluation of the project outputs and outcomes; (iii) the effective use of both international and national resources allocated to it; (iv) the timely availability of financing to support project implementation; (v) the proper coordination among all project stakeholders; in particular national parties; and (vi) the timely submission of all project reports, including work plans and financial reports.

The project management arrangement is expected to consist of the following:

- The Project Steering Committee (PSC)
- The National Project Director (NPD)
- The Project Management Unit (PMU)
- The Technical Working Group (TWG) within the National Sustainable Energy Platform (NSEP)

Figure 5 shows the structure of the proposed implementation arrangement.

▪ 7.1.1 Project Steering Committee

The Project Steering Committee (PSC) will consist of high-level representatives from UNIDO and Government ministries and agencies: i) Ministry of Infrastructure and Natural Resources (MIRN); ii) Ministry of Planning, Finance, and Blue Economy (MPFEA); iii) National Designated Authority (NDA); iv) General Regulatory Authority (AGER), Ministry of Planning, Finance and Blue Economy (MPFBE); v) Office of Secretary of State for Trade and Industry (SENAPIQ); and vi) General Directorate of Environment (DGA).

The PSC will be chaired by the Representative of the Minister of Infrastructure and Natural Resources. The primary roles of the PSC are: (i) to provide overall guidance to the implementation of the project; (ii) to ensure good coordination among participating agencies, sectors and international organizations; and iii) to provide financial steering of the project. The PSC shall meet at least once a year (and ad hoc basis as agreed), to discuss the progress of the project and provide future guidance.

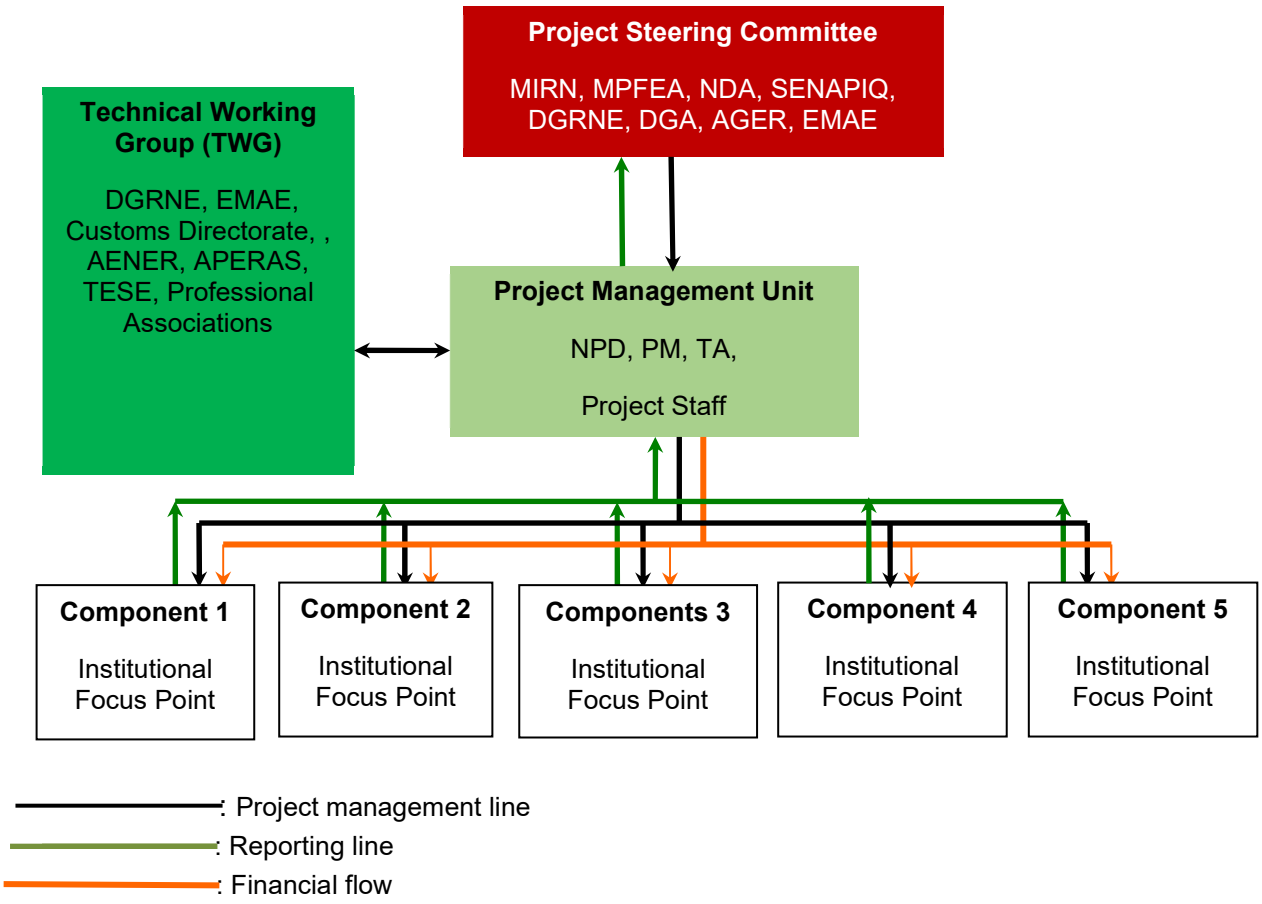


Figure 5: Proposed Project Implementation Arrangement

▪ 7.1.2 National Project Director

The Director of DGRNE will be the National Project Director (NPD). The NPD's overall role is to ensure the successful execution and implementation of the project activities toward achieving project results. The NPD represents MIRN and is accountable to the Government of STP and UNIDO for the substantive quality of the Project and for the proper use of project resources. The NPD is responsible for mobilizing all national and international project inputs in a timely manner, supporting project management and implementation, organizing project activities in accordance with the project work plan, and reporting to the Government of STP and UNIDO the progress and the financial status of the Project.

▪ 7.1.3 Project Management Unit (PMU)

DGRNE will set up a Project Management Unit (PMU) that will be responsible for the overall operational and financial management and reporting of the UNIDO funds in accordance with the rules and regulations for nationally executed projects. The Project Manager will be in charge of day-to-day operations of the Project, and will be working with his team at DGRNE premises. The structure of the PMU is presented in Figure 6.

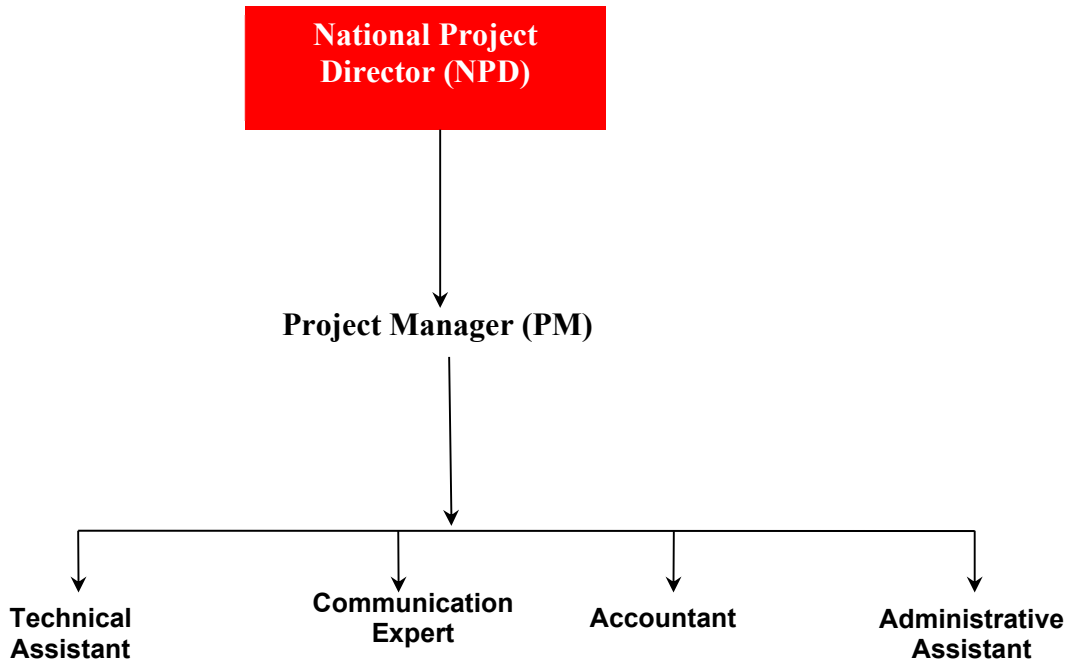


Figure 6: Project Management Unit (PMU)

The PMU will initially comprise: (i) the NPD who works part-time for the project as in-kind contribution of the Government of STP; (ii) the Project Manager (PM); (iii) a Communication Expert; (iv) a Technical Assistant; (v) an accountant and; (vi) Administrative Assistant. Additional experts may be considered to join the PMU, if necessary.

The Project Manager, who will have the technical qualifications and experience as an energy expert, will be appointed to be in charge of the day-to-day operations of the Project, centralize information related to project implementation and carry out regular progress reporting. The PM will also act as secretary of the Project Steering Committee. The PM will also prepare quarterly progress reports to review achievement in the previous quarter, prepare financial report and develop work plan and budget for the next quarter. All such documents would be endorsed by the UNIDO officer responsible for the EE project. The PM will also produce annual progress reports, which must be submitted to the PSC. At the end of the project, the PMU will produce the terminal report, which is to be submitted to the PSC.

▪ 7.1.4 Technical Working Group

A Technical Working Group (TWG) will be established within the National Sustainable Energy Platform (NSEP) to provide overall comments of key project activities including fund commitments. The TWG will consist of the Head of the EE Department of the DGRNE, senior representatives from SENAPIQ (and ENCE when established), Customs Directorate, EMAE, AENER, APERAS, TESE, academia (R&D institutions), and professional associations. The TWG will meet four times a year during the project implementation.

○ 7.2 Stakeholder participation

The stakeholders presented in Table 10 will be involved in further project implementation activities by using appropriate mechanisms and channels. These include direct consultations, specific workshops, and public awareness raising. In addition, capacity building of project partners through “learning by doing” approach is envisaged for the benefit of institutional stakeholders.

Table 10: Key project stakeholder and their roles

Stakeholder	Roles
Ministry of Planning, Finance, and Blue Economy (MPFEA)	The MPFEA is responsible for providing financial support to energy sector institutions and programs in STP. As such, it may be associated in the financing of demonstration projects (as part of public sector projects) during the project timeframe. It will participate in the Project Steering Committee (PSC) meetings. The MPFEA will also collaborate with MIRN to develop the financial incentive policies to importers/distributors of appliances to change their import habits in favour of EE appliances.
Ministry of Infrastructure and Natural Resources (MIRN)	The MIRN is responsible for defining government policy on energy efficiency, as well as proposing a legislative framework for implementing EE regulations. Within the MIRN, the DGRNE and its EE Department will work closely with other public institutions to develop an overall policy statement on energy efficiency, defining the government's strategic orientations in this sector. As such, DGRNE will coordinate the necessary government support and insight. It will also preside over the Project Steering Committee (PSC).
General Directorate of Environment (DGA)	The DGA is the key governmental body responsible for the formulation and implementation of national environmental and climate change policies. The project will work closely with the DGA and other relevant environmental agencies and institutions to promote the EE project.
Water and Electricity Company (EMAE)	EMAE is an autonomous public entity responsible for the water and electricity sector of STP. EMAE provides public services for the production, transmission and distribution of electricity, as well as the capture, supply, conservation and distribution of water. EMAE will be involved in the project monitoring and evaluation (M&E) by collecting and reporting electricity consumption data of end-users. EMAE, supported by consultants, will establish standard formats and guidelines for the data collection and reporting, and will organize training sessions, for project partners, in their use. EMAE demonstrated its interest in the promotion of energy efficiency when its female staff engaged in a "Light Bulb Replacement Campaign" on the International Women's Day on 8 March 2021 to replace incandescent lamps in households with energy-efficient lamps in the rural community of Ribeira Afonso. The main objective of the campaign was to make women aware of the importance of saving energy.

General Regulatory Authority (AGER)	AGER is a multi-sector entity responsible for the regulation and supervision of the sectors of electricity and water as well as telecommunications and postal services in STP. The DGRNE will work closely with AGER in the development of regulations to promote EE appliances
National Industrial Property and Quality Service (SENAPIQ)	SENAPIQ is responsible for quality assurance and the registration and granting of trademarks, patents, industrial drawing, technology transfer and geographical indication.
National Energy Certification Body (ENCE)	ENCE (when established) will be involved in the legal and regulatory framework for EE appliances and the DGRNE will collaborate with it together, with AGER, to regulate the EE appliance market. The ENCE will also drive conformity to MEPS and labels of EE appliances and quality of systems.
Association for Development of Technology, Engineering, Health and Education (TESE)	TESE has the capacity and experience to contribute to the awareness creation on EE LRACs and their benefits. TESE carried out an awareness campaign in the field of energy efficiency and energy conservation for EMAE staff, energy sector stakeholders (AGER, DGRNE) and for the public on TV, in schools and in the communities, with the support of the DGRNE.
Santomean Renewable Energy Association (AENER)	AENER will play a role in awareness creation on EE appliances among importers and distributors of appliances in STP, with the aim to change their import habits from inefficient appliances to good quality EE appliances. The objectives of AENER includes “to promote advocacy and lobbying as instruments for raising awareness and support in decision-making in favour of environmentally friendly and economically viable energy alternatives.
Association for the Promotion of Renewable Energy and Sustainable Environment of São Tomé and Príncipe (APERAS)	APERAS will play a role in awareness creation on EE appliances among importers and distributors of appliances in STP. APERAS has the mission “to mission is to promote, raise awareness, educate, train and empower the Santomean society on the best development practices of the national energy sector, its integration with the protection of the environment and biodiversity, as well as the mitigation of the effects of climate change.

The Project will seek to build on the competencies of all stakeholders by creating a policy dialogue platform through its Communication Strategy to bring all views to the table and draw up the final orientation and guidance towards achieving project outcomes. Each involved stakeholder will play a central role based on its areas of expertise to ensure the delivery of outcomes and outputs pertaining to its mission. Other major stakeholders identified for the successful implementation of the project include: (i) professional associations; (ii) Non-Governmental Organizations (NGOs) particularly those working on environmental protection and natural resources conservation and (iii) consumers associations for dissemination of information materials on best practices for electricity consuming products.

7.3 Project implementation plan

The project will be implemented in 2022-2025, and the implementation plan is presented in Table 11. Table 12 presents the possible risks associated with the project and the strategies to manage the risks.

Table 11: Project Implementation Plan

Project component	Programmed Activities	Key Implementing Agency	Supporting Agency	2022						2023						2024				2025			
Component 1. Energy Efficiency Policy Enhancement	1.1 Draft, promote Government adoption and implement national policy on energy efficiency to create enabling environment for the implementation of PANEE	MIRN	MPFEA, DGRNE, AGER, SENAPIQ, AENER, CCIAS																				
	1.2 Draft and promote passing of by -law concerning the creation, organization and functioning of the EE Department of DGRNE	MIRN	DGRNE, AGER																				
	1.3 Recruit qualified personnel and provide resources for the functioning of the EE Department of DGRNE	DGRNE	AGER																				
	1.4 Draft and promote passing of law concerning the creation, organization and functioning of the National Energy Certification Body (ENCE)	MIRN	DGRNE, AGER, SENAPIQ																				
	1.5 Recruit qualified personnel and provide resources for the functioning of ENCE	MIRN	DGRNE																				
	1.6 Hold consultations with Government stakeholders and constitute the Project Steering Committee (PSC); clearly define their functions and establish its work plan	DGRNE	AGER, SENAPIQ																				
	1.7 Establish the Project Management Unit (PMU) and provide resources for its functioning	DGRNE																					

	1.8 Establish a Monitoring, Reporting and Verification (MRV) system for the EE Department (DGRNE) to work with EMAE to monitor and assess the efficiency and effectiveness of the implementation of EE measures (including energy savings from use of EE appliances); MRV indicators will be disaggregated by gender for impact on women	DGRNE	EMAE, SENAPIQ	
	1.9 Draft and promote passing of law to phase out lighting, refrigerators and air conditioners (LRACs) in STP, including incentive measures	MIRN	DGRNE, AGER, SENAPIQ	
	1.10. Starting the energy labeling process	MIRN	DGRNE, AGER, SENAPIQ	
Component 2: Technical and Managerial Capacity Building for EE Appliance Market Development	2.1 Conduct capacity building workshops for PMU members and EE Department staff on: a) project management; b) policy and legislation preparation; c) energy efficiency standards, quality control and quality assurance of appliances; d) application of the project Communication Strategy; and e) used appliance disposal and recycling	DGRNE	TESE, AGER, SENAPIQ	
	2.2 Conduct capacity building workshops for key public agencies, including DGRNE, EMAE, SENAPIQ, ENCE, DGA and Customs Directorate on: a) reinforcing administrative and technical capacities; b) development of EE appliance market, including undertaking market studies	DGRNE	TESE, BSTPPTC, SENAPIQ, CCIAS	

	2.3 Conduct capacity building workshops for EE appliance importers, traders and potential manufacturers (from a gender perspective to encourage participation of women) on: a) preparation of bankable business plans to local financial institutions; and b) design and implementation of adapted business models for EE appliance market transformation	DGRNE	TESE, AENER, CCIAS																	
	2.4 Conduct capacity building workshop for financial institutions on EE appliance technologies and assessment of business plans on EE appliance business ventures.	DGRNE	TESE, AENER, CCIAS																	
	2.5 Conduct capacity building workshop to raise awareness of potential manufacturers, appliance importers, large retailers, sales chains and financing institutions (from a gender perspective to encourage participation of women) on: a) social and economic benefits of EE appliances; b) EE appliance financing	DGRNE	TESE, AENER, CCIAS																	
	2.6. Conduct capacity building workshop for elected officials, local decision-makers and agents in charge of public procurement	DGRNE	TESE, AENER, CCIAS																	
Component 3: Appliance Quality Improvement	3.1 Establish and provide resources to Technical Working Group (TWG) on standards and labeling of lamps, refrigerators and ACs (LRACs) within ENCE	DGRNE	SENAPIQ																	
	3.2 Adopt, through stakeholder consultation, minimum energy performance standard (MEPS) and labeling of LRACs	SENAPIQ	DGRNE																	

	3.3 Draft and promote passing of a law to establish a legal framework for enforcement of the EE labeling and standards of LRACs	DGRNE	AGER, SENAPIQ, CCIAS																			
	3.4 Set up appliance testing procedures for LRACs by customs officials; and establish relationship with testing laboratories in the region;	SENAPIQ	DGRNE																			
	3.5 Train the trainers of customs officials in technical and vocational institutions in STP;	SENAPIQ	DGRNE																			
	3.6 Conduct capacity building of customs officers to conduct entry inspections and tests on quality of equipment entering STP;	SENAPIQ	DGRNE																			
	3.7 Establish a database of market statistics (imports etc.) and registered products on EE LRACs on the STP market	DGRNE	AGER, SENAPIQ, Customs Directorate, CCIAS																			
	3.8 Establish a national quality inspection system for EE LRACs involving the key institutions NQC, ENCE, AGER, SENAPIQ and Customs Directorate	SENAPIQ	DGRNE, AGER, SENAPIQ, Customs Directorate, CCIAS																			
Component 4: Energy Appliance Dissemination	4.1 Accelerate replacement of approximately 300,000 incandescent light bulbs with LED (10 light bulbs in 60,000 homes over 5 years)	DGRNE	AENER, CCIAS																			
	4.2 Replace 100,000 conventional light bulbs with LED light bulbs in the most impoverished households (5 light bulbs in 20,000 households)	DGRNE	AENER, CCIAS																			
	4.3 Replace 198,000 incandescent light bulbs with LED light bulbs in public buildings	DGRNE	AENER, CCIAS																			

	4.4 Replace 20,000 inefficient light bulbs for LED in public street lighting	DGRNE	AENER, CCIAS	
	4.5 Develop a financial incentives mechanism to support EE LRACs sales (e.g. rebates on purchase of energy efficient appliances, taxation/duty free importation, discount for exchanging old LRACs for new EE ones, payment system in installments etc.) and promote for Government adoption and implementation ((from a gender perspective to encourage participation of women)	DGRNE	MPFEA, AENER, CCIAS	
	4.6 Develop and implement mechanisms for environmentally-sound management of used, destroyed or recycled LRACs	DGA	DGRNE, AENER, CCIAS	
Component 5: Consumers Education and Awareness	5.0. Elaborate, validate the communication strategy	DGRNE	EMAE, AENER, CCIAS	
	5.1 Prepare and disseminate project information flyers and messages to raise awareness of the target audiences on benefits of EE LRACs (from a gender perspective to encourage participation of women)	DGRNE	EMAE, AENER, CCIAS	
	5.2 Consolidate and present all relevant information about EE LRACs at project website	DGRNE	EMAE, AENER, CCIAS	
	5.2 Use appropriate channels to give information of EE appliances to the consumers (by EMAE); present “tips on energy savings” on the EMAE website; and join flyers to electricity bills on a regular basis for	DGRNE	EMAE, AENER, CCIAS	

	consumers' education		
	5.3 Designate selected retail shops as show-rooms for presentation of EE appliances to consumers (by PMU in association with EMAE)	DGRNE	AENER, CCIAS

Table 12: Project Risks and Management Strategy

Risk Description		Category	Impact Severity	Likelihood	Risk Management Strategy and Safeguards	When / By Whom?
1	The project may face a low level of participation from the private sector (LRACs importers and distributors)	Organization	Medium	Medium	The Project will mitigate this risk by: ● Engagement with the private sector from the project design stage to the project implementation ● Designating the representatives of the private sector within the project management bodies (TWG, etc.) ● Disseminating the project outputs and relevant information through appropriate channels, ● Identifying their needs and demand through continuous engagements.	2022-2025 Project Management Unit (PMU)
2	LRAC importers and distributors may not be able to deliver high quality EE lighting products	Technical	Medium	Medium	Initial engagements with the LRAC importers and distributors show that they have adequate understanding of the need of more EE products to cope with climate change and participate in the promotion of EE LRACs in STP. The Project will undertake capacity building activities benefiting LRAC importers and distributors (Component 2) and create their awareness to enable them to quickly adapt to the new market demand and requirements and supply the market with high quality EE LRAC products.	2022-2025 PMU MIRN/ DGRNE

Risk Description		Category	Impact Severity	Likelihood	Risk Management Strategy and Safeguards	When / By Whom?
3	Weak government support, which leads to low level and ineffective enforcement of policies and regulations	Political	Medium	Medium	With its commitment to RJSE and PANEE, the government is willing to contribute to the development of a coordinated energy-efficiency promotion framework including the set-up of an EE LRAC standards and labels program. The Government of STP will therefore provide sufficient human and financial resources for setting up a national policy framework for promoting EE LRACs and enforce the new legislation for EE LRACs as well as the associated regulations.	2022-2025 MIRN/ DGRNE SENAPIQ AGER
4	The project may face lack of commitment of public institutions for compliance monitoring and enforcement of MEPS and labels for LRACs	Institutional	Medium	Medium	Initial engagements with the SENAPIC and the Customs Directorate show that they have adequate understanding of the need of more EE products to manage the energy demand in STP and participate in the promotion of EE LRACs in STP. The Project will undertake capacity building activities for SENAPIC, the Customs Directorate and related partners (Component 2) and create their awareness to enable them to conduct efficient compliance monitoring and enforcement of MEPS and labels for LRACs	2022-2025 MIRN/ DGRNE SENAPIQ Customs Directorate
5	The project may face power utility reluctance to engage in public EE LRACs promotion	Institutional	Low	Low	Promoting EE LRACs will result in substantial savings in energy consumption in STP. Coupled with capacity saving (and thus avoid unnecessary additional capacity investments) this should provide sufficient motivation to engage the EMAE to actively participate in the financing scheme and awareness creation programs to promote EE LRACs	2022-2025 PMU EMAE MIRN/ DGRNE

8. BUSINESS MODEL FOR ENERGY EFFICIENT LIGHTING, REFRIGERATORS AND ACs

After conducting an analysis of different financial mechanisms, and the Baseline Assessment of Market Conditions of Lighting, Air Conditioners and Refrigerators in STP, as well as discussions with local stakeholders, business model to facilitate the promotion of EE lighting, refrigerators and ACs in STP is summarized in Figure 7.

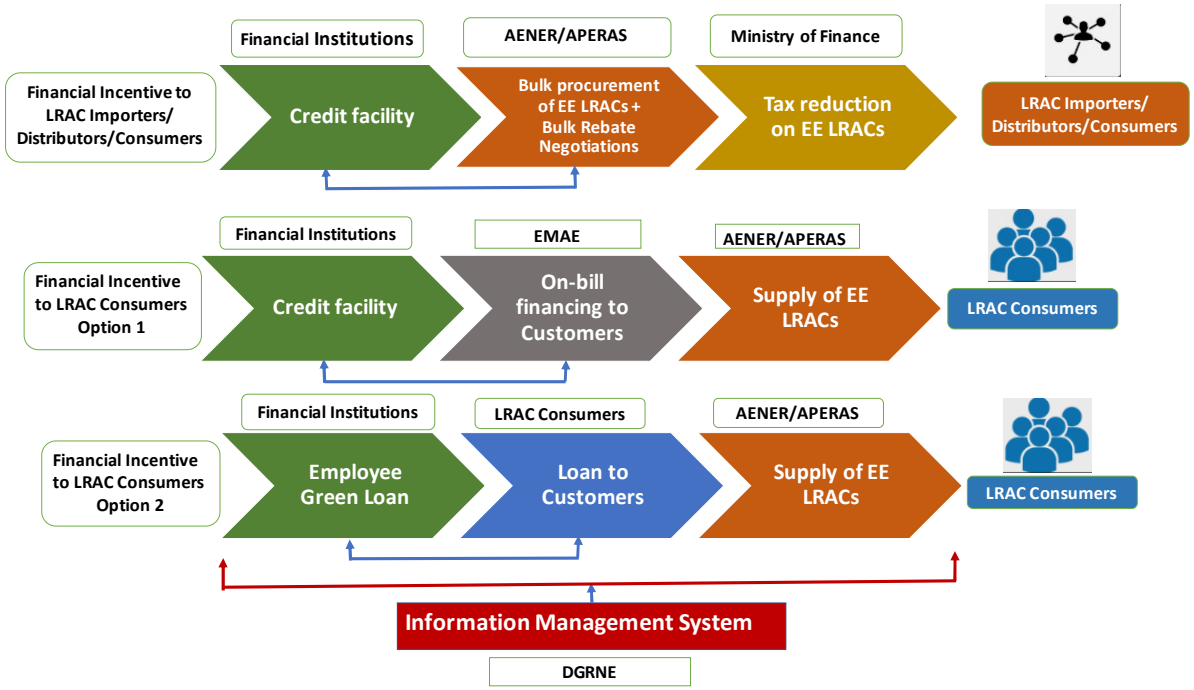


Figure 7: Business model components for energy efficient lamps, refrigerators and ACs

The key elements of the proposed business model to promote EE LRACs in STP are:

- **Bulk rebate negotiation** for price reduction on LRACS;
- **Strong supply chain with last mile service delivery** to ensure availability and servicing of LRACs at local retail shops in STP;
- **Information Management System (IMS)** for efficient coordination between the various actors;
- **Effective consumer engagement** to create awareness about the EE program and the product benefits among stakeholders; and
- **Financial incentives and financing options** to make it easier for consumers to purchase the higher-priced EE LRACs in STP.

Additionally, capacity building under the EE project, will strengthen AENER and APERAS for increased advocacy for the reduction of import taxes by Government on LRACs, to reduce their prices on the market.

○ 8.1 Bulk rebate negotiation

It is recommended that DGRNE supports AENER and APERAS to negotiate bulk rebates with manufacturers/bulk suppliers of LRACs in Asia and Europe in exchange of including their EE lighting, refrigerators and AC products in the EE programme of STP program.

It is recommended that MIRN engages the International Development Partners of STP and the local financial institutions (soft credit facility) to provide initial funding for the bulk procurement of EE LRACs for the importers and distributors. It is expected that a few rounds of bulk procurement of EE LRACs

will bring their prices well below market prices and make them affordable for low-income consumers in STP. To manage the demand risk, the EE project will initially tap the middle- to high-income consumers of LRACs concentrated in urban areas and increasingly target the low-income consumer segment as the product prices drop over time. The EE Project will tap the nodes of aggregate demand such as social housing schemes, commercial buildings and institutional spaces (schools, hospitals, government offices) to significantly boost the bulk procurement efforts in the initial phases and help reduce prices

○ 8.2 Strong supply chain with last mile service delivery

Through the capacity building programs of the EE project, members of AENER and APERAS will be supported to build a robust multi-channel distribution network to ensure last mile availability and servicing of EE LRACs at local retail shops in the communities of STP, with a decentralised distribution and inventory management mechanism to manage logistics costs. AENER and APERAS will explore the setting up of micro franchises to mobilise the participation of local retailers in the supply chain, as they influence consumers' purchase decisions heavily. The PMU will coordinate the establishment and strengthening of the partnership between the AENER/APERAS and EMAE to jointly identify the existing distribution and retail network and expand it with additional strategic points of sale. The benefits of including local retailers include:

- Inclusion of a grassroots stakeholders whose advice is trusted by consumers while purchasing appliances;
- Creation of local capacity to provide timely after-sales services; and
- Creation of an organic demand for EE LRACS even after the EE program in STP has ended.

The PMU will ensure that women are encouraged to take advantage of the opportunities offered through the setting up of micro franchises to mobilise the participation of local retailers in the supply chain.

○ 8.3 Information Management System

An information management system (IMS) will be hosted at the DGRNE (and later transferred to the EE Department when established) and shared with EMAE and relevant project partners for efficient coordination between the various actors and maintaining a transparent record of sales of LRACs and inventory movement in a prompt manner. The IMS will be beneficial to various stakeholders of the EE Project: i) DGRNE and wholesale distributors will use it to keep track of the inventory at critical hold points; ii) EMAE will integrate the IMS with their consumer database to verify consumer details, such as contact information, power consumption, arrears on power bills, etc.; iii) retail-level distributors will use it to record sales to verified consumers; and, iv) it will be used to efficiently operationalize convenient repayment options for consumers and for deploying targeted financial incentives.

○ 8.4 Effective consumer engagement

The EE project (Component 5) includes consumer engagement by the DGRNE (and later the EE Department when established) to support this business model for awareness creation on the benefits of EE appliances and the project itself. This engagement will include obtaining regular feedback from consumers of the EE LRACs to ensure quality and grievance redressal, which would help build consumers' trust in the EE LRACs and the EE project. The engagement will also help to understand consumers' needs and concerns and help improve the marketing strategy for EE LRACs as well as help improve the financial incentive mechanisms and payment options.

Innovative consumer engagement strategies led by EMAE, AENER and APERAS will be conducted to create awareness about the EE project and the benefits of EE LRACs among consumers, as well as retailers and local technicians.

○ 8.5 Financial incentives and financing options

The two financial incentives schemes recommended to be developed under the EE project by DGRNE for LRACs consumers in STP are: i) On-bill-financing (OBF) through EMAE; and ii) Employee Green Loan through wage deduction by financial institutions (e.g. Ecobank) and institution-based or community-based credit unions.

It is recommended that the DGRNE and partners engage EMAE to establish the on-bill-financing (OBF) option, where LRACs consumers will pay for the appliance cost as installments added to their monthly electricity bills from EMAE. The OBF will be enabled and managed via the Information Management System (IMS), see section 7.3) to be hosted at the DGRNE (and later transferred to the EE Department) and shared with EMAE. The IMS will provide a robust data management system that will digitally record the number of LRAC sales made, link these sales to consumer details through the customer database of EMAE, and make this information available to relevant actors in the LRAC supply chain. This will address possible challenges in the verification of sales and financial risk due to consumer defaults on installments. It is recommended that MIRN should engage the International Development Partners of STP and the local financial institutions (soft credit facility) to provide initial funding to EMAE to support the OBF.

It is also recommended that DGRNE engages the financial institutions as well as the institution-based or community-based credit unions in STP to establish the Employee Green Loan (EGL), in the form of short-term to medium-term personal unsecured loans to LRAC consumers. The EGL will initially target LRAC consumers who are government employed, and eventually some who are private sector employed. The LRAC consumers who are government employed are perceived as almost credit risk-free by financial institutions due to their employer's strong backing. Both the burden of upfront investment and the need for collaterals are reduced, providing more liquidity and reducing borrowing costs for clients, while drastically reducing perceived risk for financial institutions. Under the EGL scheme, the financial institution will enter into an employee green loan finance agreement with the client's employer entity. The client then makes loan repayments through wage deductions while his/her employer entity makes bulk repayments for all their employees to the financial institution at the end of every month. The employer entity is thus guarantor of the client's loan, reducing the need for stringent credit assessment and collaterals. The client thus receives a green loan from the financial institution and buys the equipment upfront from LRACs retailers approved by DGRNE. Employees do not need to be account holders with financial institutions to access this mechanism. The local financial institutions can offer employee loans with repayment periods between 6 and 36 months. Financial institutions are able to charge below market rates monthly to employees due to lower default risk. The development of such a mechanism could then be extended to more private sector companies.

9. REGIONAL AND INTERNATIONAL TECHNICAL SUPPORT OPPORTUNITIES FOR STP

A number of initiatives and partners have been assessing the level of development concerning the adoption and implementation of standards and labels for domestic appliances. These include: i) ECREEE; ii) SACREEE; iii) CLASP; iv) RISE; v) U4E; vi) ISO; vii) ECEE E3; viii) AFREC; and ix) ARSO.

o 9.1 ECREEE

ECOWAS has approved/adopted binding MEPS for lightings, refrigerators, air conditioners, televisions, electric water heaters, electric fans, air conditioners, off-grid and on grid lighting. ECREEE has also developed MEPS for *solar home* equipment at a regional level, as well as a strategy to support countries in the elimination of incandescent lamps (ECOWREX Annual Report, 2020).

ECREEE could support STP in the following areas:

i. ECREEE support to the CEREEAC with specific case study focused on STP with the support of UNIDO and IRENA

ii. ECREEE approach to member states to implement MEPS

o 9.2 SACREEE - EELA

The regional centres for RE and EE of East and Southern Africa (EACREEE and SACREEE) have partnered with UNIDO, SADCSTAN, EASC, CLASP, the Swedish Energy Agency and the Swedish Standard Institute in a project aimed at the transformation of the regional markets for energy efficient lighting and appliances. The Energy Efficient Lighting and Appliances project in Southern and Eastern Africa (EELA) aims to create market and institutional conditions to enable a transformation of the sector to stimulate increased diffusion of efficient lighting products and other appliances across all sectors.

The support of EELA to STP, as defined by their objectives could include:

i. National coordination platform.

ii. Regional policy and regulatory environment including gender and CC.

iii. Capacity building and institutional strengthening framework Awareness raising strategy

o 9.3 Collaborative Labelling and Appliance Standards Program (CLASP)

CLASP has also a large pool of publications from the institutions and its partners on the analysis of products, markets and policies. For example, the programme provides guides on the application of standards and labels and tools to help decision-makers in assessing the benefits of these instruments and in setting the performance targets. The appliances covered for MEPS and Energy Labelling are lighting, refrigerators, air conditioners, distribution transformers and electric motors.

The support of CLASP can be:

- Support initiatives to establish databases following the adoption and implementation of MEPS.

o 9.4 Regulatory Indicators for Sustainable Energy (RISE) database

The World Bank's RISE database measures national policy and regulatory frameworks. The indicators cover energy access, energy efficiency and renewable energy. RISE allows for countries to compare the status of their policy and regulatory frameworks against other countries and to identify areas of improvement.

The support of RISE could be:

- Assessment of the policy/regulation instruments for both MEPS and labels.

9.5 UN Environment's United for Efficiency Programme (U4E)

U4E has a database of country Energy Efficiency Policy Assessment for Lighting, Residential Refrigerators, Room Air Conditioners, Distribution Transformers and Industrial Motors. The same platform contains also estimations of the potential savings by each of these equipment by 2030 according to Business as Usual (BAU) and two MEPS adoption scenarios for all African countries. U4E monitors the Green Climate fund.

The support of U4E could be:

- Supporting the implementation of the GCF programme for lighting, Air conditioners, refrigeration, or industrial cooling.

9.6 International Organization for Standardization (ISO)

ISO is an international standard-setting body composed of representatives from various national and regional standards organizations. ISO promotes worldwide proprietary, industrial, and commercial standards. ISO has published 23091 International Standards, which can be bought from member countries or the ISO Store.

- Interest of STP to ISO is to be a member of the ISO, starting as observer at first

9.7 Electrical Energy Efficiency (ECEE E3)

ECEE E3 programme is a globally standardized approach to test and verify Energy Efficiency for electrical/electronic equipment, based on IEC International Standards.

It aims to prevent duplication of testing, reduce costs and support global trade in a timely manner. IECEE E3 programme can provide proof of compliance to IEC International Standards in the field of Energy Efficiency in general and more particularly in:

Annex 1 - Energy performance

Annex 2 - Energy consumption

Annex 3 - Level of noise emission

Only Kenya, Nigeria and South Africa are members from the African continent.

9.8 African Energy Commission and United for Efficiency (AFREC/U4E) - Africa Energy Efficiency Programme

AFREC has partnered with U4E and have designed the **Africa Energy Efficiency Programme** to support continental level market transformation to higher efficiency lighting and appliances.

This programme will start with an Energy Saving Assessment to inform policy makers potential of MEPs and Energy labelling to save energy, costs and GHG emissions.

9.9 African Organisation for Standardisation (ARSO) - Africa Standards Harmonization for Trade

The African Organisation for Standardisation (ARSO) is Africa's intergovernmental standards body formed by OAU (currently AU) and UNECA in 1977 in Accra Ghana. The fundamental mandate of ARSO is to develop tools for standards development, non-electrotechnical standards harmonization and implementation of these systems to enhance Africa's internal trading capacity, increased Africa's product and service competitiveness globally, and uplift of the welfare of African consumers as well as standardization forum for future prospects in international trade referencing.

While increased trade and closer economic cooperation between developing countries represent a considerable potential for development, realising this potential represents a major challenge especially in terms of an effective continental standardization infrastructure. This forms the basis for ARSO Strategic Direction as summarised in its Vision, Mission and Goals.

In carrying out its mandate, ARSO seeks to:

- harmonise national and/or sub-regional standards as African Standards and issue necessary recommendations to member bodies for this purpose;
- initiate and co-ordinate the development of African Standards (ARS) with references to products which are of peculiar interest to Africa;
- encourage and facilitate adoption of international standards by member bodies;
- promote and facilitate exchange of experts, information and co-operation in training of personnel in standardisation activities;
- co-ordinate the views of its members at the ISO, IEC, OIML, Codex and other international Organisations concerned with Standardisation activities.
- create appropriate bodies in addition to the organs of the organisation for the purposes of fulfilling its objectives.

Two ARSO initiatives are particularly relevant to this work:

- ARSO Certification System (ARSO-CERT) is a regional certification system established by ARSO under a continental certification marking scheme and is intended to certify the quality of African goods, products and services produced in accordance with the Africa Standards (ARS) issued by ARSO.
- ARSO **Conformity Assessment** Committee (CACO) Conformity assessment is to enable member states to produce and offer consistent and improved quality of goods/products and services through harmonization of common quality control, inspection and testing activities using standards as a medium (see http://www.arso-caco.org).

9.10 General Collaborations

- There are international, continental, regional and member states experiences with adoption, enforcement of MEPS and market surveillance that can inform future development of the M VE system, as well as the development of roadmaps for supporting testing of appliances and development of market surveillance across the continent.
- The MEPS initiatives adopted at regional level, e.g. at SADC/EAC, ECOWAS and Mediterranean countries, will be a good start towards harmonization of MEPS adopted in the country.
- The adoption, implementation and harmonization of MEPS and Energy Labelling is at its infancy in the majority of African member states.
- Many African countries have developed National Energy Efficiency Action Plans (NEEAPs), such as those of ECOWAS have precisely defined what needs to be done on MEPS adoption and enforcement. In the cases such policies are supported by appropriate regulation and MEPS are mandatory.
- Typically, MEPS adoption for lighting, refrigerators, air conditioners tend to be the common ones across the member states that have MEPS.

10. COMMUNICATION STRATEGY TO PROMOTE ENERGY - EFFICIENT LIGHTING, REFRIGERATORS AND ACs IN STP

This document lays out the Communication Strategy for promoting awareness, target group uptake, and stakeholders' commitment towards the promotion of EE LRACs in STP. Awareness activities and engagement under the Strategy will contribute to maximize energy efficiency gains under the EE project and help to ensure that target groups adopt and sustain the use of energy efficient appliances. Project Management Unit (PMU.

o 10.1 Objectives of the Communication Strategy

The Communication Strategy on the Promotion of Efficient Appliances (CS-PEA) in STP provides the general roadmap to update all stakeholders regularly on activities and outcomes of the project to promote EE LRACs in STP. It also provides guidelines to enhance communication among stakeholders of the project. The content of the communication will include success stories and case studies highlighting benefits / energy savings gains on energy efficiency interventions in STP and similar countries. The CS-PEA is expected to raise the awareness of the project and will have the potential to impact positively on other national policies and on the media.

The CS-PEA is intended to address:

- Better targeting at the various audiences related to electrical appliances in STP;
- Better focus at what motivates the various audience segments to act;
- Ensuring that stakeholders and partners feel consulted and have ownership of the EE project;
- More consistent and effective messaging based on this understanding.

o 10.2 Target of the Communication Strategy

The main audience of the CS-PEA comprise: i) Policy makers; ii) Regulatory Authority; iii) Quality Assurance Agency; iv) Compliance and Enforcement Agencies; v) Waste Management Agencies; vi) Academia (R&D institutions); vii) Private Sector (LRACs importers, distributors and retailers); and viii) Civil Society, as presented in Figure 8.

o 10.3 CS-PEA Focal Person

A CS-PEA Focal Person will be designated at the PMU who will be responsible for gathering and processing information related to the implementation of the EE project and share it with the project management team and other shareholders. The CS-PEA Focal Person will monitor the progress and achievements of the implementation of the EE project in order to spread the relevant information, including project milestones and concrete impacts to the project management team and other shareholders.

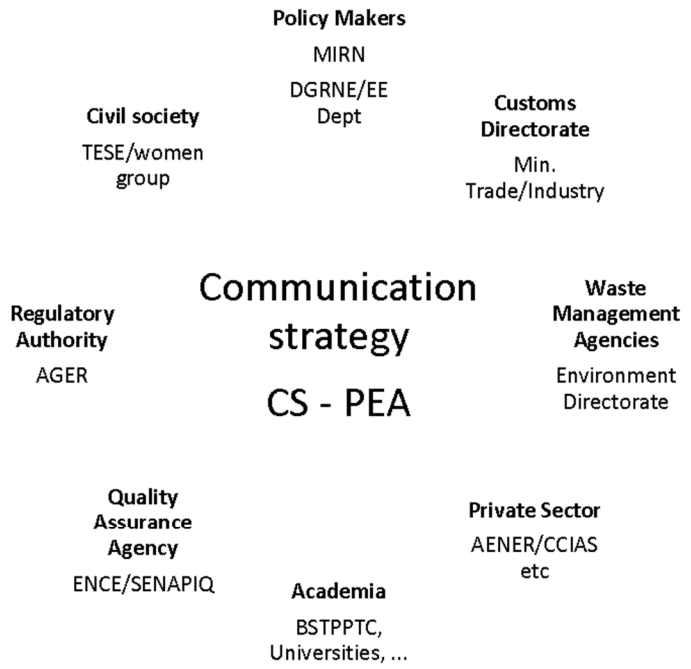


Figure 8: Key audience of the Communication Strategy – CS-PEA

o 10.4 Internal and external communications

The communication strategy comprises both internal communication and external communication.

▪ 10.4.1 Internal communication

The objective of the internal communication is to present activities and mechanisms for a smooth and effective communication exchange within the project management team (PMU and TWG). The internal communication strategy is also intended to strengthen the cooperative relationship within the implementation partnership and to facilitate the sharing of information between the key implementation partners of the EE project (frequent exchange of emails and the setting up of the project web site) as well as an effective and shared management of the knowledge generated by the EE demonstration activities (energy savings, reduced CO_{2e}, increased interest in energy efficiency). The internal communication involves those policy makers that can have an impact on the policies and on the practices (administration, authorization) related to the promotion of EE LRACs in STP and are able to influence increased use of the EE appliances.

▪ 10.4.2 External communication

The successful implementation of the EE project also depends on the capacity to activate synergies and guarantee a constant relation between actions planned at different levels and sectors to promote EE LRACs in STP. The external communication is crucial for creating the EE project's national importance, and significantly contribute to the project's public recognition. The external communication is intended to spread the new knowledge, events and initiatives, outputs and results achieved under

the project to stakeholders and civil society, with a special focus on the widespread use of EE appliances as base for a new wise and sustainable energy practice.

The PMU will prepare a list of people and bodies to be engaged and informed by the CS-PEA, as well as a list of TVs, radios, newspapers, thematic (energy efficiency, sustainable energy etc.) newsletters to be involved with the aim of broadcasting to a wider public about the EE project's scope, activities and outcomes. A project website will be established, where relevant information on the EE project will be made available to stakeholders. The project website may also publish appliance market surveillance results to such that: i) Consumers can learn more about the benefits of the EE project (MEPS and labels); ii) Appliance retailers can learn about their responsibilities and about the project; iii) Appliance importers/distributors can learn about their responsibilities and access important documentation In addition, seminars, webinars, press conferences as well as press releases, press articles, interviews on TV and radios will be conducted.

▪ 10.4.3 CS-PEA brochure

The PMU will create a CS-PEA brochure containing an overview of the focus areas of the EE project, key activities and expected outcomes, and soft copies will be shared with stakeholders to make available for printing. Generally, the CS-PEA brochure will represent a relevant communication tool that, owing to its high visibility and versatility, can be used to promote the EE project towards a larger audience during all types of public events related to the use of EE LRACs.

Some other models and tools for information and awareness raising are presented in Appendix 2.

o 10.5 Quarterly/annual communication evaluation

The PMU will conduct quarterly and annual communication evaluation to monitor the communication activities that have taken place compared with those planned by the communication strategy, by using some performance indicators (such as the number of enquiries from the CS-PEA Focal Person, number of radio interviews, etc.).

● 11. CONCLUSION - RECOMMENDATIONS

A critical factor for the success of the implementation of the EE appliance project in STP is readily available funding for the activities. A **dedicated financing fund** in the form of a National Fund financed by international financial institutions and/or regional initiatives should be established to finance EE projects. **Companies and financial institutions** have to begin **to invest in companies that have environmental, social and governance (ESG) impacts**, including EE. STP should seek to leverage environmental, social, and governance (ESG) investments for the implementation of EE and the attraction of private capital.

Reliable, timely and detailed data on energy end-uses, markets, technologies and energy conservation opportunities in all sectors should also be collected for the development of effective EE strategies and policies in STP. The DGRNE should undertake a review of best practices in data collection for EE. Additionally, the DGRNE should:

- Develop **awareness campaigns** for consumers, government officials, businesses, and financial institutions. Media campaigns through television or radio should be implemented for widespread reporting of the benefits of EE as well as information on government support, cost of equipment, and funding available to citizens.
- **Introduce EE into the curricula of colleges and universities as well as professional institutions** throughout the region to significantly increase awareness as well as the supply of qualified EE engineers and technicians.
- Develop and implement regular and comprehensive **training and capacity building programs to build EE expertise** across the project development value chain.

Gender mainstreaming in the EE appliance project in STP is also critical for the success of the project. It is important to **integrate gender aspects** into the project, to achieve the significant gender benefits and positive impacts on women and girls of the EE measures in households as well as in industries such as agriculture, textiles and clothing, fisheries, aquaculture, and several rural enterprises. The PMU will ensure that women are encouraged to take advantage of the opportunities offered through the setting up of micro franchises to mobilise the participation of local retailers in the supply chain of LRACs.

The EE appliance project is expected to make a positive impact on **Climate Change** in the following ways:

- Energy saved through the implementation of the EE measures will delay investments in future generation, displacing GHG emissions;
- The EE measures will enable electricity to reach disconnected populations, avoiding the use of diesel and kerosene;
- EE in industries and commercial units can reduce the cost of production per unit, making them viable and allowing them to invest more in clean technologies. EE measures are an ongoing process rather than a non-permanent investment and EE measures adopted in industries and business units will ultimately encourage the STP economy to adopt a lower GHG trajectory.

Digitalization and New Business Models should be incorporated in the implementation of the EE appliance project. Digital trends in energy should be considered fundamental to ensuring faster and more efficient growth in the sector and ultimately improving the efficiency of energy development, distribution and use. The digital trends to be aware of across the region include:

- The use of smart devices and meters to enable customers to optimize their energy consumption, reduce their monthly bills and save energy in the process;
- The application of digital money and mobile payments in the context of energy access to enable many people to access energy products and electricity through a pay-as-you-go system, removing the barrier of upfront capital costs.

Digital innovation will ultimately enable greater reach in access to RE with EE design.

As other critical factors, testing, inspection, and certification of appliances are essential to support the implementation of MEPS in STP. However, methodologies for testing electrical devices are not yet developed.

Policy, Regulation and Standards are also very important factors for the success of the EE appliance project in STP. Considering that the policy and regulatory framework in STP is still in its infancy, EE is

generally not among the priority options. In the absence of targets and policies, regulations and standards for EE appliances and projects that help effectively achieve EE goals and objectives are also largely absent. Regulation can ensure minimum performance appliances or eliminate very poor-quality appliances from the market.

12. APPENDICES

○ Appendix 1: Overview of all policies and measures for the energy and electricity sector

	Policy Type	Measure	Target Group	Under I Implementation / Planned	Period / Entry Into Operation
1	**Development of Prior Studies and Collection of Information (Policy and Technical)**	Preparation of studies and collection of information on the potential for energy efficiency in STP and its contribution to mitigation and adaptation	Decision makers in the public and private sector	planned	2021-2025
2	**Organizational strengthening (Institutional)**	Creation and integration of the EE department at DGRNE	Public Sector / Energy Service Companies	planned	2021-2025
3		Institution of a National Energy Certification Body or Entity (ENCE)	Public Sector / Energy service companies	planned	2021-2025
4	**Market development (Regulatory and Legal)**	Regulate the energy efficiency of appliances available on the market	General public	planned	2021-2023
5		Regulate energy labeling for equipment (development of MEPS - *Minimum Energy Performance Standards*)	General public	Under implementation (Call for submission of proposals launched in 2021)	2021-2022
6		Regulate minimum energy performance standards for new buildings	Construction professionals / Building users and owners	planned	2021-2035

7		Regulate minimum energy efficiency standards for importing appliances	Customs Officials/DGRNE/DGA/ Traders	planned	2021-2030
8		Regulate energy intensive consumers	Intensive Consumers and Industry	planned	2021-2025
9		Regulate projects and installation of industrial equipment	industrial companies	planned	2021-2025
10		Regulate the incorporation of technologies suitable for energy savings and efficiency in public and private real estate infrastructure projects with an emphasis on the tourism sector such as hotels	Private sector with emphasis on the hotel sector	planned	2021-2025
11	**Creation of incentive mechanisms and guarantees (Financial and Fiscal)**	Creation of incentives and financial mechanisms to increase the population's access to energy efficient appliances (eg, discount for exchanging old appliances for new ones, payment system in installments, among others)	General population	planned	2021-2025
12		Creating tailored financing solutions	Private sector / General population	planned	2020-2030
13	**Transparency and Decision Support (Policy and Information)**	Creation of a centralized system including a database on energy efficiency	Political and business decision makers/ /Population in general	In implementation	2020-2023

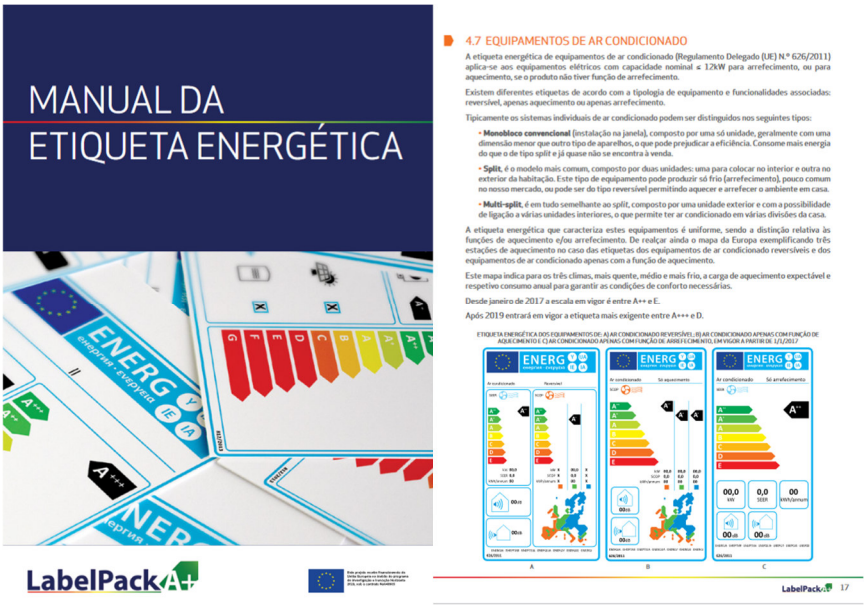
14		Creation and implementation of an MRV (*Monitoring, Recording and Verification*) system for the implementation of EE measures	DGRNE/Policymakers	planned	2022-2030
15	**Qualification and Certification Initiatives (of products and services) in EE**	Creation, updating and continuous implementation of a training program for specialists in specific EE topics (creation of technicians and auditors)	Energy sector professionals	Under implementation (and needs further funding)	2020-2050
16		Carrying out continuous training actions for institutional managers in the structuring of complete energy efficiency project proposals and project management for fundraising	Energy sector professionals	planned	2021-2050
17		Creation of competences within the DGRNE for centralization and management of energy efficiency data, including calculation standards	Professionals from MIRN / DGRNE, DGA, EMAE, AGER and other institutions related to EE	planned	2021-2023
18		Carrying out continuous actions to support the training of national associations and entrepreneurs	EE-related associations and organizations in STP	planned	2021-2050
19		Elaboration and continuous implementation of a	Energy sector professionals	planned	2021-2050

		training and capacity building plan for technical staff on EE			
20		Training actions for EMAE technicians on the use of SGI and O&M	Energy sector professionals	planned	2021-2025
21		Creation and installation of laboratories in the EE area	Researchers, students and professionals in the energy and related fields	planned	2021-2035
22		Promoting technical and technological training for staff at training centers and universities, on an ongoing basis	Universities and vocational training centers	planned	2021-2050
23		Establish cooperation agreements with universities and international centers for technological research in the field of EE	Universities and technology centers	planned	2021-2030
24	**Development of programs and action plans**	Create an action plan to promote national energy autonomy and encourage energy efficiency in homes and commercial/industrial buildings in addition to public lighting	Residences / Commercial and industrial buildings / Public administration	planned	2021-2023
25		Create a program to adopt innovative technologies for energy-efficient refrigeration and air conditioning systems	Residential / Commercial Buildings	planned	2021-2030
26		Create a program to	Electric Sector	planned	2022-

		accelerate the development of smart grids and the mass use of smart meters			2050
27	**Information and Awareness Initiatives**	Execution of SEforALL awareness campaigns for STP that include energy efficiency	General population	planned	2021-2023
28		Continuous implementation of communication campaigns from a gender perspective to increase bill collection and combat commercial losses	General population and commercial sector	In implementation / Planned	2020-2050
29		Carry out continuous publicity and awareness campaigns for the population on the rational use of energy	General population	planned	2020-2050
30		Carrying out continuous publicity and awareness campaigns on the rational use of energy in hotels and other tourist accommodation	Tourism sector	planned	2020-2050
31		Dissemination of information on EE projects that have been successfully implemented at national level	Private sector / General population	planned	2021-2050

○ Appendix 2: Models and tools for information, awareness raising

Example of tools produced by the Portuguese Energy Agency



Example of a manual on energy labeling produced by Portuguese Energy Agency (ADENE)

Example of air conditioner technical manual, produced by ADENE (source : Ar Condicionado)

Awareness video produced by the Portuguese Energy Agency

- *CLASSE+: A eficiência tem classe*
- *Certificar é Valorizar - spot 30s*
- *ENERGIA ON-OFF Ep. 04 - Iluminação*
- *ENERGIA ON-OFF Ep.01 - Eficiência Energética*

Platform

The Casa+ Portal: tool to help carry out ADENE's missions, to raise consumer awareness in the choice of effective and quality solutions and products: https://www.classemais.pt/

Portal presentation webinar: https://www.youtube.com/watch?v=9X7gxg-Q7uQ