



# **STRATEGIC PROGRAMME FOR THE PROMOTION OF INVESTMENTS IN RENEWABLE ENERGY AND ENERGY EFFICIENCY IN THE ELECTRICITY SECTOR OF SÃO TOMÉ AND PRÍNCIPE**

## **SÃO TOMÉ E PRÍNCIPE**

**DRAFT OF THE PROJECT COMPONENTS /  
POINT 3 OF THE GEF CEO ENDORSEMENT DOCUMENT**

05 June 2018

## DISCLAIMER

This is a working document that describes the project components based on the PIF, information collected during the first mission to São Tomé e Príncipe in March 2018 and from other meetings that took place in the period between February to June 2018.

The document still has some sections in which information needs to be added/ reviewed.

All comments and inputs are welcomed.

## Imprint

Developed with technical assistance from:

ITPEnergised (ITPE Ltd)



© Copyright 2018 ITPE Ltd. The concepts and information contained in this document are the property of ITPE Ltd. Use or copying of this document in whole or in part without the written permission of ITPE Ltd. constitutes an infringement of copyright. ITPEnergised is a trading name for the legal entity ITPE Ltd.

Limitation: This report has been prepared solely for the use of the Client and any party with whom a warranty agreement has been executed, or an assignment has been agreed. No other parties may rely on the contents of this report without written approval from ITPE Ltd, for which a charge may be applicable.

ITPE Ltd. accepts no responsibility or liability for the consequences of use of this document for any purpose other than that for which it was commissioned, nor the use of this document by any third party with whom an agreement has not been executed.

### 3) THE PROPOSED ALTERNATIVE SCENARIO, GEF FOCAL AREA<sup>1</sup> STRATEGIES, WITH A BRIEF DESCRIPTION OF EXPECTED OUTCOMES AND COMPONENTS OF THE PROJECT

#### **Proposed Alternative Scenario**

The proposed alternative scenario is to carry out a series of components and activities that will lead to the promotion and adoption of sustainable energy solutions (RE and EE) in the electricity market of STP. The combined and integrated interventions in the areas of technology demonstration, policy development support, capacity building and SIDS-SIDS cooperation will create an enabling environment for the integration and scale up of sustainable energy technologies in STP. The project will contribute to the transformational change of the electricity sector to a sustainable low-carbon development path.

Under the baseline scenario, the barriers would not be adequately addressed providing a rationale for GEF involvement. The GEF financing will provide the necessary catalytic support to create and sustain an environment that is conducive to promoting investments and adopting appropriate RE and EE technologies in STP electricity sector contributing to climate change mitigation and associated environmental and socio-economic benefits to the country.

The GEF project will also provide the opportunities and the means for STP to make good use of the lessons learned and best practices from Guinea-Bissau and Cabo Verde, who underwent a similar experience and are in the process of addressing similar barriers thanks to GEF intervention.

#### **Project Approach**

In line with the proposed alternative scenario, the GEF project focuses on the mitigation of the barriers for sustainable energy investments. The project will, with a relatively small GEF grant, have significant impact and leverage co-financing from the public and private sector. The project will adopt an inter-disciplinary approach involving national Ministries and institutions, academia and research centres, industrial associations, financing institutions, foundations, venture capitalists and utilities.

The proposed approach is fully in line with Objective 1 of the GEF-6 Climate Mitigation Strategy, which aims to promote innovation, technology transfer, and supportive policies and strategies, with Program 1 focusing specifically on the promotion of the timely development, demonstration, and financing of low-carbon technologies and mitigation options. It responds also to the GEF Private Sector Strategy. The GEF-6 private sector engagement approach supports private or public energy service companies and Small and Medium-sized Enterprises (SMEs) to promote RE and EE.

In order to reach the project's objective, four project components (PC) are proposed (Figure 1 depicts the intervention of the GEF/UNIDO project):

**Project Component 1 (PC1):** Strengthening the policy, legal and regulatory framework for sustainable energy solutions (RE and EE)

**Project Component 2 (PC2):** Promoting investments in sustainable energy solutions

**Project Component 3 (PC3):** Strengthening capacities on sustainable energy island solutions

**Project Component 4 (PC4):** Project monitoring and evaluation

---

<sup>1</sup> For biodiversity projects, in addition to explaining the project's consistency with the biodiversity focal area strategy, objectives and programs, please also describe which [Aichi Target\(s\)](#) the project will directly contribute to achieving..  
GEF6 CEO Endorsement /Approval Template-August2016

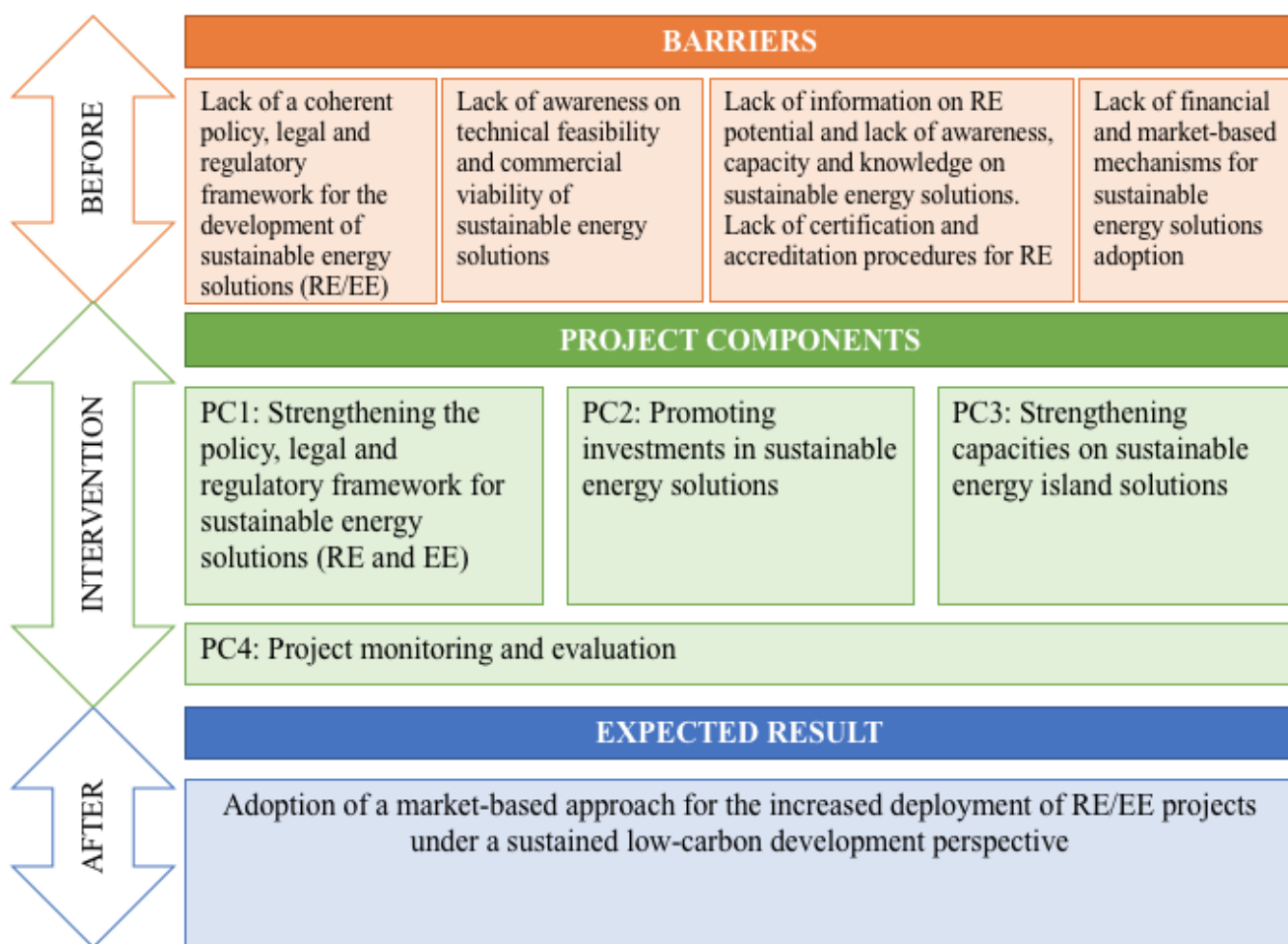


FIGURE 1: PROJECT COMPONENTS

Project implementation will be monitored and evaluated on an ongoing basis for improved replication of the project activities during and after the project period. The monitoring methodology will be conducted on a periodic basis in line with the GEF, UNIDO and Government requirements. A detailed description of the activities under this component is provided in Part II, section C: Describe the Budgeted M&E Plan.

The following description includes the contents of each PC:

***Project Component 1 (PC1): Strengthening the policy, legal and regulatory framework for the development of sustainable energy solutions (RE and EE)***

*Expected outcome 1: A conducive policy, legal and regulatory framework for RE and EE is created and its implementation facilitated*

So far STP has no coherent policy, legal and regulatory framework in place for the adoption of sustainable energy solutions (RE and EE) and to promote access to energy to the population. Moreover, the lack of access to electricity services in rural and remote areas hinders the efforts of communities to implement climate change adaptation measures. According to data from INE and EMAE, STP electrification rate over the last years increased from 57.9% in 2012 to 74.5% in 2018<sup>2</sup>. The electrification rate in 2018 in São Tomé was of 75,3% while in Príncipe was of 56.8%. There is still a way to go to achieve universal access in STP. Although there are targets set up by the Government of STP towards RE in 2020 and 2030 (40% and 47% of the electricity mix, respectively)<sup>3</sup> as well as a recognition of RE and EE and the role of independent power producers (IPPs) there are no specific fiscal and non-fiscal incentives nor a clear policy, strategy, programmes and standards that contribute to foster the adoption of both RE and EE and to attract investors for

<sup>2</sup> Data reported in the Baseline Report (Annex I)

<sup>3</sup> National Determined Contribution (NDC) from November 2016 / INDC from September 2015, Decree-Law n.26/2014 “Lei de Bases do Sector Elétrico” (Basic Electricity Sector Law), between others.  
GEF6 CEO Endorsement /Approval Template-August2016

the implementation of these type of technologies. In addition, there is a need to improve communication amongst stakeholders in the energy sectors as well as coordination of activities.

Nonetheless the GEF/UNDP project being implemented in STP “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*” (GEF ID5334) was recently restructured and includes activities that aim at promoting STP policy, legal and regulatory framework for RE. Moreover, the WB has also a programme that contemplates activities aiming at improving the energy legal and regulatory framework in the country.

Therefore, the objective of PC1 is to contribute, in cooperation with, and to complement the GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*”, to set up a coherent policy, legal and regulatory framework for the integration of sustainable energy solutions (RE and EE) in STP electricity sector.

This will be achieved through: the creation of a National Sustainable Energy Platform and Website that will increase communication and cooperation amongst energy sector stakeholders as well as information dissemination on the sector and its on-going activities; the development of a national RE and EE policy coupled with an energy access strategy that will put forward concrete targets for the deployment of RE, EE and energy access in various sectors; the development of action plans with measures and actions to be adopted with a chronogram for policy implementation; the development of an incentive package for sustainable energy; and the development of EE standards for electrical appliances.

Thus, PC1 will support the creation and will facilitate the adoption and implementation of a conducive policy, legal and regulatory framework for sustainable energy (RE and EE) in STP. This will be achieved through the implementation of a set of activities framed under each Expected Output of the GEF Project.

### **Output 1.1. A National RE and EE Policy is developed and its adoption and implementation facilitated**

#### **Activity 1.1.1 Establishment of a National Sustainable Energy Platform (NSEP)**

During the PPG stage and as a result of stakeholder’s consultation activities it was identified that for the creation of a sustainable legal, policy and regulatory framework to promotion sustainable energy in STP there is a need to increase communication and cooperation amongst all stakeholders involved in the energy sector, including private sector ones.

For that, the National Sustainable Energy Platform (NSEP), that will include representatives of public and private institutions operating/involved directly and indirectly in STP energy sector (including Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs)), will be created. It is envisaged that the NSEP will meet on a regular basis and that it will bring together the following institutions: MIRNA/DGRNE, MIRNA/DGA, AGER, EMAE, AFAP, UNDP, AfDB, National Institute for Gender Equality Promotion (*Instituto Nacional para a Promoção da Igualdade e da Equidade de Género*, INPIEG) and will be hosted and coordinated by the MIRNA/DGRNE. Depending on the issues to be discussed and analysed other stakeholders will be invited to attend to the meetings, such as financial institutions, NGO, CSOs etc.

The NSEP will coordinate and support the following activities:

- Guide the detailed analysis on the gaps and synergies of STP policy, legal and regulatory framework, as well as of expected and ongoing projects/initiatives of the energy sector in order to provide recommendations on how to promote better coordination between them and to ensure that they are contributing to the sustainable development of STP energy sector (Activity 1.1.3)
- Discuss and analyse recommendations on how to improve policy and regulatory environment to promote sustainable energy in STP (Activity 1.1.4)
- Provide guidance and inputs on the national RE and EE policy documents to be developed (Activity 1.1.6), including, if possible, on the Strategic Plan for the Development of RE in STP that will be established through the support of the on-going GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*”.
- Provide guidance and inputs on the development of the package of incentives to support RE and EE (Output 1.2)
- Provide guidance and inputs in the development of EE standards for electric appliances (Output 1.3)
- Discuss and provide input on the GIS based National RE Mapping (Output 2.1)
- Discuss and contribute towards the development of the National Sustainable Energy Investment Plan (NSEIP) (Output 2.2)
- Discuss and contribute towards the creation of a National RE Facility for Sustainable Energy projects (Output 2.4);

- Encourage the adoption of gender dimension into the energy policy, legal and regulatory framework as well as into sustainable energy initiatives (PC1)
- Establishment of an Energy Sector Database (expands the to-be-created Electric Power Database under the GEF/UNDP project “Promotion of environmentally sustainable and climate-resilient grid /isolated grid based hydroelectric electricity through and integrated approach in STP”)
- Creation and maintenance of a Website for dissemination of information and awareness raising on the energy sector and energy sector activities (including GEF/UNIDO project activities and its deliverables and other on-going projects) (Activity 1.1.2)

A strong coordination effort will be needed in order to organise and guide the NSEP work towards the final goal of improving the policy, legal and regulatory environment. With this in mind, establishing and improving mechanisms for synergy building, information sharing, shared awareness and advocacy is advisable. The mechanism can comprise:

- Conducting scheduled meetings among NSEP members, having in mind the following suggestions:
  - Each participating institution/entity should select a representative person to attend the NSEP meetings as well as one replacement if the person cannot attend.
  - The NSEP host (MIRNA/DGRNE) supported by the Project Management Unit (PMU) should be responsible for scheduling meetings and informing members about upcoming dates.
  - The NSEP work should be coordinated by MIRNA/DGNRE. During the meetings, activities and tasks to be conducted should be identified and assigned to the corresponding members (entities), indicating objectives, critical path activities, milestones and deadlines to be fulfilled. The results should be discussed in the following meeting to identify any possible delays, hurdles or changes.
  - Meeting minutes should be created each time the NSEP meets and records must be kept on where the discussions were held, the people present and next actions. This is useful to avoid future misunderstandings on allocated responsibilities. They should be distributed to all the attendees (even to those who were not present).
- Creating a computer-based information sharing and storage tool within the Website to which members can have access to (with a specific login function). If members are allowed to upload/modify information they should inform the NSEP Coordinator.
- Creating a communication protocol to be followed by NSEP members.
- Sharing the outcomes/actions of the NSEP with the public through the Website (Activity 1.1.2)
- Apply best practices in Good Governance to ensure intended outcomes are achieved. The function of good governance in the public sector is to ensure that entities act in the public interest at all times. This requires:
  - Strong commitment and integrity, ethical values, and the rule of law; and
  - Openness and comprehensive stakeholder engagement.
  - Defining outcomes in terms of sustainable economic, social and environmental benefits;
  - Determining the interventions necessary to optimize the achievement of intended outcomes;
  - Developing the capacity of the entity, including the capability of its leadership and the individuals within it;
  - Managing risks and performance through robust internal control and strong public financial management; and
  - Implementing good practices in transparency and reporting to deliver effective accountability.

Women of the respective institutions and entities will be encouraged to participate on the NSEP, in order to promote equal gender opportunities.

It is envisaged that through the joint participation and discussions carried out under this Activity that the national ownership on the process of integrating sustainable energy into STP legal, policy and regulatory framework will be strengthened.

As the establishment/improvement of policy and regulatory framework will be an activity that will be carried out throughout the entire project, the NSEP will meet 2 times a year during the GEF/UNIDO project. These meetings will be half-day working meetings where the National and International Consultants and the PMU will be invited to present results of the Activities 1.1.2 to 1.1.7 and the results of the activities of other outputs of PC1 and others that may contribute directly and indirectly to the improvement of the legal, policy and regulatory framework in place as well as to share the experience of implementing the policies and frameworks developed throughout the project and on synergetic projects. This will allow the project to adapt the developed and improved policies to the changing environment.

### **Activity 1.1.2. Establishment of a Website and Energy Sector Database**

Information on the energy sector is scarce and spread across the sectors. Also, there is no harmonised way of collecting data and also there is no validation of the current data on the energy sector. As data of the sector is crucial for the development of any plan and policy, for analysis and reports on the energy sector and of other sectors that use energy (e.g. GHG Communications to the UNFCCC, etc), for a potential investor and for the public in general, it is of extreme importance that the energy sector data is gathered in a consistent way, validated and reported back.

MIRNA/DGRNE does not have a website and at the PPG stage revealed that it would be something that it would like to have.

The GEF/UNIDO project will support MIRNA/DGRNE in the development of a Website with an integrated Energy Sector Database that will make information on the energy sector available to all interested stakeholders.

The Energy Sector Database will be created, with the main objective of providing rigorous information on the STP energy sector, including but not limited to:

- Centralise and validate the information on the energy sector (demand, generation of past years, installed capacity as well as predicted in the future);
- Make information available on the energy sector legal and regulatory framework as well as on the sectors plans and strategies for the future.

Under the GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*” it is expected that some support will be provided to the definition of the database. The GEF/UNIDO project will work with the GEF/UNDP project in the establishment of this database and in associating it to the Website, which will be the instrument used for the communication and dissemination of the gathered and treated information.

It is expected that the Energy Sector Database could be a simpler version of the “Energy Observatory” that was recently launched by ADENE in Portugal (<https://www.observatoriodaenergia.pt/pt>).

The Website will serve the following functions:

- Raise awareness of the general public on sustainable energy initiatives by making information available on:
  - The energy sector;
  - Sustainable energy approach that can be and should be adopted;
  - Advantages of the use of sustainable energy in STP;
- Share with the general public information about:
  - The GEF/UNIDO project implementation status, on-going/planned activities, results and lessons learnt from GEF/UNIDO project activities;
  - Other on-going and synergetic country initiatives.
- Advertise available financial options and other incentives for sustainable energy projects, such as calls for proposals that will be released on the to be created National Facility for RE Projects;
- List and provide contacts of companies in the country that provide services that can support the development/management / maintenance of sustainable energy projects and initiatives.

It is expected that the Website will be linked to other related existent platforms (ECREEE, SIDS DOCKS, UNIDO).

The design of the Website and the associated Energy Sector Database will be done by a National IT Consultant guided by MIRNA/DGRNE, an International Consultant and the PMU. The maintenance and the updating of the Website and Energy Sector Database content/information will be carried out during the project as a joint task of the PMU and a technician from the MIRNA/DGRNE appointed for it. From time to time, support from a National IT Consultant will be required (he/she will be hired to provide one or two days of support to the platform each month).

### **Activity 1.1.3 The existent policy, legal and regulatory framework for RE and EE is reviewed, and gaps and opportunities identified**

Based on the findings of the Baseline Report (Annex I) developed during the PPG phase, the RE Potential Resource Mapping developed under PC2 of the GEF/UNIDO project, outputs of the STP PSRP and of the GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*”, a gap analysis will be conducted in terms of the current regulation related to on-grid and off-grid RE projects as well as to EE and energy access. At the



moment, STP has no laws, plans/strategies or regulations in place towards RE and EE, although the Government of STP (through MIRNA, EMAE and AGER) has set up targets for RE for 2020 and 2030 in its NDC.

Within this analysis the existing institutional documents of the energy sector and of other sectors (such as environmental sector, infrastructure development/building sector etc.) that refer to RE and EE will be analysed in depth as well as the institutional framework in place (responsible bodies and responsibilities). The gap analysis will also look into how gender and youth are integrated and being addressed in the electricity sector.

This will enable to understand the regulatory and institutional framework barriers and opportunities that exist in the country and to put forward recommendations to overcome those barriers. Within this, and as energy is a transversal issue to other sectors of the economy, recommendations will also be drawn on how to integrate RE and EE into the economic and social sectors (such as education, health, environment and industry, amongst others), including recommendations on how to integrate gender issues in the development of RE and EE projects.

The findings of this Gap Analysis and Recommendations analysis will be summarised in a report that will be presented and discussed with STP stakeholders at a workshop (see activity 1.1.2). This will enable to gather feedback and inputs from different stakeholders on the report and its findings, as well as to discuss and refine the recommendations put forward to address the identified barriers. With the collected feedback, the final Gap Analysis and Recommendations report will be compiled to inform the development of the National EE policy, the SEforAll AA (Activity 1.1.3), the incentive package (Output 1.2) and the EE standards for electric appliances (Output 1.3).

An International Energy Policy Consultant will lead this activity with inputs from National Legal and Policy Consultants and the PMU.

#### **Activity 1.1.4 Workshop on the Gap Analysis and Recommendations**

The results of the gap analysis, identification of barriers and the proposed recommendations will be presented and discussed with key stakeholders of the energy sector and representatives from other interested sectors at a ½ day workshop. This workshop will be held with relevant governmental agencies, EMAE, NGOs and potential (private and public) project developers. This will be important as it will serve to validate the work carried out under Activity 1.1.2, as well as to discuss and agree on the recommendations on how to overcome the barriers and establish a legal and regulatory framework conducive to the adoption of sustainable energy solutions (RE and EE). An International Energy Policy Consultant will lead this activity with inputs from the National Legal and Policy Consultants. The PMU will help with the coordination of this activity.

#### **Activity 1.1.5 Development of the National RE and EE policy**

Similar to the national RE and EE policy development processes implemented in other SIDS, such as Cabo Verde and Guinea-Bissau, and since within the GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*” a Strategic Plan for the Development of RE in STP will be developed, in this activity the RE policy will be complemented and the EE policy will be developed for STP based on the findings of Activity 1.1.3. The policy will comprise the development of a National EE Action Plan (NEEAP) and the Sustainable Energy for All (SEforAll) Action Agenda (AA) for STP.

The STP NEEAP and SEforAll AA will be designed to include goals and targets for 2020 and 2030 for STP in terms of the development of the power sector, development of RE systems (including grid-connected and off-grid RE targets, improve access to energy for the population, use of RE resources, etc) and EE targets (grid loss reductions, efficiency of energy systems production etc), respectively. Besides the goals and targets, the plans will clearly define the trajectories for target achievement and highlight all measures and programmes that will be implemented to achieve those targets. The SEforAll AA will also identify energy nexus initiatives, programmes and projects (for example, energy-water nexus opportunities). The two plans will also identify the need for the development of specific laws and regulations to introduce incentive mechanisms for RE generation and for improvement of efficiency in the electricity sector, as well as capacity and infrastructural needs of the sector.

The STP NEEAP and SEforAll AA will be prepared using a table of contents and layout that will be agreed previously with MIRNA/DGRNE (that can be based on the NEEAP developed for Cabo Verde and Guinea-Bissau and the SEforAll template and guidance provided by AfDB). This will enable harmonisation of the STP RE and EE plans and SEforAll AA with Cabo Verde and Guinea-Bissau plans. Table 1 summarises the main contents for the NEEAP and the SEforAll AA.

TABLE 1: MAIN CONTENTS OF STP NEEAP AND SEFORALL AA OF STP

<b>NEEAP main content</b>	Introduction
	Status quo of EE in the country contemplating: general indicators, total energy consumption and the primary energy consumption
	Summary of the national EE policies and measures
	National EE targets and indicators
	EE potentials



	<p>Sectoral EE targets and indicators: efficiency in lighting; high performance distribution of electricity; safe sustainable and affordable cooking; EE standards and labelling; EE in buildings; other sectoral EE targets</p> <p>National public institutions involved in the NEEAP implementation</p> <p>Measures for achieving the targets;</p> <p>Schedule for NEEAP implementation</p> <p>Preparation of the NEEAP</p> <p>Monitoring and follow-up of NEEAP's implementation</p>
<b>SEforAll AA main content</b>	<p>Executive summary</p> <p>Preamble</p> <p>Introduction</p> <p>Part 1: Vision and Targets until 2030: including energy sector trajectory; energy access target until 2030; RE target until 2030; EE target until 2030; and Relevant nexus targets until 2030</p> <p>Part 2: Priority Action Areas: description for the areas of energy access, RE, EE and additional action areas of the current status and trajectory, existing plans/ strategies and existing gaps; priorities to be addresses to achieve the objectives in the respective areas; high-impact opportunities. This part also should include information on enabling action areas, namely energy planning and policies, business model and technology innovation, finance and risk management; capacity building and knowledge sharing and other priorities.</p> <p>Part 3: Coordination and follow-up: including the description of the national SEforAll coordination structure; follow up analysis; monitoring, evaluation and reporting; link to the Investment Prospectus/Investment strategy (this to be developed under PC2 of this GEF project).</p>

The NEEAP and SEforAll AA will have as a basis the NDC developed by the Government of STP, which sets up the RE targets for 2020 and 2030 for STP, the STP PSRP, the results of the GIS Mapping on RE Resource (resulting from PC2, Output 2.1) and the Strategic Plan for the Development of RE in STP (if that is developed by then). These documents, as well as political commitment and aspirations in terms of RE, EE and energy access will be used for the definition of the RE and EE goals and targets for STP as well as the measures, programmes and actions that will need to be implemented to achieve the proposed targets.

For the development process of the NEEAP and SEforAll AA, the NSEP (and other national stakeholders) should be convened and consulted on a regular basis, so that they can provide inputs on the directions of the plans as well as to help define the RE, EE and energy access scenarios. It is expected that this NSEP will formally meet at least three times during the process and will also provide inputs on the compiled NEEAP and SEforAll AA drafts, and if possible on the Strategic Plan for the Development of RE in STP. The NSEP members should also be available for one-on-one consultations during the plans' entire development process.

The NEEAP and SEforAll AA will be developed by a National Policy Expert guided by and International Policy and Strategy expert with support from MIRNA/DGRNE, the NSEP and AfDB.

The NSEIP to be developed under Output 1.2.2 will be directed towards the targets of the NEEAP, SEforAll AA and the Strategic Plan for the Development of RE in STP.

The final versions of the NEEAP and SEforAll AA will be presented and validated in a validation workshop (see Activity 1.1.7) with a wider audience of STP stakeholders.

#### **Activity 1.1.6 Monitoring of the implementation of the NEEAP, SEforAll AA and the Strategic Plan for the Development of RE in STP**

The day-to-day progress of the implementation of the three plans will be monitored by the PMU. Towards the end of the GEF project a National Evaluator will analyse and report on the status of implementation of the plans. This will include actions implemented, results achieved, lessons learnt, barriers and recommendations for improvement.

The results of this analysis will then be presented and discussed at a Workshop (Workshop on the progress of the implementation of the NEEAP, SEforAll AA, the incentive package and EE standards – Activity 1.1.7). Based on the results of the evaluation and the comments received and agreed actions during the workshop, the plans will be improved. The improvements of the plans will be carried out by a National Consultant with guidance from MIRNA/DGRNE, NSEP and the PMU.

#### **Activity 1.1.7 Legal and Regulatory Framework Workshops**

Within this activity three (3) main workshops will be carried out:

- Validation workshop for the NEEAP and SEforAll AA. The GEF/UNIDO project will try to coordinate with the GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*” the validation of these two plans with the validation of the Strategic Plan for the Development of RE in STP.
- Validation workshop for the incentive package and EE standards
- Workshop on the progress of the implementation of the: NEEAP, SEforAll AA, incentive package, EE standards and Strategic Plan for the Development of RE in STP.

During the Validation Workshops the draft version of the NEEAP and SEforAll AA (developed in Activity 1.1.5) as well as the incentive package (developed in Output 1.2) and the EE standards for electric appliances (developed in Output 1.3) will be presented and discussed with STP stakeholders with the objective of validating all the policy/legal framework documents and standards.

At the Workshop on the Progress of the Implementation of the NEEAP, SEforAll AA, incentive package and EE standards, and the Strategic Plan for the Development of RE in STP the stakeholders will be informed about how the implementation of the developed legislation has been conducted, the results achieved through it and the lessons learnt. Recommendations for improvements of those will be discussed and agreed with the stakeholders, to better align the legislation to the achievement and aspiration of STP goals in terms of RE, EE and energy access.

These workshops will be half a day workshops and are estimated to involve the participation of around 40 stakeholders each. The workshops will be organised by the PMU and supported by both the International and National consultants that worked on the documents to be validated / presented.

## **Output 1.2. A package of incentives is developed, and its adoption and implementation facilitated**

### **Activity 1.2.1 Development of the package of incentives**

Article 51 of the DL n.26/2014, relative to the “Special Incentives for the Production of Electricity” refers that:

- “1. The production of electricity maybe objective of special incentive regimes, with the aim to: foster energy efficiency; foster the reduction of fossil fuel consumption; promote the use of RE; protect the environment; and support the technological development”*
- 2. That the special incentive regime is to be developed in complementary legislation and that these last ones should contemplate the eligibility criteria and application modes of the incentives; and the nature of the incentive to the investment, production or both as well as the respective timetable and other conditions.*
- 3. That the special incentive regimes may include the possibility to establish preferential conditions for certain projects to be recognised as projects of national interest due to its innovative characteristics.*
- 4. That special incentive regimes associated to guarantees of origin or autonomous tradable titles may be created and provided according to the sources of energy used for electricity generation.*
- 5. That the incentives may be provided for the construction and maintenance of grid infrastructures, including connection capacity;*
- 6. That the additional cost relative to the incentives should be specified in the consumers invoice and included in the tariff system.”*

Thus, although the DL refers that the incentives should be created in secondary laws, these secondary laws still do not exist.

Moreover, there are no incentives or regulations regarding the RE based electrification though mini-grids. In addition, although there is a recognition and ambition that the energy sector should be liberalised, and that the participation of the private sector is key for the development of the energy sector, there is an absence of standard procedures (such as Power Purchase Agreements) to guide the involvement of Independent Power Producers (IPPs) or Public Private Partnerships (PPPs) as well as a lack of clarity in relation to the licencing processes for RE and EE projects.

The newly restructured GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*” will work on the definition of some of these incentives, namely:

- Regulation for interconnection: definition of the purchase relationship between a private operator and EMAE;
- Prepare a Manual on Technical and Administrative procedures private energy operators from all sources of RE to connect to the grid;
- Elaboration of the Sanctioning Regime;
- Study on sustainable tariffs for investments in energy production in isolated rural networks and identification of different incentive mechanisms for RE producers.

Thus, and having all of this into account, there is a need to develop/complement secondary legislation for the creation of incentives and standards that will support the development of RE and EE and its integration to the energy sector. Also, although the DL n.26/2014 makes the provision for the creation of a series of incentives, there is a need to, first of all, carry out a study or studies that analyse:

- What incentives (fiscal and other incentives) should be put forward for the development/implementation of EE projects and to promote sustainable access to electricity (RE mini-grid systems for example) and what will the expected impact of these incentives be in the electricity tariff that will be charged to the consumers? (this study should complement the “Study on sustainable tariffs for investment in energy production in isolated rural networks and identification of different incentive mechanism for RE producers” that will be developed with GEF/UNDP support).
- To what type of projects and up until what capacity should the special incentive regimes be provided?
- If guarantees of origin or autonomous tradable certificates are provided, how will they be allocated? How will those tradable certificates be used/how and when can they be traded? What will their value be? How will this market function / operate? What will be the impact for the consumers?
- Shouldn't feed-in- tariff system or quota systems for RE be considered for STP?
- Should other fiscal incentives (e.g. waive of duty for RE and EE equipment) and non-fiscal incentives (e.g. exemption of full EIA for RE and EE projects), be put forward? If so, how would that work?
- What should be the support mechanism for IPPs and PPPs and how those should be put in place and advertised (including the analysis of the establishment of a standardized PPA; the development of guidelines for IPP and for PPP for the development of RE and EE projects in STP, among others)? (this should complement the “Manual on Technical and Administrative procedures for private energy operators from all sources of RE to connect to the grid” that will be developed with GEF/UNDP support)
- How would the licencing process for RE and EE process look like? (this should complement the “Manual on Technical and Administrative procedures for private energy operators from all sources of RE to connect to the grid” that will be developed with GEF/UNDP support)
- What would be the best package of incentives and the implications for the population?

These studies should be carried out by International and National Consultants with the support and guidance from MIRNA/DGRNE and AGER. The results of the studies should be presented to MIRNA/DGRNE and AGER as well as to the NSEP in order to collect feedback and establish a package of incentives that should be adopted in STP. Once the package of incentives is defined and agreed among all the stakeholders, proposals for secondary legislation for the creation and implementation of these instruments will be created by the International and National consultants and submitted to Government institutions for revision, approval and adoption.

During the definition of this package of incentives, a schedule for their implementation as well as the responsible entities for their provision and monitoring of their implementation will be pointed out.

These studies, instruments and respective secondary legislation should be then presented and validated by a wider group of stakeholders at the Validation Workshop for the incentive package and EE standards (Activity 1.1.7).

#### **Activity 1.2.2 Monitoring of the implementation of the incentive package**

The day-to-day progress of the implementation of the incentive package will be monitored by the PMU. Towards the end of the GEF project, a National Evaluator will analyse and report on the status of implementation of the incentive package. This will include, actions implemented, results achieved, lessons learnt, barriers faced, and recommendations for improvement.

The results of this analysis will then be presented and discussed at a Workshop (Workshop on the progress of the implementation of the Strategic Plan for the Development of RE in STP, NEEAP, SEforAll AA, incentive package and EE standards – Activity 1.1.5). Based on the results of the evaluation, the comments received and agreed actions during the workshop, the analysed secondary legislation will be improved. These improvements will be carried out by a National Consultant with guidance from MIRNA/DGRNE, AGER and the NSEP.

### **Output 1.3. EE standards for electric appliances with potential to reduce the peak load demand by at least 1 MW are developed and their implementation facilitated**

#### **Activity 1.3.1 Development of EE standards for electrical appliances**

So far, the Government has not set any specific targets or standards for EE. The annual work plans of the Government “*Grandes Opções do Plano*” just speak about the need to establish an EE program. Moreover, the DL n.26/2014 also refers that they want to improve the

quality of the electricity system, promote EE, increase environmental sustainability and contribute to the reduction of the energy dependency of the country.

According to the Baseline Report (see Annex I), although electricity access in STP is 74.5% the electricity generation and supply system is very inefficient. There are a lot of cuts on electricity supply, technical difficulties associated with the maintenance of the electricity generators as well as there are several electricity generators are not operational. Moreover, the MV and LV grid system is very degraded and there are significant losses in supplying the electricity to the final consumers (the majority of the final electricity consumers do not have meters to measure electricity consumption). It is estimated that the losses of the electricity systems are of around 30%.

Thus, the GEF project will develop EE standards for electric appliances with potential to reduce the peak load demand by at least 1MW towards the reduction of technical and non-technical losses in the transmission and distribution system.

These standards will be developed by a National Consultant, led by an International consultant with guidance from MIRNA/DGRNE, AGER, the NSEP and the PMU.

The draft version of the standards will be presented at the Validation Workshop for the incentive package and EE standards. The inputs gathered will be used to compile the final version of the standards that will be submitted to the Government of STP for endorsement.

### **Activity 1.3.2 Monitoring of the implementation of the EE standards for electrical appliances**

The day-to-day progress of the implementation of the EE standards for electrical appliances will be monitored by the PMU. Towards the end of the GEF project, a National Evaluator will analyse and report on the status of implementation of these standards. This will include actions implemented, results achieved, lessons learnt, barriers faced and recommendations for improvement.

The results of this analysis will then be presented and discussed at a Workshop (Workshop on the progress of the implementation of the Strategic Plan for the Development of RE in STP, NEEAP, SEforAll AA, incentive package and EE standards – Activity 1.1.5). Based on the results of the evaluation, the comments received and agreed actions during the workshop, the standards will be improved. These improvements will be carried out by a National Consultant with guidance from MIRNA/DGRNE, AGER, the NSEP and the PMU.

The following table summarises the outputs and activities of PC1.

<i><b>Project Component 1): Strengthening the policy, legal and regulatory framework for the development of sustainable energy solutions (RE and EE)</b></i>	
<i><b>Outcome 1:</b> A conducive policy, legal and regulatory framework for RE and EE is created, and its implementation facilitated</i>	
PC1 is directed at adjusting the policy and institutional framework in order to promote the adoption of sustainable energy solutions (RE and EE) in STP	
<i><b>Output 1.1:</b> A National RE and EE Policy is developed, and its adoption and implementation facilitated</i>	
<b><i>Planned and Envisioned Activities</i></b>	<b><i>Responsibility</i></b>
<u>Activity 1.1.1 Establishment of a National Sustainable Energy Platform (NSEP)</u>	MIRNA/DGRNE MIRNA/DGA, AGER, EMAE, AFAP, UNDP, AfDB, INPIEG, etc PMU
<u>Activity 1.1.2. Establishment of a Website and Energy Sector Database</u>	MIRNA/DGRNE International Consultant National IT Consultant PMU
<u>Activity 1.1.3 The existent policy, legal and regulatory framework for RE and EE is reviewed, and gaps and opportunities identified</u>	International and National Consultants PMU
<u>Activity 1.1.4. Workshop on the Gap Analysis and Recommendations</u>	International and National Consultants PMU
<u>Activity 1.1.5. Development of the National RE and EE policy</u>	International and National Consultants MIRNA/DGRNE NSEP AfDB
<u>Activity 1.1.6. Monitoring of the implementation of the NEEAP, SEforAll AA and the Strategic Plan for the Development of RE in STP</u>	National Evaluator MIRNA/DGRNE NSEP PMU

<u>Activity 1.1.7 Legal and Regulatory Framework Workshops</u>	National and International Consultants PMU
<b><i>Output 1.2: A package of incentives is developed, and its adoption and implementation facilitated</i></b>	
<b><i>Planned and Envisioned Activities</i></b>	<b><i>Responsibility</i></b>
<u>Activity 1.2.1 Development of the package of incentives</u>	National and International Consultants NSEP MIRNA/DGRNE and AGER PMU
<u>Activity 1.2.2 Monitoring of the implementation of the incentive package</u>	National Evaluator MIRNA/DGRNE and AGER NSEP PMU
<b><i>Output 1.3: EE standards for electric appliances with potential to reduce the peak load demand by at least 1 MW are developed and their implementation facilitated</i></b>	
<b><i>Planned and Envisioned Activities</i></b>	<b><i>Responsibility</i></b>
<u>Activity 1.3.1. Development of EE standards for electrical appliances</u>	National and International Consultants NSEP MIRNA/DGRNE and AGER
<u>Activity 1.3.2. Monitoring of the implementation of the EE standards for electrical appliances</u>	National Evaluator MIRNA/DGRNE and AGER NSEP PMU

## **Project Component 2 (PC2): Promoting investments in sustainable energy solutions**

*Expected outcome 2: An enabling investment framework for RE and EE is created and its implementation facilitated*

This component aims at creating and facilitating the implementation of a sound and enabling national investment framework for RE and EE solutions with a strong replication and leverage effect. The GEF/UNIDO project will particularly focus on project preparation and bundling, as well as technology demonstration.

This will be achieved through:

- The development of a Status Report of RE and EE in STP and of the GIS-based Renewable Resources Mapping
- The development of a National Sustainable Energy Investment Plan (NSEIP) and its presentation to potential investors in two investment forums;
- The deployment of sustainable energy (RE and EE) investment projects in STP
- The creation of a Financial Facility for Sustainable Energy Investment projects in STP.

### **Output 2.1. The STP RE and EE Status Report and the GIS-based National RE Resource Mapping identifying high-impact priority sites are developed and disseminated**

#### **Activity 2.1.1. A Status Report of the RE in STP and the GIS-based National RE Resource Mapping identifying high-impact priority sites are developed and disseminated**

Having the Baseline Report as a starting point, as well as existent information from other on-going projects (the March 2018 Mission Report to STP of the International Hydro Power Expert (see in Annex K)), the Water Resource Management Plan, the LCPDP developed by the WB, the STP Hydroelectric Inventory to be developed by the GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP*”), the GEF/UNIDO project will carry out the development of: (i) a STP RE and EE Status Report; and (ii) a GIS-based National RE Resource Mapping identifying high-impact priority sites, which will be widely disseminated.

The STP RE and EE Status Report will be developed and completed at the start of the GEF/UNIDO project. The GIS-based National RE Resource Mapping will be developed simultaneously with the development of the NEEAP, the SEforAll AA, and the Strategic Plan for the Development of RE in STP (the latter to be developed with support from the GEF/UNDP) as the information of this analysis should be used to support the establishment of the goals and targets in terms of RE for the country. The GIS-based National RE Resource Mapping will identify and provide basic information (e.g. geo-coordinates, size, costs) about on- and off-grid priority sites in various GEF6 CEO Endorsement /Approval Template-August2016



RE technology areas (e.g. hydro, bioenergy, PV, wind). The resource mapping will provide essential information to better plan the interplay between grid-connected and off-grid options.

The STP RE and EE Status Report will be developed with support from ALER.

The GIS-based National RE Resource Mapping will be developed by a National GIS expert supported by an International Expert. The mapping and the STP RE and EE Status Report will be used for the development of the plans described in PC1 and for the development of the NSEIP.

Both documents will be disseminated through the MIRNA/DGRNE Website, ALER and UNIDO websites.

## **Output 2.2. A National Sustainable Energy Investment Plan (NSEIP) is developed and presented to investors and financiers in at least two (2) investment forums**

### **Activity 2.2.1. Development of the National Sustainable Energy Investment Plan (NSEIP)**

The results of PC1 and of Activity 2.1.1 will be used for the development of the STP NSEIP.

The NSEIP will comprise a project pipeline directed to attain the STP RE, EE and energy access targets set up in the plans and policies developed under PC1 and in the NDC. It is envisaged that the plan will include a list of projects with information on project promoters, project development status, the need for additional studies, the scale of capital expenditure required, the possible returns on investment that are available, mapping of financing resources and the definition of fundraising activities. The plan will be used to attract local and international financiers and donors to invest in the sustainable energy sector in STP. The NSEIP will focus on grid-connected and off-grid small to medium scale RE projects.

The following steps will be taken for the compilation of the NSEIP:

- **Project pipeline / Investment Prospectus (IP) development:** the pipeline presents to individual investors, investment organizations, donors, and bankers all the basic, but critical, project information for their consideration of an investment opportunity. The pipeline showcases private and public-sector projects that need full or gap financing, as well as public sector technical assistance needs for enhancement of the enabling environment. It is a dynamic document that captures funding opportunities arising from: (i) adjustment to changing priorities on the basis of future reviews of strategies/plans/programs, (ii) projects currently in a portfolio and (iii) additional projects generated from existing or new sustainable energy programs. In short, the portfolio is a snapshot of sustainable energy projects at a specific point in time, and a flexible vehicle to showcase evolving investment opportunities to funders, financiers and other stakeholders. Each of the projects contemplated in the pipeline will have a Project Fiche that summarises the details of the project.

The pipeline of projects that will be inserted in the NSEIP will be developed following the template of the SEforAll IP. It will use as a primary list of projects the projects identified in Outputs 2.1 and 2.3. The project pipeline is supposed to be continuously updated every time a sustainable energy project is identified.

- **Mapping of financing resources/contributors:** this exercise will identify stakeholders potentially interested in making financial, technical or in-kind contributions to sustainable energy project developments in STP. This exercise is, as well, a dynamic process of identification, classification, and the development and maintenance of relationships with investors. It requires a mechanism to ensure a continuous collection and up-dating of information about different funders, financiers, and donors. Besides the identification of the possible investors, the financing resources mapping will also provide information on the conditions for their investments, including technology, size, ownership, market segment, and other requirements. To carry out this exercise a systematic data collection template will be used so that the same information can be collected from possible investors. As with the pipeline of projects, the financing resources mapping should be continuously updated – not only verifying information on the investors already listed but also adding new ones when identified.
- **Fundraising activities:** raising funds is the critical task to bring mature and bankable projects to financial closure and execution. The NSEIP will put forward a strategy and a plan for fundraising activities, that can include advertising and awareness/information campaigns, meetings, participation in conferences and investment forums etc. In fact, under the GEF/UNIDO project the NSEIP will be presented in at least two forums (see Activity 2.2.2).

The NSEIP will be prepared by an International Consultant and the PMU.

### **Activity 2.2.2. Presentation of the NSEIP to potential investors and financiers in at least two (2) investment forums**

In partnership with ALER (Associação Lusófona de Energias Renováveis), the NSEIP will be presented to potential investors and financiers in at least two (2) investment forums, to be carried out in Portugal and STP. STP will also benefit from the experiences of Cabo Verde and Guinea-Bissau which have already developed such investment plans.

The activity will be implemented by ALER and the PMU.



### Output 2.3. Innovative RE and EE projects with a total installed capacity of at least 5 MW are developed to financial closure and their implementation is facilitated

#### Activity 2.3.1. Innovative RE and EE projects (small hydro, solar, wind and/or bioenergy) with a total installed capacity of at least 5 MW are developed to financial closure and their implementation is facilitated

Selected projects of the NSEIP with a total electric capacity of 5 MW (or more) will be brought to financial closure with support from the GEF/UNIDO project and their implementation will be facilitated with co-finance from the Government of STP, international donors, banks and private investors. The GEF grant will be used to fund the incremental costs of the selected projects. The selected projects will be highly innovative when considering the baseline in STP, as apart from one small-scale hydropower plant (Contador plant) and some PV stand-alone systems (namely used to power communication stations, military signalization, private initiatives, schools and agricultural cooperatives), there are currently no RE systems in operation (detailed information is presented in the Baseline Report present in Annex I). In addition, EE initiatives that can lead to power savings are also proposed based on the analysis conducted by EDP on Príncipe Island (see Annex K). EE measures could be easily replicated in São Tomé Island in future interventions, conducting to even higher savings.

The supported scope of projects will include grid-connected small-hydro power plants, PV-Diesel hybrid systems (up to 2 MW) and replacement of old light bulbs, which will replace electricity production based on diesel and reduce consumption peaks thus eventually having a positive impact on the energy profile of the country and its economy. Particular focus will be given to nexus solutions with high local value creation effects as well as to support gender inclusion and women empowerment. Through the implemented projects the feasibility and viability of various RE/EE technologies will be demonstrated.

Knowledge exchange with Cabo Verde and Guinea-Bissau on already implemented PV-diesel mini-grid hybrid projects (e.g. systems in Bambadinca, Bissora, Monte Trigo) will be established through ECREEE. UNIDO will contribute with its lessons learned from installations undertaken under the GEF Projects “*Promoting market-based development of small to medium scale renewable energy systems in Cape Verde*” (GEF ID 3923) and “*Promoting investments in small to medium scale renewable energy technologies in the electricity sector of Guinea Bissau*” (GEF ID 5331).

The PPG phase included the identification of a list of potential RE investment projects comprising approximately 20 MW and EE projects involving electricity savings. A preliminary list identified RE and EE projects (also referred to as *Projects Pipeline*) is included in Annex J with a description of their current status and with indication of the available information. During the Mission to STP the majority of the projects identified to be developed as investment projects were hydropower ones (more concretely rehabilitation of hydropower plants), and thus priority will be given to these projects since they would bring immediate benefits. In fact, a specific analysis of the hydropower resources available in both São Tomé and Príncipe Islands was carried out during the 2018 Mission to STP by an International Hydro Power Expert contracted by UNIDO (see Annex K). In addition to hydropower projects some solar projects were also identified.

These identified project opportunities were screened according to their relevance, cost-effectiveness, impacts, available information, recommendations from involved parties and potential for replication (see Table 2). The identified and selected priority projects include 6.12 MW of RE projects and EE projects whose full feasibility still needs to be assessed (see Sub-Activity 2.3.1.1).

In general terms for the hydropower projects, as indicated in the March 2018 Mission Report to STP of the International Hydro Power Expert (Annex K), there is a need to include within any new study the influence of water extraction and use for other applications alongside hydropower generation since this has not been included in previous development studies.

A characterisation of the identified and selected priority projects is included in Table 3.

During the GEF/UNIDO project other RE and EE projects will be identified and added to the *Projects Pipeline* so that they are analysed, and their implementation facilitated.

TABLE 2: INVESTMENT PROJECTS SELECTION CRITERIA

Criterion	Specific Assessment Criteria
Relevance	<ul style="list-style-type: none"><li>• Alignment of the project with national policies and strategies (NDC, STP Vision 2030) and GEF 6 project objectives</li><li>• RE installed capacity (MW) and generated energy (kWh)</li><li>• Reduction in the demand through adoption of EE (kWh) and reduction of the peak load (MW)</li><li>• Financial model adopted by the project</li></ul>
Feasibility	<ul style="list-style-type: none"><li>• Technical feasibility</li><li>• Implementation probability</li><li>• Economic viability</li><li>• Co-finance structure (% of investment sought)</li><li>• Timing for implementation</li><li>• Risks/ barriers for Project implementation and adopted mitigation measures</li></ul>

<b>Cost Effectiveness</b>	<ul style="list-style-type: none"> <li>• Cost/kW</li> </ul>
<b>Sustainability</b>	<ul style="list-style-type: none"> <li>• Pollution reduction and GHG emission reduction</li> <li>• Management model adopted by the project (including maintenance activities)</li> </ul>
<b>Impact</b>	<ul style="list-style-type: none"> <li>• Social inclusion/social impact</li> <li>• Number of beneficiaries</li> <li>• Inclusion of gender issues (e.g. % of women benefited by the project)</li> <li>• Environmental impacts and mitigation measures adopted</li> <li>• Diesel savings in terms of costs</li> </ul>
<b>Replication potential</b>	<ul style="list-style-type: none"> <li>• Scalability: number of inhabitants / businesses that can benefit from this type of projects</li> <li>• Ease of Replication</li> </ul>

Table 3 shows the key features of the selected RE and EE priority projects.

TABLE 3: KEY FEATURES OF THE SELECTED PRIORITY PROJECTS

Renewable Energy Priority Projects						
Location STP	Project Name	Description	Budget for project conduction (USD)	Estimated capacity to be installed (MW)	Estimated energy generation (MWh/year)	Estimated direct GHG emissions reductions (tCO <sub>2</sub> /year)
São Tomé Island	Agostinho Neto SHPP	<p>"Located on D' Ouro River. The plant was constructed in the colonial times to provide electricity for cocoa production. It was refurbished but after experiencing electromechanical problems the system stopped operating in 2006/2007 was partially dismantled. Although the building infrastructure is in general good shape, rehabilitation works are still needed. These should be quite straightforward to be done. Issues concerning ownership, management of the plant and water use sharing are to be studied as well.</p> <p>This project has been considered in UNDP project ID 00094537 for immediate refurbishment. The AFAP considers this SHPP as a priority project for further studies.</p>	\$ 706 800.00	0.381	1 340.00	1 173
São Tomé Island	Contador MHPP Capacity extension	Located on Contador River. Current capacity installed and under rehabilitation is 2*960 kW at the Contador HPP. The Power Sector Recovery Project financed by WB is conducting the rehabilitation and optimization works. In 2016, Hidroelectrica STP proposed to double the capacity and reach 4 MW, 280 m head, run-of-river hydropower plant for which additional studies need to be conducted alongside the rehabilitation. In 2014 the plant was able to provide 7.7 MWh which represents approx. 46% use factor.	xxxxxx	2.080	9 110.40	7 972
Sao Tome Island	GueGue Small Hydropower Plant	<p>Located on Manuel Jorge River. The plant was commissioned in 1941 and rehabilitated in 1993/94 by WB and Sweden. There was a cooperation agreement between EMAE and Transelektra S.A. Operations in 2011 were closed due issues between partners regarding payments. It is next to the grid, civil structures are in good shape and although electromechanical parts need replacement it is a good option for refurbishment. Further studies should include a detailed analysis on potential judicial issues that could still be pending of resolution and on technical aspects related to available water flows due to water resource extraction for other uses.</p> <p>The AFAP considers this SHPP as a priority project for further studies.</p>	\$ 706 800.00	0.320	1 125.46	985
São Tomé Island	Diogo Vaz Micro	Located on Águas das Galinhas River, on the Reyes Kakao plantation. Rehabilitation is needed (there are remains of turbine, pipes, machinery,	\$ 57 250.80	0.027	118.00	103

	Hydropower Plant	buildings) and new studies concerning joint water usage and sharing approaches with developments in Amambo.  The AFAP considers this SHPP as a priority project for further studies.				
São Tomé Island	Monte Café Micro Hydropower Plant	Located on Manuel Jorge river basin. Still operable but needs rehabilitation works and new engineering design. It was used many years ago for productive uses in the agricultural sector. Currently people are taking water from the headrace and therefore new studies should take into consideration this fact.	\$ 25 444.80	0.012	52.44	46
Príncipe Island	Other hydro sites on Papagaio River	The Papagaio River basin is the biggest one on Príncipe Island. The hydropower analysis performed by EDP in December 2016 shows four (4) sites of interest along this river. The cost of energy produced is the cheapest in comparison to the rest of the basins, it is close to the grid and is the most attractive basin in terms of potential energy generation. The proposed alternatives (for all the river basins that add up 24 alternatives) were analysed in terms of annual production, installed power as well as energy costs, for different flow rates. Additionally, economic analysis included the estimate of the IRR and the NPV.  The analysis done on Papagaio river concludes that two (2) options are the most promising ones (see Table 5.15 of EDP report): option 1a and option 2.	\$ 6 103 355.80	1.090	3 060.00	2 339
			\$ 3 912 373.60	0.814	2 300.00	1 758
Príncipe Island	Solar PV-diesel hybrid plant at Airport	The existing diesel generators can generate electricity in combination with a PV plant to reduce diesel consumption. There is an area identified at the airport (500 m long by 80-100 m wide, a triangle) where the PV panels could be mounted. The soil is good and compact. More detailed studies are needed but the main indicators have been estimated in 2015 (LCOE, OPEX, CAPEX, diesel savings and CO <sub>2</sub> emission reductions)	\$ 2 238 200.00	1.400	1 400.00	1 070
<b>Total</b>				<b>6.124</b>	18 506.30	15 445

Energy Efficiency Priority Projects					
Location	Project name	Description	Estimated budget for project conduction (USD)	Estimated electricity savings (MWh/year)	Estimated direct GHG emissions reductions (tCO <sub>2</sub> /year)
Príncipe Island	Replacement of old light bulbs with LED bulbs	LED lights consume 10% of what an incandescent bulb does and 40% of what a CFL does, therefore it is an attractive option to reduce electricity demand, especially during the night (17.30-23.30 hs) when the peak is very high. Measurements done during this period show a consumption in lighting of 600 kWh with a savings potential of about 420 kWh. The budget corresponds to 3300 LED bulbs of 8 W each.	\$ 35 340.00	111.97	86
Príncipe Island	Consumption cut on Air Conditioning equipment and others	The proposal is to switch off the air conditioners at night in public buildings to save energy. The estimate was based on night time baseload data during 10 hours for a 50 kVA consumption. The budget corresponds to equipment purchase for 48 energy audits on buildings for 1 year to be carried out by 2 technicians.	\$ 35 340.00	130.50	100
<b>Total</b>			<b>\$ 70 680.00</b>	<b>242.47</b>	<b>185</b>

The investment projects will be developed/implemented under the supervision of the PMU with support from the National and International RE & EE Consultants and various specialized subcontractors (e.g. equipment suppliers, etc). The PMU will make sure that important cross-cutting issues such as gender, conflict-sensitivity and minority rights of disadvantaged population groups are considered during project implementation. The final GEF contributions to the individual investment projects will be determined in cooperation with the co-financiers and final price offers received. The GEF/UNIDO project will closely partner with UNDP, WB, European Investment Bank (EIB) and the African Development Bank (AfDB) to leverage financing for the deployment of the identified projects.

This will include also cooperation with the UNIDO hosted Private Financing Advisory Network (PFAN) regarding the financial structuring of projects and matchmaking with investors. PFAN is a multilateral public private partnership and identifies promising clean energy projects at an early stage and provides mentoring for development of a business plan, investment pitch, and growth strategy, significantly enhancing the prospect of financial closure. This far, 87 projects have achieved financial closure with over US\$ 1.2 billion of investment raised.

The following sub-activities will be implemented to ensure support for the development of the 6.12 MW of sustainable energy projects is achieved:

#### *Sub-Activity 2.3.1.1) Identification of sustainable energy investment projects to be included in the pipeline*

The identification of the sustainable energy investment projects pipeline will be carried out throughout the duration of the GEF/UNIDO project (with stronger emphasis on the first two years of the project implementation) by the PMU in cooperation with the National and International RE & EE Consultants, WB, UNDP, AfDB, ECREEE and other development partners. The selection of the projects to be implement will follow the same criteria as outlined in Table 2.

Within this activity it is envisioned that the pipeline will be further expanded, and more projects identified and analysed to be implemented. The projects pipeline and used selection criteria will be available and disseminated through the GEF/UNIDO project's Website. It will be based on the Projects Pipeline included in Annex J.

#### *Sub-Activity 2.3.1.2) Analysis of the technical and economic viability of the identified projects and selection of at least 5 MW of projects to be implemented*

The potential sustainable energy investment projects identified in Sub-Activity 2.3.1.1 will be further analysed in terms of technical and economic viability. This will be carried out through the use of already existing tools like RETScreen, Homer and any other software the National and International RE & EE Consultants consider appropriate. In this analysis, the viability of the projects will be assessed, including technical design, economics, environmental and social benefits (including gender inclusion) of each of the projects. Moreover, possible sources of co-finance will be highlighted for each one. This activity will be carried out by the National and International Consultants (RE & EE and Finance), coordinated by the PMU.

Having in mind the results from the previous sub-activities and the scoring on the different projects regarding the selection criteria, at least 5 MW of sustainable energy investment projects will be selected for implementation. The selection of these projects will be carried out in either one of the NSEP or Project Steering Committee (PSC) meetings, following the recommendations of the PMU and of the National and International RE & EE Consultants.

The selected projects to be implemented will be advertised on the GEF/UNIDO project's Website.

#### *Sub-Activity 2.3.1.3) Finalize the design and procurement documents of the RE and EE investment projects and negotiate the final cost-sharing and co-financiers and promoters*

In this sub-activity, procurement documents and financial models to be adopted will be finalised for the selected project feasibility studies. Based on the feasibility studies and procurement documents, the final cost-sharing will be agreed among all financiers.

This sub-activity will be carried out by the PMU in cooperation with the National and International RE & EE Consultants. The assisting Consultants will be hired through a public tender process.

#### *Sub-Activity 2.3.1.4) Provision of technical assistance for the implementation of the investment projects*

This sub-activity includes:

- tendering/subcontracting of equipment and specialized services for the implementation of the sustainable energy projects; and
- day-to-day management of issues coming up during the transport, installation, commissioning and operation of the projects in cooperation with the co-financiers and the project promoters.

The PMU will be responsible for overseeing the implementation progress of the individual projects and will recommend disbursements of GEF resources upon achieved milestones and results. The PMU will coordinate closely with equipment suppliers and executing partners. Regular reporting on the progress of each investment project will be required and provided by the PMU to the NSEP and the PSC.

### **Activity 2.3.2. Monitoring and evaluation of investment projects**

Continuous day-to-day monitoring of the implementation of the investment projects will be required and conducted by the project proponents by using agreed monitoring indicators (the project proponents and the PMU will agree the project monitoring indicators,



monitoring frequency and reporting for each project). The PMU will monitor the project operation periodically (in the beginning every two months until month six and then every six months). The evaluation of the investment projects will be carried out by an Independent National Consultant/Evaluator. The PMU will prepare the Terms of Reference for the evaluation. Each project evaluation should follow the same reporting structure for this GEF/UNIDO project. This will include as a minimum:

- Assessing the relevance, effectiveness, efficiency, impact and sustainability of the individual projects and respective financial mechanism adopted
- Assessing the commercial operation of the project
- Monitoring and verifying the energy generated and GHG emissions avoided directly due to the GEF/UNIDO project
- Assessing the socio-economic impacts of the projects (by considering gender aspects)
- Identifying faced challenges
- Compiling lessons learnt

#### **Activity 2.3.3. Preparation of case studies and dissemination**

For each investment project a case study will be prepared for dissemination and capacity building purposes and also uploaded in the Website. The lessons learned will provide valuable input for the policy development project component (PC1) of this GEF/UNIDO project. This activity will be of the PMU responsibility.

### **Output 2.4. Based on existing instruments, a Financing Facility for Sustainable Energy projects is created and undertakes regular call for proposals to support project development and investments**

#### **Activity 2.4.1. Creation of a Financing Facility for Sustainable Energy Projects and facilitation of calls for proposals within the facility**

The GEF/UNIDO project will facilitate the creation of the STP Sustainable Energy Financing Facility (STP-SEFF) which will release regular call for proposals to support RE and EE projects development and investments with small grants. The calls will be funded by the GEF grant and other co-financiers.

UNIDO has experience in setting up and managing this type of financing facilities. In 2011 it has established the ECOWAS Renewable Energy Facility (EREF) operated by ECREEE, which is still operational. The EREF provides seed funding for pre-investment activities (measurements, feasibilities, financial structuring) and business development (e.g. development of business plans) for small to medium scale RE and EE projects in the ECOWAS region. Usually, the EREF provides a limited grant amount (between €5,000 and €100,000) per project. The eligible EREF grant is determined on a project-by-project basis.

The EREF has been used in the establishment of financing facilities similar to the one here proposed, for example, for the GEF Projects “*Promoting market-based development of small to medium scale renewable energy systems in Cape Verde*” (GEF ID 3923) and “*Promoting investments in small to medium scale renewable energy technologies in the electricity sector of Guinea Bissau*” (GEF ID 5331).

In this case, although STP is not part of the ECOWAS, ECREEE is the focal point for African SIDS within the SIDS DOCK initiative and therefore it has a mandate to work in STP. Thus, apart from the GEF co-funding and UNIDO experience in setting up and managing this type of financial mechanism, the STP-SEFF will receive support from ECREEE/EREF and co-finance from the regional SIDS-SIDS activities.

Similar to the EREF, the STP-SEFF will provide project development and small grants as seed fund co-finance for RE and EE investment projects to be implemented within the scope of the GEF-UNIDO project. At least one STP-SEFF call for proposals will be undertaken. The STP-SEFF will be used to support the development and implementation of the sustainable energy projects identified in Output 2.3, mainly from the end of the first year onwards (as it will have to be established first). The project developers will be responsible for the final designs and the feasibility studies. The National and International RE Consultants will assist. Any further TA required will be identified at this time.

Advice will be provided to the project developers on sourcing finance and, where considered appropriate by the project team, some limited seed finance will be available from the GEF/UNIDO project if required (approx. 10% of project costs) through the STP-SEFF. Technical assistance will be provided during the project development and implementation according to the needs identified during the project selection process. The PMU will be responsible for over-seeing each of the new and scale-up projects and for the disbursement of any funds to these projects.

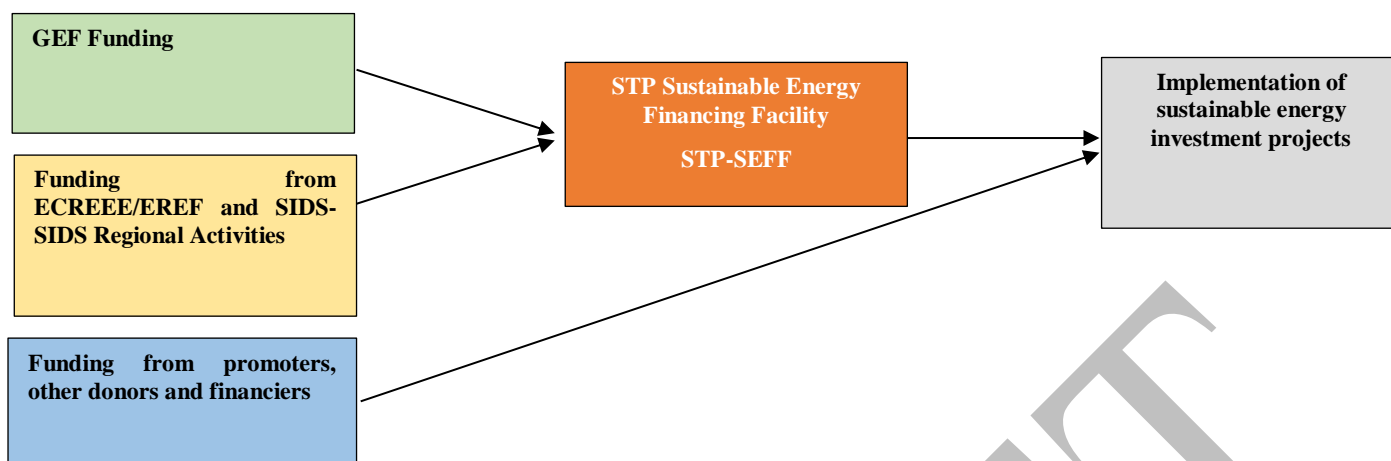


FIGURE 2: RELATIONSHIP OF THE DIFFERENT CO-FINANCING SOURCES FOR THE DEVELOPMENT AND IMPLEMENTATION OF PROJECTS UNDER PC2

The following table summarises the outputs and activities of PC2.

<i><b>Project Component 2 (PC2): Promoting investments in sustainable energy solutions</b></i>	
<i><b>Outcome 2: Enabling investment framework for RE and EE is created and its implementation facilitated</b></i>	
PC2 is directed at creating and facilitating the implementation of a sound and enabling national investment framework for RE and EE solutions with a strong replication and leverage effect.	
<i><b>Output 2.1:</b> The STP RE and EE Status Report and the GIS-based National RE Resource Mapping identifying high-impact priority sites are developed and disseminated</i>	
<i><b>Planned and Envisioned Activities</b></i>	<i><b>Responsibility</b></i>
<u>Activity 2.1.1. The STP RE and EE Status Report and the GIS-based National RE Resource Mapping identifying high-impact priority sites are developed and disseminated</u>	National and International Consultants ALER
<i><b>Output 2.2:</b> A National Sustainable Energy Investment Plan (NSEIP) is developed and presented to investors and financiers in at least two (2) investment forums</i>	
<i><b>Planned and Envisioned Activities</b></i>	<i><b>Responsibility</b></i>
<u>Activity 2.2.1 Development of the National Sustainable Energy Investment Plan (NSEIP)</u>	International Consultant PMU
<u>Activity 2.2.2 Presentation of the NSEIP to potential investors and financiers in at least two (2) investment forums</u>	ALER PMU
<i><b>Output 2.3:</b> Innovative RE and EE projects with a total installed capacity of at least 5MW are developed to financial closure and their implementation is facilitated</i>	
<i><b>Planned and Envisioned Activities</b></i>	<i><b>Responsibility</b></i>
<u>Activity 2.3.1. Innovative RE and EE projects (small hydro, solar, wind and/or bioenergy) with a total installed capacity of at least 5 MW are developed to financial closure and their implementation is facilitated</u>	National and International Consultants PMU
<u>Activity 2.3.2. Monitoring and evaluation of investment projects</u>	Project Proponents PMU
<u>Activity 2.3.3. Preparation of case studies and dissemination</u>	PMU
<i><b>Output 2.4:</b> Based on existing instruments, a Financing Facility for Sustainable Energy projects is created and undertakes regular call for proposals to support project development and investments</i>	
<i><b>Planned and Envisioned Activities</b></i>	<i><b>Responsibility</b></i>

### **Project Component 3 (PC3): Strengthening capacities on sustainable energy island solutions**

*Expected outcome 3: The capacities and knowledge-base of institutions and experts on renewable energy and energy efficiency island issues are strengthened*

There is a general lack of capacity, knowledge and awareness on RE and EE at all levels. To promote the adoption of RE and EE in the electricity sector of STP it is important that this situation improves.

Nevertheless, at PPG stage it was identified that there are already some activities being put in place that aim at understanding the capacity needs of different stakeholders in STP as well as activities to increase stakeholders' capacities in relation to the energy sector and RE in particular. These are:

- The restructured GEF/UNDP project “Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated approach in STP” already includes some activities that aim at identifying some training needs and on reinforcing the capacity of some of the governmental institutions in STP regarding their functions in the sector as well as to RE, namely:
  - Identification of the DGRNE training needs for the development of its functions on the energy sector;
  - Reinforcement of MIRNA/DGRNE material and organizational capacity;
  - Preparation and implementation of a training plan for the technicians of the Energy Directorate of DGRNE, UGP Energia, EMAE, AGER, DGA, DF and DADA
  - Reinforcement of the capacity in terms of the use of environmental evaluation methodologies for RE;
  - Design and implement the communication strategy and advocacy aimed at communities, decision-makers, the private sector, and other stakeholders;
- As a consequence of the analysis of the DGRNE training needs, the DGRNE is preparing its capacity building plan which is still to be finished in 2018. The analysis carried out revealed so far that there are no entities in STP providing training services in the area of RE and EE.
- AGER carried out a training needs assessment and developed a Training Plan proposal in the area of electricity<sup>4</sup>. The objective of this Training Plan is to organize and make visible the information regarding the formative need(s) of any organization that aims to provide knowledge and promote professional skills, with a view to improving quality service, contributing in a direct way to organizational success. The plan includes a list of training programmes that are needed:
  - Training on the value chain of the electrical system (production, transportation, distribution and commercialization) and on the tariff study (this tariff study is the one being developed with support from the WB);
  - Training on grid access (grid connection; grid protection, accessories);
  - Training in the field of Energy Resources Management Plans (contingency plan, reduction of electrical losses, etc);
  - Training in the field of equipment certification (standardization of technical and safety requirements, inspection procedures, etc.);
  - Training in the field of Electrical Efficiency and Energy Management (energy management, electricity consumption, knowledge of efficient equipment);
  - Training in the field of electrical quality service provision (standardization of minimum quality criteria for providing electricity service);
  - Conflict Management
  - English language
  - Renewable Energy;
  - Execution of LV and MV boxes
  - Safety and technical knowledge in the field of MV and HV electric lines control
  - Work in heights;

<sup>4</sup> AGER, *Proposta de Formação para Departamento de Assuntos de Electricidade*, 3 of March 2008.  
GEF6 CEO Endorsement /Approval Template-August2016

- Substation concepts.

At the time of writing of this document there was no proposal on who would conduct and support the implementation of this Training Plan.

- EMAE has also an inventory of its capacity building needs that highlights, between other things, EMAE and the DGRNE need of training on the development, operation and maintenance of small-hydro systems.
- The WB/EIB within the STP PSRP has a package of capacity building services, that includes capacity building in RE; mini-hydro and in the reinforcement of the management capacity that could be useful for EMAE.

The Centre for Renewable Energy and Industrial Maintenance (CERMI) of Cabo Verde is a Corporate Public Entity whose vision is to be a “centre of excellence” in the field of RE and industrial maintenance at national level, ECOWAS and the PALOP (“Países Africanos de Língua Oficial Portuguesa”, African countries with Portuguese as official language) in the fields of training and certification of equipment and professionals, business incubation and R&D (Research and Development)<sup>5</sup>. CERMI was inaugurated in March 2015, and officially created by the Cabo Verde Decree-Law n° 29/2014<sup>6</sup>. It was established with the aim of being an instrument for the operationalization of the country's energy policy, promoting and carrying out activities of public interest in the area of energy in general and in the area of demand management in particular and its interfaces with other sectoral policies, without losing its focus on the ECOWAS and PALOP markets<sup>7</sup>. Table 4 summarises CERMI main strategic business axes and its sub-domains.

TABLE 4: CERMI BUSINESS STRATEGY<sup>8</sup>

Main strategic business axes	Strategic business sub-domains
<b>(1) Intervention in the area of energy management and industrial maintenance</b>	<p>1.1. Solar thermal systems: covers the operationalization of laws, technical regulations and standards, the certification of persons, companies and systems, the training of the technical community and knowledge dissemination;</p> <p>1.2. RE generation (decentralized generation and micro-generation): focuses on the operationalization of laws, regulations and technical regulations, certification of people, companies and systems, training of the technical community and dissemination of knowledge;</p> <p>1.3. Comfort in buildings: includes the development of normative devices in collaboration with the Cabo Verde Institute for Quality Management and Intellectual Property (IGQPI), Directorate of Energy Services in Cabo Verde and competent entities; operation of laws, technical norms and regulations; certification of people, systems and buildings; technical community training and knowledge dissemination;</p> <p>1.4. Efficiency of equipment: includes certification, inspection of partnerships, development of incentive mechanisms in partnership with competent entities, training of the technical community and dissemination of knowledge.</p> <p>1.5. Industrial maintenance: covers training and certification of persons, knowledge dissemination, development of the technical normative framework for safety, quality and extended useful life of industrial systems and equipment.</p>
<b>(2) The Scientific and technological domain for research and innovation</b>	<p>2.1. Scientific and technological research for the development of prototypes: covers research, laboratory testing, provision of services to third parties and scientific education programs;</p> <p>2.2. Networking and management of scientific knowledge: includes the development, implementation and management of the scientific and technological platform, the development and management of the scientific and technological network, the promotion and participation in scientific and technological working groups, the organization of conferences, workshops, forums, fairs and exchanges, the publication of technical manuals and the publication and dissemination of articles, newsletters, magazines and scientific and technological works.</p>

Up to 2020, CERMI aims at being a centre recognised at both national and regional level with political, technical and financial sustainability that contributes to the overall sustainability of the environment and the quality of life, by promoting<sup>9</sup>:

- Mitigation of greenhouse gas (GHG) emissions and climate change.
- Development and dissemination of technologies of greater efficiency in the use of resources.
- The scientific community and attracting national and international strategic partners.
- Greater dynamics in the sectoral market by acting on energy demand.
- A better balance between demand and supply in the employment market.

<sup>5</sup> <http://www.governo.cv/index.php/rss/7484-governo-quer-que-cermi-seja-um-espaco-de-referencia-para-as-energias-renovaveis-fernando-elisio-freire>

<sup>6</sup> Government of Cabo Verde, Decree-Law n.29/2014, <http://extwprlegs1.fao.org/docs/pdf/cvi134635.pdf>

<sup>7</sup> Programa Estratégico do CERMI, E.P.E 2015-2020

<sup>8</sup> Programa Estratégico do CERMI, E.P.E 2015-2020

<sup>9</sup> Programa Estratégico do CERMI, E.P.E 2015-2020

CERMI provides training courses on RE and EE and is expected to expand its curriculum to start offering courses on RE and EE projects associated with water resource management systems as well as in entrepreneurship and Energy Service Companies (ESCOs). CERMI will undergo organizational learning and development to create readiness in its management system, infrastructures and human, material and financial resources. CERMI offers facilities for education, applied research and experimentation, seven training workshops, catering space and a resource centre (capacity: 300 trainees, 4100 m<sup>2</sup>). The Centre integrates different production technology and RE storage: (i) on-grid PV of 117 kWp (ii) off-grid PV of 32 kWp connected to batteries, and (iii) two wind turbines (rated power of 6 kW and 1 kW). The Centre is also equipped with a climate control system based on an absorption chiller (system that allows cold production from the heat produced by solar collectors) and a domestic solar hot water system. CERMI's building itself was built as a model of respect for the environment, EE, and cost efficiency in its construction and maintenance, taking into consideration the materials and equipment lifecycle and contributing to the reduction of global warming.

The following are some of the contents of CERMI curriculum on RE and EE:

- Installation and maintenance of small PV systems for electricity production: includes several modules from basic technical English to electric machines, basic principles of electricity and magnetism, project management, among other. Specifically related to RE and EE, it includes the following learning modules:
  - Energy and the environment (30 hours);
  - Energy management and EE (30 hours)
  - PV systems II (30 hours)
  - Dimensioning of PV systems (30 hours)
  - Implementation of solar PV (hands-on module) (100 hours)
  - Maintenance of PV systems (80) hours.
- Installation and Maintenance of Air Conditioning and Refrigeration Installations/systems: similarly to the PV installation courses, this one also includes modules of basic knowledge (technical English, physic-chemistry, oral and written communication in Portuguese, applied math), technological subjects covering planning of preventive maintenance in air conditioning and refrigeration installations; assembly of mechanic components; assembly of electrical and measurement/control components; installation and maintenance of equipment.

Moreover, Lux-Dev has just started a regional program “*Anchorage of CERMI to ECOWAS*” in which support is being provided to CERMI to train trainers on RE and EE. Under this programme, the trainers from the region and from the PALOPs come to CERMI (in Praia) to receive training.

Also there are some ECOWAS regional programmes managed by ECREEE, such as the “*ECOWAS Renewable Energy Entrepreneurship Support Facility*” that aims to provide support to entrepreneurs working in the RE sector by training them and offering technical support in order to refine their projects and enable their RE business to prosper; and the “*ECOWAS Programme on Gender Mainstreaming in Energy Access*” that aims to factor in the different needs of men and women in the planning and execution of clean-energy related interventions in the region to ensure a universal access to energy services, from which STP can benefit from through the SIDS-SIDS cooperation.

The Research Centre for Energy, Environment and Technology (CIEMAT “Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas”) from Spain has been actively involved in awareness raising and capacity building on sustainable energy solutions for Islands under the SIDS DOCK umbrella. CIEMAT cooperate with the GEF/UNIDO project in the development of online modules for the training course on sustainable energy solutions for islands (Output 3.3).

PC3 aims at mitigating the existing capacity constraints in the RE and EE sector of STP. The activities that are here proposed are directed to:

- (i) Understand the capacity needs of the different key market players/enablers (e.g. policy makers on federal and municipality level, utility, regulator, consultants, project developers, businesses and industry, banks, civil society) on different aspects of RE and EE and on developing and facilitating the implementation of a National Qualification, Certification and Accreditation Framework to strengthen their capacities on the referred subjects (Output 3.1); and
- (ii) Implement within the National Qualification, Certification and Accreditation Framework:
  - a special capacity building programme for MIRNA/DGRNE, EMAE, AGER and other authorities (Output 3.2);
  - a train-the-trainers programme (that will be implemented through and at CERMI – see Output 3.4),
  - a special on-line training programme on sustainable energy solutions for islands;
  - training and awareness raising sessions for national stakeholders.

This will all be carried out through the establishment of synergies and in cooperation with on-going initiatives (GEF/UNDP project “*Promotion of environmentally sustainable and climate-resilient grid-based hydroelectric electricity through and integrated*”).



approach in STP”, ECREEE regional initiatives and programmes, WB) as well as SIDS-SIDS knowledge transfer. During the PPG phase this component was highlighted as high priority by most of the stakeholders.

Through this GEF/UNIDO project, CERMI will be able to contribute to the achievement of its 2020 objectives and targets, as it will extend its network of trainers able to provide training courses in STP and the PALOPS and in this way achieve one of its main goals which is to train trainers and expand its services to the PALOPS.

### **Output 3.1. Based on a capacity needs assessment: a qualification, certification and accreditation framework on sustainable energy is developed and its implementation facilitated**

#### **Activity 3.1.1 Capacity and training needs assessment**

During the PPG stage, it was identified that there are no programmes in place about or related to RE or EE and that there are no STP organisations or institutions that offer training on these subjects. Also, it was clear that at PPG stage several activities are being defined that include capacity building actions targeting some energy sector stakeholders. Furthermore, different stakeholders show different capacity building, knowledge and awareness needs.

As there is a lot being defined in STP at the moment, at the beginning of the implementation of this GEF/UNIDO project, a detailed capacity and training needs assessment for different stakeholders’ groups will be carried out. The groups to be targeted are:

- MIRNA/ DGRNE and PMU
- Other governmental institutions operating in the energy sector: EMAE and AGER
- Other local institutions and market players
- Market enablers

Some of these organizations are carrying out or have carried out capacity needs assessment and have already a Training Plan that they would like to implement. For these organisations, the already carried out assessments, the Training Plans put together, and the initiatives that will support the implementation of the identified Training Programmes or parts of them, will be summarised and used to put together a National Qualification, Certification and Accreditation Framework on Sustainable Energy (Activity 3.1.2).

For the other stakeholders’ groups, the Capacity and Training Needs assessment and the corresponding actions under the National Qualification, Certification and Accreditation Framework on Sustainable Energy will need to be developed under this GEF/UNIDO project, more specifically, as part of this activity. The results will be summarised in a Capacity and Training Needs report, which will enable the development of the National Qualification, Certification and Accreditation Framework on Sustainable Energy (see activity 3.1.2).

This activity will be carried out by the International Consultants and PMU.

Table 5 summarises a first assessment of capacity needs undertaken during the PPG stage.

**TABLE 5: CAPACITY REQUIREMENTS OF VARIOUS STAKEHOLDERS GROUPS**

<b>Stakeholder group</b>	<b>Capacity needs</b>
Policy makers in the RE and EE sectors and the energy sector in general.	<ul style="list-style-type: none"> <li>• Developing and operationalizing coherent, comprehensive and evidence-based policies, laws and regulations that create a level playing field for RE and EE technologies</li> <li>• Implementing energy planning</li> <li>• Negotiating Power Purchase Agreements (PPAs) with independent power producers (IPPs) and setting viable feed-in tariffs (FiTs)</li> <li>• Mainstreaming climate resilience and gender</li> </ul>
Policy makers from non-energy sectors like agriculture, health, water, private sector, transport sectors etc.	<ul style="list-style-type: none"> <li>• Basic design of RE systems</li> <li>• Integrating RE components into other sectors (e.g. health, rural development, agricultural processing)</li> </ul>
Entrepreneurs, project developers, equipment manufacturers, consultants and industry support bodies	<ul style="list-style-type: none"> <li>• Basic concepts of electricity generation</li> <li>• Development of vocational and higher education courses adapted to RE and EE requirements and languages of the region</li> <li>• Vocational training on sustainable energy solutions for islands</li> <li>• Certification for conducting energy audits</li> <li>• Identifying, developing and packaging a pipeline of potential RE and EE investment projects</li> <li>• Negotiating viable PPAs with investors</li> <li>• Preparing quality business plans that are consistent with existing financing mechanisms</li> <li>• Identifying and developing potential CDM projects</li> <li>• Mobilizing and structuring investments in RE and EE projects</li> <li>• Mainstreaming climate resilience of energy infrastructure and gender</li> </ul>



	<ul style="list-style-type: none"> <li>• Special training on the operation, management and maintenance of on-grid/off-grid RE systems with a special focus on hydropower plants</li> <li>• Enforce, monitor, and verify standards on efficient electric appliances</li> </ul>
Utilities	<ul style="list-style-type: none"> <li>• Ability to tender RE and EE projects</li> <li>• Negotiate PPAs</li> <li>• Grid stability and the integration of RE</li> <li>• Integration of EE in the production and transmission of energy</li> <li>• Special training on the operation, management and maintenance of hydropower plants</li> </ul>
Recipients/buyers of energy services and technologies	<ul style="list-style-type: none"> <li>• Willingness and ability to pay for the services or technologies</li> <li>• Ability to assess the energy implication or cost in daily choices and decisions such as selecting electric equipment</li> </ul>

### **Activity 3.1.2 Development and facilitation of the implementation of a Qualification, Certification and Accreditation Framework on Sustainable Energy**

Based on the results of the Capacity and Training Needs assessment (Activity 3.1.1) a National Qualification, Certification and Accreditation Framework on Sustainable Energy will be developed taking advantages from and in cooperation with on-going initiatives in the country as well as in other SIDS, CERMI's mandate and on-going programmes. This will include a detailed implementation work plan, with a schedule, role/objectives/milestones, responsibilities and inherent cost. This will be carried out by an International Expert and the PMU with support from CERMI, ECREEE and CIEMAT.

The following table highlights possible components of the National Qualification, Certification and Accreditation Framework on Sustainable Energy.

TABLE 6: POSSIBLE COMPONENTS OF THE NATIONAL QUALIFICATION, CERTIFICATION AND ACCREDITATION FRAMEWORK ON SUSTAINABLE ENERGY

Training Programme / Modules of the Programme		Contents of training programme/ module of the programme	Target Groups
(1) Energy Expert Training (~0,5 week)		<ul style="list-style-type: none"> <li>• Sustainable Energy Projects: importance of the consideration of sustainable energy projects / opportunities and risks</li> <li>• Providing technical assistance to enterprises and coaching on RE and EE measures implementation in the electricity sector</li> <li>• Providing technical assistance on the identification of the aspects to be considered when integrating RE systems and EE measures in the electricity sector / opportunities and risks</li> <li>• Conducting training sessions for stakeholders interested in developing their own RE and EE projects</li> <li>• Definition of the financial mechanism to be implemented for sustainable energy initiatives</li> <li>• Mainstreaming climate change and gender in sustainable energy projects</li> </ul>	DGRNE, EMAE, AGER, STP Universities and training institutions
(2) RE Training (~2 Weeks)	Module 1: Training on Identification, Development and Management of RE projects	<ul style="list-style-type: none"> <li>• Sustainable Energy Projects: importance of the consideration of sustainable energy projects / opportunities and risks</li> <li>• Identify what sort of projects each participant could develop at their sites</li> <li>• Identify, develop a project pipeline of potential sustainable energy investment projects</li> <li>• Identify the technical issues of the projects</li> <li>• Carry out a life cycle cost analysis of the project</li> <li>• Use a software for RE potential analysis such as RETScreen, PVsyst and COMFAR<sup>10</sup>;</li> <li>• Analyse the impact on the electricity production costs of using sustainable energy solutions when compared with fossil fuels</li> <li>• Special hydropower training course (management and maintenance of hydropower systems)</li> </ul>	Management and technical people involved in developing RE projects looking at developing a project, possibly with support from the GEF/UNIDO project
	Module 2: Design and Development of RE Projects	<ul style="list-style-type: none"> <li>• Understand all the issues related to the design and development of RE projects from assessing the site-specific resource available, sizing and designing a system, to either writing or commissioning someone to write a specification, planning and permitting and providing links to additional information resources.</li> <li>• Incorporate specific issues of RE development in tendering</li> </ul>	Technical persons responsible for developing RE projects. This is designed as a follow-on module from the Identification, Development and Management of RE

<sup>10</sup>RETScreen: <http://www.nrcan.gc.ca/energy/software-tools/7465>

PVsyst: <http://www.pvsyst.com/en/>

COMFAR: <https://www.unido.org/resources/publications/publications-type/comfar-software>

GEF6 CEO Endorsement /Approval Template-August2016

Training Programme / Modules of the Programme		Contents of training programme/ module of the programme	Target Groups
		<ul style="list-style-type: none"> <li>Importance of contracting certified installers / oversee the project installation</li> <li>Mainstreaming climate change and gender in RE projects</li> </ul>	Projects Training (Module 1)
	Module 3: Financing instruments for RE projects	<ul style="list-style-type: none"> <li>Analyse existent financing instruments, including the carbon finance, the financial mechanism established under this GEF/UNIDO project, and other financing available for RE systems</li> <li>Analyse the financial viability and sustainability of these types of projects.</li> <li>Energy Service Companies (ESCOs) as financial mechanism/model</li> <li>Guidance in the development of a quality business plan that is consistent with existent financial mechanisms</li> </ul>	Project developers and financial institutions that want to develop and/or provide financing for RE projects and who wish to better understand the issues, as well as technicians who want to expand their services to RE projects development and implementation.
	Module 4: Operation, Management and Maintenance of RE Projects	<ul style="list-style-type: none"> <li>Guidance on operational and management issues of RE projects including monitoring and quality control</li> <li>Guidance on maintenance activities for RE projects and its importance</li> <li>Possible role of ESCOs</li> </ul>	Project developers looking at developing a RE projects who wish to better understand the issues, as well as technicians who want to expand their services to RE
	Module 5: Technical grid connection issues for RE	<ul style="list-style-type: none"> <li>Distribution, stability, power grid quality concepts;</li> <li>Effects of RE injection into the grid and how to minimise disruptions</li> </ul>	DGRNE, EMAE, AGER and RE project developers
(3) EE Training (~1 Week)		<ul style="list-style-type: none"> <li>Fundamentals of EE and the importance of the adoption of EE measures in the electricity sector: <ul style="list-style-type: none"> <li>EE terms and indicators</li> <li>Load characterization and load management studies</li> <li>Evaluation of the energy consumed per working area, per equipment and voltage level monitoring</li> <li>Load curve and load factor calculation</li> <li>Calculation and control of maximum load and optimization procedures</li> <li>Design, implementation and evaluation of energy savings and energy conservation programs</li> <li>Elaboration of energy consumption standards for different types of electric equipment</li> <li>Equipment's energy performance certificates</li> <li>Measurement of electric variables (power, active and reactive energy, voltage, current and power factor)</li> </ul> </li> <li>Energy audits: <ul style="list-style-type: none"> <li>Definitions and process</li> <li>Energy performance analysis</li> <li>Assessment of energy saving</li> </ul> </li> <li>Economics of EE systems: <ul style="list-style-type: none"> <li>Investment criteria</li> <li>Cash-flows</li> <li>Simple payback, internal rate of return and paybacks</li> <li>Life Cycle Costing (LCC) decision making method</li> </ul> </li> <li>Financing options</li> <li>Role of ESCO in EE</li> </ul>	DGRNE, EMAE, AGER, project developers and financial institutions that want to develop and/or provide financing for EE projects and who wish to better understand the issues, as well as technicians who want to expand their services to EE related projects.
(4) Capacity Building Programme for MIRNA/DGRNE, EMAE, AGER and other authorities (~1,5 Weeks)		Specific training course that will be compiled using the information of the Training Programmes (2) and (3) but as a "lighter version". This training course aims at providing information on sustainable energy projects (importance, identification, important aspects to consider, stage of development).	MIRNA/DGRNE, EMAE, AGER and other authorities
(5) Special on-line Training Programme on Sustainable Energy Solutions for Islands (~2 days)		Specific training course that will be compiled using: (1) the information of the Training Programmes (2) and (3) but conceived as a lighter version with a special focus on its application on islands and (2) experiences and lessons learnt from the implementation of sustainable energy solutions in other GEF projects from Cabo Verde and Guinea-Bissau. This training course aims at providing information on sustainable energy solutions applicable in island contexts (importance, identification, important aspects to consider, stage of development).	STP, Cabo Verde, Guinea-Bissau stakeholders

For each of the referred training programmes / training modules, if contents already exist and have been developed by on-going initiatives (CERMI, CIEMAT, etc) those will be analysed and improved. If they do not exist, the referred contents will be developed by an International Consultant with guidance from the PMU.

Its implementation will be facilitated in close cooperation with national and international partners. The National Qualification, Certification and Accreditation Framework on Sustainable Energy will be implemented by different experts depending on the subjects of the identified needs.

The implementation of National Qualification, Certification and Accreditation Framework on Sustainable Energy will be evaluated by training programmes/actions by the trainees and the PMU. At the end of each training programme/action the trainees will be asked to evaluate the training action (its contents, its format, information delivered and means used, contribution of the training programme to the trainee's capabilities, etc.). The collected information will be analysed by the PMU, who will evaluate the implementation of each component as a whole. Every year the PMU will write a report on the progress and results yielded by the implementation of the National Qualification, Certification and Accreditation Framework on Sustainable Energy as a whole.

### **Output 3.2. Enhanced capacities of MIRNA/DGRNE, EMAE, AGER and other authorities to integrate and manage on-grid/off-grid RE systems and to enforce, monitor, and verify standards on efficient electric appliances**

#### **Activity 3.1.2 Develop and facilitate the implementation of a special capacity building programme for MIRNA/DGRNE, EMAE, AGER and other authorities on integration and management of on-grid/off-grid RE systems and enforcement, monitoring, and verification of standards on efficient electric appliances**

In line with the investment component, a special capacity building programme within the National Qualification, Certification and Accreditation Framework on Sustainable Energy (Training Programme 4 referred in Table 6) will be designed and put in place, to strengthen:

- the capacities of MIRNA/DGRNE, EMAE and AGER to integrate and manage on-grid/off-grid RE systems, which will include biomass, solar, wind and a special focus on mini-hydro.
- the capacities of other relevant national authorities (e.g. customs) to monitor, verify and enforce standards on efficient electric appliances, in line with the policy component (PC1).

This will be implemented by different experts depending on the subjects of the identified needs.

As per the other training courses, under the National Qualification, Certification and Accreditation Framework on Sustainable Energy, the implementation of this special capacity building programme will be evaluated by training programme/action by the trainees and the PMU at the end of each programme/training action. The collected information will be analysed by the PMU, who will evaluate the implementation of each component as a whole. Every year the PMU will integrate the progress on the implementation of this special training programme on the report on the progress and results yielded by the implementation of the National Qualification, Certification and Accreditation Framework on Sustainable Energy as a whole.

### **Output 3.3. At least one (1) on-line training program on sustainable energy solutions for island is developed in Portuguese and applied by capacity building institutions and experts in São Tomé and Príncipe, Cabo Verde and Guinea-Bissau**

#### **Activity 3.3.1 Develop and implement a special on-line training programme in sustainable energy solutions**

Within this activity, and under the SIDS DOCK umbrella, the National Qualification, Certification and Accreditation Framework on Sustainable Energy will include the development and implementation of an on-line special training programme on sustainable energy solutions for islands (Training Programme 5 referred in Table 6), that will:

- Devote special attention to RE and EE considerations and applications on islands;
- Include important elements of SIDS-SIDS cooperation between the Portuguese speaking countries STP, Cabo Verde and Guinea-Bissau.
- Serve as a basis for exchanging lessons learnt from other on-going GEF projects in STP, Cabo Verde and Guinea-Bissau.

This will be developed in Portuguese as an on-line training course that will enable the participation of several stakeholders from the Portuguese speaking islands, enabling in this way to address the scarcity of training resources in Portuguese. The training materials used for this course will then be compiled into a Best Practice Guide for the development of Sustainable Energy Solutions in Islands that will be available in both Portuguese and English. This on-line special training programme will then be used by capacity building institutions and experts in the three countries and the Best Practice Guide will be disseminated through the MIRNA/DGRNE Website, ECREEE and SIDS DOCKs websites. It is expected that this online training programme will run at least twice during the GEF/UNIDO project.

The regional SIDS-SIDS activities will provide co-funding for this activity.

CIEMAT from Spain will develop the on-line modules of the training programme (with co-finance provided by the Spanish Agency for International Development Cooperation AECID) as well as the Best Practice Guide for the development of Sustainable Energy Solutions in Islands.

It is estimated that at least 75 stakeholders will participate in the online training programme.

**Output 3.4. At least five (5) capacity building institutions and fifteen (15) certified trainers engage in capacity building courses on renewable energy and energy efficiency issues**

**Activity 3.4.1. Train-the-trainers on the modules developed in Output 3.1**

The objective of this activity is to carry out Train-the-Trainers programmes for STP stakeholders at CERMI in Cabo Verde, taking advantage of CERMI's state of the art infrastructure, as well as experience on the subjects of these training programmes. This activity aims at contributing to mitigate the barriers associated with the limited technical knowledge on the installation, operation and maintenance of RE systems in STP as well as on the consideration and incorporation of EE measures, therefore contributing to creating a critical mass of trainers that can deliver the established programmes in STP, ECOWAS and the PALOP.

It is envisaged under the train-the-trainers programme that five (5) capacity building institutions and fifteen (15) certified trainers will be trained. The trainings will seek at least 40% female participation.

The following sub-activities will be implemented:

*3.4.1.1. Design and definition of the Train-the-Trainers Programme*

The Train-the-Trainers programme will be designed having in mind the results of the capacity needs inventory conducted in Output 3.1 and the contents to be taught. The detailed work plan for each of the modules will be compiled and will clearly highlight the schedule, objectives, roles and responsibilities, milestones, target audience etc. This will be carried out by International Consultants with support from the PMU and CERMI.

*3.4.1.2. Execution of the Train-the-Trainers Programme*

A group of approximately 15 professionals will be trained through classroom lessons, on-the-job and mentoring activities conducted by CERMI Staff and International Consultants. They will be equipped with the expertise and the tools required for providing the following services:

- Providing technical assistance to enterprises and coaching on RE and EE project implementation.
- Conducting Training Programmes for stakeholders interested in developing RE/EE projects.

It is expected that the 15 people will come from MIRNA/DGRNE, EMAE, AGER, STP Universities and training institutions. Some of the trained professionals will subsequently assume roles as RE and EE Consultants for RE and EE projects and become a source of expertise and services for the GEF/UNIDO project as well as for the electricity sector in STP. Women will be encouraged to participate.

The Train-the-Trainers programme will follow the following steps:

Step 1: Preparation of the training programme

This involves the preparation of the training material and contents of the lessons, the selection of trainees, the identification of 1-2 demonstration projects from GEF/UNIDO projects implemented and in operation in Cabo Verde for the practical training, securing approval for site visits, classroom logistics, etc.

Step 2: First training period

CERMI Staff and International Consultants will provide training to STP trainees in classrooms and at investment projects locations for on-the-job training where the GEF/UNIDO projects are implemented and in operation in Cabo Verde. The training will cover the subjects to be taught in the Training Programmes to be implemented under the National Qualification, Certification and Accreditation Framework on Sustainable Energy (Table 6).

The training will be provided both directly to the future experts and also with the future experts as participants in the training sessions that they will teach later on their own. So, for each of the courses CERMI Staff and the International Expert(s) will train National STP RE and EE Consultants on the use of the training curriculum. This curriculum will be introduced to the national experts in three stages: observing CERMI Staff/International Consultants teaching / delivering the first training; co-teaching / delivering the second training with the CERMI Staff/ International Consultants; and delivering the third training with CERMI Staff/ International Consultants observing and providing feedback on teaching / delivering techniques. Any future workshops will be delivered by the National Consultants alone.

Step 3: Second training period: trainees apply knowledge, skills and tools provided

Trainees apply the knowledge, skills and tools that have been provided to identify potential projects and to start on the design and development of the projects. During this period, trainees will have access to International Consultants' "remote" coaching and technical advice.

#### Step 4: Third training period

International Consultants provide advanced training to national trainees in classrooms and at demonstration project sites either in Cabo Verde or STP. They review and discuss the projects development and the status that the participants have reached. They observe and provide feedback to trainees in the application of skills in project development.

##### 3.4.1.3. Evaluation of the Train-the-Trainers Programme

This activity aims at evaluating the training component of the Train the Trainers course and the other technical modules offered. This evaluation will be carried out by the National Consultants, Trainees and the PMU.

#### **Output 3.5. One hundred (100) national stakeholders are trained on sustainable energy issues by certified local trainers**

##### Activity 3.5.1. Train 100 national stakeholders on sustainable energy issues

This activity will train at least one hundred (100) energy key STP stakeholders on sustainable energy issues and projects. This will have a particular focus on:

- planning, implementation, operation, maintenance and monitoring of RE on-grid and off-grid projects and/or EE projects; and
- hydropower and hydrological measurements.

This will be done in cooperation with ECREEE regional training activities and by national trained trainers of Output 3.4.

The trainings will seek to integrate at least 40% female participation.

The following table summarises the outputs and activities of PC3.

<u>Project Component 3 (PC3): Strengthening capacities on sustainable energy island solutions</u>	
<u>Outcome 3: The capacities and knowledge-base of institutions and experts on RE and EE island issues are strengthened</u>	
PC3 is directed at mitigating the existing capacity constraints in the RE and EE sector of STP.	
<b><u>Output 3.1:</u></b> Based on a capacity needs assessment: a qualification, certification and accreditation framework on sustainable energy is developed and its implementation facilitated	
<b><u>Planned and Envisioned Activities</u></b>	<b><u>Responsibility</u></b>
<u>Activity 3.1.1. Capacity and training needs assessment</u>	International Consultants PMU
<u>Activity 3.1.2 Development and facilitation of the implementation of a Qualification, Certification and Accreditation Framework on Sustainable Energy</u>	International Consultant PMU CERMI, ECREEE and CIEMAT
<b><u>Output 3.2:</u></b> Enhanced capacities of MIRNA/DGRNE, EMAE, AGER and other authorities to integrate and manage on-grid/off-grid RE systems and to enforce, monitor, and verify standards on efficient electric appliances	
<b><u>Planned and Envisioned Activities</u></b>	<b><u>Responsibility</u></b>
<u>Activity 3.2.1 Development and facilitate the implementation of a special capacity building programme for MIRNA/DGRNE, EMAE, AGER and other authorities on integration and management of on-grid/off-grid RE systems and enforcement, monitoring, and verification of standards on efficient electric appliances</u>	National Consultants PMU
<b><u>Output 3.3:</u></b> At least one (1) on-line training program on sustainable energy solutions for island is developed in Portuguese and applied by capacity building institutions and experts in São Tomé and Príncipe, Cabo Verde and Guinea Bissau	
<b><u>Planned and Envisioned Activities</u></b>	<b><u>Responsibility</u></b>
<u>Activity 3.3.1. Develop and implement a special on-line training programme in sustainable energy solutions</u>	CIEMAT
<b><u>Output 3.4:</u></b> At least five (5) capacity building institutions and fifteen (15) certified trainers engage in capacity building courses on renewable energy and energy efficiency issues	
<b><u>Planned and Envisioned Activities</u></b>	<b><u>Responsibility</u></b>
<u>Activity 3.4.1. Train trainers on the modules developed in Output 3.1</u>	CERMI Staff International Consultants



**Output 3.5:** One hundred (100) national stakeholders are trained on sustainable energy issues by certified local trainers

<b>Planned and Envisioned Activities</b>	<b>Responsibility</b>
<u>Activity 3.5.1. Train 100 national stakeholders on sustainable energy issues</u>	Certified local trainers ECREEE

#### **Project Component 4 (PC4): Monitoring and evaluation**

**Expected Outcome 4:** Continuous monitoring and evaluation (M&E) of the implementation of the GEF project conducted in accordance with established GEF and UNIDO procedures and guidelines

The overall objective of PC4 is to ensure continuous monitoring and evaluation (M&E) of the implementation of the GEF project conducted in accordance with established GEF and UNIDO procedures and guidelines. This will allow not only the monitoring of the project's progress but also the design of an overall project impact assessment on a rolling periodic basis, built-up from achievements under the project's different components. The monitoring and evaluation of the project activities combined with the assessment of the project results impact will provide a frame for periodic reviews of the project's 'Theory of Change' and the update of subsequent implementation strategies and work plans.

This will be achieved through:

- Establishment of Project Management Unit (PMU), the National Project Coordinator (NPC) and Project Steering Committee (PSC)
- Establishment and implementation of an adequate and systematic monitoring, evaluation (M&E) and reporting of all project indicators following UNIDO and GEF procedures to ensure successful project implementation;
- Timely and continuous dissemination of project activities and results through the project's Website.

The following are the two main outputs of PC4:

#### **Output 4.1. Mid-term review and terminal evaluation executed**

##### **Activity 4.1.1 Mid-term review**

The NPC will prepare the TORs for the recruitment of an Independent Evaluator that will perform the mid-term review of the project according to UNIDO and GEF guidance. Achievements made up to this stage should be identified and compared against baseline and targets, impacts and sustainability of results assessed as well as possible risks until the finalisation of the project identified. This evaluation should be carried at the middle of the project (month 24).

Since this project falls under GEF CCM-1 Program 1 "Promote the timely development, demonstration, and financing of low-carbon technologies and mitigation options", achieved greenhouse gas emissions reductions should be evaluated too. This should be done using the GEF Climate Change Mitigation tool.

##### **Activity 4.1.2. Terminal evaluation**

The NPC will prepare the Terms of Reference (TORs) for the recruitment of an Independent Evaluator that will perform the terminal (final) evaluation of the project. Achievements made up to this stage should be identified and compared against baseline and targets, impacts and sustainability of results assessed in order to evaluate the overall project performance during its implementation period. This evaluation should be carried out three months prior to the end of the project.

Since this project falls under GEF CCM-1 Program 1 "Promote the timely development, demonstration, and financing of low-carbon technologies and mitigation options", achieved greenhouse gas emissions reductions should be evaluated as well. This should be done using the GEF Climate Change Mitigation tool.

#### **Output 4.2. Project's progress monitored, documented and recommended actions formulated**

##### **Activity 4.2.1. M&E Framework design**

The first activity is to develop a detailed working plan for the execution of the project (schedule, roles and responsibilities, milestones, etc.). This plan should consist of all the necessary items to be applied during project execution and should be designed following GEF and UNIDO procedures. The plan should have a logical framework that captures the identified indicators per outcome and/or output as well as indicators to measure how the GEF project contributes to STP attainment of the sustainable development goals: SDG-7 (universal sustainable energy access), SDG-9 (sustainable and inclusive industrialization focusing on the transformation sector), and SDG-13 (climate action).

An **indicator** is a quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of an activity. A "starting point" (e.g. value) for each indicator should be selected in order to allow for later comparison against achievements during evaluation stages.



A proper M&E framework should consist of the following:

- **Monitoring process:** it refers to the continuous process of collecting data on the agreed indicators to provide information on the extent of progress and achievements made. It involves the systemic collection of information and data as well as calculating specific indicators to evaluate the effectiveness of the activities implemented. The monitoring should be conducted following specific procedures to collect and manage information, data, and variables. Procedures that are already in place in the country to track variables should be taken into consideration and synergies with other on-going initiatives should be taken into consideration (for example, the SEforAll initiative).
- **Evaluation process:** it refers to the action of assessing the achievements in comparison to the original baseline scenario (at any given moment during implementation) and to the expected targets. This will help the evaluator to understand if the objectives set for each indicator were met or not. This comparison enables the country to identify delays or deviations and to take corrective actions accordingly (e.g. modify targets or implementation strategies). Proper monitoring is vital for conducting a successful evaluation, which will aid to keep the initiative on track. A proper evaluation frequency should be selected in accordance with the type of activity under execution and the targets. Typical evaluation frequency is once a year.
- **Reporting process:** refers to the systematic and timely provision of essential and useful information showing how STP is progressing toward the achievement of the project's goals. It should take place at periodic intervals and should result in the publication of a simple report indicating for the corresponding monitoring period which were the expected objectives and what was achieved, as well as any problems faced during monitoring in order to take the necessary corrective actions.

An International Consultant will be hired to design the M&E framework and to provide the necessary capacity building course to the NPC and those involved in the implementation of the M&E framework.

#### **Activity 4.2.2. M&E Framework implementation**

The M&E will be applied as described in its design. Roles and responsibilities of the different actors involved in the application of the M&E Framework should be defined. The M&E plan will be reviewed and updated periodically basing on the results that are being achieved throughout project implementation. The NPC will be responsible for the day-to-day management, monitoring and evaluation of project activities as in the agreed M&E plan. The NPC will coordinate all project activities being carried out by project National and International Consultants and partners.

The following table summarises the outputs and activities of PC4.

<b><u>Project Component 4 (PC4): Monitoring and evaluation</u></b>	
<b><u>Outcome 4:</u></b> Continuous monitoring and evaluation (M&E) of the implementation of the GEF project conducted in accordance with established GEF and UNIDO procedures and guidelines	
Project progress towards objectives continuously monitored and evaluated.	
<b><u>Output 4.1:</u></b> Mid-term review and terminal evaluation executed	
<b><u>Planned and Envisioned Activities</u></b>	<b><u>Responsibility</u></b>
<u>Activity 4.1.1. Mid-term review</u>	International Independent Evaluator
<u>Activity 4.1.2. Terminal evaluation</u>	International Independent Evaluator.
<b><u>Output 4.2:</u></b> Project's progress monitored, documented and recommended actions formulated	
<b><u>Planned and Envisioned Activities</u></b>	<b><u>Responsibility</u></b>
<u>Activity 4.2.1. M&amp;E Framework design</u>	International Consultant
<u>Activity 4.2.2. M&amp;E Framework Implemented</u>	NPC