GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Naoko Ishii
CEO and Chairperson

June 10, 2014

Dear Council Member:

UNDP as the Implementing Agency for the project entitled: ***Timor Leste: Promoting Sustainable Bio-energy Production from Biomass*** , has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with UNDP procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by Council in June 2012 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by UNDP satisfactorily details how Council's comments and those of the STAP have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.TheGEF.org. If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

Pp/ Naoko Ishii
Chief Executive Officer and Chairperson

Attachment: GEFSEC Project Review Document
Copy to: Country Operational Focal Point, GEF Agencies, STAP, Trustee

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REQUEST FOR CEO ENDORSEMENT/APPROVAL

PROJECT TYPE: FULL-SIZED PROJECT
TYPE OF TRUST FUND: GEF TRUST FUND

PART I: PROJECT IDENTIFICATION

Project Title:	Promoting Sustainable Bio-energy Production from Biomass (SBEPB)		
Country(ies):	Timor-Leste	GEF Project ID:	4344
GEF Agency(ies):	UNDP	GEF Agency Project ID:	4250
Other Executing Partner(s):	State Secretariat for Electricity (SSE); Ministry of Agriculture and Fisheries; and, Ministry of Public Works	Submission Date: Re-submission Date: Re-submission Date:	12 Nov 2013 21 Feb 2014 29 Apr 2014
GEF Focal Area (s):	Climate Change	Project Duration:	48 months
Name of parent program (if applicable): ➢ For SFM ☐		Agency Fee:	US$ 174,300

A. FOCAL AREA STRATEGY FRAMEWORK[1]:

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Indicative Financing from Relevant TF	Indicative Co-Financing
			($) a	($) b
CCM-2	2.1 Appropriate policy, legal and regulatory frameworks adopted and enforced	2.1 Extent to which EE policies and regulations are adopted and enforced	328,000	1,970,000
CCM-2	2.2: Sustainable financing and delivery mechanisms established and operational	2.2: Investment mobilized	1,415,000	4,680,000
Total Project Costs			1,743,000	6,650,000

B. PROJECT FRAMEWORK

Project Objective: Removal of barriers to sustainable production and utilization of biomass resources in Timor-Leste and application of biomass energy technologies to support local economic, environmental and social development that leads to GHG mitigation.

Project Component	Type (TA/ INV)	Expected Outcomes	Expected Outputs	Indicative Financing from Relevant TF	Indicative Co-Financing
				($) a	($) b
1. Policy and Institutional Support for	TA	1.1 Implementation of strengthened	1.1: Developed and adopted new regulations and technical guidelines for renewable energy technology appraisal	125,000	570,000

[1] Refer to the reference attached on the Focal Area Results Framework when filling up the table in item A.

Deployment and Commercialization of Advanced Bio-energy Technologies		enabling policies, legal and institutional framework for deployment of biomass energy technologies as well as the growth of biomass energy businesses in Timor-Leste.	and evaluations 1.2: Developed and implemented national strategy and roadmap for the promotion of bio-energy production and utilization 1.3: Designed and operational national biomass energy resource inventory 1.4: Modalities and details of participation of community-based organizations and grassroots institutions finalized and agreed		
2. Bio-energy Investments Promotion - Sustainable Bio-energy Technology Demonstration & Market Development	INV	2.1 Increased investments in Bio-energy 2.2 Development of a local supply chain and market for BETs 2.3 GHG emissions avoided from technology applications and investments	2.1 Designed and implemented start-up grant and end user subsidies to enable market development for private-sector participation in biomass energy business 2.2: Implemented and operational 400 locally produced industrial stoves for income generating local enterprises such as tofu/tempe and salt production, bakery and coffee roasting 2.3: Implemented and operational locally produced 19,600 energy efficient cook stoves in households and local enterprise/community-based institutions	1,197,000	4,785,000
3. Capacity Development and Market Transformation	TA	3.1 Enhanced capacities of policy makers, financial institutions, entrepreneurs, project developers, communities and end-users on the development of the local BET market	3.1: Established and operational Research, Knowledge, Learning and Coordination Centre, leading a network, for Timor-Leste 3.2: Energy, Industrial and Rural Development planners trained on integrated rural energy planning, low carbon technology promotion and regulatory enforcement 3.3: Public stakeholders, project developers and micro-entrepreneurs trained on bio-energy technology component manufacturing/fabricating; BET project development, consultancy and energy services provision 3.4: Communities and local institutions trained on the installation and maintenance of energy-efficient cook stoves/ furnaces 3.5: Completed site visits to successfully operated BET applications and dialogues with policy makers, regulators, technology developers, entrepreneurs and financiers	303,000	680,000
Subtotal				1,625,000	6,035,000

5. Project Management Cost[2]	118,000	615,000
Total Project Costs	1,743,000	6,650,000

C. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME($)

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Co-financing Amount ($)
National Government	Government of Timor-Leste	Grant	4,200,000
National Government	Government of Timor-Leste	In-kind	1,310,000
Multilateral Agency	UNDP (core resources)	Grant	350,000
Multilateral Agency	UNDP	In-kind	420,000
NGOs	Mercy Corps	Grant	210,000
NGOs	Haburas	In-kind	60,000
Private Sector	Startec	Grant	100,000
Total Co-financing			6,650,000

D. **TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY – N.A.**

E. **CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS**:

Component	*Estimated person weeks*	*GEF amount ($)*	*Co-financing ($)*	*Project Total ($)*
Local consultants*	117**	237,000	120,000	357,000
International consultants*	93**	265,000	468,000	733,000
Total	**210****	**502,000**	**588,000**	**1,090,000**

*Details provided in Annex B.; **GEF FUNDING ONLY

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF

The formulation and design of the Project is largely consistent with the concept and design in the original PIF, including major aspects such the overall budget, the duration of the project implementation, the total number of stoves to be disseminated, among others. However, since the focus of the Project is on the promotion and dissemination of improved cook stoves and furnaces, addressing both the demand and supply of the technology, the Focal Area Objective has been shifted from CCM-3 to CCM2 on Energy Efficiency. The change is reflected in Section A – Focal Area Strategy Framework.

Based on elaborate stakeholder consultations, field visits, and surveys conducted during the PPG stage, there are some aspects of the Project Framework that have been added or modified, mainly for the purpose of making the design of the Project more detailed and the implementation mechanisms more

attuned to the field conditions. The project framework has been streamlined to comprise of 3 main components, instead of 4. The following additional Output has been envisaged:

Output 1.3: Modalities of participation of community-based organizations and grassroots institutions finalized and agreed

The following modifications have been made:

Output 2.1: Designed and implemented start-up grant and end-user subsidies to enable market development for private-sector participation in biomass energy business. This output was moved from Output 1.3 of the original PIF as it supports more appropriately Outcome 2 related to market mechanisms and increased private sector participation. In addition, under Output 2.1, the focus of the Project will be restricted to improved energy efficient cook stoves as it is more cost-effective focus the limited resources on a technology that more cost-effective and has wider reach and the opportunity for a market mechanism to be built for scale-up and sustainability. Hence, Output 2.1b & c in the original PIF have been dropped. The funds have been transferred to increase the total number of energy efficient cook stoves/furnaces from 16,000 to 20,000 and the setting up of the Loan Risk Guarantee Scheme to promote greater market and private sector participation.

Similarly, Output 3.2, 3.3 and 3.4 and 3.5 of the approved PIF have been merged under Output 2.1 for support to investment projects in Output 2.2, 2.3 and 2.4. Output 3.1, 3.6 and 3.7 of the approved PIF have been merged into Output 3.1 (Established and operational Research, Knowledge, Information and Coordination Centre) in the ProDoc (previously Output 4.1 of the approved PIF) to develop and enhance the techno-financial capacity of SSE as the Centre of Excellence for the depository of bioenergy knowledge, baseline inventory data base, research, information and coordination of bioenergy activities. These knowledge products (training manuals, guidelines, DVD, CD, marketing leaflets) will be used for the training of public, private, CSO and end user stakeholders.

There are some changes in the detailed breakdown of the budget. Parts of the budgets from Components 1 and 4 have been moved to Component 2 to cater for increased number of cook stoves. However, the overall GEF funding requirements remain the same as in the original PIF at USD 1,743,000. The changes in the allocation between components will not affect the original objectives and outcomes of the Project. The summary of the changes is shown in Table 2 below.

Table 2: Summary of Comparison between the GEF-Approved PIF and ProDoc

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	**Project Document**	
Component 1: Policy and Institutional Support for Deployment and Commercialization of Advanced Bio-energy Technologies (BET).		
Output 1.2. Developed and implemented national strategy and roadmap for promotion of bioenergy production and utilization, using community-based (farmer-managed) woodlots and non-fuel wood energy resources. (Modified a little; woodlots dropped)	1.2: Developed and implemented national strategy and roadmap for the promotion of bio-energy production and utilization	Slight change to keep the focus on demand-side management while the Project will work collaboratively with institutions working on the supply-side.
Output 1.3. Designed and implemented fiscal incentives for	Output 2.1. Designed and implemented startup grant and end	Output 1.3 in the approved PIF is moved to Component 2 and becomes Output 2.1

private-sector participation in biomass energy business (SHIFTED)	user subsidies to enable market development for private-sector participation in biomass energy business	in the ProDoc as this financial incentives output supports more appropriately Outcome 2 related to market mechanisms and increased private sector participation.
1.4. Evaluation reports on the feasibility of local manufacturing and fabrication of low carbon bio-energy technologies components and parts (SHIFTED)	*Merged into Outputs 2.2, 2.3 and 2.4.*	Output 1.4 in the PIF to evaluate local manufacturing/fabrication capacity will be carried out as part of the feasibility study to scale up improved cook stoves under Output 2.2, 2.3 and 2.4 in the ProDoc.
Output 1.5. Designed and operational national biomass energy resource inventory (NO CHANGE, just the numbering changed to 1.3)	1.3: Designed and operational national biomass energy resource inventory	No change (just the numbering)
	Output 1.4. Modalities and details of participation of community-based organizations and grassroots institutions finalized and agreed. (NEW)	Output 1.4 in the ProDoc was added following several consultations with Government, partners, civil society and communities during the PPG phase and it was agreed that the Project will be more effective to involve community-based organizations and grassroots institutions and utilize their network and experience in the roll-out of the efficient stoves to be promoted in this Project. Scheme to incentivize their participation will be developed.
Component 2: Bio-energy Investments Promotion - Sustainable Bio-energy Technology Demonstration & Market Development		
Output 2.1. Implemented and operational BET Full Scale Models on: 2.1[a] Energy Efficient Cook stoves Production/ Fabrication Centers (2 sites), 2.1[b] Community/HH Biogas Production for Cooking/ Heating/ Lighting (400 units) and 2.1[c] Briquetting for bio-energy fuel production (1 site) (Output 2.1b & c dropped)	Output 2.1: Designed and implemented start-up grant and end-user subsidies to enable market development for private-sector participation in biomass energy business. (Moved from Output 1.3 of the original PIF as it supports more appropriately Outcome 2 related to market mechanisms and increased private sector participation).	PIF Output 2.1[a] Energy Efficient Cook stoves Production/ Fabrication Centers (2 sites) will be carried out within ProDoc Outputs 2.2, 2.3 and 2.4 where 25 stove producers will be trained as certified producers. Output 2.1 [b] on Community/HH Biogas Production for Cooking/Heating/Lighting (400 units) & Output 2.1 [c] on Briquetting for bio-energy fuel production (1 site) have been deleted to consolidate limited resources for improved cook stoves since the stove activities can reach far more stakeholders and results in proportionately far more emissions reduction.
Output 2.2. Implemented and operational locally produced industrial stoves for income generating local enterprises such as coffee roasting, brick making, ceramics making, palm sugar production, and bakery (NO CHANGE, just the numbering	Output 2.2. Implemented and operational 400 locally produced industrial stoves for income generating local enterprises such as tofu/tempe and salt production, bakery and coffee roasting	This is now Output 2.3 in the ProDoc. NO CHANGE, just the numbering and the number of named enterprises reduced but this will not limit the enterprise sub-sectors that will be allowed to participate

and the list of named enterprises reduced)		
Output 2.3: Locally produced 15,000 energy-efficient stoves in rural households and community-based institutions for cooking needs implemented and promoted for replication.	Output 2.3: Locally produced 19,600 energy-efficient stoves in rural households and community-based institutions for cooking needs implemented and promoted for replication	Based on a survey during the PPG, the number of energy efficient stoves has been increased to 19,600 units, comprising 19,000 household improved cook stoves and 600 institutional stoves. This is due to increased demand to cover a wider area then initially planned.
Component 3: Sustainable Bio-energy Technology Demonstration & Investment Development		
The entire PIF Outcome 3 has been merged into Output 2.1 and the PIF Outcome 4 as explained below. PIF Outcome 4 now becomes ProDoc Outcome 3:		
Output 3.1. Documented and disseminated process and results of all of the above (2.1, 2.2 and 2.3) Output 3.6 Developed and operationalized equipment standards and technical guidelines in BETs Output 3.7 A techno-economic resource center set-up and operationalized to monitor and report on bio-energy production and utilization, including economic, technical and financial analysis service provision	Output 3.1, 3.6 and 3.7 in the approved PIF have been merged into "Output 4.1" (now NEW Output 3.1): 3.1: Established and operational Research, Knowledge, Learning and Coordination Centre, leading a network, for Timor-Leste	Output 3.1, 3.6 and 3.7 in the approved PIF have been merged as Output 4.1 in the ProDoc to develop and enhance the techno-financial capacity of SSE as the Centre of Excellence for the repository of bioenergy knowledge, baseline inventory data base, research, information and coordination of bioenergy activities. These knowledge products (training manuals, guidelines, DVD, CD, marketing leaflets) will be used for the training of public, private, CSO and end user stakeholders, contributing towards practical hands on-training.
Output 3.2. Designed and operationalized financing mechanisms for banks/ financial institutions to support project development 3.3. Completed promotion of successful technology and financial models/ packages for expansion beyond project sites 3.4 Developed tailor-made financial services, adapted from regional best practice methodologies for financing bio-energy, including loan-products in (micro-) finance institutions Output 3.5 Established and operationalized new innovative mechanisms for repayments of microfinance loans	Output 3.2, 3.3 and 3.4 and 3.5 of the approved PIF have been merged under Output 2.1 in order to support Outputs 2.2, 2.3 and 2.4. Output 2.1: Designed and implemented start-up grant and end user subsidies to enable market development for private-sector participation in biomass energy business	Outputs 3.2, 3.3, 3.4 and 3.5 in the approved PIF have been merged into Output 2.1 in the ProDoc for the development and roll-out of financial products and services with MFIs under the investment projects. Co-funding (USD 200,000) from the UNDP Social Business Programme will be used to support this output.

4. Capacity Development and Market Transformation		
The entire PIF Outcome now assumes ProDoc Outcome number 3:		
Output 4.1. Established and operational Research and Information dissemination network (Numbering changed)	Output 3.1. Established and operational Knowledge, Research, Information and Coordination Centre, leading a network.	As mentioned above, Output 3.1, 3.6 and 3.7 of the approved PIF have been merged into Output 3.1, as sub-activities, in the ProDoc to develop SSE as the 'One Stop Shop' facility to collect, stored and disseminate bioenergy solutions for enhancing the techno-financial capacity of the public, private, CSO and end user stakeholders.
Output 4.2. Industry policy planners' and regulators' capable of formulating and enforcing adopted policies, regulations and guidelines to enable low carbon technologies enhanced Output 4.3. Energy and rural development planners trained on integrated energy planning (Consolidated and numbering changed)	Output 3.2. Energy, industrial and rural development planners trained on integrated energy planning, low carbon technology promotion and regulatory enforcement	Outputs 4.2 and 4.3 in the approved PIF have been combined as Output 3.2 in the ProDoc to ensure between coordination between national and district development agencies, based on feedback from agencies during the PPG phase.
Output 4.4. New entrepreneurs trained on bio-energy technology component manufacturing/ fabricating, BET project development, consultancy and energy services provision (NO CHANGE, the term "new entrepreneurs" defined)	Output 3.3. Public stakeholders, project developers and micro-entrepreneurs trained on bio-energy technology component manufacturing/fabricating, BET project development, consultancy and energy services provision	This is now Output 3.3 in the ProDoc and the term "new entrepreneurs" has been expanded to include public stakeholders, project developers and micro-entrepreneurs.
	Output 3.5: Completed site visits to successfully operated BET applications and dialogues with policy makers, regulators, technology developers, entrepreneurs and financiers (NEW)	Output 3.5 in the ProDoc was added as site visits have been put forward by stakeholders as necessary elements for awareness and capacity building of different stakeholders and value chain actors in the Project. In addition, it was highly recommended by development partners working in Timor-Leste.
OTHERS (GEF FINANCING)		
Component 1		
GEF: USD 221,000	GEF: USD 125,000	The reason for the reduction of the GEF funding, and hence the total budget is mainly due to the following: Transfer of PIF Outputs 1.3 and 1.4 to ProDoc Outputs 2.1, 2.2, 2.3 and 2.4.
Co-financing: USD 600,000	Co-financing: USD 570,00: USD 520,000 (GoTL); USD 50,000 (UNDP)	
Total: USD 821,000	**Total: USD 695,000**	
Component 2		
GEF: USD 840,000	GEF: USD 1,197,000	The addition of USD 357,000 is transferred from PIF Outputs 1.3, and 1.4 as well as another USD 100,000 from PIF Outcome 3. This also allows an increase

		in the number of cook stoves (from 15,000 to 20,000) to be promoted.
Co-financing: USD 4,190,000	Co-financing: USD4,785,000: USD 210,000 (Mercy Corps), 100,000 (Startec); USD 3,975,000 (GoTL), USD500,000 (UNDP)	Additional co-financing is available as a result of baseline project activity commitments from GoTL, Mercy Corps, Hivos, and UNDP. They will also support part of Outputs 2.2, 2.3 and 2.4. .
Total: USD 5,030,000	**Total: USD 5,982,000**	
Component 3 (originally PIF Component 4)		
GEF: USD 470,000	GEF: USD 303,000	USD 167,000 is transferred to Output 2 as some of the capacity development activities will be covered by Mercy Corps, Social Business, SEFOPE, IADE/ILO training activities.
Co-financing: USD 885,000	Co-financing: USD680,000: USD 400,000 (GoTL), USD60,000 (Haburas); USD220,000 (UNDP)	The reduction in co-financing is compensated by work already initiated by other partners – Mercy Corps, SEFOPE, and IADE/ILO.
Total: USD 1,355,000	**Total: USD 983,000**	

A.1: National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

The Constitution of Timor-Leste states that the provision of energy is a basic need and that all communities should have access to energy. This project is in line with this national priority. In addition, the Rural Energy Policy of Timor-Leste proposes an Integrated Rural Energy Development Program that emphasizes the promotion and use of renewable and alternative energy throughout the country, especially in rural and remote areas as a high priority. Timor-Leste's Rural Development Strategic Framework for 2010-2020, finalized in December 2009, recognizes the importance of maximizing the use of indigenous renewable resources in order to reduce the costs of generation and improving energy security for the people. It identifies constraints preventing the wider adoption of low carbon energy technologies due to a dearth of demonstration projects to foster widespread interest amongst the private sector and inadequate financial assistance.

The Strategic Development Plan 2011-2030 (SDP) of the GoTL underlines the importance of renewable energy resources. According to the SDP, renewable energy supplies have the potential to make a dramatic contribution to the economic growth and help to reduce poverty levels in remote rural areas. These supplies will also contribute to Timor Leste's climate change adaptation and mitigation efforts and help the country to meet its obligations under the international climate change conventions. The SDP sets a target that by 2020 at least half of Timor Leste's energy needs will be provided by renewable energy sources.

The project has been designed based on extensive consultation with public and private key stakeholders. Thus, there are extensive inputs from the key relevant agencies of government such as the Ministry of Environment, Ministry of Public Work (State Secretariat for Electricity), Ministry of Finance, Ministry of Agriculture and Fisheries (National Directorate for Forestry and National Directorate for Livestock). The project fits into government's overall plan to scale up alternative clean bioenergy and reduce reliance on unsustainable firewood by promoting bioenergy standards and best practices.

The project is relevant to the UNDP Country Program Action Plan II (2009-2013) mandate through its strong emphasis on environmental governance, capacity development and technical training for the

private sector in order to provide professionals with the necessary know-how and technical skills to advise builders and other decision makers about EE standards and to integrate them into national policies and legislations. It also fits the UNDP's mandate by helping improve the capabilities of municipal enforcement agencies leading to better governance through sustained technical and institutional support.

The UN Integrated Mission in Timor-Leste), which has functioned as an interim governing institution since Timor-Leste obtained independence, operates under the mandate provided by the Security Council Resolution 1704. This mandate, as per the request of the Government of Timor-Leste, ended on December 31st, 2012. This means that remaining functions of the UNMIT were fully handed over to the Government, including law and order. The end of the successful UNMIT mission was a clear indication that the Government is taking full ownership of governance and development of the country. The importance of the support from UN development agencies to the Government is herewith also increased and it is foreseen that new development assistance frameworks will be developed in the coming year. These will likely continue on the basis of the successful existing ones, consolidating peace and stability in the country, while moving away from the high dependence on foreign expertise towards a higher focus on capacity development of government and non-state institutions, especially at the local level.

The SBEPB project is fully harmonized with the priorities of the current UNDP Timor-Leste Country Programme (CPD 2009-2013). The CPD analysis recognizes that strong progress was made in recent years in terms of economic growth, although highly dependent on oil and gas, and poverty reduction. At the same time the benefits of economic growth are not being distributed evenly, increasing inequality on the country. Poverty remains widespread in rural areas with a large proportion of the population still living a subsistence existence, providing a focus for UNDP's programming work over the coming years. The rural population and especially disadvantaged groups are recognized to be particularly vulnerable to global climatic change and recurrent natural disasters.

More specifically the CPD contributes to the goal of consolidating peace and stability in the country through the relevant UNDAF outcomes: (a) democratization and social cohesion; and (b) poverty reduction and sustainable livelihoods. The CPD program is contextualized in the post-crisis scenario and focuses on development and governance as means for contributing to lasting peace, stability and security in the country. The program uses social mobilization as a poverty reduction strategy, linking communities to microfinance services and marketing channels. The UNDP promotes and supports community-driven and managed rural infrastructure, self-help groups and community-based, sustainable natural resource management to enhance agricultural productivity and incomes. Women's groups are also engaged as agents of change. UNDP will continue to support the mainstreaming of environmental issues into poverty reduction and good governance strategies, particularly in climate change. It will strengthen support to the Government in environmental management, including the implementation of national environment and energy policies (CPD page 4). Further United Nations supports climate change mitigation and adaptation measures in the country to strengthen the synergy between sustainable development and climate change (UNDAF page 17).

The Government and UNDP are thus actively pursuing measures to support and strengthen effective climate change adaptation. The SBEPB project will build upon the Government's and UNDP's strategies and will support integration of climate mitigation and adaptation to strengthen sustainable development benefits, as follows:

1. Sustainable growth and MDG achievement will be achieved through promoting sustainable livelihoods through integrating climate change mitigation and vulnerabilities in local development planning, more sustainable climate resilient small-scale infrastructure services and improved environmental protection;

2. Effective governance will be supported through providing the combined climate resilient infrastructure and ecosystem mitigation and adaptation options in the already existing local planning and budgeting process as supported by the existing bioenergy project;
3. The project is the dedicated climate change mitigation initiative in Timor-Leste that from the design phase directly aims at integrating market-based management approaches to scale up bioenergy as inclusive business development. Lessons learnt will help to design future market based modern energy services initiatives based on best practices.

A.2: GEF Focal area and/or fund(s) strategies, eligibility criteria and priorities

The project fits Focal Area Objective CCM-3, to promote the demonstration, deployment, and transfer of innovative bio-energy low-carbon technologies and investments in renewable energy technologies. It will focus on enabling environment, technical and institutional capacity building as well as investment in promoting energy access through the deployment and diffusion of commercially available bio-energy technologies, with the aim to support Timor-Leste towards a low-carbon, climate resilient, gender sensitive and sustainable development pathway.

A.3: The GEF Agency's comparative advantage:

According to the paper on Comparative Advantages of GEF Agencies (GEF Council Paper C.31.5, rev. 1), it is acknowledged that UNDP has a comparative advantage in implementing energy projects, particularly in providing technical assistance and capacity building, leveraging on its country presence and experience in integrated policy development, human resources development, institutional strengthening, and non-governmental and community participation, which are key features of the barrier removal activities of this project. Through its engagement in the both the NAPA and the INC process, UNDP is well placed to support the GoTL in the activities related to climate change adaptation and mitigation.

A.4: The baseline project and the problem that it seeks to address:

The GoTL (SSE)-led village small renewable energy access program is built on the earlier UNDP's Participatory Rural Energy Development Programme (PREDP) that focused on small household level biogas plants and solar PV home systems. The program sought to institutionalize a system for community mobilization with the support of facilitating partners (NGOs/CBOs) and build a local governance structure. However, this program has been limited in scale, dependent upon donor support and did not address the barriers to widespread application of biomass energy technologies, as described in the section above. Building on the lessons learnt, the GoTL is determined to step-up this work together with a number of partners. The EC-funded Energy for All Programme will support the improvement and dissemination of improved stove technology, covering 15 villages, and set up pilot farmer managed micro-nursery and agroforestry in selected sites. The Enterprise Challenge Fund helps to demonstrate a business model using the MFI on the ground, working closely with an MFI and focused on a specific solar lamp.

The SBEPB project brings together the various partner driven initiatives within the baseline project to seek synergies but, more importantly, targeting the barriers to the promotion of widespread adoption and application of low carbon biomass energy technologies, using local resources that will be sustainably sourced. The baseline project activities will be expanded and/or supplemented in order to enhance the realization of potential global environmental benefits from them.

The project will ensure that biomass energy use is sustainable and does not, in any way, contribute to deforestation and land degradation, reduced soil fertility or increased GHG emissions beyond project boundaries. In this regard, the Ministry of Agriculture and Fisheries that is responsible for forestry, agriculture and livestock, will be a key partner in this project. The Ministry of Economy and Development will also be a key partner to lend support to the work on entrepreneur and market development, including developing public-private sector partnerships.

The following describe the activities of the proposed GEF project:

Component 1: Policy and Institutional Support for Deployment and Commercialization of Advanced Bio-energy Technologies

This component will address the institutional and policy-related barriers to the development and utilization of bio-energy resources using low-carbon energy technologies for energy services provisions. It will support the development of a national strategy and roadmap for the promotion of sustainable production, conversion and efficient utilization of bio-energy, through inclusive community participation and investments in low-carbon energy technologies, within the framework of a national sustainable energy policy. The expected outcome from this project component is the implementation of strengthened enabling policies, legal and institutional framework for the deployment of innovative biomass energy technologies as well as the growth of biomass energy businesses in Timor-Leste. It will also support the on-going work in the finalization and implementation of the National Sustainable Energy Policy and the Rural Energy Strategy for Timor-Leste.

The expected outputs that will contribute to the realization of the overall outcome of Component 1 are the following:

- Output 1.1: Developed and adopted new regulations and technical guidelines for renewable energy technology, appraisal and evaluations
- Output 1.2: Developed and implemented national strategy and roadmap for the promotion of bio-energy production and utilization
- Output 1.3: Designed and operational national biomass energy resource inventory
- Output 1.4: Modalities and details of participation of community-based organizations and grassroots institutions finalized and agreed

Component 2: Bio-energy Investments Promotion

This component is designed to overcome the technical and market barriers for the widespread development/adoption and application of BETs and bioenergy-supported projects in Timor-Leste. It will focus on increasing investments in bio-energy in order to raise investment confidence in this sector. The expected outcomes from this component are: (1) Increased investments in Bio-energy; (2) Development of a local supply chain and market for BETs; and, (3) Avoided GHG emissions from RE technology applications and investments. Under this component, the project will provide financial and technical support for the demonstration, commercialization and investments in energy-efficient furnaces and cook stoves production for livelihood enhancement and corresponding market development.

The expected outputs that will contribute to the realization of the overall outcome of Component 2 are the following:

- Output 2.1: Designed and implemented start-up grant and end-user subsidies to enable market development for private-sector participation in biomass energy business

- Output 2.2: Implemented and operational 400 locally produced industrial stoves for income generating local enterprises such as tofu/tempe making, salt making, coffee roasting and bakery.
- Output 2.3: Implemented and operational 19,600 locally produced energy-efficient cook stoves in rural households and community-based institutions

Component 3: Capacity Development and Market Transformation

This project component comprises of activities that will enhance the level of knowledge, skills and awareness on the co-benefits and features of BETs and bioenergy-supported livelihood/productive use projects as part of the Government's renewable energy promotion, development and utilization campaign through nodal centers of excellence, led by SSE. It will specifically address the barriers of low level public awareness, lack of technical knowledge and market information and intelligence regarding bioenergy technology applications; and, general perception of potential project developers, service providers and beneficiaries who currently hold the view that bioenergy projects are expensive, risky and investment recovery is difficult. It will also serve to channel detailed information on sectoral energy consumption patterns in the economy, resource inventory and proven BETs available in the market. Enhanced capacities of policy makers, financial institutions, entrepreneurs, project developers, communities and end-users on the development of the local BET market is the main outcome from the interventions that will be carried out under this project component. Capacity development activities will be led and coordinated by the SSE, hence ensuring linkages with policy making activities at SSE. In addition, capacity development with SSE as the Centre of Excellence will strengthen the agency's technical abilities through the development of local champions in analysis, planning, policy development and delivery of services.

Through this project component, more accessible information on modern biomass energy technology applications will be available, stakeholders will become aware of the ecological, social and economic benefits of bio-energy, and financing institutions will be favorable towards BET application and investment projects as well as the productive uses of bio-energy. It is expected that, as a result of the advocacy campaigns, policy makers would appreciate the advantages and practicality of a thriving BET market in the country, and will establish and implement suitable supportive policies and regulations.

The expected outputs that will contribute to the realization of the overall outcome of Component 4 are the following:

- Output 3.1: Established and operational Knowledge, Research, Information and Coordination Centre, leading a network, for Timor-Leste
- Output 3.2: Energy, industrial and rural development planners trained on integrated energy planning, low carbon technology promotion and regulatory enforcement
- Output 3.3: Public stakeholders, project developers and micro-entrepreneurs trained on bio-energy technology component manufacturing/fabricating, BET project development, consultancy and energy services provision
- Output 3.4: Communities and local institutions trained on installation and maintenance of energy efficient furnaces & cook stoves
- Output 3.5: Completed site visits to successfully operated BET applications and dialogues with policy makers, regulators, technology developers, entrepreneurs and financiers

A.5: Incremental/Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

The proposed TL SBEPB Project will specifically aim at addressing the gaps of the baseline project by targeting the barriers to the promotion of widespread adoption and application of low carbon biomass energy technologies, using local resources that will be sustainably sourced. The baseline activities will be expanded and/or supplemented in order to enhance the realization of potential global environmental benefits from them.

This project will focus on the promotion and use of bioenergy governance and resources for the provision of energy services in urban, peri-urban and rural areas. It will build on the Government's plan to endorse and implement the Rural Energy Strategy. It will involve activities that will overcome/remove barriers to the development and widespread use of biomass energy resources, to contribute to the enhancement of socio-economic growth in the country's rural areas.

The goal of the Project is the reduction of GHG emissions in the rural household and cottage industrial sectors of Timor-Leste through sustainable production and utilization of biomass-based energy in the country, and the promotion of sustainable biomass energy technologies, using market based approached and inclusive value chain financing. It also aims to promote the sustainable production of biomass in farmer managed agroforestry and community forests and to reduce the amount of biomass energy utilization through the adoption of efficient processes and technologies, which is mainly used for cooking and thermal heating purposes in rural households and local enterprises.

This project will involve incremental activities that will overcome/remove the regulatory, institutional, technical and financial barriers to the sustainable production and utilization of biomass resources and for the scaling up of modern biomass energy technologies (BETs) that will drive Timor-Leste towards a low emissions, climate resilient, gender and youth sensitive, pro-growth and sustainable development path. The success of the project is expected to encourage the increased utilization of sustainable biomass energy resources to meet the energy needs for cooking, heating and lighting, as well as productive uses, for urban and rural Timorese. To this end, up to 20,000 efficient stoves will be disseminated throughout the country during the Project implementation.

During the project preparation stage, three types of efficient stove technologies were identified and these will be introduced and promoted to replace the current traditional stoves used in the country. Moreover, a menu of stove technologies that have been successfully introduced in other countries and are considered relevant for Timor-Leste has been prepared and will be provided to potential end users for them to select from. Extensive consultations with communities and households will precede any introduction of these stove technologies.

Without GEF intervention, modern BETs will not be introduced to "green" the value chain and the working environment of the cottage industry such as in the food processing sector e.g. tofu/tempe, salt, bakery. With the GEF-funded project, a review of technologies will be conducted, and where applicable will be considered for demonstration. The application of these technologies will be demonstrated to showcase their technical feasibility and economic viability in the local context and environment. Its successful implementation and operation is aimed to convince the cottage industry and other relevant industries in the country to replicate the technologies in their sector and industries.

The Project will draw lessons from and address barriers encountered by the existing energy projects being implemented by the Government of Timor-Leste. The project specifically aims to ensure that biomass energy use is sustainable and does not, in any way, contribute to deforestation, land degradation, reduced soil fertility or increased GHG emissions beyond project boundaries. The project, as a whole, will facilitate the widespread application of bio-energy systems for economic and social uses in the country. It targets the realization of a substantial increase in the sustainable extraction and efficient conversion and

use of biomass energy resources for the provision of energy services facilitated through the barrier removal activities and other capacity building and technical assistance activities that will be implemented. Approximately 206,633 tCO2e emissions are expected to be avoided directly by the project during the four-year project period. Investments on sustainable bio-energy energy generation/ utilization that can be facilitated by this project will also result in overall global GHG emissions reduction.

The GEF grant will be specifically targeted to provide support for identifying and overcoming the technical, financial and regulatory barriers in transforming the market for the promotion of low emission bioenergy solutions in Timor-Leste as inclusive business and through value chain financing and leveraging private sector resources. The scaling up principles of improved cook stove are based on: i) Startup subsidy; ii) Value chain support from producer to end user and iii) overcoming the cook stove supplier and demand risks through: a) quality control systems through Testing & Certification and Standard & Label; b) business service providers support, and c) create demand and aggregation through awareness and output based incentives for local women's unions to link suppliers and consumers.

The GEF grant will also be targeted to provide support for demonstration projects using modern biomass energy technologies and establishment of market mechanisms to disseminate modern and efficient cook stoves, as well as technical assistance (TA) for mainstreaming sustainable biomass energy through strengthening institutional, policy and regulatory frameworks, capacity development, knowledge management and creating an enabling environment for private sector investment and public-private partnerships. The private sector will be strongly urged to play its critical role in investing into the demonstration projects and in technology development.

This GEF project has been designed and positioned to complement and harmonize all the on-going initiatives on bioenergy, biomass and forestry to secure energy and food access in Timor-Leste. Most significantly, the project is positioned to remove all form of barriers, earlier mentioned in the efficient utilization of biomass for energy access and food security in Timor-Leste. These barriers if not removed will impair and hinder these initiatives. Without GEF support, these hurdles will remain and will result in unabated growth of non-renewable firewood and deforestation and the resulting GHG emissions. Barriers to be addressed by the project are:

- Lack of Policy, Legal and Regulatory Framework
- Limited Institutional capability
- Low Public Awareness, Retailers Interest and Demand on Alternative Energy
- Lack of Capability from Local Manufacturers
- Lack of fair and inclusive and pro-gender opportunity
- Lack of private sector participation and market based approach
- Lack of access to affordable and competitive credits and loans

The barriers presented above slow down the penetration of higher efficient and low emission solutions in Timor-Leste. The project has been designed to overcome the most significant barriers and allow a faster transformation process for the market. The GEF support will also catalyze the intervention of many local co-financing partners of government and NGO origin. These partners would not provide their support to the initiative without GEF intervention.

Under the 'business as usual' scenario, in the absence of GEF support and in light of the barriers mentioned above, modern biomass technologies for industrial applications are not envisaged to be implemented widely in the near or medium term future, and households are not expected to adopt more efficient cook stoves at a rate that ensures more sustainable utilization of the country biomass resources. With the expected continued growth in energy demand, driven by strong economic growth and an

increase in the population the pressure on the utilization of biomass resources for energy purposes will increase. Therefore, it is pertinent that the country harnesses this energy resource in a sustainable manner. The government's ambitious plans for rural energy development provide an opportunity for GEF to play a catalytic role in systematically addressing these barriers in order to promote modern rural biomass energy services.

Being a least developed country, Timor-Leste has limited capacity and resources to address its sustainable development needs. While it acknowledges the socio-economic benefits of renewable energy resources such as biomass, it does not have enough technical and financial resources to take advantage of the additional global environmental benefits of biomass energy utilization. Under the business as usual scenario, rural Timor-Leste, in particular, will continue to rely on fuel wood as its primary source, even with the advent of increased electrification of the country. Inefficient traditional wood stoves and furnaces, coupled with the increasing growth of rural based energy consuming enterprises, will lead to unsustainable production and utilization of the biomass resources in the country.

Without GEF support, the potential global environmental benefits in terms of CO2 emission reductions from sustainable use of bioenergy in rural areas will not be realized. These applications include household applications for cooking and heating, and use of non-renewable energy resources, biomass in particular, for the operation of rural industries. If current barriers that hinder the widespread sustainable and efficient use of biomass in rural areas persist, the potential CO2 emissions avoidance will not be realized. The country would have limited success in promoting renewable energy as an effective policy and institutional instrument for achieving the country's energy development and utilization objectives. The anticipated increase in fuel wood consumption presents an opportunity to improve the utilization performance of biomass fuels as an energy resource in the country's rural areas, and at the same time, showcase the better efficiency and environmental performance of modern BETs.

By expanding and mainstreaming the coverage of the planned work done in the field of biomass energy production and utilization by the government or by other donor agencies, the magnitude of national development benefits (energy savings, rural employment) and global environmental benefits (CO2 emission reductions) will become more significant. With GEF support for the incremental costs needed to create the much-needed policy and regulatory regimes, as well as the market mechanisms that will support widespread applications of BETs, the anticipated energy savings in rural areas can be achieved. In this regard, GEF support will ultimately help achieve GHG emission reductions in Timor-Leste's rural sector, which comprises about 70% of the total population. This will help expand energy access to the grassroots level of the population, building and complimenting on the current access projects that primarily targeted educational and religious institutions.

With a population growing at 2.4% and 70% living in rural Timor-Leste, there is constant and increasing pressure on the forests of Timor-Leste. Due to the increasing electricity tariff and unsubsidized kerosene, households even in electrified areas increasingly opt to use fuel wood for cooking. This further leads to unsustainable extraction from the forests. There is increasing concern that quality wood is being extracted leaving low quality wood, which in the medium to long term will affect Timor-Leste's ability to sustain its committed forest cover and consequently the carbon stock. Whilst protected areas have increased in the past due to Tara Bandu by-laws and national policy to increase ecological diversity and create biological corridors, there is continuous pressure on the forests, particularly in the buffer zones of protected areas. This Project aims to contribute towards an easing of this pressure.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address risks:

Based on discussions with stakeholders, it is expected that the overall project risk will be low to medium. The potential risks, which could hinder the successful project implementation and/or reduce project effectiveness, are itemized in Table 16. To address these anticipated risks, the project will be designed to include an effective means to monitor, and to the extent possible, mitigate these risks. A project monitoring & evaluation plan has been prepared to track not only the project milestones, but also the indicators that will show that the identified risks are, if not eliminated – at least mitigated. Stakeholders were engaged from the project design stage. The measures that have been taken during the preparation and design of the Project and/or will be taken during the implementation phase so that these potential risks will be mitigated are outlined in Table 1.

Figure 1: Rationale for intervention for overcoming the technical, regulatory and financial barriers in the scaling up of bioenergy solutions as inclusive business development in Timor-Leste.

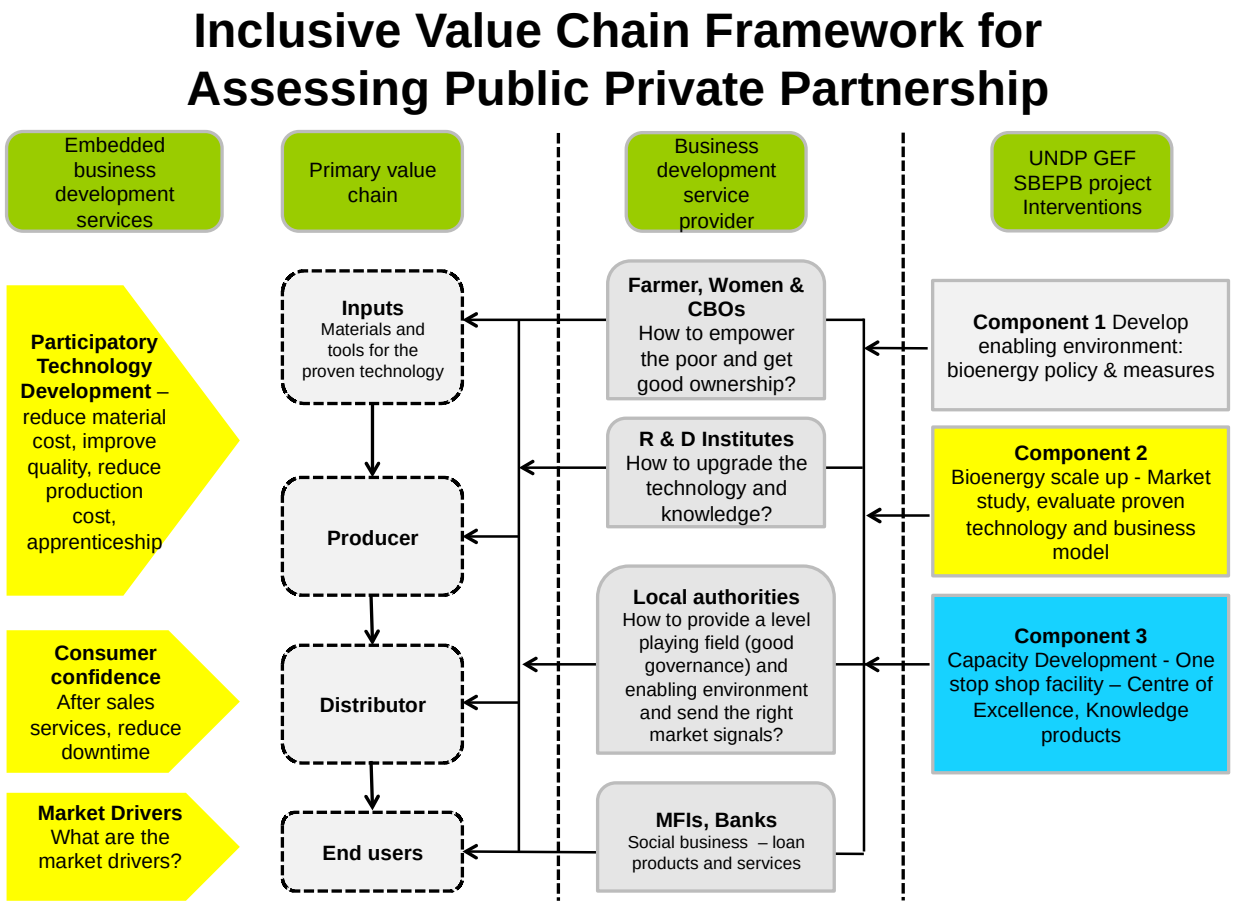


Table 1: Mitigating Risks			
Type	**Level**	**Risk**	**Mitigation**
Technical Risk	Low	The success of this project will largely depend on adequately increasing the technical capacity of the relevant institutions, such as the SSE, DIT, Forestry and Livestock Department etc. The following are therefore potential risks:	Bottom up; participatory training approach will be used to generate greater ownership. To mitigate this risk, adequate provision will be made to train staff of these institutions to imbibe the new technology.

		• Lack of project ownership • The willingness of the staff of these institutions to adopt new knowledge and practice • Insufficient training of laboratories staff, manufacturers, importers and retailers in the implementation of the standards and testing program • Lack of adequate training of key stakeholders to the project • Inadequate training on procedures for energy consumption measuring, calculation of energy efficiency index and enforcement procedures.	Training and enhancement of the capacity of relevant agencies and stakeholders is a key component of the current project.
Economic and political Risk	Medium	• The Timorese economy is highly dependent on oil for over 95% of her foreign earnings come from the exportation of petroleum. Any fall in the price of oil in the international market may have significant impacts on the volume of economic activities in Timor-Leste. The current and future price of fossil fuel could influence the uptake and buy in of bioenergy options. A drop in international and regional oil prices would diminish the attractiveness of bioenergy measures and therefore could likely threaten the willingness of the stakeholders to engage in the proposed bioenergy reform & strategy. • Political upheaval and instability could affect economic development and the uptake of bioenergy technology	The current international forecast indicates that the price of oil is likely to remain high over the short term. Political reforms are constantly being introduced to provide stability for economic growth that would incorporate bioenergy strategy. This is not considered a significant risk. The 2012 Presidential and Parliamentary elections in Timor-Leste were remarkably peaceful, and further significant outbreaks of violence are considered unlikely.
Financial Risk	Medium to High	To promote bioenergy in Timor-Leste will require a significant investment on the part of the government and other development partners. Therefore the likely risks to be associated with this project are: • Government unable to promote and mobilize adequate private sector participation to put in this quantum of investment. • The unstable nature of the exchange rates of both local and foreign currencies and high interest rates. • The higher upfront cost of bioenergy appliances (improved cook stove) may be a deterrent to consumers.	The project will put in place a strategic public-private partnership, complementing adequate structures, mechanisms, policy and legislation that will encourage investment in the sector.
Marketing /Distributi on Risk	Low	Insufficient numbers of households purchase alternative energy technologies to conduct useful analysis The anomalies in the Timor-Leste marketing and distribution system such as the	This is considered extremely unlikely. During the PPG exercise, a viability study was conducted, and all indications show that very large numbers of households will choose to purchase energy technologies.

		proliferation of traditional and substandard products, monopoly of distribution etc., may pose a potential danger to the success of the project. This makes the current business environment not conducive to the development of bioenergy.	This will be addressed by the current project by putting in place the right policy and legislation and setting up a stringent mechanism for enforcement.
Information Risk	Low	Though may be considered as low risks but they may impact on the project: • There is low level of awareness on the potentials of bioenergy solutions to bring about economic development and environmental sustainability. • There is also lack of thorough communication with key policy makers. • More so, there is lack of an accurate reporting of existing legal and regulatory framework. • Not many Timorese have information on the existence and availability of bioenergy appliances. • Illiteracy and general low capacity among households in target areas poses challenges in terms of data collection and impact measurement	This will be addressed by creating knowledge networks and awareness using all type of media (TV, radio, newspaper) and using NGOs already working on bioenergy projects. The implementation of a bioenergy policy will be included as a component of procurement policy to help the country adapt to the adoption of bioenergy. Using local CBO who has extensive experience of working with these types of households in Timor-Leste and in many other countries around the world. CBO will design the research tools to take into account respondent capacities, and minimize the risk of respondent incomprehension and bias.

A.7: Coordination with other relevant GEF financed initiatives:

The project development team held consultations on project activities to ensure coordination and collaboration between all the baseline projects and the proposed GEF project. Consultations with SSE seek to build on the village level governance mechanisms established for local energy services delivery. The project will establish improved cook stoves production facilities, building on the experience from PREDP and the baseline EC funded Energy for All project that aims to adopt fuel efficient cook stoves promoted by Stovetec, which is said to be 40% more efficient than open fires. Collaboration with Haburas will focus on its distribution network for improved cook stoves. Coordination between the Ministry of Economy and Development/ILO, SEFOPE, SSE and the Ministry of Agriculture and Fisheries (responsible for forestry matters) will be a priority of the project development team to ensure synergies and complementarities between both ongoing and planned projects and activities relevant to the proposed GEF project. The team will also consulted biomass projects in other countries like Indonesia, Cambodia and the Philippines.

This project will also be closely linked to a number of other initiatives –past, ongoing and planned – in Timor-Leste, namely the UNDP's GEF Small Grant Programme, the Initial National Communication for the UNFCCC, the National Adaptation Programme of Action, the National Biodiversity Strategy and Action Plan, Sustainable Land Management and other initiatives such as the Community Forestry and Rural Development programs that are currently being developed. The planned support currently being designed by UNDP and FAO in assisting the Government promote agricultural productivity will be harmonized with this project; particularly the promotion of the productive use of renewable energy and technologies in the sector. The ongoing micro-finance institutions support program will be linked to the micro-entrepreneur development schemes to be initiated in this project. Coordination of the various programs and initiatives will be provided through the Inter-Ministerial Working Group for Environment and Natural Resources Management and joint/coordinated Project Boards. In addition, the project will

also leverage the regional experiences of GACC, Hivos and GERES as well as the local experience of Raimaran and Permatil, in the promotion and application of improved cook stoves, and the UNDP's Social Business program in the provision of financial products and services, including micro-financing for the development of the public-private partnerships to promote investments in the technologies and their productive use.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE

B.1 Describe how the stakeholders will be engaged in project implementation:

In order to ensure project sustainability beyond the GEF project and to optimize efficient coordination and implementation for the scaling up of bioenergy solutions, the roles of the public, private and CSO stakeholders have been identified and are presented in Table 2. Inputs from meetings, workshops, individual interactions and literature review were used to ascertain their role in the project.

Table 2: Roles of stakeholders in the implementation of the project

Category	Stakeholder	Role in Project	Remarks
Government Institutions	National Development Planning Commission (NDPC)	Ensuring inclusion of project in national plans and development programs	NDPC, chaired by the Prime Minister, is the advisory body for formulating development plans and policies of the country
	Ministry of Finance (MOF)	Endorsement of Subsidy Policy;	MOF is the central authority of Government of Timor-Leste responsible for maintaining both micro- and macro-economic stability in the country. This includes enhanced mobilization of both internal and external resources.
		Representation in National Climate Change Steering Committee;	
		Coordinate with development partners at macro level	
	Ministry of Commerce, Industry and Environment (MCIE)	Coordination with other Ministries	MCIE is responsible for promoting sustainable development of country through environmental protection. This includes coordinating adaptation and mitigation programs to minimize the negative impacts of climate change. EPA-SL comes under the purview of MCIE.
		Representation in Project Board	
	Ministry of Public Works (MPW)	Coordination to ensure avoidance of duplication	MPW is responsible for development of policies and plans for conservation, regulation and utilization of energy, especially electricity. SSE comes under the purview of MPW.
		Licensing of project, where needed	
	Minister of State and of Foreign Affairs and Cooperation (MSFAC)	Coordination with local governments	MSFAC is responsible for coordination, cooperation, facilitation, monitoring and evaluation of activities undertaken by local bodies (Sucos Development Committees, Municipalities and Aldeas Development Committees)
		Support in resource mobilization and local planning and permits etc.	
	Secretariat of State for Professional Training and Employment (SEFOPE)	Support for social enterprise development and linkages (inclusive of Women and Youth). Collaboration for skill based training.	SEFOPE, with representation in all 13 districts, promotes the development of cottage and small industries enhancing their industrial productivity. It also works towards creating a congenial environment for investment in such industries. CTEVT is a national autonomous body committed to the production of technical and skillful human resources in the country.

Semi-governmental Institutions	State Secretariat for Electricity (SSE)	Project executing agency	SSE is a government institution under MPW responsible for developing and promoting renewable energy technologies in Timor-Leste
		Mobilize resources	
		Coordinate with other stakeholders	
		Support coordination with development partners	
	Timor-Leste Electricity Authority (TLEA)	Coordinate among grid and off-grid electrification	TLEA is the Government owned national electric utility responsible for most of the electricity generation, transmission and distribution in Timor-Leste
		Future collaboration for grid connection of Mini Grid and Mini Hydro	
Non-Governmental Organizations	Local NGOs	Collaboration and synergy regarding RE and RE based enterprise development at local level	
	National NGOs	Collaboration and synergy regarding RE and RE based enterprise development at national level	
	International NGOs	Collaboration and synergy regarding RE and RE based enterprise development at national and international level	
Community Based Organizations	Forest users groups, cooperatives, Women Group and Youth Group etc.	Financing of RE and RE based productive end uses	
		Raw materials for productive end uses	
		Member mobilization for RE utilization and demand creation	
Programs	EU-Energy For All Program (E4A)	Project complements the efforts of SSE to enable it to meet its renewable energy targets, thereby helping reduce GHG emissions and contribute to the socio-economic development of rural Timor-Leste	E4A, implemented by Mercy Corps, aims to improve the living standards of rural women and men, increase employment of women and men as well as productivity, reduce dependency on traditional energy and attain sustainable development through integrating the alternative energy with the socioeconomic activities of women and men in rural communities.
	UNDP-Social Business Program (SBP)	Collaboration and synergy regarding Social Business Fund	SBP helps low-income families become entrepreneurs, promote the development of their enterprises, and then create a strong partnership between consumers of micro-enterprise products and services and local service delivery institutions.
Development Partners	UNDP	• Implementing/Executing Agency	This Project will be implemented by UNDP under direct implementation arrangements (DIM).
		• Project promoter	
		• Facilitation of linkages with other UN agencies	
	GEF	Funding the project	
	Mercy Corps	Developer of improved cook stove solutions	Partner in the scaling up of improved cook stove and development of the cook stove testing center.
	Hivos	Developer of biogas technology	Partner in the scaling up of biogas technology
te sector and their Associatio	Dili Institute of Technology	Centre of Excellence for improved cook stove development,	DIT is a private University with laboratory for testing and measuring the quality of improved

	(DIT)	standardization, testing and monitoring	cook stove. Has the opportunity to test other clean technology such as solar, bio-mass/bio-gas, micro-hydro.
	Startec Enterprise Ltd	A pioneer in the production of improved cook stoves through import of stove liners from overseas. Provide training for cook stove producers	
Financing and insurance Institutions	National commercial and development banks	Financing of RE systems and productive end uses	
	Micro-financing institutions and Cooperatives	Financing of RE based productive end uses	BRAC offers financial products and services to small and medium social entrepreneurs.
	Insurance companies	Insurance of RE systems and electricity based enterprises	
	Development focused impact funds	Source of seed funding, equity and credit enhancement products	
Local Institutions and their Associations	Sucos Development Committees (SDCs)	Local coordination and resources mobilization	SDCs are district level local governments in Timor-Leste
		Local permits etc., where needed	
	Aldeas Development Committees (ADC)	Local coordination and resources mobilization	ADCs are village level local governments in Timor-Leste
		Local permits etc., where needed	
	Association of Sucos Development Committees Timor-Leste (ASDCTL)	Awareness and advocacy for increased utilization of RE and RE based productive end uses in SDCs	
		Policy Advocacy	
	National Association of ADCs in Timor-Leste (NAAITL)	Awareness and advocacy for increased utilization of RE and RE based productive end uses in ADCs	
		Policy Advocacy	

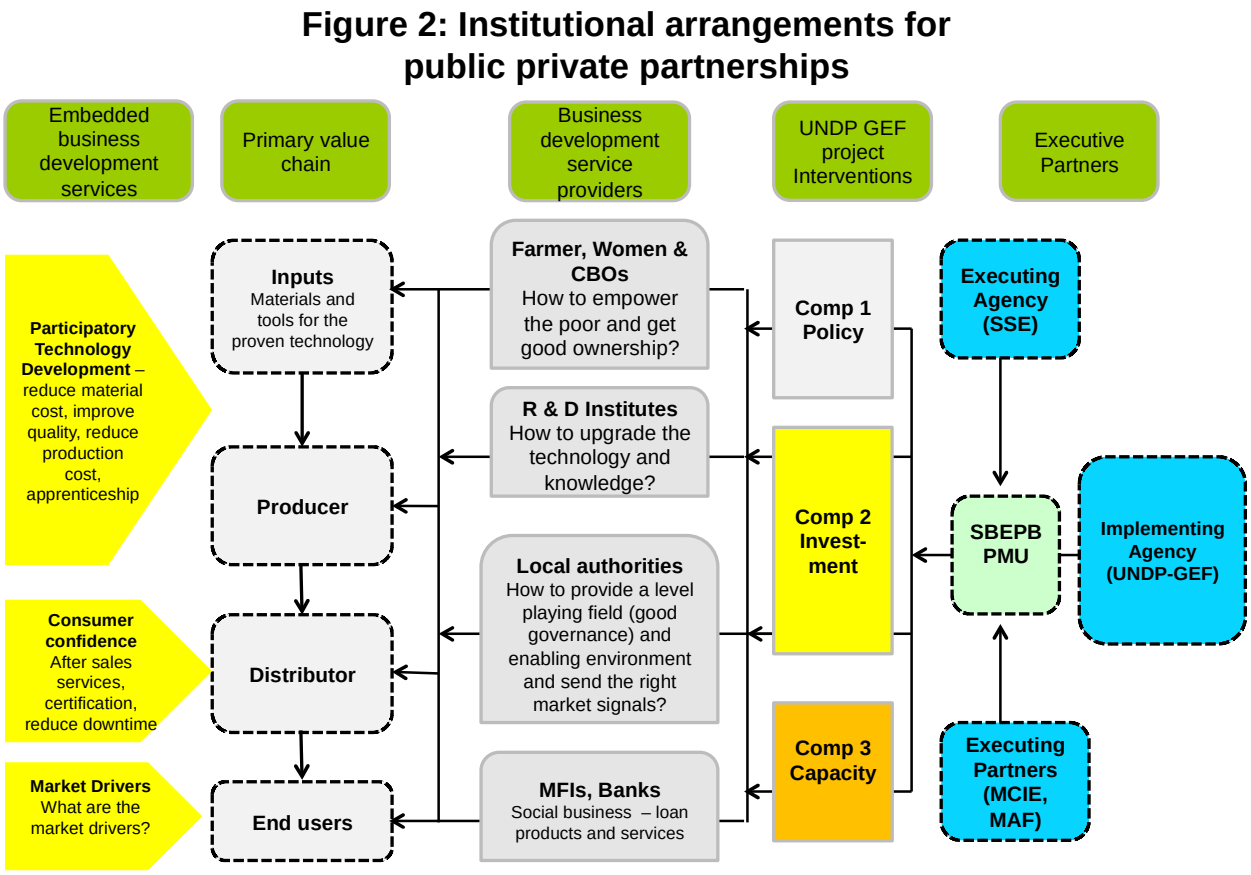
The graphical presentation of the implementation arrangement and linkages among participating institutions and stakeholders is shown in Figure 2.

B.2 Describe the socioeconomic benefits to be delivered by the project at the nationals and local levels, including consideration of gender dimensions, and how these will support the achievement of the global environmental benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF)

Timor-Leste's economic and social development, achieving poverty reduction and improving food, water and energy supplies, are going to depend heavily on the country's renewable natural resources, and how

they are exploited with regard to conservation and sustainability. A key issue for Timor-Leste is that, due to geological, topographical and climatic factors, the country's renewable natural resource base is not strong. Agricultural productivity is low, and more than 98% of households depend on wood for cooking and heating further degrading the land and entrenching a cycle of poverty and resource degradation. While aiming to remove barriers for the deployment and expansion of biomass energy technologies and GHG emissions reduction, this project will also contribute towards the Government's effort on attaining the goal of poverty reduction through environmental mainstreaming. National capacity will be strengthened to create and implement the enabling policy environment and mechanisms for the promotion of low carbon biomass energy technologies that will reduce the pressure on the forests and, at the same time, working in harmony with the Government's planned new Integrated Natural Resources Management/Poverty-Environment Initiative, support improved coordination, integrated planning, reporting and decision-making across key government and non-government agencies towards improved governance structures for the direct community engagement in poverty reduction and environment mainstreaming with the creation of Green Jobs and public-private partnerships in the management and conservation of renewable natural resources.

Figure 2: Engagement and linkages of stakeholders in the scaling up of bioenergy solutions



Women's participation, representation and access to resources and benefits will be a key focus of this project that aims to provide access to improved household energy needs through clean cooking stoves, and advanced biomass cook stoves. The project will contribute towards social, economic governance

transformations to empower women through specific activities that: promote participatory and consultative planning for decision-making; improve women's capabilities through their involvement, as consumers and producers in pilots and as role models; and, advance their influence in decision-making as well as control over natural resources. The project will have specific gender goal indicators, which will include the collection of gender-disaggregated data and a strong monitoring and evaluation mechanism to operate and advance gender mainstreaming and social equity.

The Project will focus on the promotion and use of biomass energy resources for the provision of energy access and services in rural areas. Overall, the Project is expected to result in a reduction of annual biomass/fuel wood consumption in Timor-Leste through the gradual utilization of biomass-based energy systems and efficiency improvements in the rural areas of the country as influenced by the Project. The Project will facilitate the widespread application of biomass-based energy systems in the country, particularly for economic and social uses in the country's rural areas. The reduction of GHG emissions in the country through the use of more efficient fuel wood technologies and sustainable biomass energy generation will in turn result in overall global GHG emission reductions.

The implementation of the Project is expected to bring about the following benefits to the country and to rural communities:

1. Economic benefits:

    - Access to clean energy and food security and sustainable livelihood
    - Energy, fuel wood and expenditure savings through certified, standards and labeled products
    - Access for people living in rural areas in Timor-Leste to alternative less polluting and efficiently produced energy technologies
    - Establishment of Centre of Excellence equipped with local champions and social entrepreneurs empowered to invest in greening the energy value chain (cottage industry, food processing)
    - Local MFI capable of developing affordable energy loan products and services
    - Use of women groups to create demand in reducing the supply risks for producers

2. Environmental benefits:

    - GHG emission reductions
    - Establishment/supplementing of scarce fuel wood resources in forests with farmer chosen fuel wood species in Farmer Managed Agroforestry to provide a sustainable supply of fuel wood to villagers and peri urban end users
    - Reduced deforestation with benefits for improved environmental services, conservation of land and biodiversity and improved watercourse

3. Social benefits:

    - Employment generation at the community level through the empowerment of women and youth as social entrepreneurs to participate as value chain actors through inclusive business and startup grant
    - Potential for productive uses of energy leading to improved micro-enterprise development and sustainable livelihood and greater community and business resilience to changing climate
    - Reduction of health hazards
    - Time savings, in particular, for women and children from collection of fuel wood, leading to more productive use of their saved time and contribute to MDG goals.

The potential for synergies to mitigate and adapt to climate change in developing low emission, climate resilient, gender sensitive and sustainable development trajectory for the scaling-up of the improved cook stove are outlined below:

Improved cook stoves (ICS)

- *Synergies*: Intermediate steps to accessing modern energy; Top Lit Up-Draft gasifier stove can produce biochar as soil amendment for improving soil fertility; standardizing energy efficiency parameters for faster marketing; ash as mineral fertilizer or compost enhancer; reducing in-house air pollutants; hybrid stoves for multiple fuel wood and briquette.
- *Mitigation*: Renewable energy for households; GHG reductions through reduced fuel wood consumption; reduced deforestation; household savings in reduced fuel wood consumption and time spent to collect fuel wood by women and children.
- *Adaptation*: Enhance climate resilience by advancing MDG goals (poverty reduction, mother and child health, livelihood); access to bioenergy and food security (climate friendly agriculture and forestry); livelihood security; reduce indoor air-pollution; organic farming; 'green jobs' created by social entrepreneurs for trained artisans in local fabrication places.

B.3: Explain how cost-effectiveness is reflected in the project design

The project targets the realization of a substantial increase in the sustainable and efficient use of biomass energy resources for the provision of energy services in Timor-Leste's urban and rural sector (i.e., for household, community and rural industry uses) facilitated through the barrier removal activities focusing on institutional strengthening, regulatory framework, capacity building, investment promotion, market development and other technical assistance activities that will be implemented. During the project inception phase, targeted consultations will be held with local entrepreneurs to participate in the demonstrations projects, through investments in land, premises and hardware of the projects. Also, Component 1 of the project focuses strongly on specific development and implementation of a roadmap for sustainable bioenergy promotion, to be complemented with recommendations for fiscal incentives from the Ministry of Finance, as well as earmarked areas for sustainable bioenergy production through Farmers Managed Micro-nurseries and agroforestry system.

At the end of the four-year Project period, approximately 206,633 tCO2e emissions will be avoided directly, through the 19,600 improved stoves and the scaling up of 400 industrial stoves. Throughout the life of the same stoves and the implemented BETs, and without the benefit of additional installations, the cumulative GHG mitigation is expected to be at least 675,214 tCO2e (lifetime direct GHG emissions avoided), giving a cost of less than USD 2.56 of GEF resources/tonne of CO2 emissions avoided. This clearly shows that the approach of barrier removal for this project is more cost-effective than the Clean Development Mechanism and other carbon financing schemes. While this is based on the assumption that the Project would have created the enabling conditions that will facilitate the widespread application of BETs in rural Timor-Leste's cooking and thermal energy needs by 2015, this measure of the project's cost effectiveness (i.e., UAC) will be tracked using the Tracking Tool for Climate Change Mitigation Projects developed by GEF. The CO2 emission reduction estimations are presented in Section 2 and Annexes F and G of the ProDoc.

C. DESCRIBE THE BUDGETTED M & E PLAN

The project will be monitored through various M&E activities. The M&E Work Plan and Budget is shown below.

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Project Inception, Workshop and Report	▪ Project Manager ▪ UNDP CO, UNDP GEF	Indicative cost: 10,000	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Evaluation	▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: USD 20,000	At the mid-point of project implementation.
Final Evaluation	▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 30,000	At least three months before the end of project implementation
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ local consultant	0	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: 3,000	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	Paid from IA fees and operational budget	Yearly
TOTAL indicative COST		US$ 85,000	

Project start:

A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and APRC/RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making

structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception document is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Annual Work Plans

After the Inception Workshop, the Project Management Unit will prepare the project's first Annual Work Plan (AWP), on the basis of the Project Results Framework (PRF). This will include reviewing the PRF (indicators, means of verification, assumptions and risks), imparting additional detail as needed on the basis of this exercise, finalize the AWP with precise and measurable performance indicators and in a manner consistent with the expected outcomes for the project. Similar Annual Work Plans will be prepared in subsequent years as part of its annual PIR.

Performance Reporting

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of value chain actors are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in *ATimor-Lesteas*, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc... The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

  The APR/PIR includes, but is not limited to, reporting on the following:

  - Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
  - Project outputs delivered per project outcome (annual).

- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

UNDP CO and the UNDP RCU/APRC will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board will be invited to join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU/APRC and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (insert date). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Centre (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Centre (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out

recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

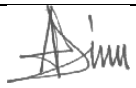
Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the country endorsement letter(s) or regional endorsement letter(s) with this template).

NAME	POSITION	MINISTRY	DATE
Joao Carlos Soares (Mr.)	National Director for International Environmental Affairs and GEF OFP for TL	Ministry of Commerce, Industry and Environment	**OCTOBER 20, 2013**

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF policies and procedures and meets the GEF/LDCF/SCCF criteria for project identification and preparation.					
Agency Coordinator, Agency name	**Signature**	**Date**	**Project Contact Person**	**Telephone**	**Email Address**
Adriana Dinu UNDP – GEF Executive Coordinator and Director a.i.		April 29, 2014	Thiyagarajan Velumail, Regional Technical Advisor (Energy), UNDP-APRC	+662 304 9100 Ext. 2597	rajan.velumail@undp.org

ANNEX A: PROJECT RESULTS FRAMEWORK

1. TL SBEPB PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: By 2012, national capacity for environmental sustainability and disaster management strengthened (MDG 7)
Country Programme Outcome Indicators: Detailed regulatory bioenergy framework supporting dissemination of bioenergy technologies Number of households in remote sucos using renewable energy with increased income generation opportunities
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. **Expanding access to environmental and energy services for the poor.**
Applicable GEF CC-M Focal Area Objective: Objective 3 – Promote investment in renewable energy technologies
Applicable GEF Expected Outcomes: Favorable policy and regulatory environment created for renewable energy investments; and, Investment in renewable energy technologies increased.
Applicable GEF Outcome Indicators: tons CO2eq avoided

TL:SBEPB PROJECT PLANNING MATRIX

Strategy	Objectively Verifiable Indicators			Source of Verification
	Indicators	Baseline	Targets	
Project Goal: Reduction of GHG emissions through sustainable production and utilization of biomass energy in the country, and the	• Quantity of GHG emissions mitigated annually by End of Project (EOP), tCO2e. • Total cumulative quantity of GHG emissions mitigated by EOP, tCO2e.	• 0 • 0	• Up to 117,145 • Up to 206,633	• GHG emission mitigation calculations; Statistics reports from SSE; SBEPB project activity and M&E reports • Surveys; Statistics reports from SSE; SBEPB project activity and M&E reports

promotion of innovative low-carbon biomass energy technologies.				
Project Objective: Removal of barriers to sustainable production and utilization of biomass resources in Timor-Leste and application of biomass energy technologies to support local economic, environmental and social development that leads to GHG mitigation.	• Reduction of non-sustainable fuel wood consumption for energy use in households and industries by EOP, tons. • No. of households and industries that adopted, and are benefiting from, the energy-efficient furnaces/stoves & other BET applications by EOP.	• 0 • 0	• Up to 192,665 • Up to 20,000	• Household and industry surveys; SPEPB project M&E Reports • Industry surveys; SPEPB project activity and M&E Reports • Household surveys; SPEPB project activity and M&E Reports
Component 1: Policy and Institutional Support for Deployment and Commercialization of Advanced Bio-energy Technologies.				
Outcome 1: Implementation of strengthened enabling policies, legal and institutional framework for deployment of biomass energy technologies as well as the growth of biomass energy businesses in Timor-Leste.	• No. of sustainable biomass energy production businesses that were proposed and developed as influenced by the strengthened policy and institutional frameworks for the deployment of BETs and biomass energy businesses by Year 2	• 0	• 25	• Business plans of companies interested in biomass energy production; Industry surveys; SPEPB project activity and M&E reports
	• No. of biomass energy utilization projects that are planned and developed for PURE/SURE purposes by EOP	• 0	• 25	• Documentation of proposed and planned biomass energy supported PURE/SURE projects by the GOT and private sector
	• No. of policies and legal frameworks that is supportive of BET applications and biomass energy business development approved and enforced by Year 3	• 0	• 1	• Documentation of new and approved policies and legislations for supporting BET applications
	• Volume of funding made available for BET application projects by EOP, US$ million/year	• 0	• 1 million	• Documentation of financial agreements for BET projects
	• No. of relevant GOT agencies and institutions involved in biomass energy production and use of BETs and are linked with each other via a working mechanism	• 0	• 5	• Documentation of GOT memos and MOU on the collaborative work on BET promotion activities

	for coordination by EOP. • No. of satisfied users of the Biomass Energy Resource Information System (BERIS) each year starting Year 2	• 0	• 200	• Surveys; SPEPB project activity and M&E Report
Component 2: Bio-energy Investments Promotion - Sustainable Bio-energy Technology Demonstration & Market Development				
Outcome 2.1: Availability of financial support for rural bio-energy production and associated low-carbon technology applications	• No. of operational financial support schemes (e.g., loan products) developed for scaling up and replicating successfully implemented BET projects (e.g., ICS) by Year 2, including the LRGF.	• 0	• 2	• Documentation of formulated financial support schemes; SPEPB project activity and M&E reports
	• No. of local financial institutions that apply the new financial support schemes to support BET projects by Year 4	• 0	• 2	• Documentation of agreements with FIs in the implementation of financial support schemes; SPEPB project activity and M&E reports
	• Volume of funds earmarked by participating FIs for financing BET projects by EOP, US$ million/year	• 0	• 3	• FI reports on its BET loan portfolio; SPEPB project activity and M&E reports
Outcome 2.2, 2.3 and 2.4: Increased investments in Bio-energy	• Production of improved cook stoves (ICS) by Year 4, units	• 0	• 19,000	• Surveys; SPEPB project activity and M&E reports
	• No. of ICS bought and utilized by consumers annually starting Year 4	• 0	• 19,000	• Surveys; SPEPB project activity and M&E reports
	• No. of furnaces/stoves installed & being used on a daily basis by households in targeted areas by EOP	• 0	• 600	• Surveys; SPEPB project activity and M&E reports
	• No. of industrial stoves installed and are operational by EOP.	• 0	• 400	• Surveys; SPEPB project activity and M&E reports
	• Total volume of investments on biomass energy technology applications by EOP, US$ million/year	• 0	• 1	• Survey of FIs; SPEPB project activity and M&E reports
Outcome 2.3: GHG emissions avoided from technology applications and investments	• Annual fuel wood savings from the cost-effective and efficient use of biomass energy in rural communities starting Year 4, tons	• 0	• 109,226	• Quantifications based on annual surveys of biomass resources; SPEPB project activity and M&E reports
	• Annual GHG emission reduction from the cost effective and efficient use of biomass energy in rural communities starting Year 4, tons	• 0	• 117,145	• Quantifications based on annual surveys of rural communities; SPEPB project activity and M&E reports
Component 3**: Capacity Development and Market Transformation**				

Outcome 3: Enhanced capacities of policy makers, financial institutions, entrepreneurs, project developers, communities and end-users on the development of the local BET market	• No. of local manufacturing firms that can fabricate and install equipment/components used in BET systems by Year 4	• 1	• 25	• Company profile of qualified local manufacturing firms fabricating and installing BET system equipment and components • Company profile of qualified local engineering firms working on BET application projects; job certifications of technical staff
	• No. of trained and qualified men and women technicians working on BET application projects by EOP	• 0	• 25	
	• No. of trained men and women technicians who are qualified to repair and maintain BET equipment and installations by EOP	• 0	• 25	• Company profile of qualified local technical services firms doing R&M work on BET system facilities; job certifications of technical staff
	• No. of local development plans that integrate biomass energy use, BET applications, and biomass industry development prepared by local government men and women planners by EOP	• 0	• 10	• Documentation on local development plans in selected towns
	• No. of local men and women financial officers that are capable of evaluating biomass energy and other RE project proposals by EOP	• 0	• 15	• Profile of banks/FIs with RE project loan portfolios; job certifications of technical staff
	• No. of local entrepreneurs and SMEs that are gainfully involved in businesses that make up the value chain of the BET application industry by EOP	• 0	• 25	• Survey of companies involved in the upstream and downstream activities in the BET application industry

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF)

1. RESPONSE TO THE COUNCIL MEMBER COMMENTS

Comment	Response	Reference
Germany welcomes the project proposal from Timor-Leste to increase sustainable production of biomass for energy use. Please provide information about what is involved in producing bio-digesters and other energy-producing technologies locally. Can all materials be sourced locally?	The implementation mechanisms and business models for the production and utilization of improved cook stoves are described in detail in Section 2 and in Figure 3 (page 88). Feasibility study has shown that production and construction materials for improved cook stoves are available locally but these are imported so prices can be relatively higher. In collaboration with Cookstove Testing and Development Centre and SSE, efforts will continually be made to improve the product design and local content will increase as the market matures. Bio-digesters have been dropped, as advised by GEFSec.	ProDoc: Section 2 and Page 88 (Figure 3) on cook stove production and use in Timor-Leste
How can more investment from the private sector be leveraged?	25 stoves fabricators will be trained and formed into producers association and equipped with business skills and access to microcredit to develop future scaling up. Existing local fabricators and masons have indicated their interest to participate in this Project and their willingness to produce the stoves and furnaces locally. However, it is envisaged that a community of local entrepreneurs and a local market will further emerge as the demand for improved cook stoves grow as a result of the SBEPB project.	ProDoc: Output 2.1, 2.2 and 2.3
Will steps be taken to rehabilitate degraded lands?	No specific activities will be directed at rehabilitating degraded lands but activities carried by partners (Mercy Corps, World Vision, Permatil) seeks to train farmers to raise seedlings and plant saplings on their own land as agroforestry system. Their nursery management and agroforestry skills could be transferred to sustainable land and forestry management projects and future REDD + project for rehabilitating degraded and protect buffer zones near protected forests through the provision of alternative livelihoods.	

2. GEF SECRETARIAT REVIEW AT PIF/WORK PROGRAM INCLUSION

Comment	Response	Reference
12. Has the cost-effectiveness been sufficiently demonstrated, including the cost-effectiveness of the project design approach as compared to alternative approaches to achieve similar benefits?	Yes, this has been sufficiently demonstrated. The estimated unit abatement cost (UAC) is less than USD 2.56 of GEF resources/tonne of CO2 emissions avoided. This measure of the project's cost effectiveness (i.e., UAC) will be tracked using the Tracking Tool for Climate Change Mitigation Projects developed by GEF.	ProDoc: Section 2 under Cost effectiveness CEO Endorsement: Section C to E
21. Is the project structure sufficiently close to what was presented at PIF, with clear justifications for changes?	Yes, the project structure has followed closely the structure presented in the PIF.	
27. Have the appropriate Tracking Tools been included with information for all relevant indicators, as	Yes this has been included.	CEO Endorsement: Annex A; GEF CC-M

applicable?		Tracking Tool
28. Does the proposal include a budgeted M&E Plan that monitors and measures results with indicators and targets?	The proposal includes a detailed M&E plan that includes indicators and targets.	ProDoc: Section V CEO Endorsement: Section H
31. Items to consider at CEO endorsement/approval. At CEO Endorsement please also address the following issues: a. The sustainability of the project activities (i.e. the operation of BET full-scale model beyond the end of the project).	The target of disseminating 20,000 cook stoves nationwide will be achieved through inclusive business and value chain financing. This project will leverage public private partnership to develop and establish commercially sustainable models that ensure efficient stoves are being promoted and disseminated effectively. These social business models have been clearly identified and described in the ProDoc. The Project will work with community-based organizations (CBOs) and grassroots institutions that are already actively present and have complimentary activities in the rural areas. During the project preparation stage, CBOs already existing in Timor-Leste such as youth groups, women's groups, the Farmers Managed Agroforestry Group, SEFOPE and IADE's Technical and Business Training program, UNDP's Social Business program have been identified to fit into this category and have given indications that they would be willing and interested to provide this role within the Project. The Project will provide support that will include peer to peer training, institutional capacity development, knowledge products development and dissemination and startup subsidies to reduce supply and demand risks.	
b. The provision of analytical data and assumptions to justify the incremental cost of the project activities	This is explained in the table below.	
c. The analytical estimation of the global environment benefits of the project.	At the end of the 4-year Project period, approximately 206,633 tCO2e emissions will be avoided directly, through the dissemination of 20,000 improved stoves. Throughout the life of the same stoves, and even without the benefit of any additional installations, the cumulative GHG mitigation is expected to be at least 675,214 tCO2e (lifetime direct GHG emissions avoided), giving a cost of less than USD 2.56 of GEF resources/tonne of CO2 emissions avoided. This clearly shows that the approach of barrier removal for this project is more cost-effective than the Clean Development Mechanism and any other carbon financing schemes.	ProDoc: Section 2 under Global benefits and Annexes E to F

Measures for ensuring the sustainability of the project activities beyond the end of the project.		
Aspects	**Open Stoves**	**Improved Stoves proposed to be promoted under GEF**
Technological front	a. The open stoves were not as efficient as proposed improved stoves that range between 18-20%. b. The open stoves have no ability to regulate the combustion process and hence reduced efficiency. c. Cooking pots only sit on three stones and hence not responsive	a. The proposed improved stove designs for cooking and stoves are based on Aprovecho technology customized to Timor-Leste with efficiency greater than 40%. b. The proposed stove is not only smokeless but also has the provision to regulate the combustion processes rendering higher efficiency. c. The improved stoves come with a pot hole that can fit various pot sizes.

	to the needs of the beneficiaries	
Implementation Modality	a. The traditional program often are not mainstreamed at the national level and died down due to lack of funding support. b. The market drives for the improved stoves are often limited due to freely available woodlots with low opportunity cost.	a. Considering the increased usage of fuel-wood mainly by the rural population and to provide alternative livelihood, it is intended to mainstream the fuel supply and utilization following strategies proposed in the ProDoc. b. Promotion of improved stoves will be a national program and will cover all 13 districts with their own production centers, that will also address policy, institutional, technology development & support, partnerships with local fabricators/technicians, community mobilization through Farmer Managed Agroforestry Groups, NGOs, SEFOPE/IADE's Business training program as well as awareness raising and knowledge management. c. Need for improved stoves have become more urgent as other alternative sources like LPG has not only become expensive but less available in the small Timorese market. People are also requiring traveling longer distances to get fuel wood and water.
Financing Modality	a. Traditional marketing strategy were supply driven and were provided at free of cost. b. Sense of ownership was not inculcated into the mind set with poor overall buy in.	a. The use of graduated startup subsidy seeks to stimulate the nascent market to reach a tipping point by mitigating the initial supply and demand risks. b. Since the subsidy is not given out 100% free, there will be a strong sense of ownership that will ensure the sustainability of the technology and benefits.
Capacity Building	a. Often the capacity development at the community level to operate and maintain the improved stoves is not in place. b. Local fabricators/distributors were not empowered nor engaged in the implementation of the program	a. The project plans to establish a capacity development mechanism through inclusive business training where the poor, youth and women will be empowered to participate as suppliers, producers, distributors or well-informed end users along the value chain across the country where learners are the residents of the communities. b. The project will work in partnership with the local fabricators and distributors.

Responses to STAP Comments:

Comment	Response	Reference
1. Rationale for the bioenergy technologies: There is a need to consider criteria for selecting the bioenergy technologies for intervention. The criteria could include - suitability of the technology for the identified need and scale of application, robustness of the design, installation and operational costs, cost-effectiveness, and the availability of sustainable biomass. The main needs for bioenergy technologies would include - cooking, lighting and small-scale industrial applications. There is a need to address all three services. The PIF discusses extensively the lack of access to electricity in rural areas. It is not clear which technology will be used for generating electricity for decentralized application in rural areas. Two potential technologies include - firstly, small-scale biomass gasifiers with installed capacity of 20-500 kW; secondly, biogas-based power generation of capacity 5-10 kW, based on cattle waste and possibly leaf litter. There is lot of experience using these two technologies for power generation.	The selections of the bioenergy technology for the provision of cooking, lighting and industrial use are based on: suitability of the technology for the identified need (user friendliness, acceptability) and opportunity for up-scaling (incentivize women to create demand to reduce supply risks, youth participation, available skills and local materials); robustness of the design (room for improvement, standard, certification and label); installation and operational costs (minimize downtime); cost-effectiveness (affordability, bulk order/purchase to lower input cost/prices), the availability of sustainable biomass (farmer managed agroforestry for securing food and bioenergy access) and protection of the natural resources. As government is embarking on an ambitious electrification program, consultation with SSE had advised that the GEF project should focus on scaling up of improved cook stoves to set the pathway for access to modern energy services, After much deliberation, SSE is of the view that small-scale biomass gasification is not ready for demonstration yet in Timor-Leste.	ProDoc: Section 2
2. Baseline: There is a need for developing a good baseline project scenario with respect to BETs that are being currently propagated, availability and use of fuel wood, rates of forest loss and afforestation programs, CO2 emissions from any non-sustainable use of biomass. 92% of all primary energy inputs in Timor-Leste are from biomass. However, there is a need to explore the suitability of other RE technologies also. Is biomass currently extracted sustainably or non-sustainably? What is the efficiency of use of biomass for cooking?	The baseline scenarios has been analyzed in detail and described in the ProDoc: 90% of the household still rely on fuel wood for cooking; current cook stove programs are restricted to several districts which are ready for nationwide scaling up; still ample fuel wood in the rural areas but stocks are becoming critical in some large cities like Dili; latest satellite study revealed an alarming high deforestation rate of 1.73%; afforestation programs needs critical technical and business support; high CO2 emissions from non-sustainable use of biomass from open fires and inefficient stoves (range between 10 to 25%).	ProDoc: Page 26
3. Barrier analysis: The PIF states policy and institutional support will address institutional and policy related barriers to bio-energy. However, STAP recommends a systematic assessment and ranking of the barriers so that interventions could be targeted.	Barriers have been identified, categorized and used in prioritizing interventions within the Project.	ProDoc: Page 26
4. Biomass production: According to FAO, Timor-Leste is losing 1.16% of forests annually or 11,200 ha per year during 1990-2010. The area under plantations has remained stable at 43,000 ha during the	Based on GEFSEC recommendations, and in consultations with GoTL, this project will only focus on improving demand side management to reduce demand for non-renewable biomass and will collaborate with other development partners (e.g. Mercy Corps, JICA,	

period 2000 to 2010. This indicates no new afforestation programs occurred in the country. What are the barriers to expanding afforestation? The PIF had not assessed and included the biomass production component. STAP recommends significant scale intervention on raising new plantations to supply fuel wood for cooking and feedstock for biomass gasification for power generation.	World Vision) who work on the supply side through agroforestry programme.	
5. Briquetting: The end use of the briquettes is not clear. What is the rationale for briquetting?	As recommended by GEFSEC and in consultation with the GoTL, the activity on briquetting has been deleted.	
6. Demonstration of technologies: Which technologies will be demonstrated?	A detailed survey of industries requiring biomass energy technologies (BETs) as well as assessments of various BETs has been conducted during the PPG stage. In discussion with SSE during PPG, SSE recommended that the GEF project should focus on the scaling up of improved cook stoves. SSE reiterated that Timor-Leste is not in a position to demonstrate gasification of biomass for off grid electricity generation.	ProDoc: Section 2 and Output 2.3
7. Source of technology or technology transfer: It is not clear whether the designs required are already available in Timor-Leste? If not, where will the technology be sourced? There is a need for a plan for technology transfer.	New (modern and efficient) stoves will indeed be introduced. The project also goes beyond demonstration as it is planned to disseminate around 20,000 cook stoves nationwide during the Project period. An appropriate and effective market mechanism is required to successfully implement this. A suggested market mechanism for the promotion and uptake of the stoves has been devised.	ProDoc: Section 2.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS

A. EXPLAIN IF THE PPG OBJECTIVE HAS BEEN ACHIEVED THROUGH THE PPG ACTIVITIES UNDERTAKEN.

The PPG objective of formulating detailed Project Document has been achieved. The project formulation was done through consultations involving a range of stakeholders from the two main implementing ministries, namely, the Ministry of Public Works (State Secretariat for Electricity) and the Ministry of Agriculture and Fisheries, support agencies such as the Ministry of Commerce, Industry and Environment and donors like UNDP and development partners. Consultative activities were taken up through individual interviews with stakeholders and workshop (Problem/solution analysis and Log frame Workshop). A baseline study to assess the type of wood stoves used in rural households and institutions as well as an industries survey contributed to the project design with vital information on identification of a menu of improved stoves, GHG calculations and on identifying institutional arrangements, especially at the district and community level.

B. DESCRIBE FINDINGS THAT MIGHT AFFECT THE PROJECT DESIGN OR ANY CONCERNS ON PROJECT IMPLEMENTATION, IF ANY:

The following concerns were encountered during the project design and development:

- Concerns related to implementation capacity at local levels due to the lack of presence of relevant NGOs in all districts and limited capacity of district/sub-district administrations were discussed during the project formulation. Remoteness of settlements and poor road connectivity further added to this concern. However, in addition to existing structures of NGOs at district and sub-district levels, the SSE received positive feedback from the Business mentoring training sector (IADE/SEFOPE) as a strong potential partner for stove distribution at the local level. In addition, the capacity of the Renewable Energy Division of the SSE is to be strengthened following a recent upgrade of the division to an independent Department of Renewable Energy.

- The SSE, expressed concerns about the social and cultural acceptability of improved stoves in relation to the roles of smokes and their user friendliness in the Timorese households. Taking into account the varying design needs for different cultural/ethnic backgrounds, it is critical that the role of smoke must be taken into account in the design and dissemination program.

C. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES AND THEIR IMPLEMENTATION STATUS IN THE TABLE BELOW:

Project Preparation Activities	*Implementation Status*	*GEF Amount ($)*				*Co-financing ($)*
		Amount Approved	*Amount Spent to date*	*Amount Committed*	*Uncommitted Amount**	
Collection and analysis of baseline data including comparative review of other countries under similar conditions and circumstances	Completed	10,000	10,000			10,000
Review of experiences in Timor-Leste	Completed	15,000	10,000	5,000		30,000

Project Preparation Activities	*Implementation Status*	*GEF Amount ($)*				*Co-financing ($)*
		Amount Approved	*Amount Spent to date*	*Amount Committed*	*Uncommitted Amount**	
and other countries of the following: - Application of biomass energy technologies for household use and productive use for income generation activities; - Domestic and artisanal production of energy efficient industrial furnaces/kilns, cook stoves, biogas plants, biomass briquetting, including operations and performance (technical, economic, social data) - Farmers managed agroforestry biomass production and management, including the setting of sustainability criteria, safeguards and the certification of production - Area/community-based energy needs assessment and planning						
Conduct a Logical Framework Analysis (LFA) to define project goal, objectives, outcomes, outputs and activities, including success indicators as well as delineation of responsibilities and coordination mechanisms	Completed	10,000	10,000	0		5,000
Stakeholder engagement, capacity needs assessment of key local implementing partners and co-financing	Completed	5,000	5,000	0		10,000
Detailed design of project implementation plan	Completed	15,000	15,000	0		5,000
Preparation and finalization of the full-sized Project Document	Completed	0	0	0		11,500
Total		**55,000**	**55,000**	**0**		**71,500**

*Any uncommitted amounts should be returned to the GEF Trust Fund. This is not a physical transfer of money, but achieved through reporting and netting out from disbursement request to Trustee. Please indicate expected date of refund transaction to Trustee. N/A

ANNEX D: CALENDAR OF EXPECTED REFLOWS

Provide a calendar of expected reflows to the GEF Trust Fund or to your Agency (and/or revolving fund that will be set up) – No financing schemes

United Nations Development Programme
Country: Timor-Leste

PROJECT DOCUMENT

Project Title: Promoting Sustainable Bio-energy Production from Biomass (SBEPB) in Timor-Leste

UNDAF Outcome(s): By 2012, national capacity for environmental sustainability and disaster management strengthened (MDG 7)
UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Expanding access to environmental and energy services for the poor
UNDP Strategic Plan Secondary Outcome: Strengthened national capacities to mainstream environment and energy concerns into national development plans and implementation systems; and Countries develop and use market mechanisms to support environmental management
Expected CP Outcome(s): 3. Access to sustainable energy and livelihoods for remote sucos (sub-districts/blocks) improved
Expected CPAP Output (s):
3.1: Adequate policies on renewable energy in place, strong institutional linkages established, and knowledge, awareness and capacities of stakeholders improved (policy makers, financiers, suppliers and end-users);
3.2: Effective and affordable renewable/alternative energy technologies for remote Sucos supported through demonstration projects and private sector participation.

Executing Entity/Implementing Partner: The Government of Timor-Leste, Ministry of Public Works (State Secretary of Electricity)

Implementing Entity/Responsible Partners: United Nations Development Programme

The Promoting Sustainable Bio-energy Production from Biomass (SBEPB) Project is a four-year program contributing to the reduction of greenhouse emissions through removal of barriers to sustainable production and utilization of biomass resources in Timor-Leste and application of biomass energy technologies to support local economic, environmental and social development.
The objective of the Project will be achieved through enhancing the capacity of all relevant public and private stakeholders, developing policy and legal bioenergy frameworks for the promotion of energy efficient and low carbon end-use appliances and scaling up of 20,000 improved cook stoves (ICS) in the country. The project will assist the Government of Timor-Leste in mainstreaming sustainable biomass energy in policy formulation and consequently help in mitigating the national emission of greenhouse gases resulting from deforestation and the use of non-renewable biomass. The Project will help to increase Timor-Leste's access to clean bioenergy and also create employment through inclusive businesses.

Programme Period:	2014 -2018
Award ID:	00077146
Project ID:	00088130
PIMS #	4250
Start date:	May 2014
End Date	May 2018
Management Arrangements	DIM
PAC Meeting Date	

Total resources required (total project fund)		$8,393,000
Total allocated resources (UNDP managed funds)		$770,000
- Regular (UNDP TRAC)		$620,000
- UNDP (Social Business)		$150,000
- GEF		$1,743,000
Other (partner managed sources)		
• Government (cash)		$4,200,000
• Government (In-kind)		$1,310,000
• Mercy Corps		$210,000
• Startec	$100,000	
• Haburas (in-kind)	$60,000	

Agreed by (Government): _____
Date/Month/Year

Agreed by (Executing Entity/Implementing Partner): _____
Date/Month/Year

Agreed by (UNDP): _____
Date/Month/Year

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Abbreviations and Acronyms

AA	Administrative Agent
AusAID	Australia Government's overseas aid program
BOSS	Business Opportunities and Support Services
CTDC	Cook stove Testing and Development Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DDC	District Development Commission
DIT	Dili Institute of Technology
EDTL	Electricidade de Timor-Leste
EU	European Union
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GoTL	Government of Timor Leste
GWh	Gigawatt hours
Hivos	Humanist Institute for Cooperation with Developing Countries
IADE	Institute of Business Development (Portuguese acronym IADE)
ICS	Improved cook stove
ILO	International Labor Organization
INFUSE	Inclusive Finance for Underserved Economy
IWDA	International Women's Development Agency
kW	Kilowatts
kVA	Kilovolts ampere
LoA	Letter of Agreement
LPG	Liquefied Petroleum Gas
MCIE	Ministry of Commerce, Industry and Environment (former MED)
MAF	Ministry of Agriculture and Fisheries
MED	Ministry of Economy and Development (now MCIE)
MoF	Ministry of Finance
MoI	Ministry of Infrastructure (now MPW)
MPW	Ministry of Public Works (former MoI)
MW	Megawatts
NDF	National Directorate for Forestry
NDL	National Directorate for Livestock
PREDP	Participatory Rural Energy Development Programme
SDP	Strategic Development Plan
SEAPRI	The State Secretary for Support and Promotion of the Private Sector
SEPFOPE	Secretariat of State for Professional Training and Employment (Portuguese acronym)
SoS	Secretary of State
SSE	State Secretariat for Electricity (formerly SEPE)
SEPE	Secretaria de Estado da Política Energética (replaced by SSE)
tCO2e	Tons carbon dioxide equivalent
TOE	Tons oil equivalent
UNCDF	UN Capital Development Fund
UNDP	UN Development Programme
UNICEF	UN Children Fund
UNMIT	UN Integrated Mission in Timor-Leste
USD	United States Dollar
WATL	Water Aid Timor-Leste
WB	World Bank
WFP	World Food Programme

1. SITUATION ANALYSIS

1.1 Introduction to Timor-Leste

Timor-Leste is a least developed country with a growing population that remains largely dependent upon subsistence agriculture. According to the Human Development Report 2013, the country is placed 134th out 187 on the Human Development Index (HDI), with a score of 0.576 the lowest among ASEAN countries, with about 68.1 % of the population living in multidimensional poverty and additional 18.2 % vulnerable to multiple deprivations (UNDP 2013)1. In other words, six out of every seven citizens face major obstacles to improve their lives and many rural communities live in remote and inaccessible areas often with only partial access to services. In addition, the country has a large young population—about 46% are under age 15, and many do not have a basic education and experience high rates of unemployment 23.9%[2].

Figure 1: Map of Timor-Leste with administrative boundaries and district names

Since independence from Indonesia a decade ago the country has made significant progress in establishing a functioning government and public service, as well as a political system with the ability to reflect the wider needs of society within a democratic framework and system of values. The country has a multi-party political system, a growing NGO sector, a free and independent press and a government that recognizes that its legitimacy is based on openness, accountability and

[1] UNDP, Human Development Report 2013
[2] Census 2010, Timor-Leste

transparency. Timor-Leste has recently launched a "Transparency in the Government" initiative, recognizing the risks that have encumbered other natural resource rich developing nations. The country has also been rapidly moving towards increased administrative and fiscal decentralization with its 13 Districts and 65 Sub-districts. The smallest administrative division in Timor-Leste is the suco (village), which can comprise one or many aldeias (hamlets). There are total 442 *sucos* and 2,228 *aldeias*. The national capital is Dili where the majority (20%) of the population is concentrated. The recent Presidential and Parliamentary elections (2012) have been peaceful and fair and the new Government has a large extend promised continuity of development policies, including further decentralization and a focus on rural poverty reduction.

The international community continues to provide substantial support to the country recognizing that sustained engagement as this early stage in national development and nation building provides the best opportunity for ensuring long term and sustainable peace, security and prosperity.

1.2 Rationale for Intervention

The challenge for Timor-Leste is to pursue economic development without creating additional burdens on natural resources thereby preserving ecosystems that are critical to maintaining the quality of life and providing environmental services to society. The country is rich in diversified natural forests with a forest cover of nearly 58% of total land area (14,900 square km) of the country. According to FAO, Timor-Leste is losing 1.16% of forests annually or 11,200 ha per year during 1990-2010. The area under plantations has remained stable at 43,000 ha during the period from 2000 to 2010. However, the latest forestry survey conducted by Japan's Aid[3] reported that the annual deforestation rate between 2003 and 2010 is estimated at 1.73% that is much higher than the prediction of FAO. Assuming this alarming trend persisted in the following decades, 17.3% of the forests in the country would have disappeared in 2021 and all forests would have disappeared by 2071. Natural resources play a pivotal role in the lives of people in the Timor-Leste with 75% of the population (140,635) living in rural areas and over 70% employed by the agriculture and forestry sector. The Strategic Development Plan 2011–2030 commits to establishing inclusive development, while the Program of the Fifth Constitutional Government (2012-2017) has set a goal of creating opportunities for all in a fair and inclusive manner. As the Timorese government aspires to transform from subsistence agriculture into a productive and market economy, safeguards must be in place to avoid creating ever increasing economic development and demographic pressure on the natural resource base.

A report on the urban, peri-urban and urban associated rural areas of Timor-Leste is currently on the brink of a large-scale fuel poverty crisis. Internal migration to urban areas (specifically the capital Dili), poor enforcement of legislation and widespread poverty are some of the main contributing factors to fuel poverty and degraded natural resources. These trends are rapidly heading towards a state where over-extraction and insufficient re-planting of trees is threatening both people's ability to afford fuel wood for cooking and their ability to easily attain it in other ways. Coupled with this humanitarian issue, the deforestation and forest degradation that occur as a symptom of people's reliance on wood fuel (+90% of the population) is threatening the sustainability of the natural environment and its ability to perform ecological services in and around Dili.

During the Portuguese time, up to 1975, forests were relatively in good condition. During the Indonesian occupation, there were good forestry programs but military operation, illegal logging, and other over exploitation of forest resources contributed to rapid deforestation in Timor-Leste. After independence, deforestation became worse. Pressure on forests became even more acute as

[3] *Japan's Grant Aid for the Forest Preservation Program in the Democratic Republic of Timor Leste*

firewood collection intensified due to high kerosene price (which is not subsidized) and lack of alternative fuel for cooking. Kerosene stove used to be widely used during the Indonesian time due to low kerosene price and regular supply. Firewood collections become a source of livelihood for many poor families who cannot find meaningful alternative work. There is also pressure from wild fire especially during the dry periods and from people moving back to their ancestral lands. Recently, infrastructure development such as road opening and installation of electrical poles also contributed to clearing up of forests.

The impact of natural resources degradation (forest, habitat, land, water, soil and biodiversity), their causes and underlying root causes are summarized in Table 1.

Main causes of forest and land degradation in Timor-Leste are:

1. Deforestation
   - Harvesting of the country's most valuable tree species, notably sandalwood, ebony and redwood
   - Intensive cutting of trees for firewood.
2. Inappropriate agricultural practices
   - Primarily a problem in dry land farming where vegetables are grown on steep slopes without any soil conservation measures.
   - Shifting cultivation; using slash & burn techniques in upland areas.
3. Forest fires
   - Recurring wildfires on grass-covered mountain slopes
   - Fires deliberately reducing grass growth for grazing as well as to aid in hunting.
4. Over-grazing
   - Grazing animals, especially goats, roam freely through public "rangelands", rather than being "stall fed" on collected fodder.
   - Introduction and spreading of invasive weed species.
   - Destruction of vegetation, compaction of soils, loss of soil moisture and organic matter, soil erosion from wind and water run-off.
5. Demographic pressures
   - With increasing population pressure and lack of alternative opportunity, forest encroachment for forest products become the only source of rural income.

Impact of Forest and Land degradation	Causes of Forest and Land Degradation	Underlying causes
Forest and watershed degradation – 1.73%/year	Deforestation and illegal logging of important tree species	Poverty
Soil degradation and Sedimentation of waterways	Shifting cultivation	Demographic pressures
Weed invasion e.g. Eucalyptus	Uncontrolled grazing	Ineffective law enforcement
Increased water shortages – spend longer time in collection	Forest fire and slash and burn activities	**Lack of access to alternative biofuel and bioenergy solutions**
High emissions of GHG	Firewood collection including fragile mangrove species	

Table 1: Impact and Underlying Causes of Forest and Land Degradation in Timor-Leste

To contribute to addressing the above problem, the Sustainable Bioenergy Production from Biomass (SBEPB) Project with the support of the Global Environment Facility (GEF), the Government of Timor-Leste (GoTL) the United Nations Development Programme (UNDP) and other funding partners will focus on the promotion and use of biomass energy resources for the provision of energy access and services in rural areas. Overall, the Project is expected to result in a reduction of annual biomass/fuel wood consumption in Timor-Leste through the gradual utilization of biomass-based energy systems and efficiency improvements in the rural areas of the country as influenced by the Project. The Project will facilitate the widespread application of biomass-based energy systems, particularly for economic and social uses in the country's rural areas. The reduction of GHG emissions through the use of more efficient fuel wood technologies and sustainable biomass energy generation in the country will contribute to global GHG emission reductions.

The implementation of the Project will benefit the country in terms of the following:

i. Economic benefits:

- Energy, fuel wood and expenditure savings through certified, standards and labeled energy efficient appliances
- Access for people living in rural areas in Timor-Leste to alternative less polluting and efficiently produced energy
- Increase in investments in the green energy value chain (cottage industry, food processing) facilitated by an established Centre of Excellence equipped with local champions and social entrepreneurs
- Empowered local MFI for developing affordable energy loan products and services

ii. Environmental benefits:

- GHG emission reductions
- Establishment/supplementing of Farmer Managed Agroforestry to provide a sustainable supply of fuel wood to villagers and peri urban end users
- Reduced deforestation with benefits for improved biodiversity

iii. Social benefits:

- Employment generation at the community level through the empowerment of women and youth as social entrepreneurs to participate as value chain actors through inclusive business and startup grant
- Productive uses of energy and business resilience to changing climate
- Reduction of health hazards
- Time savings, in particular, for women and children from collection of fuel wood, leading to more productive use of their time and contribute to MDG goals.

1.3 Energy Situation in Timor-Leste

Timor-Leste imports all of its fossil fuels at world-market prices, primarily diesel, gasoline, LPG and kerosene. About 35% of households in the country do not have access to electricity. Although 24 hour electricity is available in the 13 districts, unreliable supply and frequent outages remains a challenge.

I. Energy Supply Situation

The power sector in Timor-Leste is composed of 2 mains power plant namely Hera (6 x 17.5 MW) and Betano (7 x 17.5 MW) that is going to be inaugurated in August 2013. The national transmission line (150 kVA) has been connected throughout the country to the 10 substations to deliver the power to the community. All districts and 44 sub-districts have been electrified and the remaining 18 sub-district will be electrified within 2013-2014 so that all community have accessed to 24 hours electricity[4].

II. Renewable Energy Policies

The Government has set its energy policy that is based on the search for alternative renewable energy sources to secure the necessary energy for domestic and industrial use and with the protection of the environment. The Government policies related to renewable energy are:

- Reduction of energy dependency and minimizing energy imports through the use of alternative and renewable energy sources such as hydro power, biomass, biogas, solar energy, turbines and wind turbines
- Regulation of the use of renewable energy sources thus contributing to the standardization and integration of different projects currently being implemented in Timor-Leste
- Supply of energy to communities in remote areas
- Safeguarding of the country's energy wealth for future generations by defining and preserving "mandatory energy reserves" both from renewable and non-renewable sources
- Drafting of appropriate regulations so that national operators may play a relevant role in the exploration of Timor-Leste's energy resources
- Development of balanced safety standards to ensure the continuous exploration, production and supply of energy resources
- Development and conduct of training programs for both operators and consumers, and promotion of the use of more environment-friendly energy sources

III. Energy Demand Situation

Energy poverty is a major driver of Timor-Leste's overall poverty cycle. Impacting a number of cross-cutting issues, energy poverty generates ill-health and environmental degradation, and limits economic growth where it is needed most. In addition, it contributes to poor education and gender inequities. The majority of Timorese households depend on kerosene and candles for lighting, the high and fluctuating price of which is a huge burden on families' limited income, and prohibitively expensive for the very poorest families meaning many have no light source after dark. As detailed in the feasibility study for this action, the average target household earns approximately $40 per month. Based on data from Mercy Corps' 2009 energy poverty study[5], families would need to spend between $15 and $20 on kerosene to fully meet their monthly lighting needs, which would consume roughly 35-50% of household monthly income. In practice the majority of families only spend up to $10 per month on kerosene and candles because it is all they can afford. This means that approximately 50% of their lighting needs are currently unmet.

Energy demand in Timor-Leste was growing by about 11% each year in 2010, with total consumption in the country at 392,466 TOE. According to a 2010 Census, 90% of people use inefficient, open, wood-fuelled fires for cooking and heat. The main source of primary energy consumed in Timor-Leste is fuel wood. The country consumed around 724 thousand tons (or 232 kTOE) of fuel wood, which accounted for 59.1% of the total energy consumption (Table 2). Fuel wood is mainly used in the residential sector for cooking and to some degree, in cottage industry such as bakeries, salt and tofu/tempe making. At the household level, energy is provided primarily from non-renewable energy sources. Firewood is the primary energy source for cooking. According to Mercy Corps's study in

4 Secretary of State for Electricity
5 Mercy Corps, 2009 Energy Poverty Assessment Timor-Leste

2011[6] on average, households use 9.3 kg of firewood per day. Multiplying this number with the number of households that report they use firewood for cooking (165,423 households), it can be estimated that as much as 561,528 tons of firewood is being consumed for household cooking in 2010. This amount is roughly equal to 179,792 tons of oil equivalent (TOE).

District	Total Population	Area (Sq. km)	Population Density	House-holds	% household that use firewood	Fire wood (t/yr)	TOE	tCO2-eq/yr
TIMOR-LESTE	**1,066,409**	**14,954**	**71**	**184,652**	**89.9**	**562,681**	**611,557**	**912,669**
AINARO	59,175	869.79	68	9,664	95.1	31,197	**33,907**	50,602
AILEU	44,325	676.02	66	6,965	95.1	22,484	**24,437**	36,469
BAUCAU	111,694	1,507.95	74	21,255	95.0	68,543	**74,496**	111,176
BOBONARO	92,049	1,380.82	67	16,883	95.4	54,673	**59,422**	88,680
COVALIMA	59,455	1,206.66	49	11,105	95.0	35,811	**38,922**	58,086
DILI	234,026	368.12	636	35,224	68.0	81,306	**88,369**	131,879
ERMERA	117,064	770.83	152	19,280	95.0	62,174	**67,574**	100,846
LIQUIÇA	63,403	550.95	115	10,351	95.0	33,380	**36,279**	54,142
LAUTEM	59,787	1,813.11	33	11,447	93.6	36,370	**39,529**	58,992
MANUFAHI	48,628	1,326.60	37	7,856	93.4	24,907	**27,071**	40,399
MANATUTO	42,742	1,785.96	24	6,925	95.2	22,379	**24,322**	36,298
OECUSSI	64,025	817.23	78	13,890	95.3	44,934	**48,837**	72,882
VIQUEQUE	70,036	1,880.39	37	13,807	95.0	44,524	**48,392**	72,219

Table 2: **Household energy consumption in Timor-Leste (National Directorate of Statistics, Census, 2010)**

Other energy sources for cooking include kerosene, LPG and limited use of other types such as used oil and charcoal. Table 3 shows estimate of energy consumption mix for fuel wood, kerosene and LPG for cooking in Timor-Leste in 2010.

Type of fuel	Consumption (Kton)	TOE
Kerosene[1]	0.971	0.311
LPG[1]	0.277	0.089
Firewood[2]	561,528	179,937

Table 3: Timor-Leste Energy Consumption Mix for Cooking (2010)

The impacts of electricity non-availability on families in Timor-Leste that use wood as fuel include:

- Night time hours are unavailable for activities including school homework, fishing net repair, craft production and general income generation
- Female household members spend as much as two days a week sourcing fuel wood;
- Deforested hillsides lead to landslides and general land degradation
- Increased cases of respiratory illnesses and general ill health as a result of smoke exposure
- The high and variable cost and availability of kerosene and purchased wood for low-income families is particularly damaging for income and food security
- Access to communications and information is reduced

Mercy Corps' 2009 energy poverty study assessed a representative sample of community energy use patterns, access to electricity, models for sustainable energy solutions, and existence and outreach of

[6]Mercy Corp, 2010s Baseline household energy survey – EU's E4A,

sustainable energy solutions providers. The study identified that the most essential energy needs among these households are for lighting and cooking, and that off-grid households pay more for energy than those who have access to electricity networks or can afford more efficient stoves, contributing to the expanding gap between the urban and rural populations.

The energy poverty study also showed that while several actors, including the Government, NGOs, and the private sector, have been involved in small, isolated pilot alternative energy projects in Timor-Leste, few of these projects have proven to be sustainable. The biggest problems have been insufficient community mobilization around broader energy-use patterns, a failure to train community members responsible for maintaining the systems, and a failure to link communities with the service providers and financial support that would make the model replicable on a meaningful scale.

IV. Energy Demand Projections

Martifer report (2010)[7] estimated that the consumption of electricity in Timor-Leste will be four times higher by 2020, rising from the current 160 GWh to 800 GWh. This increase is mainly driven by the increase in the population growth and improved disposable income. Renewable energy will be seen as an important source in meeting this demand. The Secretary of State for Electricity (SSE) has identified more than 450 MW of potential renewable energy projects divided into the following technologies: Hydro (run-of-river and regularization): 252 MW; pumping Hydro: 100 MW; Wind: 72 MW; Solar: 22 MW; and Biomass / Solid Waste: 6 MW.

V. Biomass Supply Potentials

Fuel wood is expected to remain the largest share of the total energy consumption mix in the near future, possibly followed by electricity, diesel, petrol, LPG and kerosene. Fuel wood will most likely continue to be the main source of biomass used for cooking in the future. The Japan Aid's survey estimated Timor-Leste's total existing Carbon Stock (C-stock) in the forest to be 89,534,909 tons. The availability of firewood from the country's forests should be understood within the context of rapid deforestation that the country is experiencing.

In addition to firewood, other types of biomass resources are present in the country like (1) crop residues, (2) animal dung and (3) municipal solid waste. The crop residues are a large biomass resource especially in the countryside where they are produced as by-products from harvesting and processing of agricultural crops. The main crops grown widely throughout the country are paddy and maize. Other biomass sources, such as municipal solid waste (MSW) and animal dung share a small part of total biomass energy potential in Timor-Leste.

Table 4 presents the potential of major biomass resources in Timor-Leste. There is limited potential to exploit these resources as these are disaggregated and logistic cost is prohibitive given the diverse terrain.

VI. Forest Conservation and Reforestation Programme

To arrest the deforestation rate of 1.73%, the Japan Aid's survey has recommended the Forestry Conservation and Management Plan (2014-2017) to the GoTL with the following aims:

- To protect about 73% of dense forests in the country;
- To grant more than 53% of the villages located in and around the critical forests the long term land use or forest management rights by 2023; and
- To manage major parts of the forests in at least 5 critically degraded watersheds in a proper and sustainable manner by 2023.

[7] Plano de Electrificação de Timor-Leste Com Base em Energias Renovaveis, 2010

Crop	Year	Timor Leste Production (t/yr)	Potential biomass production (t/year)	Maximum energy value (GJ/year)
Rice	2007	60,424	19,940	287,574
	2008	80,257	26,485	381,966
	2009	120,775	39,856	574,802
straws	2010	112,925	37,265	537,435
Rice husks	2007	60,424	13,293	195,407
	2008	80,257	17,657	259,558
	2009	120,775	26,571	390,593
	2010	112,925	24,844	365,206
Maize	2007	71,526	14,305	210,286
	2008	100,173	20,035	294,508
	2009	134,715	26,943	396,062
Stovers	2010	148,891	29,778	437,739
Cassava	2007	41,212	2,555	37,561
	2008	35,532	2,203	32,384
	2009	37,301	2,313	33,996
Stalks	2010	27,857	1,727	25,389
Coconut	2007	8,520	1,022	18,403
	2008	8,760	1,051	18,922
	2009	8,740	1,049	18,878
Shells	2010	8,940	1,073	19,310
Coconut	2007	8,520	3,570	49,978
	2008	8,760	3,670	51,386
	2009	8,740	3,662	51,269
Husks	2010	8,940	3,746	52,442
Coffee	2007	12,786	26,851	375,908
	2008	14,009	29,419	411,865
	2009	10,206	21,433	300,056
Husks	2010	12,800	26,880	376,320

Table 4: Potential biomass supply in Timor-Leste

The 5 programs proposed under the plan are:

1. Institutional Development Program: Establishment of policy and legislative framework on forestry sector; Development of systems and procedures for forest conservation; Development of the capacities of the staff of NDF/MAF; Creation of a New Department or Taskforce Team for Community Forestry
2. Forest Management Planning Program: District Forest Management Planning; National Forest Management Planning; Watershed Management Planning for the Critically Degraded Watershed.
3. Forest Conservation Program: Introduction and Promotion of a Simple Community Based Forestry Management Approach (CBFM); Allocation of CFMA; Collaborative Management of Protected Areas and Demarcation of CF/CFMA forest and protected areas.
4. Reforestation Program: Seedling Production; Community-Based Reforestation; Contractual Reforestation; Expansion of fruit and industrial tree plantation
5. Agricultural and Livelihood Extension Program: Sloping Agricultural techniques; Rehabilitation of aged coffee plantations; Livestock Management; Livelihood Development and Introduction of alternative rural energy

This GEF project could support the National Directorate of Forestry (NDF) under the Ministry of Agriculture and Fisheries to add incremental value in greening up the reforestation and agricultural livelihood program through the promotion of micro-nursery, agroforestry and clean bioenergy solutions for securing energy and food access for the target community.

The Reforestation program under the NDF started in 2007 with the establishment of 6 Forestry Seed and Distribution Centers to promote community tree plantings in Liquica, Bobonaro, Oecussi, Lautem, Viqueque and Manufahi. Although all the Centers are still in operation, 5 are not operating in full capacity (producing about 15,000 seedlings per year) due to poor facility (broken and missing fence, lack of water, poor maintenance) and only the one in Liquica is working well and produces about 150,000 seedlings per year. These centers are managed by the District Forestry Officers (DFO) who supports the implementation and monitoring of the programs.

A recent (2013) survey by the Initial National Communication Project on the reforestation program reported of great enthusiasm among the participants with improving seedlings and saplings survival rate of more than 60% through agroforestry system. Some farmers are also economically motivated especially those that planted Mahogany, Gmelina and super teak or local teak that can command good prices.

The problems identified during the survey are:

- Lack of technical support and training in nursery and agroforestry management
- Lack of agricultural business support agent to provide products and services (seedlings, fertilizer and water) for link upstream and downstream value chain
- Lack of access to affordable credits (e.g. in-kind credit for inputs to be repaid at harvest is an effective way for agents to attract clients)
- Late arrival of seedlings - missing the rainy season
- Lack of transportation to take seedlings from Maubara nursery in Liquica to planting location (most of the farmers have very little income to arrange for their own transportation)

In addition to forest conservation and reforestation initiatives, the locals are also taking control to protect the forest and land through the introduction of the Tara Bandu by-laws that imposes fines on those who break the rules by burning, harvesting wood, and grazing on community protected forests.

VII. Agriculture and Livestock Sector

Agriculture is the main economic area in Timor-Leste. The farming techniques used in many parts of the country result in low yields. The low yields derive from poor and inadequate farming techniques, an unskilled workforce, small sized farm plots, (average land holding is 1.2 hectares), under developed local markets, poor rural road conditions and lack of access to credits. Moreover, climate and rain also have an impact on agricultural production. Arable lands in the country accounts only for 8.2% while 58% (869,130 ha) of the total land is covered by forests. The main agriculture products are coffee, rice, corn, sweet potatoes, soybeans, banana and coconuts.

In the Strategic Development Plan (2011–2030), the Government intends to move from subsistence agriculture to production agriculture and diversify and intensify agricultural production to develop an internal market and a marketable output, with a view to achieving food self-sufficiency. Livestock is an integral part of the Timorese farming system and support agriculture through the provision of manure and draught power. Main livestock are cattle and buffalos followed by horses and pigs. Some districts have high density of animals where as some has very less. On average there are about 3 animals (cattle and buffalos) per household. Most of the cattle/buffalos free grazing and very few are stabled. Cattle manure is used as fertilizer in the field however, transporting manure from yard to the far field is not common. Chemical fertilizer is being used in some places where cattle manure is not easily

available. There are cultural and traditional factors associated to animal farming and that certain animal carry a significant value and prestige. Cattle and pigs are considered high value animals thus treated as cash saving. The Government aims to support the development of small- and medium-sized business in this sector (producing meat, milk, butter and cheese) for internal consumption as well as export in the future.

The Government intends to develop the livestock sector by:

- Designing a development policy for animal farming and veterinary surveillance, revising existing and drafting new legislation for the sector,
- Improving veterinary services;
- Investing in reproduction and vaccination campaigns to increase the numbers of herds;
- Promoting training in animal production and veterinary science;
- Developing pastures and promoting agricultural research and information, thus contribution to the eradication of weeds that hamper the health of animals in natural pastures;
- Promoting the establishment of small- and medium-sized businesses in the sector.
- Biogas plants need to be seen as integral part of future farming and animal husbandry and cannot be isolated from questions such as national targets and state promotion for cattle breeding as well as human and animal health issues.

1.4 Situation Analysis on the Use of Cooking Stoves in Timor-Leste

Various baseline surveys to investigate and analyze the fuel wood utilization in stoves for cooking and other cultural uses in rural areas at the household level and in institutions have been conducted by Global Alliance on Clean Cookstove (GACC, 2012), EU's Energy for All (2011), World Bank (2010) and Hivos (2011).

The followings are a summary of the cook stove situation in Timor-Leste:

- Indoor Air Pollution (IAP) is caused mainly from using firewood with rudimentary cooking devices and from living in a smoky environment for perceived health and functional benefits
- While there is some awareness of IAP among the Government and NGOs, there is very low awareness in the general population
- Efficient cook stove and clean energy programs are still in the early pilot phase and face capacity and cultural challenges to become scalable and sustainable
- Consumer cooking habits and preferences vary based on urban and rural living as well as income levels; strong cultural attachment to smoke, abundant supply of firewood and high clean fuel costs create high barriers to switching from firewood
- The cook stove industry is in a very elementary stage with small scale clay cook stove producers in a few rural areas and a few steel electric and LPG stove importers in the larger cities

Mercy Corp's (2011) Baseline Assessment consisted of two main parts: a comprehensive household survey conducted for 570 households in the target areas; and 34 focus group discussions and key informant interviews, conducted with women, village leadership and farmers.

World Bank (2010) and Mercy Corps (2011) studies and the inventory data for First National Communication report have indicated that there is still abundant biomass supply in most parts of the country, except in the Dili district. Because of this abundance, fuel-wood is, and for some time to come will continue to be, the cheapest cooking fuel compared to liquefied petroleum gas (LPG), kerosene, and electricity, even after accounting for different cooking equipment efficiencies.

Despite of this abundance and the low opportunity cost for biomass utilization, the responsible policy for the GoTL to pursue must result in a reduction or eventual curtailment of household fuel-wood use. The rationale for this policy is based on:

i. The certainty that the current positive supply-demand balance will change in the future, with population growth and increased pressure on wood supplies as forest lands are converted to agriculture; and

ii. The adverse impacts to public health from indoor air pollution (IAP) associated with use of fuel-wood in traditional cook stoves.

A World Bank Country Environmental Analysis for Timor-Leste conducted in 2008 estimated that the mean annual morbidity and mortality cost of health effects from IAP associated with the use of solid fuels is between $5 million and $20 million. The mean estimate is equivalent to about 1.4% of Timor-Leste's gross national income, or 3.5% of GDP in 2006.

GACC (2011) report reiterates the urgent need for clean cook stove and fuel interventions to reduce IAP exposure as well as reduce the dependence on firewood as fuel:

- A clean cook stove alone may not be enough to reduce IAP exposure, the solution should be holistic to address uses of fire and smoke beyond cooking (i.e. lighting, repellent, drying, traditional practices) reduction in the very large amount of time spent cooking each day and greater ease of cooking, in particular benefiting women and girls;
- A clean cooking program should include an awareness program around the dangers of smoke and around the health, economic, and ecological benefits from clean cook stove
- Government may support a cook stove initiative that aligns with its targets, integrates with existing programs and does not over extend limited government resources
- Several clean cook stove projects were launched in 2011 by NGOs and UN agencies that could benefit from coordination to align goals and strategy, to share learning and avoid duplication of effort
- Consumer segments need to be understood in depth and solutions should be tailored for each segment's needs and access to technology
- Developing a sustainable and scalable clean cook stoves and fuels industry is a long term effort and will require a commitment of 10-15 years

Compared with non-sustainable fuel wood, modern fuels, including LPG and kerosene, have lower emissions and are more convenient and cleaner to handle. It is almost inevitable that demand for modern fuels, particularly LPG, will increase dramatically in Timor-Leste in the coming years, as economic conditions improve and a middle class emerges and expands (GACC, 2011). Most developing countries favor this modernization outcome and adopt policies to accelerate the transition from fuel-wood to modern fuels.

Although Timor-Leste is well endowed with natural gas, world experiences can show the GoTL that if the price of LPG or kerosene fuel should be subsidized directly, the negative consequences could be: (a) possible diversion of the fuel for non-cooking uses, such as transport, can occur (this is more likely to happen with kerosene than LPG); (b) possible smuggling and sale of the fuel outside of the country; (c) difficulties in limiting benefits to low-income households or crafts and professions; and, most important of all, (d) the subsidy burden to the Government is likely to become unmanageable in the future. As shown worldwide, 'addiction to subsidy' can be extremely difficult to withdraw or even reduce once they become critical to consumer choices for fuel use (e.g. Nigeria, Indonesia). Furthermore, subsidy can distort the market and crowd out private sector participation whilst deterring end users to pay the full market price.

It is often more effective, with fewer undesirable side effects, to subsidize access rather than consumption. Subsidizing bioenergy access calls for programs that part subsidize the equipment or production system needed for early movers and adopters to cause a 'tipping point' for making the fuel switch (e.g. new stove purchases, deposits for LPG cylinders, bio-digester, furnace), secure supply chains and facilitating fuel logistic and market support but keeping fuel prices at market levels. This will create a level playing field for new bioenergy solutions to compete fairly. The financial exposure of the Government for an equipment subsidy program can be determined annually in advance, unlike fuel subsidy programs that are entirely subject to the vagaries of fuel market fluctuations. The Government may terminate the equipment subsidy program at almost any time with minimal public inconvenience.

Micro-enterprises and cooperatives are in need of vital market research to orient products and services to the market. GACC (2011) has conducted based on the Census of 2010 and analysis on market segmentation based on household incomes, fuel for cooking and degree of exposure to indoor air pollution (IAP) in Timor-Leste. The market can be segmented into 5 categories:

i. Segment 1 Affluent: These consumers are in the top 1% of income level of more than USD 20,000 per year (about 2,000 of the total 184,000 households) and most currently utilize clean-burning LPG, kerosene, and electric cook stoves and their exposure to IAP are minimal. This group can afford higher priced products and fuels; no subsidy is needed as there is high willingness to pay for improved cook stoves and will switch if product provides financial or health benefits. But there is still possible perception issue with LPG safety.

ii. Segment 2 Urban Middle-Class: This group with annual income of USD 10,000 to 20,000 represents 8% of total 185,000 households (about 15,000 households) often hold down regular or semi-regular employment and are likely utilizing wood for current cooking needs but have the disposable income to purchase an improved solution. Their exposure to IAP is considered as moderate. These consumers could possibly afford higher priced products and fuels; no subsidy are needed as there is moderate willingness to pay but will switch if product provides financial or health benefits. Initial demand from this and the affluent group will help to generate critical mass for rapid urban and peri urban market growth and spur innovation that will contribute to reduction in production cost. But there is still perception issue with safety of LPG.

iii. Segment 3 Urban Poor: 12% of total households (about 22,000 households) are classed as urban poor (USD 5,000 per year) who are squeezed by rising living costs in urban centers. These consumers have very limited disposable income but do not face the same level of logistical and awareness issues as the rural poor. Most of these consumers cannot afford higher priced products and fuels and there is low willingness to pay but would switch if product provides very clear benefits in money or time saved. Hence some subsidy may be needed to influence coupled with strong awareness campaign on the benefits of clean technology.

iv. Segment 4 Rural Middle-Class: Benefiting from lower living costs in rural areas and often self-employed (USD 5,000 to 10,000 per year); these consumers have some disposable income but limited geographic access to cleaner fuels. These represent about 21% of total households (about 39,000 households) who can possibly afford higher priced products and fuels but with low willingness to pay and hence have significant exposure to IAP. They may switch if product provides very clear financial or health benefits, hence demonstrations and awareness campaign through radio, word of mouth and advertising will be very critical to spur demand and rural market growth. There is still perception issue with safety of LPG.

v. Segment 5 Rural Poor: Living below the poverty line and sometimes relying on subsistence farming for survival (< USD 5,000 per year), these consumers currently collect firewood and have higher financial and cultural barriers to a fuel switch. There are about 106,000 households that represent 58% of the total households with extreme exposure to IAP. These end users are unlikely to afford higher priced products and fuels with low willingness to pay hence some upfront subsidy will be needed with gradual reduction as the project progresses. There is a need for heavy investment in raising awareness to encourage the switch to cleaner technology to reduce exposure to IAP. This can be done through demonstrations using Women group to create local demand where their efforts will be rewarded through a voucher scheme. These will help to mitigate the supply/producer risk. Most of the poor do not have access to microcredit.

The impact on firewood consumption and harvesting is expected to be substantial. Mercy Corps (2011) report estimated an efficiency saving of 40% will result in 1,360 kg less firewood use per year for each stove-using household, reducing deforestation and the pressure on natural resources in target areas. The report suggested there are multiple reasons that women will be motivated to shift to using fuel efficient stoves, but in particular the practical benefits are likely to be among the strongest push-factors: greater ease of cooking was highlighted by 91% of current stove users; 64% of stove owners said reduced smoke was a benefit of the stove, and 55% said the stove was safer than using an open fire.

Other time-saving benefits will also be important, including less firewood use and associated chopping of firewood and firewood collection (though this latter is not considered a burden by women in Dili at least, as it is seen as a valuable social activity and welcome respite from household duties). The economic benefits of shifting to fuel-efficient stoves will likely be less important than the factors listed above, due to the very low number of households' currently purchasing firewood. The health benefits of fuel-efficient stoves have the potential to be a major factor in persuading women to shift cooking practices, but such promotion needs to be accompanied by educational activities to improve understanding about the negative health implications of open fires and indoor smoke pollution.

Because of the scale of dependency on open fires in the country the impact of a successful fuel-efficient stove program is likely to be huge and it will benefit women and girls in particular:

- A reduction in the very large amount of time spent cooking each day and greater ease of cooking, in particular benefiting women and girls;
- Reduced exposure to smoke, and associated health problems;
- Reduction in time spent collecting firewood, benefiting all household members; and
- Improved livelihood

Working with institutions that have existing health networks to promote the health benefits of stoves, through the Ministry of the Health would likely have particular benefits in terms of outreach and take-up of stoves.

1.5 Survey of Industries Using Fuel Wood

During the project preparation stage (PPG phase), a cottage industry survey was conducted to establish a baseline situation of industries that are using substantial wood as raw materials or using fuel wood as a source of energy to operate the manufacturing or processing units. The data collected was used to come up with a plan for interventions to green up the value chain by introducing energy efficient technologies that would lead to a reduction in utilization of fuel wood and, where necessary, also use waste products from wood-based industries to generate energy that can be used in the industry itself. Thermal energy applications in micro small medium enterprises (MSME) can be significant enough to stimulate market transformation and innovation where productivity, hard work and innovation could be rewarded. Building a strong foundation for these MSME would ensure the engine for future green growth and employment.

As a young and subsistence economy, the country's industrial sector and non-oil economy is still in its nascent stage. This is great opportunity to add incremental value to partner with UNDP's Social Business initiative to green up the value chain for cottage industry that relies on polluting and scarce firewood and inefficient technology. Strengthening the technical, financial and business capacity of the actors involved in the cottage industry will be a small step in building a strong foundation for future industrial development. Unfortunately there are no data on the numbers of enterprises but IADE/ILO

and SEFOPE are in the process of collecting these data for their online enterprises directories. The opportunity to leverage micro-finance and small business loan through UNDP's Social Business Fund will also be explored. Some of the key finding of the cottage industries surveyed during the PPG phase that consumed polluting firewood and use inefficient technologies were:

I. Tofu/Tempe Making

- Tofu and tempe are a popular source of soy protein
- A typical small size tofu enterprise produces between 20 to 36 panels of tofu (130 pieces per panel) from 50 kg of soybean
- This consumes about 1 truck of lorry (1 ton) of firewood which last for two days (i.e. 500 to 700 kg per day)
- One firm employs about 6 persons
- The employees often complaint about sore eyes and respiratory problems associated with working in smoky conditions from the fumes and smelly fumes from the burning of used engine oils for starting the fire
- The respondents are keen to improve their furnace and are willing to contribute towards the cost of the more efficient furnace

II. Salt making

- A typical salt making communities have 20-30 households producing salt in the area. Each household own one hut with thatched roof and earth floor.
- One household typically produced 2 containers of salt per day and the alt is sold in next town for $ 2.5 - $ 5/container/about $ 10/week.
- One household cooked the salt for 6-8 hours per day that uses about 1 cart of fire wood (50-80 kg) per day. The fire wood was they collected from bushes around their house.
- It takes them about 4 hours per day for a household to collect firewood because the bushes are getting sparse and they have to travel farther.
- The communities gets funds from AECID and the GoTL for the building the huts.
- The seawater is boiled in a flat zinc pot about 1 m x 0.5 m with a clay support. The boiling produces a lot of caustic smoke that can be irritating to the eyes and throat.
- The cooking method produces a lot of ashes that they pile near the hut. Some of the piles are as high as 2 m.

III. Bakeries

- Whilst some modern bakeries that supplies big cities use electricity, the majority of small and medium bakeries still rely on traditional method of baking using furnace/stove that rely on firewood
- Amount of firewood consumed ranged from 500 to 900 kg per day that is supplied by dealer.
- There is opportunity to introduce more efficient cook stove that will reduce firewood usage and cleaner and hygienic environment

IV. Coffee roasting

Coffee is a beverage grown in hot and moist tropical regions along the foothills of the country and the producers have concentrated particularly in Ermera district but the districts of Manufahi, Ainaro and Liquica also produce significant amounts of coffee. It has long been the primary cash crop and the main source of income for farmers. Before sending the coffee to the market, it is de-pulped and dried. The method of drying is crude and coffee growers use a lot of wood to smoke-dry the harvested coffee.

Some key findings of the coffee producing include the following:

- Rotary roaster with firewood imported from Indonesia
- Use about 300 to 500 kg of fuel wood per day costing USD 40 per month
- Machines cost about USD 1,000 to USD 3,500 and they are from Indonesia
- Cost USD 1 per kg of raw coffee selling at USD 4/kg
- Roast about 250 kg of raw coffee per day
- Potential to sell to tourist as organic coffee

V. Institutional Stoves for Schools, Prisons and Hospitals

a. World Food Programme

Under the National School Feeding Programme, more than 1,000 primary schools in the country use firewood as main energy or power source for cooking the school meals. This has a negative impact on the environment through massive consumption of firewood. In response to energy needs for cooking the school meals and to safeguard the environment, WFP has installed clay and biogas stoves and kitchen improvement in over 152 schools since 2010, selecting schools located in areas with high risks of deforestation in the districts of Baucau, Bobonaro, Liquica and Manatuto. Additionally, the Republic of Korea through WFP supports the construction of over 100 stoves and kitchens in the districts of Aileu and Dili. Biogas is targeted for schools with adequate water supply, kitchen facilities and access to cattle waste for gas replenishment. Likewise, the clay stoves are targeted in the schools with kitchen and water could be sourced for cooking.

To date, 21 bio-digesters and 152 clay stoves and 152 new kitchens constructed and installed benefiting 38,189 schools children. The plan for 2013 is to construct 68 clay stoves and 57 new kitchens in 57 schools in Baucau, Bobonaro and Aileu Districts. The amount of fuel wood used per school ranges from 20 to 50 kg per day. No test has been done on the energy efficiency of these stoves but it is estimated to be between 20 to 40%. The bio-digesters and stoves have been installed by WFP-NGO partners: Bili Bala Olaria (Manatuto & Dili); Raibokur (Aileu); Rai Maran (Liquica); Hadiak Futuru (Baucau); and Haburas Moris (Bobonaro). The main lessons learned are lack of feedstock for biogas digesters, lack of water for the operation of the bio-digester and lack of fuel wood. Awareness campaign on the benefits of domestic cook stove will be promoted among the school children.

b. UNICEF Stove Programme

UNICEF has been implementing the ICS project in Aileu district since January, 2012. The main emphasis of this project is to address the improvement of health conditions of children and women in the rural districts. UNICEF is implementing the project in cooperation with Department of Environmental Health of Ministry of Health (MoH) and the local NGO AMAR in Acumau suco of Remexio sub-district. Since the inception of the Project, UNICEF has installed ICS in 4 households, 1 Community Health Centre and 2 schools. In 2011 UNICEF had provided training to the partners MoH, SAS Ermera, NGO AMAR, NGO HIM, Sanitation Marketing Group of Aco-Mau, Remexio, Aileu and Humboe, Ermera, including staff of UNICEF's WASH project. During the mentioned training the participants practiced 2 cook stoves in schools and 5 in households as a pilot project. In addition, UNICEF has trained 50 beneficiaries on how to make the improved mud cook stoves. The efficiency of these stoves ranged between 20 to 50%. Now the implementation of project is stopped due to the lack of funds. The main lessons learned are: lack of suitable clay, lack to time to make the stoves especially during planting and harvesting season, lack of skilled masons.

Both UNICEF and WFP when interviewed during PPG have said they do not have any funding for their stove program. Hence, this proposed GEF project seeks to build upon the initiatives undertaken by UNICEF and WFP to scale up cook stoves program in Timor-Leste.

1.6 Problem Analysis

Based on the above analysis of the energy situation and the current situation in industries and households that are consuming wood as fuel, the increasing trend of fuel consumption is obvious. In order to analyze the underlying causes of this problem, a stakeholders' consultation was conducted in Dili on Nov 13-14, 2012 with 25 participants attending the event. All main stakeholders were consulted several times during the PPG process to ensure that their priorities and experiences within the context of Timor-Leste are captured and reflected in the design of the Project.

The participants generally agreed that the main problem faced by the country regarding its biomass/fuel wood resources is the unsustainable utilization of biomass resources. This situation is caused mainly by the following factors:

Policy Aspects:
- Inadequate and incoherent policies
- Weak institutional set up
- Insufficient capacity to formulate and enforce policy/regulation

Market &Finance:
- Lack of access to alternative technology and fuel;
- Lack of market based mechanism and inclusive value chain financing to support value chain actors

Knowledge & Information:
- Low degree of local knowledge & expertise/capability/exposure to produce and utilize modern and efficient biomass systems
- Low level of awareness and capacity on sustainable biomass energy technologies

However, the solutions and actions are not likely to happen without any intervention due to several major barriers that exist. Some of the main barriers to sustainable biomass energy development and utilization are introduced in the following.

1.7 Baseline Scenario

The situation in both cottage industries and households using biomass as fuel in Timor-Leste indicates that, without intervention, the current practices in the use of inefficient stoves and furnaces and non-sustainable fuel wood will most likely continue, thereby continuing the trend of increased non-renewable fuel wood usage and deforestation in the country.

Presently, biomass is not used for electric power generation but mostly fuel wood is currently used in thermal applications for cooking and thermal heat purposes in the residential, industrial and commercial/institutional sectors. A smaller amount of biomass (fuel wood) is used in agricultural sector for crop drying. Based on the Census 2010 data, a total of 566,000 tons of fuel wood was used in the residential sector.

Biomass is the main energy source used in the residential sector. About 90% of the energy demand of the sector is met by biomass, which is mostly used in rural households. Biomass is used for cooking and space heating in higher altitude in rural households, which accounts for 90% of the total biomass used in the sector.

The Energy for All (E4A) Programme's cook stove technology landscape report[8] indicates that the traditional stoves in the country have efficiencies of 8 to 37% for the types of stoves that are identified in the baseline investigations for this Project. Cooking at schools, prisons and hospitals still rely on inefficient traditional stove. Although some initiatives have been started in the past to introduce improved cook stoves in the country, large-scale initiatives on a national level do not currently exist. It is, thus, foreseen that a widespread dissemination of the efficient stoves in the country is not likely to happen without any form of intervention to support this objective. In the cottage industrial sector, biomass is used mainly as fuel to raise steam and heat in the production of tofu/tempe, salt making, bakery and coffee roasting.

The Project will draw lessons from and address barriers encountered by past and on-going projects like the Participatory Rural Energy Project and First National Communication being executed by the GoTL and implemented by UNDP Timor-Leste. The project specifically aims to ensure that biomass energy use is sustainable and does not, in any way, contribute to deforestation, land degradation, reduced soil fertility or increased GHG emissions beyond project boundaries.

Private sector development is a key engine of economic growth and crucial to reducing poverty, as underlined in Timor-Leste Strategic Development Plan: 'The future sustainability of the economy of our nation depends upon building a mature private sector'. While the Government of Timor-Leste is committed to develop a market-led economy with the private sector as the primary engine of growth, the nascent Timorese private sector has so far been unable to spur sufficient economic development for the rapidly increased population. Despite Government efforts driven by petroleum revenue (representing more than 95% of the total State income) and the recent considerable injection of resources into the real economy, in practice, ill-equipped Timorese Micro, Small and Medium Enterprises (MSMEs) continue to face a number of constraints that limit the sector's overall growth. This is particularly evident in rural areas where poverty incidence is high and rural-to-urban migration poses a major challenge and poorer people remain excluded from the mainstream economy. An estimated one third of the population remains outside of the cash economy (formal and informal) and market access remains very limited in most rural areas of the country.

Improving the investment climate and market access provides new employment and income opportunities to both men and women. However, Private Sector Development (PSD) effectiveness requires an understanding of the different constraints often faced by women and men in this domain. In particular, en entrepreneurs and increasing women's income offer great potential for private sector development.

This GEF funded project is well aligned with Government of Timor-Leste aspirations to mainstream gender in private sector development by ensuring that gender differences are taken into account and that businesswomen and men in Timor-Leste are able to expand opportunities to participate in, benefit from, and contribute to economic development. Women's and men full participation in the economy will lead to improved welfare of families, communities and society as a whole.

At the same time, this strategy reaffirms the importance of women entrepreneurs as engines of growth for the economy in generating employment, driving production and innovation, and contributing to local development and it aims therefore to design specific interventions to help women in Small and Medium Enterprise (SMEs), including start-ups and microenterprises, to address commonly cited challenges faced to start and grown their businesses.

[8] *Technical Assessment of Cooking Stoves in Timor-Leste - Final Report, Feb 2012*

The assessment conducted by ILO through wide consultations with key stakeholders and available secondary information and data, and the related problem analysis, identifies 5 areas where interventions are needed and where the Strategy and its action plan are focused and will be executed. These include: 1. Institutional framework and business enabling environment, including lack of dialogue and coordination between the public and the private sectors; 2. Access to credit and financial services, in particular for micro and small entrepreneurs; 3: Access to Business Development Services (BDS) and information; 4. Market's access for products and services; 5: Access to formal network for women entrepreneurs.

This strategy has been therefore designed with the final objective to contribute to the generation of pro-poor inclusive economic development and quality employment for women and men by spurring growth of businesses of all sizes through engendered private sector policies and programmes.

The primary goal of the National Strategy and Action Plan for Gender and Private Sector is to ensure that the needs of women entrepreneurs are better catered for alongside men's, at districts and at national level. It further aims to guarantee a gender sensitive approach in private sector development through an enhanced collaboration of key stakeholders in Timor-Leste. It is hoped that the development of a gender and private sector strategy and the implementation of its action plan will empower and bring positive changes in the working and social lives of Timorese women and men.

This GEF funded project will partner with the State Secretary for Support and Promotion of the Private Sector (SEAPRI) and Secretary of State for the Promotion of Equality (SEPI), according with their respective mandates to support private sector and gender equality. Collaboration with other relevant government institutions, civil society, financial institutions and with the private sector is imperative to ensure that all areas are covered through a participatory process which sees the involvement of all key stakeholders for the development of an inclusive and sustainable private sector.

Figure 2 in Appendix B shows how with GEF support, the proposed project will remove the barriers that hinder the widespread utilization of improved cookstoves, thereby contributing to energy savings, reduced demand for non-renewable fuel wood and GHG emission reductions.

1.8 Stakeholder Analysis

During the Project Identification and Preparation stages, stakeholders consisting of relevant agencies, non-Government organizations (NGOs) and private sector groups who could participate in the formulation and contribute to the successful implementation of the Project have been identified. To generate buy in and strong project ownership, participatory workshop and individual face-to-face consultations were conducted to assess their needs, identify problems and suggest solutions, clearly define their role/involvement both during the Project preparation and Project implementation and ascertain their commitment to the objectives of the Project. As these stakeholders are also beneficiaries of the Project outcomes, their participation and commitment are ensured which adds assurance to the success of the Project. A description of the public, private and CSO stakeholder groups and their involvement in the Project as well as the benefits they can expect to receive is presented Annex F. Also a detailed description of the SSE, which will be the Lead Executing Agency of the Project, is presented below.

The Project Board, which is the highest level of supervision during the Project implementation, will be comprised of representatives from the funding/co-funding agencies, senior representatives of relevant Government agencies and other entities, as appropriate. This will ensure an integrated approach to deal with the challenges and opportunities that consider the interests of all stakeholders, including cross-cutting concerns/activities that incorporate and support gender equality and marginal group participation. The Project Management Unit (see Chapter 4) will be in direct regular communication with all stakeholders while exposing itself through the active participation in relevant occasions and

organizing its own workshops and training seminars.

2. STRATEGY

2.1 Project Rationale and Policy Conformity

2.1.1 Alignment with National Aspirations

The Strategic Development Plan 2011–2030 commits to establishing inclusive development, while the Program of the Fifth Constitutional Government (2012-2017) has set a goal of creating opportunities for all in a fair and inclusive manner. Achieving fair and inclusive development requires extra attention to the sucos with lower living standards, so they can share in the benefits of development. This will require a reduction in the gap they face in access to basic clean energy, education, health, and infrastructure services. The current project is aligned to improve the efficient utilization of biomass for access to low emissions alternative energy (improved cook stove) through the introduction of policy de-risking and financial de-risking instruments to create conducive and enabling environment for efficient market transformation. Thus it is geared towards a comprehensive effort to introduce clean alternative energy as market based approach in Timor-Leste.

The project in line with the GEF Operational Program No. 5 is designed to remove the barriers to access to affordable alternative energy by introducing the necessary legal, institutional and regulatory frameworks for scaling up of bioenergy solutions. It is set to remove the technical barriers by providing the Government agencies, manufacturers and importers with technical assistance and a certified independent testing facility to measure the energy consumption of end-use appliances. It also addresses address the informational barriers with a component to carry out outreach programs designed to sensitize the Timor-Leste populace on bioenergy concept and its potential for socio-economic development.

More also, the project is closely aligned with the Climate Change Strategic Priority Number 1 - Transformation of Markets for High Volume Products and Processes. The project is centered on a partnership between the key Government agencies, the Women and Youth groups, appliance manufacturers and importers. It is designed to transform the market for efficient appliances by introducing the total life cycle cost (purchase price operating cost) in the purchasing decisions by consumers and businesses. It is also expected to contribute to meeting the Climate Change focal area strategy and the GEF Strategic Program 1 (CC-SP1) “Promoting Energy Efficiency in residential and commercial buildings”.

2.1.2 Country Ownership: Country Eligibility and Country

Timor-Leste ratified the United Nations Framework Convention on Climate Change (UNFCCC) in October 2006, the Kyoto Protocol to the UNFCCC in October 2008, the Convention to Combat Desertification (UNCCD) in August 2003, and in January 2007 became a party to the Convention on Biological Diversity (UNCBD). The country is finalizing its Initial National Communication to the UNFCCC with the support of the Global Environment Facility, the Australian Agency for International Development (AusAID) and the United Nations Development Programme. The NAPA was endorsed in 2010.

The current project has been designed based on extensive consultation with public and private key stakeholders, thus there is extensive inputs from the key relevant agencies of government such as the Ministry of Finance, Ministry of Agriculture and Fisheries, Livestock Department, SSE, Ministry of Science and Technology. The project fits into the Government’s overall plan to scale up alternative clean bioenergy and reduce reliance on unsustainable firewood by promoting bioenergy standards and best practices.

The project is relevant to the UNDP Country Program Action Plan II (2009-2013) mandate through its strong emphasis on environmental governance, capacity development and technical training for the private sector in order to provide professionals with the necessary know-how and technical skills to advise builders and other decision makers about EE standards and to integrate them into national policies and legislations. It also fits the UNDP's mandate by helping improve the capabilities of municipal enforcement agencies leading to better governance through sustained technical and institutional support.

The UN Integrated Mission in Timor-Leste), which has functioned as an interim governing institution since Timor-Leste obtained independence, operates under the mandate provided by the Security Council Resolution 1704. This mandate, as per the request of the Government of Timor-Leste, ended on December 31st, 2012. This means that remaining functions of the UNMIT were fully handed over to the Government, including law and order. The end of the successful UNMIT mission was a clear indication that the Government is taking full ownership of governance and development of the country. The importance of the support from UN development agencies to the Government is herewith also increased and it is foreseen that new development assistance frameworks will be developed in the coming year. These will likely continue on the basis of the successful existing ones, consolidating peace and stability in the country, while moving away from the high dependence on foreign expertise towards a higher focus on capacity development of government and non-state institutions, especially at the local level.

The SBEPB Project is fully harmonized with the priorities of the current UNDP Timor-Leste Country Programme (CPD 2009-2013). The CPD analysis recognizes that strong progress was made in recent years in terms of economic growth, although highly dependent on oil and gas, and poverty reduction. At the same time the benefits of economic growth are not being distributed evenly, increasing inequality on the country. Poverty remains widespread in rural areas with a large proportion of the population still living a subsistence existence, providing a focus for UNDP's programming work over the coming years. The rural population and especially disadvantaged groups are recognized to be particularly vulnerable to global climatic change and recurrent natural disasters.

More specifically the CPD contributes to the goal of consolidating peace and stability in the country through the relevant UNDAF outcomes: (a) democratization and social cohesion; and (b) poverty reduction and sustainable livelihoods. The CPD program is contextualized in the post-crisis scenario and focuses on development and governance as means for contributing to lasting peace, stability and security in the country. The program uses social mobilization as a poverty reduction strategy, linking communities to microfinance services and marketing channels. The UNDP promotes and supports community-driven and managed rural infrastructure, self-help groups and community-based, sustainable natural resource management to enhance agricultural productivity and incomes. Women's groups are also engaged as agents of change. UNDP will continue to support the mainstreaming of environmental issues into poverty reduction and good governance strategies, particularly in climate change. It will strengthen support to the Government in environmental management, including the implementation of national environment and energy policies (CPD page 4). Further United Nations supports climate change mitigation and adaptation measures in the country to strengthen the synergy between sustainable development and climate change (UNDAF page 17).

The Government and UNDP are thus actively pursuing measures to support and strengthen effective climate change adaptation. The SBEPB Project will build upon the Government's and UNDP's strategies and support integration of climate mitigation and adaptation to strengthen sustainable development benefits, as follows:

i. Sustainable growth and MDG achievement will be achieved through promoting sustainable livelihoods through integrating climate change mitigation and vulnerabilities in local development planning, more sustainable climate resilient small-scale infrastructure services and improved environmental protection;
ii. Effective governance will be supported through providing the combined climate resilient infrastructure and ecosystem mitigation and adaptation options in the already existing local planning and budgeting process as supported by the existing bioenergy project;

The project is the dedicated climate change mitigation initiative in Timor-Leste that from the design phase directly aims at integrating market-based management approaches to scale up bioenergy as inclusive business development. Lessons learnt will help to design future market based modern energy services initiatives based on best practices.

2.2 Design Principles and Strategic Considerations

The Project is designed to integrate a top-down approach of providing support through policy measures and demand side management, and bottom-up approach of promoting market mechanisms to create demand for energy efficient stoves. To enhance the effectiveness of these approaches and to create an enabling environment among the stakeholders and participants in the Project, capacity building and training activities will be conducted among the different levels of participants and in the different stages of the project execution.

The selections of the bioenergy technology for the provision of cooking, lighting and industrial use are based on: suitability of the technology for the identified need (user friendliness, acceptability) and opportunity for up-scaling (time and space, available skills and local materials); robustness of the design (room for improvement, standards and testing); installation and operational costs (no hidden costs); cost-effectiveness (affordability, bulk order/purchase to lower cost/prices), the availability of sustainable biomass (farmer managed agroforestry for securing food and bioenergy access) and protection of the natural resources.

The goal of the Project is the reduction of GHG emissions through sustainable production and utilization of biomass energy in the country, and the promotion of innovative low-carbon biomass energy technologies.

Based on the above strategic considerations, the Project will focus on three major components as follows:

- **Component 1:** Policy and Institutional Support for Deployment and Commercialization of Advanced Bio-energy Technologies.
- **Component 2:** Bio-energy Investments Promotion - Sustainable Bio-energy Technology Demonstration & Market Development
- **Component 3:** Capacity Development and Market Transformation

Each of the above components will have specific activities that are designed to produce outputs leading to the following outcomes, respectively:
- **Outcome 1:** Implementation of strengthened enabling policies, legal and institutional framework for deployment of biomass energy technologies as well as the growth of biomass energy businesses in Timor-Leste.
- **Outcome 2:** Increased investments in Bio-energy, Development of a local supply chain and market for BETs, GHG emissions avoided from technology applications and investments.

- **Outcome 3:** Enhanced capacities of policy makers, financial institutions, entrepreneurs, project developers, communities and end-users on the development of the local BET market

2.2.1 Description of Components

Each of the three components of the Project will be managed by an agency among the Executing Partners through one overall Team Leader (see Management Arrangements in Chapter 4). There will be strong coordination among the different components to ensure synergy among the different activities and promote cost-effectiveness in the operation of the Project.

The project consists of three components that are designed to contribute toward achieving the project's objectives:

Component 1: Policy and Institutional Support for Deployment and Commercialization of Advanced Bio-energy Technologies

This component will address the institutional and policy-related barriers to the development and utilization of bio-energy resources using low-carbon energy technologies for energy services provisions. It will support the development of policy and associated regulatory instruments through demand side management (Standard and Testing) for the promotion of energy efficient appliances within the framework of a national sustainable energy policy. The expected outcome from this project component is the implementation of strengthened enabling policies, legal and institutional framework for the deployment of innovative biomass energy technologies as well as the growth of improved cook stove businesses in Timor-Leste.

Component 2: Bio-energy Investments Promotion – Sustainable Bioenergy Technology Demonstration & Market Development

This component seeks to overcome the technical and market barriers for the widespread development/adoption and application of improved cook stove in Timor-Leste. It will focus on increasing investments in bio-energy in order to raise private sector confidence in this sector. The expected outcomes from this component are: (1) Increased investments in Bio-energy; (2) Development of a local supply and demand chain and market for ICS businesses; and, (3) Avoided GHG emissions from RE technology applications and investments. Under this component, the project will provide financial (startup grant and end user subsidy), regulatory and technical support for the demonstration, commercialization and investments in energy-efficient furnaces and cook stoves production for livelihood enhancement and corresponding market development as detailed in Appendix B.

Component 3: Capacity Development and Market Transformation

This project component will enhance the level of knowledge, skills and awareness on the co-benefits and features of BETs and bioenergy-supported livelihood/productive use projects as part of the Government's renewable energy promotion, development and utilization campaign through nodal centers of excellence, led by SSE. It will specifically address the barriers of low level public awareness, lack of technical knowledge and market information and intelligence regarding bioenergy technology applications; and, general perception of potential project developers, service providers and beneficiaries who currently hold the view that bioenergy projects are expensive, risky and investment recovery is difficult. It will also serve to channel detailed information on sectoral energy consumption patterns in the economy, resource inventory and proven BETs available in the market. Enhanced capacities of policy makers, financial institutions, entrepreneurs, project developers, communities and end-users on the development of the local BET market is the main outcome from

the interventions that will be carried out under this project component. Capacity development activities will be led and coordinated by the SSE, hence ensuring linkages with policy making activities at SSE. In addition, capacity development with SSE as the Centre of Excellence will strengthen the agency's technical abilities through the development of local champions in analysis, planning, policy development and delivery of services.

Through this project component, more accessible information on modern biomass energy technology applications will be available, stakeholders will become aware of the ecological, social and economic benefits of bio-energy, and financing institutions will be favorable towards BET application and investment projects as well as the productive uses of bio-energy. It is expected that, as a result of the advocacy campaigns, policy makers would appreciate the advantages and practicality of a thriving BET market in the country, and will establish and implement suitable supportive policies and regulations.

2.3 Project Objective, Outcomes, Outputs and Activities

The SBEPB Project has the following Project Objective:

Project Objective: Removal of barriers to sustainable utilization of biomass resources in Timor-Leste and application of biomass energy technologies to support local economic, environmental and social development that leads to GHG mitigation

The Project has been designed to comprise of three (3) components that are expected to generate outcomes that, when achieved, will realize the Project Objective. Moreover, the Project is expected to deliver certain outputs that will help to achieve the desired project results. The key outputs include;

1. Established coherent and transparent policy and regulatory framework to stimulate bioenergy inclusive business development by leveraging public and private sector resources;
2. Completed pilot projects that demonstrate the commercial viability and benefits of the improved cook stoves and furnaces.
3. Scaling up of 20,000 improved cook stoves, inclusive of 600 institutional stoves for school and 400 industrial furnaces across Timor-Leste as inclusive business
4. Established and operational Centre of Excellence for collecting, recording, disseminating and coordinating bioenergy activities and program to strengthen the technical, resource management, financial, entrepreneurial, and social and natural capital of the public and private stakeholders
5. Established and operational testing and certification for ICS and furnaces trained and certified by an internationally recognized accreditation institute;
6. Established and operational local implementation structure and startup grant, which are mainly centers at the Sucos level equipped with trained and skilled champions.
7. Partner and incentivize women groups to create demand for bioenergy solutions to reduce supply risks
8. Manufacturers/fabricators, distributors and well informed end users that understand, accept, implement and promote the bioenergy standard and best business practices;
9. Completed public education and sensitization campaigns through various knowledge products to support the public and private stakeholders; and,
10. Completed monitoring and impact assessment of the bioenergy program.

To reduce Timor-Leste's energy and biomass-related CO_2 emissions the proposed project will enable the mitigation of the demand for non-renewable firewood and the access to cleaner alternative energy and renewable biomass in the country's residential, institutional and industrial sectors in the rural and

peri-urban areas through the introduction of a certification and testing scheme for new equipment and appliances.

The project has been designed to overcome the most significant barriers above and allow a faster transformation process for the market by leveraging private sector resources as part of inclusive growth. Each project component will comprise of activities that are specifically addressing a particular category of barriers. The project seeks to establish Centre of Excellence to sustain the barrier removal efforts thereby supporting the bioenergy business and market through local champions and social entrepreneurs.

Outcome 1: Implementation of strengthened enabling policies, legal and institutional framework for deployment of biomass energy technologies as well as the growth of biomass energy businesses in Timor-Leste.

This outcome manifests the realization of the removal of the policy, regulatory and institutional barriers for creating an enabling environment for the scaling up of bioenergy solutions as inclusive value chain business development in meeting the MDGs. A user-centered demand side management program will be developed to improve product quality, build end user confidence and reduce fuel wood demand and improve health.

A strong coherent policy and strategy supported by transparent technical and financial framework will send a clear signal to investors, technology developers and producers to mobilize their resources to accelerate the market transformation to bioenergy solutions. Continual efforts to reform the public and private partnership (PPP) and 'Ease of doing business' to overcome the business and country risks will ensure that small business and the poor can easily start a business, grow and expand their business ventures without hindrances.

Output 1.1: Developed and adopted new regulations and technical guidelines for renewable energy technology appraisal and evaluations

In order to build the confidence of the value chain actors (investors, producers, end user) through the promotion and marketing of high quality stove products and services, a policy regulatory framework to support a standards and testing program will be pursued. The S&T program will be developed in collaboration with SSE and the Cookstove Testing and Development Centre (CTDC) at Dili Institute of Technology where cook stove testing and certification facility are being installed. The standards will form the basis of the production method, testing protocol and promotional communications. National and international experts will advise on setting the right technical standards and norms.

The Stove Performance Inventory report[9] has mapped and compared stove performance against standards or benchmarks, the most relevant of which is the recently approved ISO International Workshop Agreement (IWA) on Clean and Efficient Cookstoves (February 2012). The IWA, which is a preliminary step towards a formal ISO standard (ISO 285), uses "Tiers of Performance" to categorize stove performance levels for efficiency, safety, and emissions.

Activity 1.1.1: Review of bioenergy technology landscape including sustainable energy policy, rural energy policy, technology types, sources and applicability to conditions in Timor-Leste

[9] Stove Performance Inventory Report (Oct 2012) Prepared by Berkeley Air Monitoring Group for the Global Alliance for Clean Cookstoves United Nations Foundation.

The BETs that have potential for application in Timor-Leste will be reviewed and their applicability to the different consumer context and local enterprises/industries will be assessed. Detailed information on the rural energy policy and technological options will be gathered such as, types of technologies, range of capacities, technology sources and suppliers, references of successful installations, costs, applicable industries, etc. A database through BERIS (described later) will be established to provide ready access to policy makers, private entrepreneurs and community groups.

Activity 1.1.2: Preparation of technology fact sheets and summary menu consolidating the key information

From the information obtained in Activity 2.1.1, in collaboration with the Renewable Energy Unit to be established at SSE (Activity 3.1) a menu of selected technologies will be created and fact sheets of each of these technologies detailing key information and parameters will be prepared. The menu and fact sheets will be printed and disseminated to targeted audience, such as industries generating and using biomass residues (i.e., tofu/tempe making, salt making, coffee processing, livestock producers, as well as private enterprises who could supply equipment and components). This will create greater awareness of the options available and give confidence to the potential participants to adopt and use appropriate and efficient BET applications and services. The same information will also be made available on-line via the BERIS described in Activity 1.3.2.

Activity 1.1.3: Preparation of detailed regulatory framework, containing regulations, procedures, standards and incentives for the smooth and effective implementation of biomass energy applications

This activity will ensure that the standards and testing program development and implementation will be set within the framework of the National Sustainable Energy Policy and the Rural Energy Policy. During this activity, support will be provided to get the National Sustainable Energy Policy and the Rural Energy Policy endorsed so that the Policy will take on a legal status. Support to the Ministry and SSE, including advocacy activities to generate buy in for the approval and implementation of these policies and legislations will be conducted within this activity. The implementation of these policy instruments will be monitored and, where appropriate, support will be provided from project team to make the implementation more effective.

Working closely with SSE and the Cookstove Testing and Development Centre (CTDC) at Dili Institute of Technology, the standards for equipment, production method, testing protocol, performance matric, and promotional communications will be developed according to international protocols such the ISO IWA on Clean and Efficient Cookstoves (Feb 2012) standard. To remain viable, a testing system based on chargeable fees will be developed.

While data on the performance of technologies and fuels is critically important to the sector's progress, an equally important parallel relates to understanding user behaviors and stove adoption, which will be critical for achieving the maximum benefits from clean cook stoves technologies in Timor-Leste. This will avoid the 'one size fit all' mentality. Activities will seek to understand the adoption parameters, kitchen management and "stove stacking" across the 13 districts and develop common definitions, methods, and metrics for adoption, usage, acceptance, and uptake. These will form a critical feedback to CTDC in setting appropriate standards applicable to Timor-Leste. The activities will set benchmarks and highlight best practice for implementers to ensure successful adoption and appropriate usage. The standard will be part of the criteria for the implementation and issuance of the startup and end user subsidy.

Output 1.2: Developed and implemented national strategy plan and roadmap for the promotion of bio-energy production and utilization

This Output will focus on providing support to the Ministry of Public Works and SSE to obtain Council of Ministers/Parliamentary approval of two key policy instruments – the National Sustainable Energy Policy and the Rural Energy Policy – for implementation. Support to the Ministry and SSE will include technical advice for advocacy to gain support of Parliamentarians, endorsement & approval by Government, and the subsequent implementation activities, including publicity and promotion, as well as M&E support. User interest, behavior and feedback will be also be emphasized to provide feedback to the policies, including the necessary social acceptance of the Roadmap. The Roadmap will set the guiding principles and action plan for bioenergy development and promotion, based on the guidance of the two key policies and, at the same time, ensuring consistency and synergy with the implementation of the Sustainable Forestry Management Plan. This will form the GoTL's strategy for the promotion of bioenergy in Timor-Leste. Due to the wide range of stakeholders, a participatory approach is considered appropriate to reach consensus between them. Within the framework of the implementation roadmap of the National Sustainable Energy Policy, the GEF Project will provide support to the development and implementation of the cookstoves standards and testing program, working closely with SSE and Cookstove Testing and Development Centre (CTDC). This Output will complement the work of Mercy Crops, World Vision, WFP, UNICEF and JICA's Community-Based Natural Resource Management Plan.

Activity 1.2.1: Support the Government approval process of key policy instruments for sustainable biomass energy production and utilization

The policy gaps identified during the PPG have been captured and addressed through two key policy instruments that have been drafted by SSE - the National Sustainable Energy Policy and Rural Energy Policy for Timor-Leste. The GEF Project's Bioenergy Policy Experts will support SSE to define the strategies for the key policy instruments to be approved by the Council of Ministers/Government and their subsequent implementation. Negotiations with Parliamentarians for their support to seek Government approval will be critical and the Project will accordingly work closely with them promoting and publicizing, as well as seeking the necessary social acceptance of the Strategic implementation plan/roadmap. While the GoTL and its partners will focus on the baseline activity of engaging stakeholders at the ground level in the districts and villages, the GEF Project will focus on engaging with stakeholders at the national level. Implications on cross-cutting issues such as gender, social inclusion and poverty reduction will be analyzed and an action plan developed. The project team will also work closely with the Reforestation, Protection and Production Division of the National Directorate of Forestry (NDF) to support the alignment of policies and regulatory frameworks and institutional capacity for the adoption of sustainable practices on the production of sustainable biomass for energy generation. This will involve working closely with local community based organizations (CBOs) that are active in promoting agro-forestry and watershed management program e.g. Mercy Corps, World Vision and JICA.

Activity 1.2.2: Stakeholder consultations to define and formulate the Implementation Strategy Plan/Roadmap of the policy instruments

In order to ensure participatory, demand led and country driven initiative, public, private and CSO stakeholders consultation at the national and local levels will be conducted to discuss the broad and strategic issues related to sustainable biomass production and utilization in Timor-Leste, and devise practical measures to encourage, promote and support widespread dissemination of modern, efficient and affordable BET applications. The consultations will also discuss the different roles of youth, women and men in the production and utilization of biomass and the new technologies and how the role of women can be enhanced in the project. Guidelines on the formulation of a detailed Implementation Strategic Plan/Roadmap will covers policy, standard, economic, environmental and market mechanisms for the biomass energy sector in driving towards a low emissions, climate resilient and gender sensitive and sustainable development trajectory for Timor-Leste.

Activity 1.2.3: Preparation and roll-out of the Implementation Strategic Plan/Roadmap for implementation and promotion of sustainable biomass production and utilization

Guided by the strategic guidelines agreed by the stakeholders, the Project team with support from external Experts will prepare a detailed document to be dubbed as "Strategic Plan/Roadmap for Policy Implementation and Promotion of Sustainable Biomass Production and Utilization." The Project team will work closely with SSE and NDF in the implementation of the Strategic Plan/Roadmap, continuously guiding the monitoring and evaluation of the policies as they are rolled-out.

Output 1.3: Designed and operational national biomass energy resource inventory

This output is the end product of a number of reviews, assessments and updating of the existing biomass and bioenergy baseline inventory system so that reliable, accurate and transparent data are available for the development of key performance indicators and decision-making tools to design evidence-based policy, regulation, legislation and strategy; for evaluating risks/benefits profile in bioenergy investment. This user-friendly and robust inventory system will encourage sound data management. Furthermore, the mapping of the biomass resources and availability will allow the estimation of practical potential energy that could be produced and number of green jobs created and GHG avoided. This output will help to overcome the high institutional memory loss and ensure that data are kept for perpetuity and avoid future wasteful duplication. An International Bioenergy Expert in Policy and Data Management will be hired to support the experts at SSE and Environment Directorate to develop the inventory system.

Activity 1.3.1: Identification of agencies and institutions working on biomass energy promotion and development and establishment of appropriate mechanisms for coordination

Currently, the Government agencies, international organizations, NGOs and the private sector are involved in biomass energy activities according to their specific mandates and priorities of their funding sources. To build on the stakeholders and market assessment conducted by GACC, an inventory of these agencies and institutions will be conducted with the view of establishing an appropriate mechanism whereby these entities create linkages among themselves, share information and resources, and coordinate their activities toward a common goal in order to avoid wasteful duplications and overlaps. For example, networking activities by the Cookstove Working Group will be supported and strengthened by the SSE (see Output 3.1).

Activity 1.3.2: Design and creation of Biomass Energy Resource Information System (BERIS) using database environment

A web-based database will be created and hosted within the SBEPB Project, which will be mirrored in SSE and NDF website. The aim of the BERIS is to provide a one-stop information source within the country on biomass production and utilization as well as other RE sources and technologies. BERIS is envisaged to contain the following information and features, among others:

- Relevant stakeholders consisting of the Government agencies, industries, technology providers, service providers, manufacturers, financing institutions, etc.
- Technical data and information
- Menu of appropriate technologies (from Activity 1.1)
- Fact sheets of technologies, systems and processes (from Activity 1.1)
- Case studies of successful pilot and demonstration projects
- Suppliers of equipment and components

- RE resources in the country, including locations, quantities and agencies/entities responsible for the resources
- Funding sources and opportunities – loans, grant, carbon and climate finance
- Resource materials
- Capacity building activities and knowledge products (seminars, workshops, events from Output 3)
- Gender disaggregated data, where relevant, on each of the data items mentioned

Activity 1.3.3: Data gathering, operation, management, budget and training for the BERIS program

The gathering of information, day-to-day operation and management of the BERIS will be done by the project Team within the Project Management Unit (PMU)[10] in coordination with the agencies responsible with the RE resources (i.e., SSE, NDF, agencies responsible for community forests, etc.). To ensure the sustainability of the system, the BERIS will be hosted within the Research, Knowledge, Learning and Coordination Centre at the SSE that will be established as part of the capacity building component within the Project (see Output 3.1). In addition, a training program will be developed for the management of the BERIS program, including guidance on developing annual operating budget for the BERIS staff at SSE.

Activity 1.3.4 Securing financing for the continued operation of the BERIS program

The Project Team will work closely with SSE and the BERIS staff in identifying and securing financing for the continued operation of BERIS after the completion of the GEF project. This work will be initiated as soon as the BERIS program is set-up and adequate funding needs will be established and secured by the Q2 of Year 4 of the GEF project.

Output 1.4: Modalities and details of participation of community-based organizations and grassroots institutions finalized and agreed

Community-based organizations (CBOs) are key entities in the implementation of the roll-out mechanism to disseminate the 20,000 stoves targeted in this Project. During the PPG stage, NGOs such as the Mercy Crops, World Vision, Hivos, Haburas, Permatil, and Rai Maran, UN development partners such as UNICEF and WFP, and the Community Forest Management Groups, as well as Women's organizations were identified as key members of a core network that the GEF Project will network with to reach out to smaller CBOs in target districts.

Activity 1.4.1: Development and implementation of modalities for CBO participation

From the assessment conducted during the PPG, agreements will be made with the most relevant and suitable entities. The agreement will define the roles of these CBOs, the modalities for their participation and funding requirements. A model and tentative procedures for the roll-out of the stoves using the CBOs is described in more details in the subsequent section. Output based approach will be used for ensuring the deliverance of results and long-term impacts. Service provider will be paid on the output base rather than inputs. Women groups will be rewarded for the creation of demand to reduce supply risks and to avoid the push factor as detailed in Appendix B.

Outcome 2: Increased investments in bioenergy, leading to the development of a local supply chain and market for BETs that will contribute to GHG emissions avoided from technology applications and investments

[10] The organizational structure and composition of the PMU is detailed in Chapter 4 of this document

This outcome will result from the outputs that will be delivered from the implementation of the activities in Component 2 of the project. Such activities are intended to address the lack of demand, market infrastructure and demonstration sites in Timor-Leste to showcase proven commercially viable bioenergy technology as inclusive business where the poor can be empowered to participate as producers, suppliers, distributors, employees or well-informed end users.
Such activities are meant to strengthen the technical, resource management, financial capitals and business acumen of the poor. Participatory technology development will be used to ensure that the networks and cooperation of the designers, developers, producers and end users along the value chain could be strengthen to work together so that the products meet end user needs.

Output 2.1 Designed and implemented end user subsidies and loan guarantee funding to enable market development for private-sector participation in biomass energy business

Output 2.1 is intended to leverage private sector resources for the scaling up of bioenergy solutions where the poor can be empowered to participate as actors in the value chain. Value chain financial products and services as well as fiscal incentives will be developed together with SSE and MFIs for the efficient utilization of biomass for bioenergy and food security solutions.

The project team also will review local, national, regional and international lessons learned in the scaling up of bioenergy solutions as inclusive business and value chain financing. The project team will continuously focus on the adoption of new fiscal, economic and value chain incentives that will reward hard work, productivity and innovation. Strategies to leverage private sector resources to champion bioenergy business development will be developed.

Activity 2.1.1 Establishment of procedures and modalities for the implementation of financing schemes and incentives

SBEPB will work closely with SSE, Ministry of Finance, Tuba Rai Metin, Moris Rasik and UNDP's Social Business Programme to build start-up grant program (building on previous experiences implemented by SEFOPE, IADE and Hivos to establish the procedures and modalities for the implementation of financing schemes and incentives that will be adopted. Subsidies on the cost of the stoves will be provided to the end-users. The subsidy will initially be 70% of the cost of the stoves and will be reduced to 40% towards the end of the Project as detailed in Appendix B. The GEF Project will also work closely with Tuba Rai Metin and Moris Rasik to further develop the financial products and services that have been developed under the UNCDF's INFUSE program (see Figure 4). For the roll-out of end-user subsidies for the cook stoves, the GEF Project will work in partnership with SSE and Mercy Corps (see Figure 3). In the four-year roll-out of the improved cook stoves programs, the capacities and level of awareness of the value chain actors will be raised. The SSE will work with the Ministry of Finance to review status of the market during the mid-term of the GEF Project. Incentives will also be sought from the Government for other activities that will promote the production of sustainable biomass and use of biomass residues for energy generation in industries.

Activity 2.1.2 Implementation of financing schemes and incentives for demonstrated improved cookstoves applications & services

The financing schemes and incentives that will be established in Activity 2.1.2 may be implemented through a government agency or a non-government entity such as a financing institution. This activity will promote close coordination with participating institutions and a commitment from the GoTL to allocate resources and provide the approved incentives. Support mechanisms to encourage uptake of the incentives will be initiated such as: assisting implementing agencies in streamlining procedures; organizing campaigns to create awareness of the incentives and how to tap them; supporting potential

end-users in preparing applications; monitoring and improving the effectiveness of incentives; promoting ICS on the ground of reducing IAP for rural poor; testing of other proven business models e.g. Toyola money saving box etc. During the last two years of the project (Year 3 & 4), the GEF Project will focus on helping the Government to (i) identify and mobilize financing resources to continue the subsidy scheme and (ii) design a progressive subsidy decrease leading to a purely market led development system.

Activity 2.1.3 Design and implementation of the loan risk guarantee scheme (LRGS) funding for entrepreneurs in the stoves/furnaces supply chain business

Building on the work and experience of INFUSE in Timor-Leste, the GEF project will work closely with INFUSE and its partners to incorporate a targeted initiative to implement a loan risk guarantee scheme for entrepreneurs willing to participate in stove/furnace manufacturing and its value chain business. During Year 1 of the project, the GEF Project team and the INFUSE Project team will collaborate to design and detail the financial mechanisms to be put in place; identify and seal agreements with the lead bank, appropriate intermediary financial institutions, if necessary, and the stoves/furnaces entrepreneurs; and detail activities necessary to sustain the means (financial in particular) for the mechanism continuation and scaling-up beyond project completion. During Year 4, a sustainable follow-up plan will be prepared for the continuation and possibly expansion of the LRGS beyond the project-life to attract public and private sector funds. Please see Appendix B for background details.

Output 2.2: Implemented and operational 400 locally produced industrial stoves for income generating local enterprises such as tofu/tempe and salt production, bakery and coffee roasting

The collective installed facilities/systems that make up Output 2.3 are expected to generate market driven supply of industrial/institutional cook stoves. In the private sector, the need for improved efficient cooking technologies is largely in the major urban areas of Dili and the larger district capitals, and is seen in catering businesses, food processing (e.g. tofu and tempe production, bakery, sea salt making, coffee roasting) and some light manufacturing enterprises such as ceramics and brick making. In the public sector there is also much need for institutional stoves in schools and hospitals.

Production of these stoves is likely to be centralized, with businesses constructing/installing the stove on the premises of the consumer. The stoves will be constructed from local materials using rocket-design for large pots or energy efficient ovens. This output will work closely with UNDP's Social Business Fund, SEFOPE and IADE in developing mentoring and business incubator programs in greening up the value chain.

Activity 2.2.1: Identification of local producers/fabricators, raw material suppliers and micro-entrepreneurs and their specific areas of involvement

This will involve the assessment of potential fabricators in areas that were not covered in the value chain analyses[11] that were earlier carried out by the GACC and Mercy Corps. While expanding the list of fabricators, a screening and selection of the most suitable fabricators/entrepreneurs will be conducted. These will be offered in partnerships with SEFOPE, ILO and UNDP's UNCDF and Social Business Programme in the investment, production and delivery of BETs to be promoted in this Project.

Activity 2.2.2: Implementation of public-private partnerships and startup grant for the production & delivery of energy efficient furnaces

[11] These were done to identify fabricators, business services providers and micro-entrepreneurs that have the capability to locally produce parts of BETs for demonstration projects.

The implementation of the public-private partnerships as detailed in Appendix B will be the bases for the implementation and dissemination of BETs in the relevant industries targeted in this Project, namely the coffee, bakeries, tofu/tempe and ceramic making sectors, (but not limited to these small/micro industries). The idea here is for private enterprises and MFI to execute and improve the startup grant and loan and to take up roles in the project cycle that are best done by the private sector and eventually doing it through normal market mechanisms without any government intervention or support.

Output 2.3: Implemented and operational locally produced 19,600 energy efficient cook stoves in households and local enterprise/community-based institutions

Output 2.3 seeks to implement and improve the end user subsidy and LRGS for developing a viable market system for the production and distribution of energy efficient cook stoves as detailed in Appendix B. Whilst Mercy Corps and Hivos only cover 3 districts, the GEF project will cover households in all 13 districts of the country. The primary focus of the activities will be the up-scaling of the Stovetec rocket stove piloted by Mercy Corps. Other improved stoves will also be tested.

It is anticipated that more than 25 microenterprise stove producers will be established in Dili and in district towns around the country. Training where participants will be at least 50% youth or women will be provided by the lead firm in Dili, and a startup grant to cover for initial tools and parts for production will be provided by the GEF project

Activity 2.3.1: Design and local fabrication of the domestic and institutional stoves and training on their design and operation features

Training program will be advertised in the local paper and potential social entrepreneurs will be selected for training on production, business plan and basic accounting. Training of fabricators and technicians will be arranged and conducted by the lead company in partnership with SEFOPE/ILO and service provider using trainers from the importer (e.g. Startec) and Cookstove Testing and Development Centre (CTDC) at Dili Institute of Technology (DIT). The SBEPB Project will work closely with SSE and CTDC to ensure its capacity is built to sustain the training and expansion of local fabricators and technicians after the project ends. As part of the work of the SBEPB to assist the Government in establishing fiscal incentives for BET applications (Activity 2.1.2), the local entrepreneurs would be provided with start-up grant for the fabrication and production of stoves.

Activity 2.3.2: Production, installation and dissemination of furnaces/stoves to end-users using start up grant and end user subsidy

After the private sector participants are mapped out and their potential roles ascertained under Output 1.3; the Project team will formulate a framework for partnership among Project, SSE and the entrepreneurs that is workable, effective and provides benefits and incentives to all parties concerned. This will entail detailed discussions with all parties concerned and the possibility to use tested models and innovative schemes as appropriate. Support mechanisms in the form of capacity building and startup grant to micro-entrepreneurs will be agreed as part of the public-private partnerships that will be created. The indicative mechanisms for delivery and roll-out of these stoves using end user subsidy are detailed in Appendix B. The main entities whose role will be crucial in the widespread dissemination of the stoves are the community-based organizations (CBOs) like the women groups and development partners that have local presence in the districts and villages.

Activity 2.3.3: Conduct of training and awareness campaign on the use, maintenance and benefits of energy-efficient furnaces/stoves

The CBOs will conduct awareness campaign to make the individuals and community institutions aware of the benefits of energy-efficient furnaces/stoves and create a demand for aspirational stoves. They will also organize training among potential end-users on the use and maintenance of the promoted stoves. These activities will be conducted at the village level and will target both institutional and household users as well as men and women members of the households using the incentives schemes developed under output 1.3.

Activity 2.3.4: Regular monitoring and evaluation of installed furnaces/ stoves

Part of the responsibilities of the CBOs will be to regularly monitor the use of the stoves by the end-users and get feedback on the benefits they get, their difficulties and problems in using them and their suggestions for improvement. Their feedback will be compiled and analyzed by the Team and considered in the future improvement of the design of the stoves and their dissemination mechanisms.

The CBOs will be required to submit proposals on how they will monitor and evaluate the performance of the installed furnaces/stoves. They need to demonstrate an ability to track the impact of the support provided and on the increase of cook stoves distributed/sold as a result of this proposed Project. This impact on cook stove distribution should be compared with preexisting furnace/stoves sales in the target region. A CBO's demonstrated ability to incorporate technology (such as mobile and web-based technologies) to track sales and distribution data is a plus. CBOs must be able to estimate/measure GHG emissions reductions resulting from customers using their furnace/stoves. The activities and data collection procedures of the CBOs will be periodically monitored by the Project team.

Activity 2.3.5: Improvement in the design based on results of the monitoring and evaluation activities

It is likely that the feedback from the end-users through regular monitoring and evaluation activities will yield suggestions for CTDC and SSE that will improve the function or feature of the stoves. These feedback and suggestions will be considered and improvements in the design will be incorporated into future batches of stoves to be manufactured and disseminated.

*Activity 2.3.6***:** Promotion and replication of re-designed furnaces/stoves to remaining households and community-based institutions

Once an improved design is complete, a new wave of promotion and replication will be conducted in the remaining households and community institutions that have not yet availed of the promoted stoves. The dissemination of the re-designed stoves will be conducted in accordance with the prioritization plan that will be implemented in phases as described in Section 2.3.2.

Outcome 3: Enhanced capacities of policy makers, financial institutions, entrepreneurs, project developers, communities and end-users on the development of the local BET market

To ensure the sustainability of the bioenergy solutions and business beyond the pilot and demonstration phase and to avoid the reliance on subsidy in the country, the capacity of the public and private stakeholders must be strengthened, supported and continually improved. This will ensure that the local social entrepreneurs, CSO community and bioenergy champions as value chain actors and services providers are fully supported to leverage public and private sector resources. This outcome seeks to build strong social capital along with technical and financial capitals. This outcome will generate strong buy in from the public and private stakeholders so that appropriate resources (budget, efforts, passion) are mobilized to ensure continual sustained bioenergy growth for market transformation. This will ensure that public goods and services are delivered cost effectively and efficiently so that the poor, marginalized and disadvantaged are empowered to access to opportunity and narrow the income gaps between rural and urban

population. To ensure that trainings are cost effective, the training will not be limited to presentations and documentations but will include a dominant share of practical hands-on training.

Output 3.1: Established and operational Research, Knowledge, Learning and Coordination Centre, leading a network, for Timor-Leste

Activity 3.1.1: Creation, establishment and operation of Research, Knowledge, Learning and Coordination Centre

An institutional set up as the Centre of Excellence will be established within the RE of the SSE to consolidate, preserve, coordinate and ensure continuing use of information and knowledge that are obtained and accumulated during the capacity development and other activities in this Project. This research, knowledge, learning and coordination platform aims to develop local bioenergy champions and to support and enhance knowledge gathering and dissemination to the target audience and participants of the capacity development exercises. This platform, to be initially manned by the members of the Team in collaboration with SSE and Cookstove Testing and Development Centre at Dili Institute of Technology, is envisaged to act as a one-stop center and the Centre of Excellence that will provide an integrated set of information and coordination services to the value chain actors and stakeholders in the biomass sector. The BERIS (Activity 1.2.2) will be used by this platform as a tool to gather, preserve and coordinate information.

Activity 3.1.2: Documentation, regular production and dissemination of information related to biomass energy resources and BET application and utilization

The lessons gained in the implementation of the demonstration BET projects and dissemination of stoves and the aspects showing good practices will be documented. Using the set up and communications strategy of the Research, Knowledge, Learning and Coordination Centre, the SBEPB Project will regularly produce information and knowledge products related to biomass energy resources as well as project lessons and best practices, including from other GEF bioenergy projects elsewhere, and disseminate these to target audience through newsletters, radio and other appropriate media. The aim is to create awareness among relevant government agencies and the private sector, and encourage replication of the technologies promoted in this and other Projects.

Output 3.2: Energy, Industrial and Rural Development planners trained on integrated rural energy planning, low carbon technology promotion and regulatory enforcement

Local development planning processes are key institutional mechanisms in negotiating virtuous synergies among local energy access and rural, agricultural development actors. This output will partner with the Suco Development Planning process and the District Development Planning process within the framework of the Integrated District Development Planning being implemented by Estatal. Key characteristics are:

- Structured periodic processes of local economic development planning at the district or sub-district level.
- Developing local energy markets in relation to local economic development.

Linking to a local development planning process poses several challenges. It could be a very lengthy process in which different interests and themes compete for dominance in the final plan. This entails a process of negotiation among competing priorities for which local authorities are often poorly equipped. Furthermore, once plans are finalized, funding from the central Government is often slow to follow for their implementation. The Center of Excellence at the RE Unit of the SSE will work closely with Sucos and districts to deliver up-to-date data from BERIS's bioenergy resource inventory form more informed decision-making at the local levels. Advocacy will be a key underlying component of

the hands-on training that the planners will receive on integrated rural energy planning, low carbon technology promotion and regulatory enforcement. Evidence suggests that where receptive local authorities lead an open process, it is worth engaging as it can be a unique opportunity for actors who usually work in isolation (local authorities, entrepreneurs, energy providers, energy users, agricultural groups and support organizations) to negotiate shared priorities and workable solutions.

Increased demand from productive agricultural uses contributes significantly to making energy provision more viable to local operators and can stimulate community groups to become energy providers themselves. In this process, more people gain access to energy while agricultural and economic development advance. Institutional mechanisms can be used to negotiate virtuous synergies among local energy access and agricultural development actors.

Activity 3.2.1: Preparation work and organization of training on integrated rural energy planning and biomass resource assessment

During this preparation work, the participants from among the planning officers of the districts, *Sucos* and aldeas will be selected. Invitation to the selected participants will be issued according to the protocol of the government agency involved. Along with this, other preparation work will be initiated such as: selection of the date of the training, selection and booking of the venue, invitation of resource persons, preparation of hand-outs and other preparatory activities.

Activity 3.2.2: Conduct of participatory training on integrated rural energy planning and biomass resource assessment

This participatory training will be conducted by an external expert to be sourced through Technical Assistance. The training will contain both theoretical principles of rural integrated energy and agroforestry planning and biomass resource assessment and mapping and practical exercises that may include actual assessments of biomass resources at the community level. Such training will be conducted every year to allow new participants to be trained and gain updated knowledge and techniques on the subject matter.

Activity 3.2.3: Generating public sector buy in through advocacy on project impact and co-benefits analysis

To overcome the difficulty of negotiation among competing priorities and the slow funding from the central government for implementation, this activity seeks to utilize the decision making tools developed under the BERIS program to generate strong buy in from sensitized public stakeholders (policymakers, lawmakers, planners at the national and Sucos level) by: i) engaging early on in a dialogue with the key public decision makers and financiers at the local and at the national level, starting from Q1 of Year 1; (ii) develop robust economic and social (including health and environmental) analysis of the co-benefits and expected impact of the proposed activities, reforms and mechanisms to feed this dialogue; and (iii) enable a comparison between what the project proposes and the other competing priorities authorities are considering. This will ensure that appropriate national budgets are ring-fenced for targeted access to clean cook stove technology, at the household, institutional and industrial levels. The support will also include an analysis of the scope of work of the envisioned database matching the expected financing (including beyond project completion) with targeted data, data access modes ad updating periods that are in line with the key demands of the targeted users. The focus will be on implementation going beyond analysis so that there will be appropriate matching of financing for the widespread dissemination and application of these BETs. The Ministry of Finance and the Ministry of Commerce, Industry and Environment will serve as key members of the Project Board for early dialogue, involvement and support.

Output 3.3: Public stakeholders, project developers and micro-entrepreneurs trained on bio-energy technology component manufacturing/fabricating; BET project development, consultancy and energy services provision

Activity 3.3.1: Preparation work and organization of training on different aspects of BET technologies

During this preparation work, the participants from among the relevant government agencies, project developers and micro-entrepreneurs, will be selected. Invitation to the selected participants will be issued according to the protocol of the government agency involved. Along with this, other preparation work will be initiated such as: selection of the date of the training, selection and booking of the venue, invitation of resource persons, preparation of hand-outs and other preparatory activities.

Activity 3.3.2: Conduct of training on different aspects of BET technologies

This training will provide technical and commercial knowledge on different aspects of BET technologies, particularly on those technologies implemented as demonstration projects. The resource person who will conduct the training will be selected through a competitive tender for a TA, which will be combined with the TA to conduct the training indicated in Activity 3.4.2. This training will be conducted every year during the Project implementation.

Output 3.4: Communities and local institutions trained on the installation and maintenance of energy-efficient cook stoves/ furnaces

Activity 3.4.1: Preparation work and organization of training on the installation, operation and maintenance of energy-efficient furnaces/stoves

Other than the training that will be conducted by the technology suppliers for the operators of the plants, training on the different aspects of installation, operation and maintenance of energy-efficient furnaces/stoves will be organized for selected representatives of communities and institutions. The preparation work will include the selection and invitation of participants, selection of the date of the training, selection and booking of the venue, invitation of resource persons, preparation of hand-outs and other preparatory activities.

Activity 3.4.2: Conduct of training on the installation, operation and maintenance of energy-efficient furnaces/stoves

This training is aimed to develop technical skills and capabilities of members of communities, government agencies and institutions so that there will be a pool of individuals who could be tapped for the construction, operation or maintenance of new projects, in order to enable the growth of BET service market. Such training, which will be conducted by the same resource person (or from the same firm) selected to conduct the TA for Activity 3.3.2, will incorporate hands-on exposure in the demonstration BET systems implemented by SBEPB.

Output 3.5: Completed site visits to successfully operated BET applications and dialogues with policy makers, regulators, technology developers, entrepreneurs and financiers

Activity 3.5.1: Preparation work and organization of site visits

Indonesia and Cambodia have been identified as potential site visit countries. These visits are necessary to provide opportunities to potential first-movers (who will themselves play the lead role in setting up local demonstration sites) and key value chain actors to discuss with policy makers, regulators, technology developers & owners, entrepreneurs and financiers on the challenges of setting up bioenergy businesses and projects and how they overcame the obstacles faced in order to succeed. This will also give them the confidence to start BET projects in Timor-Leste and deal with the relevant stakeholders with the right information in-hand. Partners such as Hivos, SNV and Mercy

Corps have highly recommended site visits to good practices in Indonesia and Cambodia as important exposure for local entrepreneurs and key stakeholders. Host institutions in target countries will be identified and contracted to act as a host to the participants from Timor-Leste. These host institutions will prepare the itineraries, contact the necessary local entities to visit and have dialogues with, and arrange local accommodation and transports. Visits will also be arranged to the SBEPB demonstration sites within Timor-Leste.

Activity 3.5.2: Conduct of visits to the SBEPB demonstrations and other successfully operated BET applications and formation of a local solutions exchange.

The site visit is meant to show to the participants working BET models and convince them that such technologies will work under Timor-Leste conditions. Because the targeted BETs are not yet successfully implemented in Timor-Leste, first of all, visits will be made at the beginning of the SBEPB Project implementation to countries abroad that have successfully operating installations. As these projects consist of improved cook stoves systems, the planned site visits will be in Indonesia or Cambodia where such systems are currently implemented and operating. Once the full scale BET demonstration models are completed in Timor-Leste, visits will be regularly arranged for local stakeholders to these sites.

2.4 Key indicators, risks and assumptions

The most direct global benefit of this project as it relates to GEF objectives is the reduction in GHGs emission chiefly CO_2. Other associated benefits to Timor-Leste include more access to clean bioenergy solutions for the Timorese people; development of appliances standards and guidelines; more stable renewable biomass supply and less dependency on non-renewable biomass; greening up of the value chain in the cottage industry. All these will contribute to the overall sustainability of the project and thus are critical to the continued reduction in CO_2 emissions.

The following indicators could be used to measure the impact of the proposed initiatives. The detailed indicators of the SBEPB Project according to outputs are provided in the Project Results Framework (Section 3).

Table 5: Indicators to measure the impact of proposed initiatives

Measurable Indicators	Source of Verification
Quantity of GHG emissions mitigated	• GHG emission mitigation calculations; Surveys, Statistics reports from SSE; SBEPB project activity and M&E reports
• Reduction of non-sustainable fuel wood consumption for energy use in households and industries. • Enterprises supplying clean and efficient biomass energy systems and services. • Households and industries that adopted, and are benefiting from, the energy-efficient furnaces/stoves & other BET applications.	• Household and industry surveys; SPEPB project M&E Reports • Household and industry surveys; SPEPB project M&E Reports • Household and industry surveys; SPEPB project M&E Reports
• No. of sustainable biomass energy production businesses that were proposed and developed as influenced by the strengthened policy and institutional frameworks for the deployment of BETs and biomass energy businesses • Policies and legal frameworks (including Standards and Testing procedures) that are supportive of BET applications	• Business plans of companies interested in biomass energy production; Industry surveys; SPEPB project activity and M&E reports • Documentation of new and approved policies and legislations (Standards and

and biomass energy business development	Testing procedures) for supporting BET applications
• Funding made available for BET application projects	• Documentation of financial agreements for BET projects
• Users of the Biomass Energy Resource Information System (BERIS)	• Surveys; SPEPB project activity and M&E Report
• Production of improved cook stoves (ICS)	• Surveys; SPEPB project activity and M&E reports
• Increased ICS utilization by consumers	• Surveys; SPEPB project activity and M&E reports
• Energy efficient furnaces/stoves and industrial stoves installed & used	• Surveys; SPEPB project activity and M&E reports
• Investments on biomass energy technology applications	• Survey of MFIs; SPEPB project activity and M&E reports
• Fuel wood savings from the cost-effective and efficient use of biomass energy in rural communities	• SPEPB project activity and M&E reports
• New BET replication projects	• Reports on the performance of replication projects; SPEPB project activity and M&E reports
• Financial support schemes (e.g., startup grant, end user subsidy, loan products) developed for scaling up and replicating successful BET projects	• Documentation of formulated financial support schemes; SPEPB project activity and M&E reports
• Local financial institutions that provide financial schemes to support BET projects	• Documentation of agreements with FIs in the implementation of financial support schemes; SPEPB project activity and M&E reports
• Funds earmarked by participating MFIs for financing BET project	• MFI reports on its BET loan portfolio; SPEPB project activity and M&E reports
• Local manufacturing enterprises that can fabricate and install equipment/components used in BET systems	• Company profile of qualified local manufacturing firms fabricating and installing BET system equipment and components
• Trained and qualified men and women technicians working on BET application projects	• Company profile of qualified local engineering firms working on BET application projects; job certifications of technical staff
• Trained men and women technicians who are qualified to repair and maintain BET equipment and installations	• Company profile of qualified local technical services firms doing R&M work on BET system facilities; job certifications of technical staff
• Trained and qualified men and women in rural communities gainfully engaged in community forestry and woodlot operations	• Company profile of local firms working on sustainable forestry projects; job certifications of technical staff
• Local development plans integrate biomass energy use, BET applications, and biomass industry development	• Documentation on local development plans in selected towns
• Local men and women financial officers that are capable of evaluating biomass energy and other RE project proposals	• Profile of banks/FIs with RE project loan portfolios; job certifications of technical staff
• Local entrepreneurs and SMEs that are gainfully involved in businesses that make up the value chain of the BET application industry	• Survey of companies involved in the upstream and downstream activities in the BET application industry

Based on discussions with stakeholders, it is expected that the overall project risk will be moderate. The potential risks, which could hinder the successful project implementation and/or reduce project effectiveness, are itemized in Table 5. To address these anticipated risks, the project will be designed to include an effective means to monitor, and to the extent possible, mitigate these risks. A project monitoring & evaluation plan has been prepared to track not only the project milestones, but also the indicators that will show that the identified risks are, if not eliminated – at least mitigated. Stakeholders were engaged during the project design stage. The measures that have been taken during the preparation and design of the Project and/or will be taken during the implementation phase so that these potential risks will be mitigated are outlined in Table 6.

Table 6: Mitigating Risks

Type	Level	Risk	Mitigation
Policy and Legislative Risk	Moderate	In Timor-Leste, legislative processes are usually very cumbersome and it may take several months to complete one circle of legislation. The proposed project may likely experience the following risks: • Legislative delay that may go beyond the project life span. • Inability of members and low buy in of the Timorese Parliament to fully understand the entire concept of energy efficiency and its importance thus may not show much interest in the issues. • Slow/delayed adoption of the new law and policy by the Timorese. • The mandates of SSE and other relevant agencies to the project are not revised timely. This may pose a threat to the project.	The current project will put in place activities to adequately enlighten policy makers and legislators at the outset of the project to enable them understand the urgency and importance of the project. Bioenergy Steering Committee will be formed to provide an active platform for dialogue and to enlighten the lawmakers, industry and consumers on the cost-benefit of the project and opportunity cost of inaction.
Technical Risk	Low	The success of this project will largely depend on adequately increasing the technical capacity of the relevant institutions, such as the SSE, DIT, Forestry and Livestock Department etc. The following are therefore potential risks: • Lack of project ownership • Lack of willingness of the staff of these institutions to adopt new knowledge and practice • Inadequate knowledge of laboratories staff, manufacturers, importers and retailers in the implementation of the testing program • Inadequate knowledge and skills of key stakeholders to the project • Inadequate expertise on procedures for energy consumption measuring, calculation of energy efficiency index and enforcement procedures.	Bottom up; participatory training approach will be used to generate greater ownership. To mitigate this risk, adequate provision will be made to train staff of these institutions to imbibe the new technology. Training and enhancement of the capacity of relevant agencies and stakeholders is a key component of the current project.
Economic and political Risk	Medium	• The Timorese economy is highly dependent on oil for over 95% of her foreign earnings come from the exportation of petroleum. Any fall in the price of oil in the international market may have significant impacts on the volume of economic activities in Timor-Leste. The current and future price of fossil fuel could influence the uptake and buy in of bioenergy options. A drop in international and regional oil prices would diminish the attractiveness of bioenergy measures and therefore could likely threaten the willingness of the stakeholders to engage in	The current international forecast indicates that the price of oil is likely to remain high over the short term. Political reforms are constantly being introduced to provide stability for economic growth that would incorporate bioenergy strategy. This is not considered a significant risk. The 2012 Presidential and Parliamentary elections in Timor-Leste were remarkably peaceful, and further

		the proposed bioenergy reform & strategy. • Political upheaval and instability could affect economic development and the uptake of bioenergy technology	significant outbreaks of violence are considered unlikely.
Financial Risk	Medium to High	To promote bioenergy in Timor-Leste will require a significant investment on the part of the Government and other development partners. Therefore the likely risks to be associated with this project are: • The Government and many of these development partners may be unwilling to put in this quantum of investment. • The unstable nature of the exchange rates of both local and foreign currencies and high interest rates. • The higher upfront cost of bioenergy appliances (improved cook stove) may be a deterrent to consumers.	The project will put in place a strategic public-private partnership, complementing adequate structures, mechanisms, policy and legislation that will encourage investment in the sector.
Marketing/Distribution Risk	Low	Insufficient numbers of households purchase alternative energy technologies to conduct useful analysis The anomalies in the Timor-Leste marketing/distribution system such as the proliferation of traditional and substandard products, monopoly of distribution etc., may pose a potential danger to the success of the project. This makes the current business environment not conducive to the development of bioenergy.	This is considered extremely unlikely. Prior to implementing the program, conducted an extensive viability study, and in the course of the program all indications show that very large numbers of households will choose to purchase energy technologies. This will be addressed by the current project by putting in place the right policy and legislation and setting up a stringent mechanism for enforcement.
Information Risk	Low	Though may be considered as low risks but they may impact on the project: • There is low level of awareness on the potentials of bioenergy solutions to bring about economic development and environmental sustainability. • There is also lack of thorough communication with key policy makers. • More so, there is lack of an accurate reporting of existing legal and regulatory framework. • Not many Timorese have information on the existence and availability of bioenergy appliances. • Illiteracy and general low capacity among households in target areas poses challenges in terms of data collection and impact measurement	This will be addressed by creating knowledge products and awareness using all type of media (TV, radio, newspaper) and using NGOs already working on bioenergy projects. The implementation of a bioenergy policy will be included as a component of procurement policy to help the country adapt to the adoption of bioenergy. Using local CBO who has extensive experience of working with these types of households in Timor-Leste and in many other countries around the world. CBO will design the research tools to take into account respondent capacities, and minimize the risk of respondent incomprehension and bias.

2.5 Financial modality

Without GEF intervention some baseline project activities will be performed and funded by the GoTL through agencies such as the SSE, NDF and NDL using input based approach. Funding from other donor organizations, including parallel activities, are also expected. These include funding from the UNDP's Social Business Programme, the GEF Small Grant Programme and the private cottage industries that will be hosting the demonstration projects. Development partners like Mercy Corps, Hivos will fund parallel activities on implementation of domestic and institutional cook stove. The individual households, whenever they need new stoves or replace their old ones, will continue to make their own or purchase the traditional stoves using their own funds.

2.6 Cost Effectiveness

The proposed project targets the realization of a substantial increase in the sustainable and efficient use of biomass energy resources for the provision of energy services in Timor-Leste's urban and rural sector (i.e., for household, community and rural industry uses) facilitated through the barrier removal activities focusing on institutional strengthening, regulatory framework, capacity building, market development and other technical assistance activities that will be implemented. During the project inception phase, targeted consultations will be held with local entrepreneurs to participate in the demonstrations projects, through investments in land, premises and hardware of the projects. Also, Component 1 of the proposed project focuses strongly on specific development and implementation of a roadmap for sustainable bioenergy promotion, to be complemented with recommendations for fiscal incentives from the Ministry of Finance, as well as earmarked areas for sustainable bioenergy production.

At the end of the Project, approximately 206,633 tCO2e emissions will be avoided directly, through the 20,000 improved stoves. Throughout the life of the same stoves and the implemented BETs, and without the benefit of additional installations, the cumulative GHG mitigation is expected to be at least 675,214 tCO2e, giving a cost of less than USD 2.56 of GEF resources/tonne of CO2 emissions avoided. This clearly shows that the approach of barrier removal for this project is more cost-effective than the Clean Development Mechanism and other carbon financing schemes.

The project's cost effectiveness will be tracked using the Tracking Tool for Climate Change Mitigation Projects developed by GEF.

2.7 Sustainability

Sustainability of the proposed project will depend upon various factors including the quality of the bioenergy appliances available on the market supported through the standards and testing program, and the technical assistance and capacity building program to ensure that all sectors involved gain full ownership of the tools and methods to be used. One of the purposes of this project is to stimulate sufficient demand for bioenergy solutions and measures using women groups to reduce supply risks so that: (i) the use of bioenergy efficient appliances in the residential, institutional and industrial sector will become an accepted practice; and (ii) local industry will continue to invest in time, material and people to build a strong and local knowledge base. Building capacities of key Government agencies, as well as local training/research institutions will also ensure sustainability through appropriate budget allocations for rural energy access, continuously reviewing and setting enabling policy environment

for private sector and local entrepreneurship development, providing the right skilled workforce and promoting the role of MFIs at the community level.

By the end of this GEF technical assistance and investment project, sustainability of project results will be ensured by:

- Scaling up of bioenergy solutions through market-based and inclusive value chain business model where the poor, women and youth could be empowered to participate as value chain actors
- Establishing a Centre of Excellence within the RE-SSE that will be responsible for conducting technical feasibility studies to evaluate new bioenergy solutions, techniques and appliances, as well as developing and updating the bioenergy policy and legislation (major revisions to the bioenergy policy, regulation and strategy can be expected every five years on average);
- Establishing an internationally accredited testing and certification center at CTDC at the Dili Institute of Technology for the development of new bioenergy solutions;
- Development of local social entrepreneurs, champions and service providers along the value chain using market based approach with access to affordable loans;
- Updating the regulatory and institutional framework governing bioenergy up-scaling and deployment;
- Providing peer to peer training to manufacturers, importers, distributors, retailers, consumers, engineers, enforcement agencies;
- Creating a National Bioenergy Steering Committee with members from SSE, Forestry Department, Livestock Department, CBOs (Mercy Corps, World Vision, Haburas, Permatil, and Rai Maran), etc. that will ensure harmonization of bioenergy policies and activities among key stakeholders and will promote an ongoing policy and investment dialog between public and private stakeholders.

Regarding the project's financial sustainability, it is important to note that there will not be a need for a similar project in the future in the country once the identified barriers are removed. A change in regulation and adoption of a new set of rules of the game for the bioenergy policy and legislation of Timor-Leste – if done right – should be an irreversible process unless there is a major policy reversal that could not have been anticipated. The issue of marketing imported or locally made inferior substandard bioenergy appliances will be the object of attention throughout the project.

The program has been designed to optimize the chances of the SSE and CTDC being sustainable by the end of the program. This includes:

- Locating the SSE and CTDC in an existing learning institution, so SSE and CTDC staff are integrated into a broader institutional structure;
- Ensuring host institution commitment to the SSE and CTDC and a sustainability plan is part of the selection process for the SSE and CTDC location;
- Developing an operating and business model that takes account of the need for financial sustainability in the long-term;
- Adopting a facilitation role rather than a direct management role, so that SSE and CTDC staff take responsibility for the activities and outreach;
- Engaging a broad spectrum of stakeholders (the Government, civil society and the private sector) to maximize interest in clean bioenergy and therefore demand for SSE and CTDC services;
- Integrating clean bioenergy training into the curriculum of the learning institution, so that the SSS and CTDC has a permanent role beyond research and external training; and,

- Linking the SSE and CTDC to a network of bioenergy centers connected to ARC and the GACC, and working to build partnerships between the SSE and CTDC and other regional institutions or organizations

2.8 Replicability

As the biomass, bioenergy and forestry sector are being developed to better align productive capacity with demand for sustainable feedstock, demand side management (DSM) initiatives will remain a key component of the Timor-Leste's strategy to rationalize the bioenergy and biomass market. By bringing together manufacturers/importers and buyers in an effort to improve the efficiency of appliances, demonstrates the relevance of the project that seeks to reduce the impact of high energy costs on household budgets. This is especially true where rising standards of living are encouraging the acquisition of low-cost aspirational bioenergy products and services of questionable quality.

The project intends to work closely with relevant trade and professional associations (such as Producers Association, UN Women) national and local government agencies (SSE, Forestry, Livestock and Environment Departments, DIT), consumer associations and other CBOs to remove technical, regulatory and informational barriers. Training workshops will be provided to private sector operators under the auspices of the MFI and manufacturer/importers.

The project has a component to promote bioenergy efficient appliances through regular distribution channels to educate and influence buyers at the retail locations. The project has a second component to provide a public education campaign through consumer organizations and selected media to change consumer mind sets by explaining the importance of looking at the total cost of ownership. Given the size of Timorese's domestic market, the project will collaborate with consumer organizations in the three largest urban markets in Timor-Leste for appliance sales to ensure a broad diffusion of bioenergy awareness among consumers and retailers.

The goal will be to develop transparent certification and standards for the industry, publicize the standards regulatory requirements, and sensitize consumers to the need to consider the total life cycle cost in making purchase decisions. If the demonstration effect for the appliances considered in this project can be successful, then a replicable model can be applied to other appliances on a consensus basis between manufacturers/importers, regulatory agencies and consumer protection groups.

2.9 Global Environmental Benefits

The activities of the Project consisting of the dissemination of 20,000 improved cook stoves will result in the reduction of GHG emissions amounting to approximately 206,633 tCO2e at the end of the Project.

2.9.1 GHG Emission Mitigation from the Use of Improved Cook Stoves

As explained earlier, the Project will introduce efficient stoves in three categories, namely: cook stoves, institutional stoves and industrial stoves. These stoves will replace traditional less efficient stoves currently being used by many households in Timor-Leste. Due to the much higher efficiency of the new stoves, less fuel wood will be used up for the same cooking and thermal needs derived by the end-users of the stoves. As the sources of the wood fuel are currently not coming from managed community forest plantation, the quantity of fuel wood saved and that will not be burned will therefore

cause avoidance of carbon dioxide emissions that would otherwise have been generated by the uncontrolled combustion of fuel wood in the traditional stoves. The cutting of trees from forests will also be reduced.

The GHG annual emission mitigation from stoves can be calculated as follows:

GHG emission mitigation = amount of fuel wood saved annually by the efficient stove x the emission factor of fuel wood x the number of stoves introduced

In order to provide a conservative estimate on the different parameters and assumptions leading to the calculation of the GHG emission, the UNFCCC approved methodology (AMS-II.G/Ver.02) was used. The details of the calculations for each type of stove are given in Annex F. The main parameters used in the calculations and the sources of information are shown in Table 7 below.

Table 7: Assumptions used in GHG emission mitigation calculation

Parameters	Value	Source of Information	Remarks
Efficiency of old stoves			
Cook stoves	10%	Mercy Corps	
Institutional stoves	8%	Aprovecho	
Industrial stoves	10%	Aprovecho	
Efficiency of new stoves			
Cook stoves	40%	Mercy Corps	
Institutional stoves	45%	WFP, UNICEF	
Industrial stoves	50%	Aprovecho	
Quantity of fuel wood consumed per stove per day	Cookstove = 11 (8-15) kg Institutional = 50 (60-80) kg Industrial = 180 (150-250) kg	E4A Baseline survey	
Emission factors			
Fuel wood	122 tCO2/TJ	IPCC default value	
Kerosene	71.5 tCO2/TJ	IPCC default value	Use kerosene for conservatism
Net calorific value of biomass	0.015 TJ/tonne	IPCC default value	

a. Lifetime Direct GHG Emissions Avoided

The 20,000 stoves will be disseminated in different phases and at different years. Lifetime direct emissions avoided attributable to the investments made during the projects supervised implementation period, totaled over the respective lifetime of the investments is presented in Table 8, 9 and 10. The summary of the expected annual and cumulative fuel wood savings and GHG mitigation as a result of using the efficient stoves is shown in Table 8. Table 9 shows the fuel wood savings and GHG mitigation according to the different types of stoves. The life of the stoves supported in this Project is expected to be about five years, with the industrial stoves, which is made of metal and cement, lasting slightly more than that. Thus, giving an average of five years from the end of Year 2, the stoves that are supported by the Project by utilizing the institutional and financing scheme set up within the Project, and disseminated through its roll-out mechanism, are expected to mitigate GHG emissions until the end of Year 8. Table 10 presents details of the summary in Table 8 - total lifetime direct GHG emissions avoided.

Table 8: SUMMARY: Lifetime Direct GHG Emissions Avoided

Indicator	Total @ End of Project
Fuel wood saved (tonnes)	629,570
GHG emissions mitigated (tCO2e)	675,214

Table 9: First four-year direct GHG emission mitigation of stoves				
Year	**1**	**2**	**3**	**4**
Cook stoves				
No. of installed stoves	800	4,400	10,800	19,000
Fuel wood saved annually (tonnes)	2,409	13,250	32,522	57,214
GHG emissions mitigated annually (tCO2e)	2,584	14,210	34,879	61,362
Institutional stoves				
No. of installed stoves	20	110	270	600
Fuel wood saved annually (tonnes)	274	1,506	3,696	8,213
GHG emissions mitigated annually (tCO2e)	294	1,615	3,964	8,808
Industrial stoves				
No. of installed stoves	8	68	196	400
Fuel wood saved annually (tonnes)	876	7,446	21,462	43,800
GHG emissions mitigated annually (tCO2e)	940	7,986	23,018	46,976
Total				
No. of installed stoves	***828***	***4,578***	***11,266***	***20,000***
Fuel wood saved annually (tonnes)	***3,559***	***22,201***	***57,679***	***109,226***
Cumulative fuel wood saved (tonnes)	***3,559***	***25,760***	***83,439***	***192,665***
GHG emissions mitigated annually (tCO2e)	***3,817***	***23,811***	***61,861***	***117,145***
Cumulative tCO2e mitigated	***3,817***	***27,627***	***89,488***	***206,633***

Table 10: Total Lifetime direct GHG emission mitigation of stoves								
Year	1	2	3	4	5	6	7	8
Cook stoves								
No. of installed stoves	800	4,400	10,800	19,000	19,000	19,000	19,000	19,000
Fuel wood saved annually (tonnes)	2,409	13,250	32,522	57,214	57,214	57,214	57,214	57,214
GHG emissions mitigated annually (tCO2e)	2,584	14,210	34,879	61,362	61,362	61,362	61,362	61,362
Institutional stoves								
No. of installed stoves	20	110	270	600	600	600	600	600
Fuel wood saved annually (tonnes)	274	1,506	3,696	8,213	8,213	8,213	8,213	8,213
GHG emissions mitigated annually (tCO2e)	294	1,615	3,964	8,808	8,808	8,808	8,808	8,808
Industrial stoves								
No. of installed stoves	8	68	196	400	400	400	400	400
Fuel wood saved annually (tonnes)	876	7,446	21,462	43,800	43,800	43,800	43,800	43,800
GHG emissions mitigated annually (tCO2e)	940	7,986	23,018	46,976	46,976	46,976	46,976	46,976
Total								
No. of installed stoves	*828*	*4,578*	*11,266*	*20,000*	*20,000*	*20,000*	*20,000*	*20,000*
Fuel wood saved annually (tonnes)	*3,559*	*22,201*	*57,679*	*109,226*	*109,226*	*109,226*	*109,226*	*109,226*
Cumulative fuel wood saved (tonnes)	*3,559*	*25,760*	*83,439*	*192,665*	*301,892*	*411,118*	*520,344*	*629,570*
GHG emissions mitigated annually (tCO2e)	*3,817*	*23,811*	*61,861*	*117,145*	*117,145*	*117,145*	*117,145*	*117,145*
Cumulative tCO2e mitigated	*3,817*	*27,627*	*89,488*	*206,633*	*323,779*	*440,924*	*558,069*	*675,214*

b. Project Indirect (through Replication) GHG Emission Mitigation

The design of the Project emphasizes on sustainability of its activities, including the dissemination of more stoves through government support, financial facilities and market mechanisms established. It is targeted that, due to activities and support attributable to the Project, ten years after the end of the Project (i.e., influence period), the penetration of the stoves nationwide will be about 35% of the total households of the current 184,000, allowing for 2.8 per cent annual population growth. This means an increase of about 15% annually in the number of operating stoves. The GHG emission mitigation given this situation up to Year 14 (ten years after the end of the Project), referred to as the project indirect GHG emission mitigation, is given in Table 11 (please see next page).

Years 15-18 reflect the remaining lifetime of stoves installed during the influence period. It is assumed that as the improved energy efficient stoves reach the end of their lifetime (5 years), they will be automatically replaced by the consumer/ household. However, for the sake of keeping the post-project indirect impact calculations limited to the 10-year influence period, Years 15 – 18 shows the details for retiring of the remaining stoves installed from Years 11 – 14.

Some indirect CO2 emission reductions can also be realized during the project period from similar applications that may have been influenced by the interventions that the project will be doing but are not in any way related to the project. To be conservative, these are not accounted for in the estimation of the indirect CO2 emission reductions, which in this case is mainly considered as those realized during the influence period after the completion of the GEF project.

Thus, the total indirect GHG emissions avoided is estimated to be 2,106,449 tonnes CO2eq. This is based on the following assumptions:

1. The 20,000 stoves distributed by the GEF Project will automatically be replaced as they retire at the end of their individual shelf-life. This will happen due to the various manufacturing, distribution, after-sales services, financing and information mechanisms that the GEF Project will install to ensure the sustainability of the project.
2. The indirect impact is estimated based on a 15% annual growth of customers (purchasing improved stoves) after the end of the project, from Year 5. So, it will be an annual 15% growth, starting from a base figure of 20,000. However, the CO2 emissions attributed to the baseline 20,000 stoves are NOT included in the estimation of the indirect impact. Only the annual growth of 15% of new customers is accounted for the in the calculation of indirect impact (influence). Hence, the indirect impact does NOT include the direct impact.
3. For the sake of keeping the influence period limited to the 10-year duration, the calculations for Year 15 – 18, do not assume automatic replacement.

Table 11: Post-Project indirect GHG emission mitigation of stoves														
Year	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Cook stoves														
No. of installed stoves	2,850	6,128	9,897	14,231	19,216	24,948	31,540	39,121	47,840	57,866	32,917	26,325	18,744	10,026
Fuel wood saved annually (tonnes)	8,582	18,451	29,801	42,853	57,864	75,125	94,976	117,804	144,057	174,248	99,123	79,272	56,443	30,191
GHG emissions mitigated annually (tCO2e)	9,204	19,789	31,962	45,960	62,059	80,572	101,862	126,345	154,501	186,881	106,309	85,019	60,536	32,379
Institutional stoves														
No. of installed stoves	90	194	313	449	607	788	996	1,235	1,511	1,827	1,039	831	592	317
Fuel wood saved annually (tonnes)	1,232	2,649	4,278	6,151	8,306	10,784	13,633	16,910	20,678	25,012	14,228	11,379	8,102	4,334
GHG emissions mitigated annually (tCO2e)	1,321	2,841	4,588	6,597	8,908	11,565	14,621	18,136	22,177	26,825	15,260	12,204	8,689	4,648
Industrial stoves														
No. of installed stoves	60	129	208	300	405	525	664	824	1,007	1,218	693	554	395	211
Fuel wood saved annually (tonnes)	6,570	14,126	22,814	32,806	44,297	57,512	72,709	90,185	110,283	133,395	75,883	60,687	43,210	23,112
GHG emissions mitigated annually (tCO2e)	7,046	15,150	24,468	35,185	47,509	61,682	77,980	96,724	118,278	143,067	81,385	65,086	46,343	24,788
Total														
No. of installed stoves	3,000	6,450	10,418	14,980	20,227	26,261	33,200	41,180	50,358	60,911	34,650	27,711	19,731	10,554
Fuel wood saved annually (tonnes)	16,384	35,225	56,893	81,811	110,467	143,421	181,318	224,899	275,018	332,655	189,234	151,337	107,756	57,637
Cumulative fuel wood saved (tonnes)	16,384	51,609	108,503	190,314	300,781	444,201	625,519	850,418	1,125,437	1,458,091	1,647,326	1,798,663	1,906,418	1,964,055
GHG emissions mitigated annually (tCO2e)	17,572	37,779	61,018	87,742	118,476	153,819	194,463	241,205	294,957	356,772	202,954	162,309	115,568	61,815
Cumulative tCO2e mitigated	17,572	55,351	116,369	204,112	322,587	476,406	670,869	912,074	1,207,031	1,563,803	1,766,757	1,929,066	2,044,633	2,106,449

2.9.2 GHG Emission Mitigation from Other Sources

The use of energy efficient stoves to replace the traditional ones is expected to reduce the consumption of wood fuel. This would therefore reduce the cutting of trees for fuel use, which would increase carbon capture from the seedlings and trees and improved land management. During the Project implementation, the parameters needed to calculate the GHG emission mitigation from carbon capture of seedlings and trees will be monitored with the aim of establishing the mitigation from this source.

2.10 Cross Cutting Issues

2.10.1 Gender Equity Issues

Women's participation, representation and access to resources and benefits will be a key focus of this project that aims to provide access to improved household energy needs through clean cooking stoves, advanced biomass cook stoves. The project will contribute towards social, economic governance transformations to empower women through specific activities that: promote participatory and consultative planning for decision-making; improve women's capabilities through their involvement, as consumers and producers in pilots and as role models; and, advance their influence in decision-making as well as control over natural resources. The project will have specific gender goal indicators, which will include the collection of gender-disaggregated data and a strong monitoring and evaluation mechanism to operate and advance gender mainstreaming and social equity.

Fuel wood use for domestic purposes is synonymous with women in Timor-Leste. Although women may share the task of collecting fuel wood with men, they are entirely responsible for cooking in the households. Therefore, this Project, which is addressing wood use in stoves, will directly impact women. The Project also aims at establishing wood plantations that will also directly enhance access of women to fuel wood in community forests and therefore reduce the time that women spend collecting fuel wood from forests that are far from villages. The SBEPB Project will therefore affect the time of women in wood collection, ease of operation of stoves and will contribute to improving the health of women who spend significant time in the kitchen. Women also regularly maintain the stoves to keep them in a condition that will ease their operation. It is therefore imperative that the SBEPB include women as an important target group in its activities conducted at the community level.

In addition, women entrepreneurs are constrained by family and traditional obligations and have usually lack of access to credit, technology and low business skills. Development efforts do not sufficiently addressed the multi-dimensional constraints to women's active participation in the economy in the country. There is no cohesive approach to gender mainstreaming in the economy within the government, NGO, or donor sectors and the business developing and training of the Project will have specific focus on developing businesses run by women.

2.10.2 Poverty and MDG

Market Study conducted by GACC shows that about 58% of the respondents live below the poverty line. The Project is expected to contribute to poverty reduction through savings on women's time and better health of people by reducing indoor pollution. Consequently, villagers will have less days of sickness thereby enhancing their productivity. The delivery of stoves will also create employment at the village level. Villagers like skilled masons, including women, will be targeted as trainees for constructing the improved stoves.

The Project will introduce improved stoves at a cost. The stoves will be delivered at a subsidy but villagers will have to mobilize the remaining cost of the stoves. The rural poor with no or few means of earning cash would find it difficult to mobilize money to pay for the cost of the stoves. Although provision of credit through the MFI has been considered under the project, the poor would still not be able to access credit because of the need for collateral as a pre-requisite for taking loans. The poor would therefore risk to be excluded from the Project benefits. A means of managing this risk is by linking poor villagers in the first stage of the roll-out of stoves (when subsidy rates are higher) with micro-finance institutions that are currently being initiated through the GoTL's support.

2.10.3 Socio-Economic Benefits

The SBEPB Project is expected to provide socio-economic benefits to communities using improved stoves. The improved stoves are more efficient and will use less fuel wood so households will not have to collect as much fuel wood as used now. There would be cash savings as villagers' costs for royalty paid for fuel wood and money spent for transportation would be reduced. People's time mainly that of women and children spent on collecting fuel wood would be saved. Women could potentially use that time for other productive activities.

Under the project, improved stoves will be constructed out of locally available materials but the design would require certain level of skills. The project will train village women and local masons in constructing stoves so these people could then disseminate the stoves in the villages. There is therefore potential for employment of these trained stove technicians supplementing their income through payment for stove building activities. Within SBEPB, communities with registered community forests could earn additional revenues by producing fuel wood for sale to communities that are facing fuel wood shortages, while at the same time providing a more sustainable alternative of fuel supply for these communities.

3. TL SBEPB PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: By 2012, national capacity for environmental sustainability and disaster management strengthened (MDG 7)
Country Programme Outcome Indicators: Detailed regulatory bioenergy framework supporting dissemination of bioenergy technologies Number of households in remote sucos using renewable energy with increased income generation opportunities
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. **Expanding access to environmental and energy services for the poor.**
Applicable GEF CC-M Focal Area Objective: Objective 3 – Promote investment in renewable energy technologies
Applicable GEF Expected Outcomes: Favorable policy and regulatory environment created for renewable energy investments; and, Investment in renewable energy technologies increased.
Applicable GEF Outcome Indicators: tons CO2eq avoided

3.1: Project Planning Matrix

Strategy	Objectively Verifiable Indicators			Source of Verification	Critical Assumptions
	Indicators	Baseline	Targets		
Project Goal: Reduction of GHG emissions through sustainable production and utilization of biomass energy in the country, and the promotion of innovative low-carbon biomass energy technologies.	• Quantity of GHG emissions mitigated annually by End of Project (EOP), tCO2e. • Total cumulative quantity of GHG emissions mitigated by EOP, tCO2e.	• 0 • 0	• Up to 117,145 • Up to 206,633	• GHG emission mitigation calculations; Statistics reports from SSE; SBEPB project activity and M&E reports • Surveys; Statistics reports from SSE; SBEPB project activity and M&E reports	• Recognition of the government on importance of reducing GHG emissions and continuing commitment towards it.

Project Objective: Removal of barriers to sustainable production and utilization of biomass resources in Timor-Leste and application of biomass energy technologies to support local economic, environmental and social development that leads to GHG mitigation.	• Reduction of non-sustainable fuel wood consumption for energy use in households and industries by EOP, tons. • No. of households and industries that adopted, and are benefiting from, the energy-efficient furnaces/stoves & other BET applications by EOP.	• 0 • 0	• Up to 192,665 • Up to 20,000	• Household and industry surveys; SPEPB project M&E Reports • Industry surveys; SPEPB project activity and M&E Reports • Household surveys; SPEPB project activity and M&E Reports	• Government continues to have the political will to support policies and actions that would promote clean and efficient BET applications • Parliament approves new law on the promotion of bioenergy.
Component 1: Policy and Institutional Support for Deployment and Commercialization of Advanced Bio-energy Technologies.					
Outcome 1: Implementation of strengthened enabling policies, legal and institutional framework for deployment of biomass energy technologies as well as the growth of biomass energy businesses in Timor-Leste.	• No. of sustainable biomass energy production businesses that were proposed and developed as influenced by the strengthened policy and institutional frameworks for the deployment of BETs and biomass energy businesses by Year 2 • No. of biomass energy utilization projects that are planned and developed for PURE/SURE purposes by EOP • No. of policies and legal frameworks that is supportive of BET applications and biomass energy business development approved and enforced by Year 3 • Volume of funding made available for BET application	• 0 • 0 • 0 • 0 • 0	• 25 • 25 • 1 • 1 million • 5	• Business plans of companies interested in biomass energy production; Industry surveys; SPEPB project activity and M&E reports • Documentation of proposed and planned biomass energy supported PURE/SURE projects by the GOT and private sector • Documentation of new and approved policies and legislations for supporting BET applications • Documentation of financial agreements for BET projects	• Government continues to see biomass as a priority energy resource to support the country's sustainable economic development. • SSE given the mandate and is able to put in place the appropriate policy and strategies for the promotion of BETs. • Government provides fiscal incentives for the promotion of BETs in Timor-Leste.

	projects by EOP, US$ million/year • No. of relevant GOT agencies and institutions involved in biomass energy production and use of BETs and are linked with each other via a working mechanism for coordination by EOP. • No. of satisfied users of the Biomass Energy Resource Information System (BERIS) each year starting Year 2	• 0	• 200	• Documentation of GOT memos and MOU on the collaborative work on BET promotion activities • Surveys; SPEPB project activity and M&E Report	
Component 2: Bio-energy Investments Promotion - Sustainable Bio-energy Technology Demonstration & Market Development					
Outcome 2.1: Availability of financial support for rural bio-energy production and associated low-carbon technology applications	• No. of operational financial support schemes (e.g., loan products) for scaling up and replicating successfully implemented BET projects (e.g., ICS) by Year 2, including the LRGS. • No. of local financial institutions that apply the new financial support schemes to support BET projects by Year 4 • Volume of funds earmarked by participating FIs for financing BET projects by EOP, US$ million/year	• 0 • 0 • 0	• 2 • 2 • US$3 m	• Documentation of formulated financial support schemes; SPEPB project activity and M&E reports • Documentation of agreements with FIs in the implementation of financial support schemes; SPEPB project activity and M&E reports • FI reports on its BET loan portfolio; SPEPB project activity and M&E reports	- Technology continues to be improved to generate business margin by all value chains actors
Outcome 2.2: Increased investments in Bio-energy	• Production of improved cook stoves (ICS) by Year 4, units • No. of ICS bought and utilized by consumers annually starting Year 4 • No. of furnaces/stoves installed & being used on a daily basis by households in targeted areas by EOP	• 0 • 0 • 0	• 20,000 • 20,000 • 600	• Surveys; SPEPB project activity and M&E reports • Surveys; SPEPB project activity and M&E reports • Surveys; SPEPB project activity and M&E reports • Surveys; SPEPB project activity and M&E reports	• Government provides fiscal incentives for the promotion of BETs in Timor-Leste. • Fossil fuel prices do not decline

	• No. of industrial stoves installed and are operational by EOP. • Total volume of investments on biomass energy technology applications by EOP, US$ million/year	• 0 • 0	• 400 • 1	• Surveys; SPEPB project activity and M&E reports • Surveys; SPEPB project activity and M&E reports • Survey of FIs; SPEPB project activity and M&E reports	drastically. • Financial institutions support the promotion of BETs by offering loan schemes for BETs manufacturing and procurement.
Outcome 2.3: GHG emissions avoided from technology applications and investments	• Annual quantities of sustainable fuel wood produced, starting Year 4, tons. • Annual fuel wood savings from the cost-effective and efficient use of biomass energy in rural communities starting Year 4, tons • Annual GHG emission reduction from the cost effective and efficient use of biomass energy in rural communities starting Year 4, tons	• 0 • 0 • 0	• 1 • 109,226 • 117,145	• Quantifications based on annual surveys of biomass resources; SPEPB project activity and M&E reports • Quantifications based on annual surveys of woodlots resources; SPEPB project activity and M&E reports • Quantifications based on annual surveys of woodlots resources; SPEPB project activity and M&E reports • Quantifications based on annual surveys of rural communities; SPEPB project activity and M&E reports • Quantifications based on annual surveys; SPEPB project activity and M&E reports	• Inter-ministerial collaboration is strong to promote sustainable fuel wood production.
Component 3: Capacity Development and Market Transformation					
Outcome 3: Enhanced capacities of policy makers, financial institutions, entrepreneurs, project developers, communities and	• No. of local manufacturing firms that can fabricate and install equipment/components used in BET systems by Year 4 • No. of trained and qualified men and women technicians working on BET application projects by EOP	• 1 • 0	• 25 • 25	• Company profile of qualified local manufacturing firms fabricating and installing BET system equipment and components • Company profile of qualified local engineering firms working on BET application projects; job certifications of technical staff	

end-users on the development of the local BET market	• No. of trained men and women technicians who are qualified to repair and maintain BET equipment and installations by EOP • No. of trained and qualified men and women in rural communities gainfully engaged in community forestry and woodlot operations by EOP. • No. of local development plans that integrate biomass energy use, BET applications, and biomass industry development prepared by local government men and women planners by EOP • No. of local men and women financial officers that are capable of evaluating biomass energy and other RE project proposals by EOP • No. of local entrepreneurs and SMEs that are gainfully involved in businesses that make up the value chain of the BET application industry by EOP	• 0 • 0 • 0 • 0 • 0	• 25 • 25 • 10 • 15 • 25	• Company profile of qualified local technical services firms doing R&M work on BET system facilities; job certifications of technical staff • Company profile of local firms working on sustainable forestry projects; job certifications of technical staff • Documentation on local development plans in selected towns • Profile of banks/FIs with RE project loan portfolios; job certifications of technical staff • Survey of companies involved in the upstream and downstream activities in the BET application industry	

3.2: Total Budget and Financial Planning (revised budget table)

Award ID:	00077146	Project ID: 00088130
Award Title:	Promoting Sustainable Bio-energy Production from Biomass (SBEPB)	
Business Unit	*TLS10*	
Project Title	Promoting Sustainable Bio-energy Production from Biomass (SBEPB)	
PIMS No.	4250	
Implementing Partner(Executing Agency)	UNDP (DIM Project)/State Secretariat for Electricity (SSE)	

GEF Outcome/ Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	See Budget Note:
OUTCOME 1: Implementation of strengthened enabling policies, legal and institutional framework for deployment of biomass energy technologies as well as the growth of biomass energy businesses in Timor-Leste.	UNDP,PT, SSE	62000	GEF	71200	International Consultants	50,000	-	-	-	50,000	1
				71200	International Consultants	55,000	-	-	-	55,000	2
				75700	Workshops & Meetings	2,000	1,000	1,000	2,000	6,000	3
				71600	Travel	5,000	5,000	2,000	2,000	14,000	4
					Total Outcome 1	112,000	6,000	3,000	4,000	125,000	
OUTCOME 2: Increased investments in Bio-energy, Development of a local supply chain and market for BETs, GHG emissions avoided from technology applications and investments.	UNDP, PT, SSE	62000	GEF	71200	International Consultant	30,000	-	-	-	30,000	5
				72100	Contractual services - Companies	72,000	72,000	72,000	73,000	289,000	6
				72100	Contractual Services - Companies	15,000	35,000	13,000	15,000	78,000	7
				72100	Contractual services - Companies	124,000	124,000	-	-	248,000	8
				71600	Travel	4,000	4,000	4,000	6,320	18,320	9
				71600	Travel	2,000	3,000	3,000	2,000	10,000	10
				72600	Grants	15,120	64,080	99,200	125,280	303,680	11
				72600	Grants	20,000	80,000	80,000	20,000	200,000	12
				75700	Workshops/Meetings	5,000	5,000	5,000	5,000	20,000	13
					Total GEF	287,120	387,080	276,200	246,600	1,197,000	
		4000	UNDP (Core	71200	International Consultants	40,000	-	-	-	40,000	14

			Grant)	71200	International Consultants	40,000	-	-	-	40,000	15
				72100	Contractual services - Companies	40,000	40,000	35,000	35,000	150,000	16
				71300	Local Consultants	10,000	10,000	10,000	10,000	40,000	17
				72100	Contractual services	20,000	20,000	20,000	20,000	80,000	18
					Total UNDP	150,000	70,000	65,000	65,000	350,000	
					Total Outcome 2	437,120	457,080	341,200	311,600	1,547,000	
OUTCOME 3. Capacity Development and Market Transformation	UNDP, PT, SSE	62000	GEF	71200	International Consultants	35,000	32,000	32,000	31,000	130,000	19
				71300	Local Consultants	25,000	20,000	25,000	30,000	100,000	20
				75700	Workshops & Meetings	1,500	1,500	1,500	1,500	6,000	21
				71600	Travel	1,500	1,500	1,500	1,500	6,000	22
				72100	Contractual services	18,000	0	0	0	18,000	23
				72500	Supplies	2,400	2,340	1,500	1,760	8,000	24
				72400	Communications & Audio Visual Equipment	1,500	1,000	1,000	31,500	35,000	25
					Total Outcome 3	84,900	58,340	62,500	97,260	303,000	
Project Management	UNDP, PT, SSE	62000	GEF	71300	Local Consultants	8,000	8,000	8,000	8,000	32,000	26
				71600	Travel	1,800	1,200	1,200	1,200	5,400	27
				71600	Travel (Vehicle Rental)	1,000	1,000	1,000	1,500	4,500	28
				72200	Office Furniture & Equipment	1,500	1,340	500	760	4,100	29
				74100	Professional Services (Audit)	3,000	3,000	3,000	3,000	12,000	30
				71300	Local Consultants	1,250	1,250	1,250	1,250	5,000	31
				75700	Workshops & Meetings	5,000	-	-	-	5,000	32
				71200	International Consultants (Mid-Term Evaluation)	-	20,000	-	-	20,000	33
				71200	International Consultants (Terminal Evaluation)	-	-	-	30,000	30,000	34

					Total PMC	21,550	35,790	14,950	45,710	118,000	
					Total GEF	505,570	487,210	356,650	393,570	1,743,000	
					Total UNDP	150,000	70,000	65,000	65,000	350,000	
					PROJECT TOTAL	655,570	557,210	421,650	458,570	2,093,000	

Budget Notes

1 International Biomass Technology expert will, with assistance of local consultants, design the bioenergy roadmap
2 International RE policy expert will assist NDF, with the assistance of local consultants, design the bioenergy policy
3 Workshop to develop the roadmap
4 Hiring of vehicles for local use
5 International Finance Expert to assist MFI to develop financial products and services
6 Local firms will provide technical services to develop the stove program
7 In collaboration with SEFOPE and CTDC to develop startup program for new stove producers
8 Local firms will provide technical services to develop the enterprise stoves for productive use program
9 Hiring of local transport
10 Per diem to cover for local travel
11 Subsidy for stoves program
12 Grant for Loan Risk Guarantee Scheme Fund
13 Development of loan products and services with MFIs for efficient cottage industry cook stove, including an international forum in Dili
14 International Finance Expert to design fiscal incentives and implementation arrangement
15 International expert to verify design and emission standards of stoves/furnaces
16 Local firms will provide technical services to SSE and NDF to develop the stoves use and maintenance awareness program
17 National Finance and RE Experts to assist International Consultant to design fiscal incentives and implementation arrangement
18 Local firms will provide technical services to develop the program
19 International Energy and Biomass Technology Expert to develop training materials and conduct training
20 National Energy and Biomass Technology Expert to assist International experts to develop training materials and conduct training
21 Organize workshops for public, private and CSO stakeholders
22 DSA for local travels
23 Cost of organizing and conducting overseas study tour
24 Publication of training materials
25 Development of knowledge products
26 Local professional will be hired as Project Coordinator, together with an Administrative and Finance Assistant
27 Cost to cover for travel for local site study tours
28 Vehicle rental to local travels
29 Purchase of office furniture and equipment
30 Services for annual financial audit of the project
31 Hiring of Institutional Consultant (University)
32 Inception workshop to introduce the project
33 International consultant to conduct mid-term review of project
34 International consultant to conduct final review of project

SUMMARY OF PROJECT BUDGET						
Funding Sources	Total Amount (USD)					Reference
	Year 1	Year 2)	Year 3	Year 4	TOTAL	
GEF	505,570	487,210	356,650	393,570	1,743,000	
UNDP (In kind)	75,000	73,000	65,000	57,000	270,000	Co-funding letter
UNDP (Core Grant)	188,000	72,000	45,000	45,000	350,000	Co-funding letter
Mercy Corps	210,000	-	-	-	210,000	Co-funding letter
Haburas (in kind)	15,000	15,000	15,000	15,000	60,000	Co-funding letter
UNDP Social Business	40,000	40,000	35,000	35,000	150,000	Co-funding letter
GoTL (Grant)	1,064,000	1,064,000	1,064,000	1,008,000	4,200,000	Co-funding letter
GoTL (In kind)	323,200	312,200	320,200	354,400	1,310,000	Co-funding letter
Private Sector	25,000	25,000	25,000	25,000	100,000	Co-funding letter
TOTAL	**2,445,770**	**2,088,410**	**1,925,850**	**1,932,970**	**8,393,000**	

3.3. Project Implementation Schedule

Activities	Responsibility	Schedule																Partners involved
		Year 1				Year 2				Year 3				Year 4				
		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	
Output 1.1: Developed and adopted new regulations and technical guidelines for renewable energy technology appraisal and evaluations																		
Activity 1.1.1 Review of bioenergy technology landscape including information such as rural energy policy, technology types, sources and applicability to conditions in Timor-Leste	PT, SSE	X	X															PMU, SSE, NDF, NDL, CTDC
Activity 1.1.2 Preparation of technology fact sheets and summary menu consolidating the key information	PT, SSE	X	X															PMU, SSE
Activity 1.1.3 Preparation of detailed regulatory frameworks, containing regulations, procedures, standards and incentives for the smooth and effective implementation of biomass energy applications	SSE, NDF, TA		X	X	X	X												SSE, NDF
Output 1.2. Developed and implemented national strategy and roadmap for the promotion of bioenergy production and utilization																		
Activity 1.2.1: Support the Government approval process of key policy instruments for sustainable biomass energy production and utilization	PT, SSE, NDF, NDL	X																PMU, SSE, NDF, NDL
Activity 1.2.2 Stakeholder consultations to define and formulate the Implementation Strategy Plan/Roadmap of the policy instruments	PT, TA	X	X															PMU, TA
Activity 1.2.3 Preparation and roll-out of the Implementation Strategic Plan/Roadmap for implementation and promotion of sustainable biomass production and utilization	PT, SSE			X	X													PMU
Output 1.3: Designed and operational national biomass energy resource inventory																		
Activity 1.3.1 Identification of agencies and institutions working on biomass energy promotion and development and establishment of appropriate mechanisms for coordination	PT, SSE, NDL	X																PMU, SSE, NDF, NDL
Activity 1.3.2 Design and creation of Biomass Energy Resource Information System (BERIS) using database environment	PT, SSE, NDL		X															PMU, SSE, NDF, NDL
Activity 1.3.3 Data gathering, operation, management, budget and training of the BERIS	TA, PT		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TA, PMU

Activity 1.3.4 Securing financing for the continued operation of the BERIS program	TA, PT, SSE				X	X	X	X	X	X	X	X	X	X	X			SSE, TA, PMU
Output 1.4: Modalities and details of participation of community-based organizations (CBO) and grassroots institutions finalized and agreed																		
Activity 1.4.1 Development and implementation of modalities for CBO participation	PT, SSE, NDF, NDL	X	X															PMU, SSE, NDF, NDL
Output 2.1 Designed and implemented startup grant and end user subsidies to enable market development for private-sector participation in biomass energy business																		
Activity 2.1.1 Establishment of procedures and modalities for the implementation of financing schemes and incentives	PT, SSE		X	X	X													PMU, SSE, UNDP-SB
Activity 2.1.2 Implementation of financing schemes and incentives for demonstrated ICS applications & services	PT, SSE					X	X	X	X	X	X	X	X	X	X	X	X	PMU, SSE, CBO, UNDP-SB
Activity 2.1.3 Design and implementation of the loan risk guarantee scheme funding for entrepreneurs in the stoves/furnaces supply chain business	PT, MoF, SSE, INFUSE, UNDP-SB	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, MoF, SSE, INFUSE, UNDP, Host Bank, MFIs
Output 2.2. Implemented and operational 400 locally produced industrial stoves for income generating local enterprises such as tofu/tempe making, coffee roasting, salt production and bakery																		
Activity 2.2.1 Identification of local fabricators, raw material suppliers and micro-entrepreneurs and their specific areas of involvement	PT, SSE, SEFOPE/IADE, UNDP-SB	X																PMU, UNDP-SB, Host agency
Activity 2.2.2 Implementation of public-private partnerships and startup grant for the production & delivery of certified energy efficient stove/furnace	PT, SSE, SEFOPE/IADE, UNDP-SB		X	X														PMU, UNDP-SB, Host agency, SEFOPE/IADE
Output 2.3: Locally produced 15,600 energy-efficient stoves in rural households and community-based institutions for cooking needs implemented and promoted for replication																		
Activity 2.3.1 Design and local fabrication of domestic and institutional stoves and training on their design and production and roll out of startup grant	PT, SSE, Private sector, TA			X	X													PT, SSE, Private sector
Activity 2.3.2 Production, installation and dissemination of furnaces/stoves to end-users using startup grant and end user subsidy	PT, SSE, CBOs, Private sector				X	X	X	X	X	X	X	X	X	X	X	X	X	PT, SSE, CBOs, Private sector
Activity 2.3.3 Conduct of training and awareness campaign on the use, maintenance and benefits of energy-efficient furnaces/stoves	PT, SSE, CBOs, Private sector, Community				X	X	X	X	X	X	X	X	X	X	X	X	X	PT, SSE, CBOs, Private sector, Community

Activity 2.3.4 Regular monitoring and evaluation of installed furnaces/ stoves and end user subsidy	PT, SSE, CBOs, Private sector, Community					X	X	X	X	X	X	X	X	X	X	X	X	PT, SSE, CBOs, Private sector, Community
Activity 2.3.5 Improvement in the end user subsidy and design based on results of the monitoring and evaluation activities	SSE, CBOs, Private sector, Community									X	X	X						SSE, CBOs, Private sector, Community
Activity 2.3.6 Promotion and replication of re-designed furnaces/stoves to remaining households and community-based institutions	PT, SSE, CBOs, Private sector, Community									X	X	X	X	X	X	X	X	PT, SSE, CBOs, Private sector, Community
Output 3.1: Established and operational Research, Knowledge, Learning and Coordination Centre, leading a network, for Timor-Leste																		
Activity 3.1.1 Creation and establishment of a Centre of Excellence for the operation of Research, Knowledge, Learning and Coordination Center	PT, SSE, NDF, NDL, Stakeholders, TA			X	X													PMU, SSE, CTDC
Activity 3.1.2 Documentation, regular production and dissemination of information related to biomass energy resources and BET application and utilization	PT, SSE				X	X	X	X	X	X	X	X	X	X	X	X	X	PMU, SSE, CTDC, NDF, NDL
Output 3.2. Energy, industry and rural development planners trained on integrated energy planning, low carbon technologies and regulatory enforcement																		
Activity 3.2.1 Preparation work and organization of training on integrated energy planning and biomass resource assessment	PT				X				X				X				X	PMU, SSE, NDF, NDL, CTDC
Activity 3.2.2 Conduct of training on integrated energy planning and biomass resource assessment	SSE, Stakeholders, Media, TA				X				X				X				X	PMU, SSE, NDF, NDL, TA Trainer
Activity 3.2.3: Generating public sector buy in through advocacy on project impact and co-benefits analysis	SSE, Stakeholders	X	X	X	X	X	X	X	X									PMU, SSE, NDF, NDL, TA Trainer
Output 3.3. Public stakeholders, Project developers and micro-entrepreneurs trained on different aspects of BETs																		
Activity 3.3.1 Preparation work and organization of training on different aspects of BET technologies	PT				X				X				X				X	PMU, SSE, CTDC
Activity 3.3.2 Conduct of training on different aspects of BET technologies	SSE, Stakeholders, Media, TA				X				X				X				X	PMU, SSE, TA Trainer
Output 3.4. Communities and local institutions trained on installation and maintenance of energy efficient furnaces & cook stoves																		
Activity 3.4.1 Preparation work and organization of training on the installation and maintenance of energy efficient furnaces & cook stoves	PT				X				X				X				X	PMU, SSE, CTDC

Activity 3.4.2 Conduct of training on the installation and maintenance of energy efficient furnaces & cook stoves	SSE, Stakeholders, Media, TA				X				X				X				X	PMU, SSE, TA Trainer
Output 3.5: Completed site visits to successfully operated BET applications and dialogues with policy makers, regulators, technology developers, entrepreneurs and financiers																		
Activity 3.5.1 Preparation work and organization of site visits and study tours	PT, SSE		X	X														PMU, NDL, NDF, SSE, CTDC, Host agency
Activity 3.5.2 Conduct of local and overseas visits to the SBEPB demonstrations and other successfully operated BET applications and formation of a solutions exchange	PT, SSE, NDF,			X	X													PMU, NDL, NDF, SSE, CTDC, Host agency
Project Management	Project coordination and management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Project coordinator, PMU
	Mobilization and hiring of personnel	X																UNDP CO, SSE
	Inception workshop	X																Project coordinator, PMU
	Progress report		X		X		X		X		X		X		X		X	Project coordinator, PMU
	Annual reports (APR/PIR)				X				X				X				X	Project coordinator, PMU
	Mid-term Report									X								International consultant
	Terminal Report															X		International consultant

4. MANAGEMENT ARRANGEMENT

This Project will be implemented by UNDP under direct implementation arrangements (DIM), which is the principle implementation modality under the 2009-2013 Country Programme Action Plan (CPAP). The SBEPB project provides the Government with a good opportunity to strengthen the institutional, technical and organization capabilities of its agencies in the area of sustainable biomass supply and demand for clean bioenergy, especially at it applies to the residential and institutional sector. The SSE will act as a lead partner from the Government of Timor-Leste as it is the best entity for driving this project forward and for establishing a technical competency center in the area of energy efficiency in appliances. The Ministry of Finance and the Ministry of Commerce, Industry and Environment will serve as key members of the Project Board as early dialogue is necessary to be established for their involvement and support for the sustainability of the Project beyond its GEF project-life. Other prime beneficiaries will be the Forestry, Livestock and Environment departments and CTDC at DIT, who will act as key partners, under the tutelage of the Ministry of Public Works and Ministry of Commerce, Industry and Environment.

A National Bioenergy Steering Committee will be formed to bring together the key Government ministries and private sector representatives (e.g., importers, producers, retailers, consumers) in order to provide strategic guidance to the project management unit and define the priorities of the Bioenergy roadmap and policy and legislation initiative.

The Project Management Unit will be established and hosted within the UNDP CO and it will play the key role in project execution. The composition of the PMU and the organizational structure of the Project are given in Figure 3. The PMU will be composed of:

- Project Director
- Project Manager
- Project Assistant
- Technical Experts of Components 1, 2 & 3

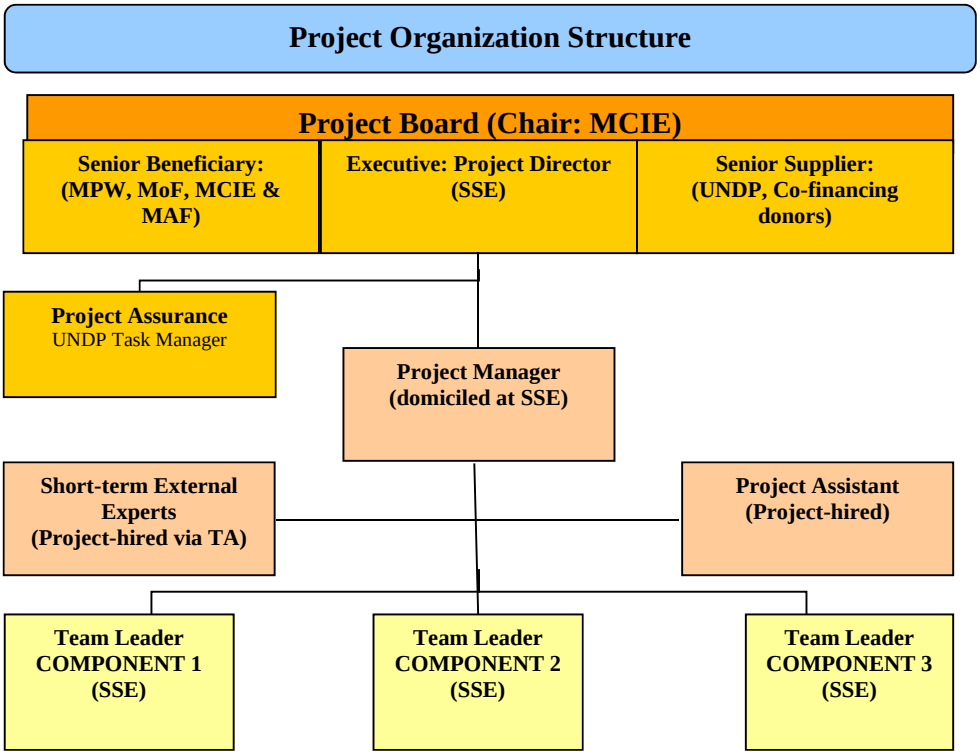
The Project Director (PD) will be responsible for overseeing overall project implementation and ensuring that the project objective and outcomes are achieved in a timely and cost effective manner. The PD will report to the Project Board on project progress and plan, and seek its guidance to resolve emerging issues. The PD will provide guidance to the PM on both strategic and project implementation issues. The PMU will meet regularly for the following functions:

- Provide technical and operational guidance to the Project
- Approve on the quarterly execution plan for the activities of the Project
- Monitor and evaluate the progress of the activities
- Discuss and address technical issues arising during the Project implementation

The project is implemented by UNDP with operational responsibility delegated to a Project Manager (CTA). The Project Manager heads the Project Management Unit (PMU) and the project will receive high level guidance and oversight from the Project Board (PB), which will be chaired by the Secretary, Ministry of Public Works, as the home ministry for the lead partner, SSE. The PB will be responsible for making management decisions on a consensus basis for the Project when guidance is required by the Project Manager, including approval of project revisions. Project assurance reviews will be made by the PB at designated decision points during the running of a project, or as necessary when raised by the Project Manager. The Terms of Reference (TOR) of the PB and of the key personnel of the Project are presented in Annex A of the Project Document.

The Project Board will play a critical role in Project monitoring and evaluation by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It will ensure that required resources are committed and will arbitrate on any conflicts within the Project or will negotiate a solution to any problems with external bodies. In addition, it will approve the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP's Task Manager.



Potential members of the Project Board will be reviewed and recommended for approval during the UNDP Project Appraisal Committee (PAC) meeting. Representatives of other stakeholders may be included in the Board as appropriate. The Board contains distinct roles, including:

1) **The PB Chair:** this will be held by the **State Secretary for Electricity.**
2) **An Executive**: this will be represented by the **Director General of the SSE** and the **Head of the Renewable Energy Division**, SSE, and Ministry of Public Work who will act as the **Project Director.**
3) **Senior Supplier**: this will be representatives from **UNDP** and co-financing donors such as the **Cook stove Working Group** and **Mercy Corps/Hivos**. The Senior Supplier's primary function within the Board will be to provide guidance regarding the technical feasibility of the project.
4) **Senior Beneficiary**: this will be represented by the ultimate beneficiaries of the Project consisting of: **SSE** and **MAF.** The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.
5) The **Project Assurance** role will be held by a Project-hired **UNDP Task Manager** and will support the Project Board Executive by carrying out objective and independent project oversight and monitoring functions.

Project Manager: The Project Manager, whose TOR is provided in Annex A of the Project Document, will hold operational responsibility of the project delegated from UNDP. He/she will have the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

Project Assistant: A Project Assistant will be hired within the Project and will provide project administration, management and technical support to the Project Manager.

Short-term External Experts: Both international and local short-term experts (STEs) will be engaged to provide technical assistance to support the different activities and aspects of the Project implementation. The selection and hiring of STEs will be done through competitive offers and in accordance with UNDP and the GoTL requirements.

Component Technical Experts: The Components 1, 2 and 4 of the Project, will be co-managed by SSE, NDF and NDL. Component 3 will be managed by Project Manager. The operation of these components will be led by Component Team Leaders provided by these agencies in collaboration with the Project Manager.

4.1 Monitoring Framework and Evaluation

The project will be monitored through the following M& E activities. The M& E budget is provided in the table below.

Project Start:

A Project Inception Workshop will be held within the first 3 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU/APRC staff vis-à-vis the PMU. Discuss the roles, functions, and responsibilities within the project's decision-making

structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan **(AWP)**. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule PB meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first PB meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

First Annual Work Plan: After the Inception Workshop, the Project Management Unit (PMU) will prepare the project's first AWP, on the basis of the Project Results Framework (PRF). This will include reviewing the PRF (indicators, means of verification, assumptions and risks), imparting additional detail as needed on the basis of this exercise, finalize the AWP with precise and measurable performance indicators and in a manner consistent with the expected outcomes for the project.

REPORTING

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of value chain actors are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in ATLAS, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc. and the use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements. The *ARR* shall be prepared by the Project Manager and shared with the Project Board/Steering Committee.

  The APR/PIR includes, but is not limited to, reporting on the following:

  - Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
  - Project outputs delivered per project outcome (annual).
  - Lesson learned/good practice.
  - AWP and other expenditure reports
  - Risk and adaptive management
  - ATLAS QPR
  - Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through Site Visits:

GoTL, UNDP CO and the UNDP APRCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress.

Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP APRC and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of Project Cycle:

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the APRCU and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Centre (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Centre (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.
During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.
The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.
Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

4.2 M & E Work Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop	▪ Project Manager	Indicative cost: 5,000	Within first three months

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
and Report	▪ UNDP CO, UNDP GEF		of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	Indicative Cost: 5,000	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports – ATLAS QPR	▪ Project manager and team	None	Quarterly
Project Board Meetings	• Project Board Chair and Secretariat • UNDP CO • Project Director • Project Manager and team	None	Every quarter (four times in a year, once on completion of the APR/PIR and more frequently if needed
Mid-term Evaluation	▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: USD 20,000	At the mid-point of project implementation.
Final Evaluation	▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 30,000	At least three months before the end of project implementation
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ local consultant	0	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: 3,000 (total 12,000)	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP APRC (as appropriate) ▪ The Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 72,000	

Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the PMT and the UNDP CO with support from UNDP/GEF. The LF Matrix in Annex 1 provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the project's Monitoring and Evaluation system will be built.

The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Report following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

Communications and Visibility Requirements

- Full compliance is required with UNDP and GEF Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be

accessed at: http://intra.undp.org/branding/useOfLogo.html. Among other things, these guidelines describe when and how the GEF and UNDP logos are required to be used, as well as how the logos of donors to UNDP projects are required to be used. To avoid any misuse, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

- Full compliance is also required with the GEF's Communication and Visibility Guidelines ("GEF Guidelines") which can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Among other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

- Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

Audit Arrangements

The Government will provide the UNDP Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the programming and finance manuals. The project will be subject to standard DEX procedure as per UNDP financial regulations, rules and audit policies. The audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

5. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP that is incorporated by reference constitute together a Project Document as referred to in the Standard Basic Assistance Agreement (SBAA) and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

- Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP/GEF hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

The UNDP Resident Representative in Timor-Leste is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP Regional Coordination Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- Inclusion of additional annexes and attachments only as set out here in this Project Document

6. ANNEXES

ANNEX A: Stakeholder Groups and their participations

A description of the public, private and CSO stakeholder groups and their involvement in the Project as well as the benefits they can expect to receive:

State Secretary of Electricity (SSE): replaced the State Secretariat for Energy Policy (SEPE) under the new Government that came into power in June 2012. The SEPE was established by an act in 2005 and it was formerly under the jurisdiction of the Prime Minister but in the new Government the SSE moved under the Ministry of Public Works. The SEPE was set up to conduct strategic planning on energy security and access issues and was mandated to introduce new energy resources and ensure efficient utilization of energy resources. In 2008, the SEPE with support from UNDP initiated the Rural Energy Policy that remains to not to be endorsed by the Government and Forestry Management Strategy with FAO. So far, the implementation of the Policy has not been well coordinated and there is a lack of focus, low ownership and buy in from public and private stakeholders as a result of inability to realize the opportunity cost of inaction.

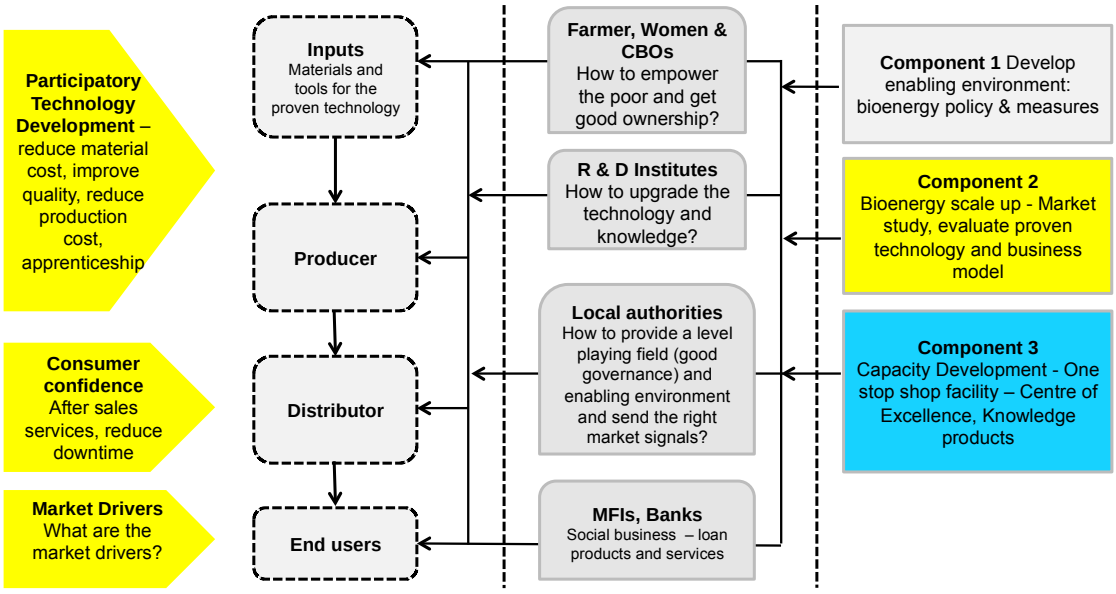


Figure 2: Rationale for intervention for overcoming the technical, regulatory and financial barriers in the scaling up of bioenergy solutions as inclusive business development in Timor-Leste.

To further implement its objective, the SSE formed the Renewable Energy and Alternative Energy unit in 2013 to address the issues of renewable energy and energy efficiency. The unit is charged with the responsibility of organizing and conducting research and development in renewable energy and energy efficiency and conservation. It is also expected to train public and private and CSO stakeholders and students in areas round climate change and RE and EE.

National Directorate of Forestry (NDF) is under the Ministry of Agriculture and Fisheries. The SBEPB's Sustainable Forest Management and Afforestation Program through tree replanting and

Farmers Managed Agroforestry will ensure that there is sustainable supply of renewable biomass that will alleviate the pressure on natural forests.

National Directorate of Livestock (NDL) is under the Ministry of Agriculture and Fisheries. It has livestock intensification centers in Same (Manufahi), in Baricafa (Lautem), in Fohorem (Suai) and in Taiboro (Oecusse). The Directorate has had several projects on cattle production and it is now implementing a program called "Enhancing Smallholder Cattle Production in East Timor".

Secretary of State for Professional Training and Employment (SEPFOPE): is under the Prime Minister. Its mission is to design, implement, coordinate and evaluate the policies in the area and it is also committed to ensuring access of the Timorese to professional training, enabling everyone to acquire and constantly update knowledge and skills to enter and / or remain working. The Secretary runs for example the National Centre for Employment and Professional Training (CNEFP) and the National Centre for Industrial Learning (SENAI).

The Instituto de Apoio ao Desenvolvimento Emprezarial (IADE): provides entrepreneurial training that is needs and market oriented. The Institution conducts assessments on the business training needs of micro, small and medium-sized enterprises to determine the training courses. IADE is supported by Irish Aid through the Business Opportunities and Support Services (BOSS) Project implemented by the International Labor Organization (ILO).

SEAPRI: The State Secretary for Support and Promotion of the Private Sector was established by Decree Law No. 41/2012 of 7 September, which instituted the organizational structure of the V Constitutional Government. Under the Presidency of the Council of Ministers, SEAPRI is the Government's main body responsible for the area of private sector development and the relations with key ac- tors in the private sector. According to its mandate, SEAPRI's competencies include the following: • Develop policies, legislation and mechanisms aiming to promote private investments and Government's collaboration with other relevant stakeholders; • Develop and implement a national plan to support private sector development in Timor-Leste; • Promote debates regarding the participation of the national private sector in the economic development of the country and discuss possible solutions related to unemployment and works-ethic (fundamental principles and rights at work); • Promote public-private sector dialogue, in order to understand problems and challenges faced by the private sector in its relation with government institutions and to agree on a common platform for action; • After consultation with the private sector, present proposal related to the formulation of supporting policies and mechanisms, including incentives, in relation to banks and financial institutions; • Support the establishment of the National Development Bank, in partnership with the Ministry of Finance and with the Central Bank. SEAPRI's organizational structure includes the following bodies: the Institute for Business Sup- port (IADE), the Specialized Investment Agency (AEI, formerly Trade Invest Timor Leste), The Specialized Investment Agency (AEI, formerly Trade Invest Timor Leste), the National Commercial Bank of Timor Leste (BNCTL) and the Bamboo Center.

Social Business Programme (2012-2015): The Programme is implemented by UNDP in partnership with Ministry of Commerce, Industry and Environment and it is funded by the Korean Government. After initiation of the Programme the team has started consultancy work to assess the development of Social Business Fund. The project will assess the existing funding/lending mechanisms for medium scale businesses. It will consider the need for establishing an independent/ special funding mechanism for Social Business financing, provide multiple case scenarios for the management and institutional arrangement for Social Business Fund, recommend the optimal scenario for the context of Timor-Leste and develop set of standard operating procedures for managing the fund taking into consideration the prevailing economic opportunities and challenges in Timor-Leste.

INFUSE (2008-2013): The Project is implemented as a partnership between UNCDF and UNDP and it focuses on increasing access by poor and low-income people to sustainable financial services while taking a broad, sector-wide approach in addressing these issues. Three mutually reinforcing program outputs include:

- Policy development and strategic coordination to enhance the enabling environment;
- Facilitating the growth and long-term sustainability of the retail financial service providers, so that they can reach an increasing number of the poor and low-income people; and
- Establishment of a financial business support infrastructure in Timor-Leste

World Food Programme: WFP has been working in Timor-Leste since 1999 and its activities focus on improving the nutritional status of children under five and women, increasing school enrolment, attendance and retention, and improving food security for the poorest. The organizations has installed clay and biogas stoves and kitchen improvement in over 152 schools since 2010, selecting schools located in areas with high risks of deforestation in the districts of Baucau, Bobonaro, Liquica and Manatuto.

UNICEF stove program: has been working in the country to ensure that children enjoy the rights guaranteed to them in the Convention on the Rights of the Child (CRC), which every country in the East Asia and Pacific region has ratified since 1999. UNICEF has been implementing the ICS project in Aileu district since 2012. The main emphasis of UNICEF's ICS project is to address the improvement of health conditions of children and women in the rural districts. The project is implemented in cooperation with Department of Environmental Health of Ministry of Health (MoH) and the local NGO AMAR in Acumau suco of Remexio sub-district.

Cook stove Testing and Development Centre (CTDC) at Dili Institute of Technology (DIT): The Centre has recently been set up by Mercy Corps to train local expertise to develop standard for cook stove through testing and certification program with support from Aprovecho.

Mercy Corps: is an international, non-governmental humanitarian relief and development agency with headquarters in the UK and the USA. Mercy Corps has been operating in Timor-Leste since 2005, and in this time it has implemented programs with funding from USAID, the EU, DFID, OFDA and the UN. Since 2011 the organization has been implementing an EU financed alternative energy program E4A with a focus on clean cook stove and solar technologies. The E4A Baseline Assessment was completed in 2011 which consisted of a comprehensive analysis of current energy practices and attitudes in the three target districts. In addition, Mercy Corps is the coordinating agency for the Timor-Leste National Cookstove Working Group, and also co-hosted the first Alternative Energy Stakeholders Meeting.

Hivos: is a Dutch non-governmental not-for-profit development organization. The regional office for Southeast Asia was established in Jakarta in 2004 and the office provides financial and political support for local NGO's in Indonesia, Timor-Leste and other Southeast Asian countries, and is also active in networking, lobbying and in exchanging knowledge and expertise. Hivos is active in promoting renewable energy particularly domestic biogas in Indonesia and some African countries. In 2009, the organization registered as an INGO in Timor-Leste and it is planning to start full fledge program establishing its own office and staff. One of the primary domains of Hivos is 'Access to Opportunities' aiming at sustainable economic development through sustainable production and sustainable energy, financial services and enterprise development including microfinance.

World Vision: WVTL is a Christian relief, development and advocacy organization dedicated to working with children, families and communities to overcome poverty and injustice. WVTL opened its Dili office in 1999 and since then has implemented a range of community-based programs. The

organization started the Bobonaro Acts on Climate Change project (BACC) which targets the sub-districts Lolotoe, about half of Balibo and Bobonaro in 2012. The project seeks to improve the well-being of households and communities, particularly women and children by improving their resilience and capacity to respond to climate change (CC).

JICA: is implementing the Community-based Sustainable Natural Resource Management (CB-NRM) Project in Timor-Leste between 2011-2014 with the objectives to develop mechanisms for effective implementation of the CB-NRM at the suco level through participatory land use planning, capacity development for field staff and farmers and effective implementation mechanisms.

PERMATIL (Permacultura Timor-Leste): PERMATIL is a national NGO that was established in 2002. Permaculture is a philosophy that combines human beings and nature to work together. PERMANTIL's activities mainly consist of facilitating community to strengthening sustainable agriculture and culture, developing and promoting appropriate technology for the community, and facilitating community to improve the quality of water and soil conditions in the country. The organization has supported establishment of some biogas plants and interested to promote bio-slurry.

Naroman Timor Foun (NTF): NTF is a national NGO that was established in 2002. The organization is currently operating in six districts in the country focusing on energy, sanitation, clean water, health promotion and agriculture. NTF has 25 permanent staff with extensive experience in community mobilization, clean water projects, and community energy projects, including carrying out energy assessments and surveys, solar capacity design, installation and training.

Yayasan Rai Maran: is a national NGO that was established in 1991. The organization has been active in installing bio-digesters at the household (10m3) and institutional level (100m3 at school) since 2005 and has experience in training local masons to build bio-digesters.

Haburas Foundation: is a non-governmental, not-profit-making organization, founded in 1999. Its programs includes: environmental education, environmental advocacy and environmental management. The organization has been active in developing rural development and poverty alleviation program and it has also pioneered the bio-briquette project to train unemployment youth to make briquette from waste papers, rice and coffee husk and sawdust.

Aprovecho Research Centre (ARC) is a non-profit corporation established in 1976 and it is dedicated to researching, developing and disseminating appropriate technological solutions for meeting the basic human needs of refugees and impoverished people and communities in the developing world. ARC is especially interested to creating effective cooking and heating systems using biomass fuels, it aims to enhance health by reducing indoor air pollution and deforestation by decreasing the amount of fuel used and lessen the global warming impact of burning biomass for cooking and heating. For over thirty years, ARC has worked on more than 150 projects in over sixty countries and is considered one of the world's leaders in helping local people in the developing world to design and disseminate biomass cook stoves made from locally available materials. In Timor-Leste ARC has taken part in an initiative of the Global Alliance for Clean Cookstoves to use Timor-Leste as a case study in stoves development. It has also provided technical support to the recently b set up CTDC at DIT.

Alternative Technology Association: The Alternative Technology Association is an Australian based NGO. The A T A International Projects Group (IPG) \ was established in 2003 and the purpose of the IPG is to promote and facilitate the uptake of sustainable/renewable and other appropriate technologies in developing countries/communities, empower communities to make their own decisions on how to improve the quality of life, provide the ATA members and staff with the opportunity to contribute their knowledge and skills to work on projects of assistance to communities in developing countries/communities. ATA is currently working on disseminating solar home system in some areas of Timor-Leste.

Micro-Finance Institution: Moris Rasik and Tuba Rai Metin are two MFI institutions that operate in Timor-Leste. Tuba Rai Metin's aim is to provide "microfinance and allied services for a large number of poor in a sustainable and regulated manner, improve the quality of lives of families and empower women. Moris Rasik's mission is poverty reduction and empowerment through provision of financial and non-financial services to rural women with incomes below the poverty line. Timor-Leste's first regulated micro insurance products were launched by Tuba Rai Metin and Moris Rasik in April 2012. Nine thousand women have now life insurance on their small businesses.

MIT D-Lab: is a program at the Massachusetts Institute of Technology (MIT) which tries to improve the quality of life of low-income households through the creation and implementation of low cost technologies. Mercy Corps is in the process of developing a strategic relationship with MIT's D-Lab to support the design and evaluation of its programs and technologies aimed at addressing energy poverty globally. At this stage, D-Lab has put forward the two staff below to lead the research. Mercy Corps and D-Lab are in the process of identifying additional co-PIs at MIT with a track record of leading and publishing on experimental or quasi-experimental impact evaluations of international development programs.

University of Timor-Leste, Universidade Nacional Timor Lorosa (UNTL): is the major institution of higher education in the country. The Department of Community Development leads local researchers and supervises the data collection and analysis on community development in the country.

Consumers: The consumers especially women will be important beneficiaries of the bioenergy program, as they will be able to reduce the share that energy represents in household budgets. However, given the relative lack of knowledge of many buyers in Timor-Leste, an information and outreach campaign will be needed to explain the value of considering the total cost of ownership before making an appliance purchase. Consumers will have important role in demanding improved product information and in driving the appliance market toward greater energy efficiency through their purchasing decisions.

ANNEX B: Assessments and proposed implementation modalities of the proposed project

1. Market Transformation and Value Chain Business Model

This project seeks to leverage private sector resources using market based mechanism and in partnership with relevant public sector agencies for ensuring that the efficient stoves being promoted and disseminated effectively as inclusive business where the poor could be empowered to participate as actors in the value chain. Therefore, there is a need to create demand for these aspirational appliances to reduce supply risk through commercially sustainable models, which include peer to peer training, institutional capacity development and, where applicable, financial support to promote this partnership. The models will be continually improved during the Project implementation. Based on discussions with potential private sector participants initially identified, the models that could work for promoting market mechanisms are graphically shown in Figures 2, 3 and 4, for stoves scale up. The major elements of these models are described in the sections that follow.

Targets and Prioritization

The target of disseminating 20,000 stoves within the period of the project implementation will be achieved in four phases (Table 12). The first phase will start at the later part of Year 1 and will prioritize districts that have strong presence of CBOs that have indicated strong interest to participate in the Project. This will increase the likelihood of success by building on the strong presence and networks of existing institutions that have on-going relationships with the villagers in the areas. Phases 2, 3 and 4 will be initiated by replicating the experience and success gained in Phase 1.

Table 12: Scaling up programme of improved cookstove in Timor-Leste

Districts	Dense Forest (ha)	Sparse Forest (ha)	Total Forest Area (ha)	Sucos covered	Year 1	Year 2	Year 3	Year 4	Total
i. Domestic Stoves									
Aileu	7,875	20,194	28,069	16		100	100	250	450
Ainaro	10,172	12,497	22,669	14	100	250	250	300	900
Baucau	14,604	20,211	34,814	26	200	250	450	600	1,500
Bobonaro	8,762	16,360	25,122	18	200	250	650	600	1,700
Covalima	16,151	31,560	47,712	19	100	250	650	750	1,750
Dili	4,301	8,312	12,613	6	1,000	1,200	1,700	1,800	5,700
Ermera	13,011	7,583	20,594	27	200	300	400	500	1,400
Lautem	40,569	22,025	62,594	13	100	300	300	300	1,000
Liquica	16,323	9,607	25,929	22	100	300	300	400	1,100
Manatuto	44,000	58,489	102,489	26		200	200	400	800
Manufahi	16,325	20,328	36,653	21		300	400	400	1,100
Oecussi	4,099	15,047	19,145	4		150	200	250	600
Viqueque	34,182	36,787	70,970	21		150	400	450	1,000
Total	230,375	278,999	509,374	233	2,000	4,000	6,000	7,000	19,000
ii. Institutional Stoves (schools, prisons and hospitals)									
Aileu	7,875	20,194	28,069	16					-
Ainaro	10,172	12,497	22,669	14					-
Baucau	14,604	20,211	34,814	26	10	20	20	50	100
Bobonaro	8,762	16,360	25,122	18		10	20	40	70
Covalima	16,151	31,560	47,712	19					-
Dili	4,301	8,312	12,613	6	10	30	40	60	140
Ermera	13,011	7,583	20,594	27		10	20	30	60
Lautem	40,569	22,025	62,594	13					-
Liquica	16,323	9,607	25,929	22		10	20	40	70
Manatuto	44,000	58,489	102,489	26		10	20	70	100
Manufahi	16,325	20,328	36,653	21					-
Oecussi	4,099	15,047	19,145	4					-
Viqueque	34,182	36,787	70,970	21			20	40	60
Total	230,375	278,999	509,374	233	20	90	160	330	600
iii. Industrial Stoves									
Baucau	14,604	20,211	34,814	26		10	28	64	102
Dili	4,301	8,312	12,613	6	8	30	40	50	128
Ermera	13,011	7,583	20,594	27		10	20	30	60
Bobonaro	8,762	16,360	25,122	18		10	40	60	110
Total					8	60	128	204	400
Grand Total					2,028	4,150	6,288	7,534	20,000

A small portion of stoves (i.e., 300 stoves out of 20,000 or 1.5% of the total number of stoves) will be allocated free to the marginalized, disadvantaged households with single parent or disabled citizens that could not afford the stoves. For each district, the indicative target number of stoves to be disseminated was computed using the criteria based on population, intensity of fuel wood usage, forest cover, status of electrification, poverty index and existence of community forests and alternative energy focal person. The distribution has been designed so that at the end of Project the dissemination activities would have covered the whole country.

Use of Local Fabricators/Technicians

A technical assessment into cooking stoves and manufacturers in Timor-Leste has been conducted by Mercy Corps as part of EU-funded E4A program. The purpose of the stove assessment was to provide a detailed assessment of existing stoves and the capacity of current stove producers in target areas, and to assess the viability of local stove manufacture in Timor-Leste. The objectives were to: (i) assess the quality and suitability of current fuel-efficient stove designs; (ii) assess the production capacity of existing stove producers and constraints to improved / expanded production; (iii) Assess the viability of local stove production in target areas where there are no existing stove producers; (iv) undertake an initial assessment of the viability of biomass pellets in Dili; (v) provide recommendations for stove design and stove production / importing approaches.

2. Assessment of Quality and Suitability of Cooking Stove Designs

The stove sector in Timor-Leste is extremely undeveloped, with only one cluster of stove producers currently operating on a market basis and producing stoves for sale. Four household stoves and two institutional stoves were tested during the assessment. The household stoves that were tested were: (i) “Indigenous” clay stove (from Indonesia); (ii) Vita stove; (iii) another Indonesian prototype stove; and, (iv) StoveTec rocket stove. Controlled cooking tests and user-demonstrations were conducted for these stoves. The “indigenous” stove was shown to be surprisingly efficient, though slightly less so than the StoveTec rocket stove, as shown in the Table 13 below. As the indigenous clay are found to be less durable and of poor quality, only the Stovetec and other improved stoves will be promoted.

	Open fire	Indigenous clay stove	Stovetec rocket stove	Indonesian 'rocket-like' stove	VITA stove
Fuel efficiency savings compared with open fire	0%	37%	40%	7%	36%
Relative weight of fuel use (open fire = 100)	100	63	60	93	64

Table 13: Comparison of stove efficiency

3. Assessment of In-Country Production Potential – Cook Stoves

The assessment included many meetings with local manufacturers including artisanal clay stove producers, metal workshops and cement casting factories. Overall, the manufacturing capacity for stoves in Timor-Leste is extremely low, but nevertheless there is potential for stove production at scale. The “indigenous” stove designs do not lend themselves to scale-up as they are too heavy and fragile to be transported and production potential to do so is poor due to the method of manufacturing. The Indonesian prototype stove is too complex to be produced affordably in-country. On the other hand, production potential in Timor-Leste is good for the simple Vita stove design. Two alternative designs were also considered that do not yet exist in the country, variations on a locally manufactured rocket stove. Further analysis and prototype development is needed, but the production potential for these stoves is also considered high.

Considering the designs of the different stoves (i.e., cooking, institutional and industrial stoves), to be introduced and promoted in this Project, different types of fabricators/technicians are required. The cook stoves and institutional stoves will use mainly mud/clay as material with some metal components for cook stoves and minimal quantity of steel bars for cook stoves. The construction and installation of these stoves require skills normally possessed by an ordinary technician/mason. The E4A's cook stove technology landscape survey has done some preliminary identification of these skills in village levels (*aldeas*) in Timor-Leste. During the implementation of the Project, individual technicians will be identified in the targeted villages. The Project will conduct capacity building activities to train the technicians on the construction and installation of the stoves. Those who pass the training and agree to the modalities of the promotion and dissemination of these stoves will be accredited by the Project and will be registered as part of the pool of technicians in their respective villages.

The design of the Stovetec cook stove to be promoted in the Project consists largely of metal parts to be procured from abroad and fabricated locally into a cooking stove. The first batch of producers has already been trained recently under the EU's E4A program. Some of the fabricators who were interviewed indicated their willingness to fabricate the stoves using the new design. During the Project implementation, detailed negotiations on the modalities for the bulk production and dissemination of the heating stoves will be agreed with the interested fabricators/entrepreneurs.

Role of Community-Based Organizations (CBO) and Women in Reducing Demand and Supply Risks through a Robust Marketing and Sale Strategy

One major challenge in the promotion and dissemination of the energy efficient stoves as inclusive business is how to create a demand for the adoption of stoves by the potential end users to replace the existing traditional stoves currently being used in their households. The findings of the Baseline Survey of Rural Fuel Stoves conducted by GACC and E4A have revealed the potential cultural barriers (e.g. traditional use of smoke in rural life) that could hinder their uptake but rural populations have indicated willingness to switchover from their traditional to more modern stoves if the modern stoves meet certain criteria. Features that were mentioned were savings in fuel wood and improved health.

However, it is envisaged that in order to convince end users to replace their old stoves with the new design, a comprehensive marketing and sale strategy will be developed to raise awareness on the economic, health, social and environmental benefits of these stoves through:.

- High visibility mass media messaging: i) Point of sale marketing (branded pushcarts and displays in shops); ii) TV and radio adverts; iii) Posters / Billboards.
- Person-to-person / word-of-mouth messaging: i) Door-to-door sales using branded pushcarts; ii) Awareness-raising and education outreach by government and civil society (Women and Mothers Union); iii) Road show and Demonstration events (rural and urban)

The high visibility mass messaging is crucial for raising the profile of cook stoves, and making them highly recognizable around the country. The more personal messaging (person-to-person) is crucial for generating awareness and triggering purchasing decisions.

A system will also be set up for end users to have a standard mechanism to place orders, make payments according to a cost sharing mechanism, a system of registering complaints and making contribution in upgrading and improving the design of the stove or requirement for after-sales service, while being assured that the stove are constructed, tested and certified to international standard (Figure 3).

For these aspects, the Project will work with community-based organizations (CBOs) and grassroots and women institutions that are already actively present and have complimentary climate mitigation

and adaptation activities in the rural areas. Likewise the Centre of Excellence will be set up to champion the good causes of clean technology. In this document, CBOs refer to both the registered and non-registered non-profit organizations. During the project preparation stage, CBOs already existing such as youth groups, women's groups, the Farmer Managed Agroforestry Group (FMAGs), and Alternative Energy Group, have been identified (see list in Table 14) to fit into this category and have given indications that they would be willing and interested to provide this role within the Project.

Special focus will be placed to ensure that women are empowered to participate in the project design and implementation; create energy policy and strategy that are gender sensitive, provide peer to peer technical and business training for women, access to market and business opportunity.

One entity that has been identified as highly suitable to carry out the role of a CBO that would implement the rollout of stoves to the rural areas is the SEFOPE's Social Entrepreneurs and NDF's Farmer Managed Agroforestry Groups initiative consisting of entrepreneur and farmer groups spread over all of Timor-Leste's 13 districts. The SEFOPE and NDF instructors are active and conduct both general and tailored-made in-house technical and business training courses. Given the above descriptions, and based on initial discussions with SEFOPE and NDF management, the SEFOPE and NDF structure would be a very suitable agency for the effective rolling out of the proposed improved stoves within the SBEPB Project.

Working as the local coordinator in the village level, the CBOs will perform the following roles (Figure 3):

- Conduct awareness campaign among the villagers on the benefits and importance of the promoted stoves that have been certified by CTDC
- Market the promoted stoves for maximum uptake from the village
- Conduct training of household members on proper operation and use of the stoves
- Receive individual orders of stoves from households
- Place bulk order of certified stoves with the fabricator for thermal heating stoves or the technician(s) for the cookstoves
- Only certified stoves with label could be produced by certified producers and eligible for end user subsidy and loan risk guarantee scheme
- Receive payment of the cost sharing portion from individual households
- Deliver payment to the fabricator/technician for the installed certified stoves (Figure 3)
- Issue delivery certificate countersigned by the individual customer and CBO authorized representative to the fabricator/technician
- Ensure that the quality of the work of the fabricator(s)/technician(s) serving its village/district is consistently acceptable and recommends re-training or additional training, if necessary.

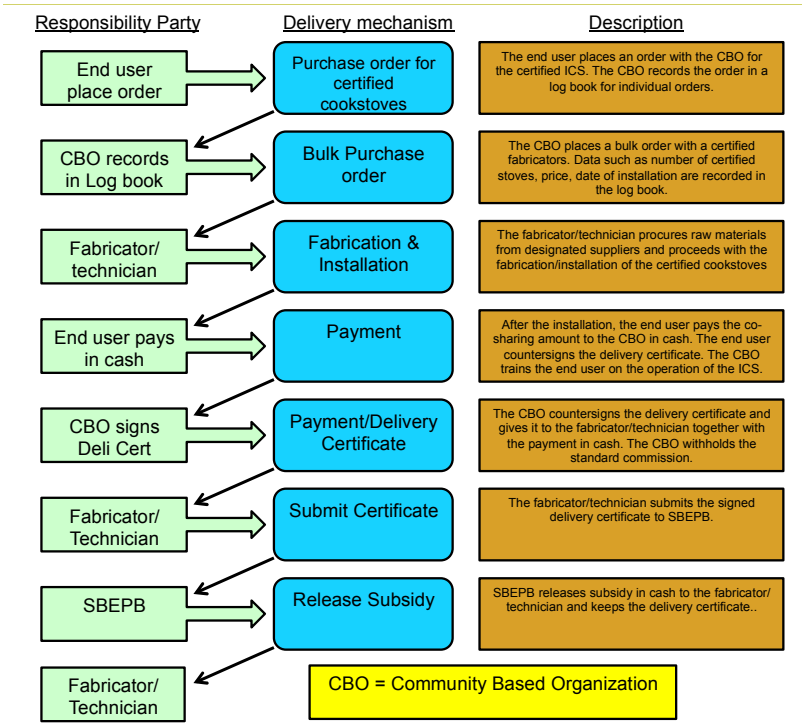


Figure 3: End User Subsidy Delivery Scheme for Certified Improved Stoves

Table 14: Major Relevant Partners and Community-Based Organizations in Timor-Leste		
Category	**Example Entities**	**Activities**
National Government and Ministries	• Ministry of Public Works - SSE • Ministry of Environment • National Directorate of Forestry • National Directorate of Livestock • IADE • SEFOPE	Set national agenda, fund programs, provide support for NGO's, capacity building, conduct awareness activities Conduct business training program for youth and women
Foreign Government Agencies	• USAID	Fund programs, provide technical and logistical support
Multilateral Organizations	• UNDP • ILO • UNICEF • WFP	Fund programs and build capacity
International NGO's	• Mercy Corps, Hivos, World Vision	Fund and run programs, provide technical and logistical support, engage and partner with organizations at local level, conduct awareness activities, capacity building
National Organizations	• Haburas • Rai Maran • Permatil	Promote briquettes, clean cook stoves, biogas, run programs, engage communities
Suppliers	• Bili Bala • Startec	Produce clay cook stoves Produce Stovetec cook stoves
End users	• Women Union • Tofu/tempe producers • Salt producers	Purchase clean bioenergy solutions Assist in technology feedback and design
District, Sub-District, Suco (Village), Aldeia (Hamlet) Level	• Suco/Aldeia Chief	Provide community-level coordination & support, lend credibility to programs, conduct awareness & training activities

The above roles and responsibilities, which cannot be effectively performed by the SBEPB Project in Dili, are pivotal for the successful promotion and dissemination of the stoves. Hence, for the duration of the Project, the full operating costs of the CBOs to perform the abovementioned activities will be borne by the Project. However, it is envisaged that before the end of the Project, CBOs will begin covering their operational costs by charging a standard minimal fee as a percentage of the price of the stoves. This fee system will be tested, appraised and adjusted during the project implementation (not at the end). This transition to market mechanism where the CBOs are rewarded as a function of the volume of the sales of the product (as an output based approach) will continue to provide incentives for them to aim for success. The fee to CBOs will be embedded into the overall price of the stove. Although this could slightly increase the cost of the stove, the participation of the CBOs will:

- Help to create local demand so that supply, producer and delivery risks could be minimized to generate market confidence
- Reduce inefficiencies in the transaction between the end user and the fabricator/technician
- Free up some time of the fabricator/technician for the production of more stoves instead of doing the marketing of their product and training the end users
- Put the task of the awareness campaign and marketing to an entity that has a local presence and has the motivation to deliver the required volume of stoves (e.g. Women group)
- Transform the stoves into a aspirational goods that has a standard quality, label, price and services

Such benefits could translate into savings of time and money for those involved in the installation and dissemination of the stoves that would be of more value than the additional fee to the CBO.

Inclusive Value Chain Financing

The GoTL and UNDP Timor-Leste are collaborating to explore innovative ways to mobilize the private sector and MFIs to contribute proactively to development – this will be done by setting up social businesses and through partnership agreements, providing them with much needed business development services. Social business networks of relevant stakeholders will also be setup for horizontal/vertical linkages and mutual support. The objective of this project is to promote high impact social enterprises that will contribute to private sector development as well as attainment of MDGs. As a result of this Project, social enterprises will contribute to the reduction of poverty in rural areas and generate rural employment and income. Investing in products and services, through both microenterprises and cooperatives that meet the needs of local communities will build local market demand, which will, in turn, drive local production, and with the multiplier effect will impact not only income levels but also the overall wellbeing of communities.

Business Mentoring, Incubation

IADE has supported E4A by developing case studies and exercises on “Improve Your Business” for Alternative Energy Products businesses. The Project has developed four modules of training on Costing, Record Keeping, Stock Control and Marketing adapted to the needs of alternative energy businesses. The last two IYB modules (Buying and Financial Planning) are currently being developed. The Project also supported IADE in developing a session plan based on the case study of Alternative Energy Products and providing intensive coaching to the trainers to effectively use the adapted case study. 10 businesses have been elected and Mercy Corps in cooperation with IADE supports the upgrading and expansion of these identified businesses to become rural and peri-urban Alternative Energy Centers that will supply alternative energy technology and provide regular servicing and maintenance of the products. While Mercy Corps focuses on the technical aspect of the products, IADE focuses on business management and customer service. This GEF funded project will partner with IADE to expand these business models to demonstrate the profitability of offering such technology in rural and peri-urban markets, and encourage Dili-based suppliers to replicate this model and extend their sales network to other energy poor areas.

This GEF project will use IADE’s Tender Information System to seek new businesses interested in selling alternative energy products. This project will provide start up grant to social entrepreneurs who have been trained to produce and market improved stoves for the domestic, institutional and industrial sectors. The Project seeks to scale up this business mentoring and incubation program across the 13 districts in partnership with IADE, SEFOPE and UNDP’s Social Business program (Figure 4).

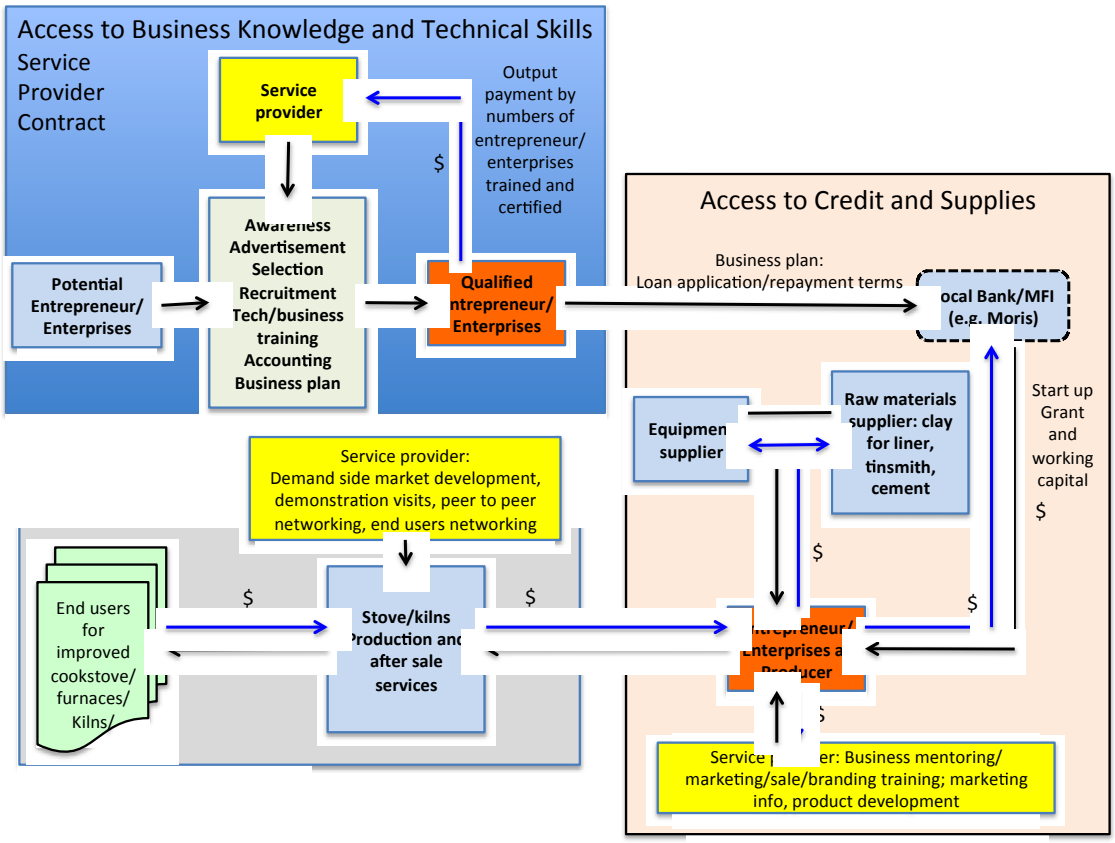


Figure 4: Participatory training in technical skills, business mentoring, basic accounting and marketing skills as output based approach

Cost Sharing and End user Subsidies

The current prices that the households are paying for their traditional stoves are shown in Table 15 below. In comparison, the estimated prices of promoted stoves are substantially higher. This is so because the improved cook stoves promoted in this Project will be imported initially.

It must also be noted that because of the above features of the improved cook stoves promoted in this Project, the costs of manufacturing them are higher than the prices of cook stoves being disseminated by other programs in other countries. Hence, the Baseline Survey and investigations conducted during the PPG stage revealed that it is necessary to provide some form of end user subsidy to cover for the incremental cost of purchasing the new systems for domestic, institutional and industrial cook stove.

As explained above, in assessing poverty indicators such as income, the GACC market report shows that 58% of the total households live below the poverty line. Often the poverty is linked to lack of access to land holdings, micro credit or loans and rely on subsistence farming for daily survival that often face food shortages in the dry season. Furthermore, lack of collateral and inability to repay are the reasons for not taking up loans. It therefore is apparent that not all have the capacity to take up loans. Therefore, promoting improved cook stoves in the country without subsidy will risk exclusion of many who will continue to use inefficient stoves and large volumes of fuel wood. Balanced socio-economic development and reduction in emissions from stoves will not be easily achieved.

Table 15: Indicative cost of stoves			
Description	Cook Stoves	Institutional Stoves	Industrial Stoves
Current cost of stove (average), USD	4	50	100
Total cost of new stove (estimated), USD	18	200	400
Cost of current stove as a percentage of total cost of new stove	22%	25%	25%

From the Baseline Survey reported in the GACC market study the respondents indicated that they desire to experience from improved stoves attributes such as durability, less smoke emissions, better heat and duality of use (cooking and heating) and less fuel wood use. The end-users are willing to pay for this difference because of the benefits that they will receive for using the new stoves, such as cleaner indoor air, reduction of health hazards and reduction of fuel costs due to decreased wood fuel consumption.

Using the principle of "end user subsidies", the fiscal support that will be provided to the end users will be reduced as the volume of the uptake of the stoves increases. This gives incentives for the potential end users to make an early decision and "try" the new system. The early batches of users are needed to create a demonstration effect and allow other potential end users to observe the benefits of the promoted technologies. As the benefits are experienced by the early users and seen by the neighbors and other potential users, the true value of the system are no longer perceived but becomes known and hopefully appreciated. This will help to create a tipping point towards market transformation for clean and affordable solutions.

It is proposed that a similar end user subsidy scheme will be given to all domestic, institutional and industrial end users. Although the industrial end users have a revenue source, such high initial subsidy is still needed to encourage uptake as they are primarily household-based micro and small enterprises. Hence a subsidy of 70% of the full cost of the cook stoves will be given to end users who belong to the first 40% of the targeted number of stoves to be disseminated. This subsidy will be reduced to 60% for users who belong to the next 50% of the target group, and finally, to 40% for users who belong to the last 20% of the target group. An indicative end user subsidy scheme is presented in Table 16. However, support to industrial end-users will be reviewed at the end of Year 1 of implementation of end-user subsidies for industrial stoves.

At the end of the Project, it is expected that the energy efficient stoves will be sufficiently demonstrated to allow market mechanism to prevail without or with minimal subsidy. It is also hoped that at the end of the Project the procedures for the construction of stoves will be more streamlined, and combined with better economy of scale, the price of stoves would be reduced, making it more affordable for end-users to purchase even without the benefit of subsidies. However, at the beginning of Year 3, the GEF Project will focus on helping the Government to (i) identify and mobilize financing resources to continue the subsidy scheme, if this is considered still necessary, and (ii) design a progressive subsidy decrease leading to a purely market led development system.

Table 16: End User Subsidy Scheme for Stoves				
Year	1	2	3	4
Percentage uptake of targeted volume in each Phase of roll-out	>0-40%	>40-60	>60-80%	>80-100%

Subsidy as a percentage of the cost of the stove	70%	60%	50%	40%
Amount of subsidy for cook stoves, USD	13	11	9	7
Amount of subsidy for institutional stoves, USD	140	120	100	80
Amount of subsidy for Industrial stoves, USD	280	240	200	160

In order to have equity and ownership among the users of stoves and to have a fair treatment for all districts in the different phases of the roll-out of these stoves, the principle of introducing higher subsidy at the beginning and phasing it out as the uptake increases will be applied similarly in each of the four phases of the stoves dissemination. Using the distribution plan in Table 17 as the basis for calculating the subsidies at each year of the project implementation, the resulting amount of subsidies according to year and type of stove is given in Table 18.

Table 17: Target distribution according to phases of implementation

Description	Cook Stoves	Institutional Stoves	Industrial Stoves	Total
Phase 1 Districts	***2,000***	***50***	***20***	***2,070***
Year 1 (40%)	800	20	8	*828*
Year 2 (60%)	1,200	30	12	*1,242*
Year 3 (0%)	-	-	-	-
Year 4 (0%)				
Phase 2 Districts	***4,000***	***100***	***80***	***4,180***
Year 1 (0%)	-	-	-	-
Year 2 (60%)	2,400	60	48	2,508
Year 3 (40%)	1,600	40	32	1,672
Year 4 (20%)				
Phase 3 Districts	***6,000***	***150***	***120***	***6,270***
Year 1 (0%)	-	-	-	-
Year 2 (0%)	-	-	-	-
Year 3 (80%)	4,800	120	96	5,016
Year 4 (20%)	1,200	30	24	1,254
Phase 4 Districts	***7,000***	***300***	***180***	***7,480***
Year 1 (0%)	-	-	-	-
Year 2 (0%)	-	-	-	-
Year 3 (0%)	-	-	-	-
Year 4 (100%)	7,000	300	180	7,480
Total	**19,000**	**600**	**400**	**20,000**

Table 18: Amount of subsidy according to year and type of stove

Description	Cook Stoves	Institutional Stoves	Industrial Stoves	Total
Year 1				
No. of stoves	800	20	8	**828**
Full cost of stoves	14,400	4,000	3,200	**21,600**
Amount of subsidy	10,080	2,800	2,240	**15,120**
Amount of cost-share	4,320	1,200	960	**6,480**
Year 2				
No. of stoves	3,600	90	60	**3,750**
Full cost of stoves	64,800	18,000	24,000	**106,800**
Amount of subsidy	38,880	10,800	14,400	**64,080**
Amount of cost-share	25,920	7,200	9,600	**42,720**

Year 3				
No. of stoves	6,400	160	128	**6,688**
Full cost of stoves	115,200	32,000	51,200	**198,400**
Amount of subsidy	57,600	16,000	25,600	**99,200**
Amount of cost-share	57,600	16,000	25,600	**99,200**
Year 4				
No. of stoves	8,200	330	204	**8,734**
Full cost of stoves	147,600	66,000	81,600	**295,200**
Amount of subsidy	59,040	26,400	32,640	**118,080**
Amount of cost-share	88,560	39,600	48,960	**177,120**
Total number of stoves	***19,000***	***600***	***400***	***20,000***
Total cost of stoves	***342,000***	***120,000***	***160,000***	***622,000***
Total subsidy	***165,600***	***56,000***	***74,880***	***296,480***
Total cost-share	***176,400***	***64,000***	***85,120***	***325,520***

Indicative Modalities and Procedures for Distribution of Stoves

During the early part of the Project implementation, the activities related to the promotion of output based and market mechanisms will focus on the identification of fabricators/technicians and the CBOs in the different targeted villages and districts. Although the principles of the modalities have been discussed with some potential CBOs, the detailed modalities and procedures will be agreed with these entities during the Project implementation. These modalities and procedures will include aspects such as:

- Procedures for procurement of raw materials
- Pricing of stoves
- Payment and incentives mechanisms (Percentage commission paid on numbers of ICS sold will be test, appraised and adjusted during the project implementation)
- Amount and mechanics of subsidy
- Roles and responsibilities of different parties
- Quality aspects
- Content of the training program

An indicative procedure for the distribution of stoves based on supply and demand contract and description of the different steps for the delivery mechanism is graphically presented in Figure 5.

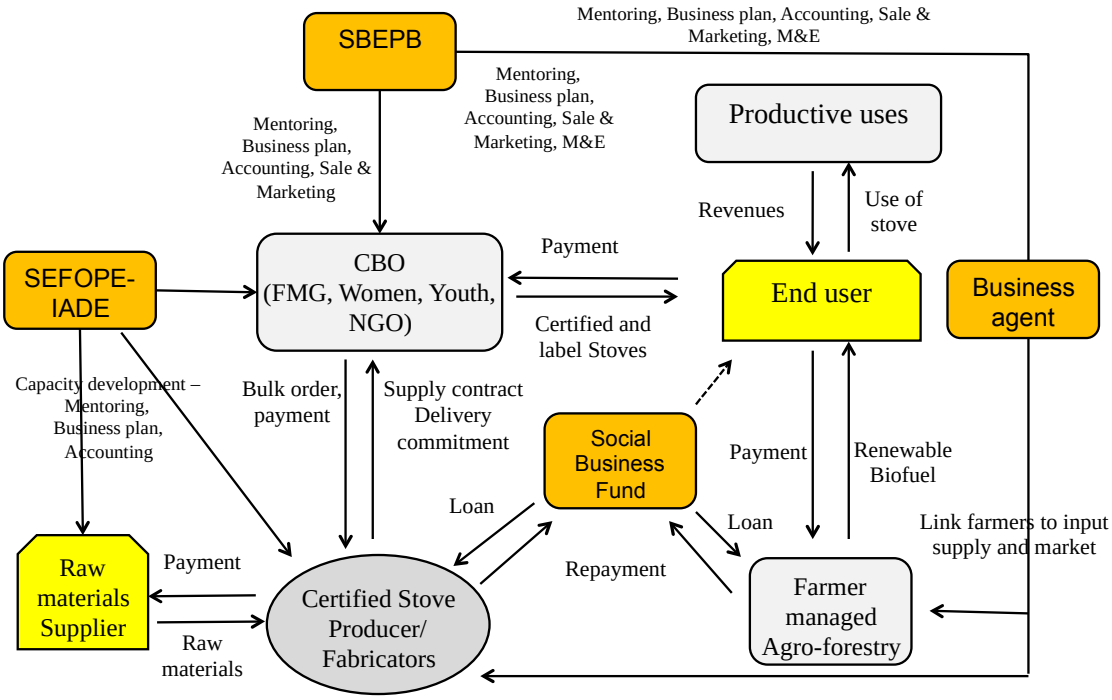


Figure 5: Market based approach and value chain financing for the scaling up of stoves

4. Design and Implementation of the Loan Risk Guarantee Scheme (LRGS) Funding Mechanism

i. Rationale:

The mobilization of the Loan Risk Guarantee Scheme (LRGS) Funding Mechanism will be incorporated into the SBEPB project in Year 1 of the project to remove the financial barriers to facilitate market development for the supply of energy efficient cook stoves and furnaces. The following key issues need attention:

- Lack of collateral to access competitive loans and credits. In fact, the key financial barrier identified during PPG has been the limited asset collateral available for most SMEs, due to lack of land ownership

- The limited experience in loan risk guarantee scheme (LRGS) funds in Timor-Leste that could successfully assist SMEs in accessing commercial loans. In 2012, INFUSE provided loan guarantee of USD 300,000 to Tuba Rai Metin and USD 230,000 to Moris Rasik. The loan guarantees were deposited with the ANZ Bank for the 2 MFIs to be able to access loans from ANZ Bank for small and micro livelihood improvement enterprise initiatives. The loan period was 12 months. Both Moris Rasik and Tuba Rai Metin had fully re-paid their loans on December 2012 and this scheme was further extended. The GEF assistance for the development of the Loan Risk Guarantee Scheme fund will build on the experience of INFUSE and partner with it to extend the service to include the stoves/furnaces supply chain business investments. Financial support from the GEF will be used to provide guarantee to Stove Service Providers (SPs) and SMEs in implementing the SBEPB project.

ii. Objective: To set up a loan risk guarantee scheme fund mechanism that will support the commercial funding of improved cookstove/furnace value chain to be undertaken by Stove SPs and SMEs.

iii. Loan Risk Guarantee Scheme Fund Size:

At the demo stage, capital support from GEF of US$ 200,000 will be used to set up the loan risk guarantee scheme fund for Stove value chain investment projects.

iv. Recipients:

All SMEs having Stove investment proposal are eligible to enjoy such financial support program. However, due to limited capital, at the early stage, the program will focus on domestic and institutional stoves as well as sectors that need to upgrade technology/equipment to save energy, such as bread making, tofu making, salt production, brick, ceramic, food processing cottage industries. The Fund will guarantee selected SMEs (the end-user) who have insufficient collateral to get commercial bank loan for implementing stove project. The program will provide guarantees for Stove Service Providers (SPs). These companies will provide stove/furnace/kilns technical services to SMEs.

v. Participating Parties involved in LRGS Operational Mechanism:

(1) LRGS managing Bank: the guarantee fund of US$ 200,000 will be deposited in trust in the local bank. The money will be deposit in stages as the guarantee portfolio increases. The local bank will also act as the fund manager as designated by the Ministry of Finance.

(2) Participating credit institutions: these institutions (Moris Rasik, Tuba Rai Metin) will provide lending to SMEs in implementing stove production activities under the guarantee from the LRGS managing bank. Any commercial bank that has experiences in lending to SMEs and handling lending from international support could be a participating bank.

(3) The Project Management Unit: the PMU of the SBEPB Project will provide technical assistance to the parties involved in operating the LRGS. The Unit will also advise the Stove Project Appraisal Committee in selecting projects and supervise the LRGS's activities according to its regulations.

(4) CTDC, Alternative Energy Centers and SSE in participating provinces/cities: These agencies will act as local focal points to receive SME's applications on for loan for their Stove investment projects and facilitate the meetings of the Stove Project Appraisal Committee.

(5) The Stove Project Appraisal Committee: The Committee will consist of representatives from SSE (PMU), UNDP, INFUSE and the participating local bank. The Committee has the following tasks and powers: (i) to adopt the strategy operation, financial plan and final account settlement reports of the Fund; (ii) to select the stoves investment projects that will be guaranteed by the LRGS and submit the list of selected projects for the respective MFI's due diligence and approval. Senior advisors on Stoves activities should be invited to be a participant in the Committee meeting of selecting the projects on a case-by-case basis.

vi. Guarantee level: the Loan Risk Guarantee Scheme fund will only provide a partial guarantee for the portion of the loans not covered by collateral. The maximum ceiling of guarantee will be discussed in details between the partner local bank and the Project proponent. Based on the existing guarantee policy in Timor-Leste, this will not exceed 75% of the portion of total loan.

vii. Procedures of guarantee: the guarantee procedures are summarized in Figure 6.

viii. Conditions to operate the guarantee system: to implement the above mentioned guarantee system, the following conditions need to be addressed:

- Sources to cover management fee of the LRGS managing bank and the meetings of the Stove Project Appraisal Committee.
- SMEs as the guarantee beneficiaries must pay guarantee fee.
- Local bank must pay interest for deposited money in the LRGS at the Bank (Interest Rate for the Fund at the Bank is equal to the interest rate of the non-limit bank deposits at

commercial banks nation-wide as proposed by local bank). All interest earnings will be paid back to UNDP.

- Risk sharing mechanism among banks and borrowers.

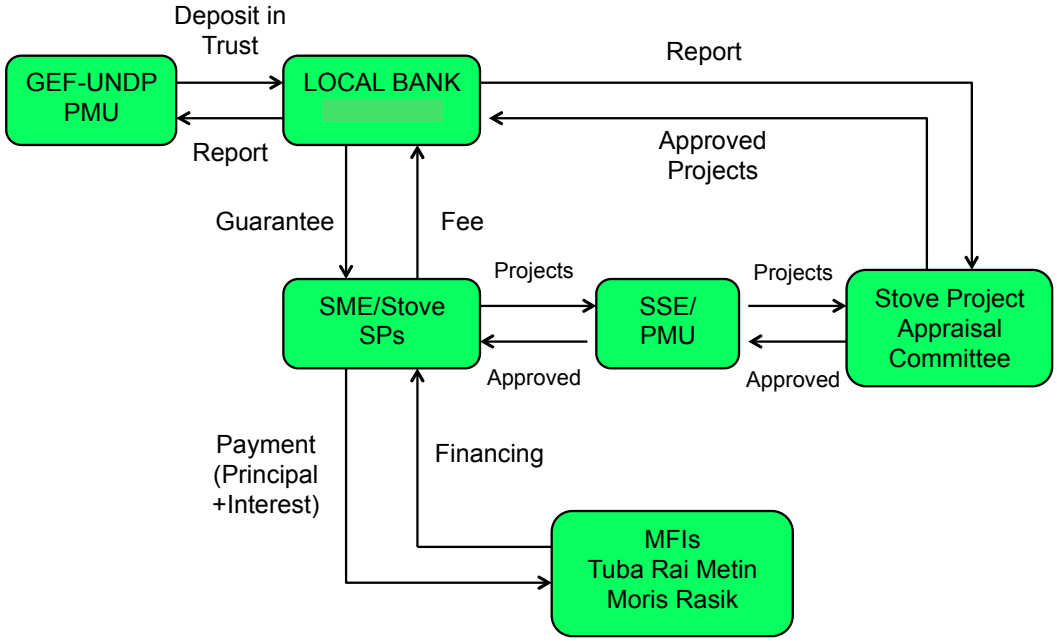


Figure 6: Implementation procedures for the Loan Risk Guarantee Scheme Fund

ix. Roles of Institutions in managing the GEF Grant allocated for Loan Risk Guarantee Scheme Fund: This section lays down some principal roles and responsibilities of relevant parties involved in the operation of the LRGS during the project period. These roles and responsibilities will be further detailed into agreements/MoU and the operational mechanism of the LRGS

UNDP Country Office

- Have authority to approve the LRGS operational plan, financial plan, and the operational regulations and criteria of LRGS;

- Manage the total capital US$ 200,000of LRGS granted by GEF and transfer to LRGS in stages as work plan prepared and requested by PMU and consistent with the approved operational and financial plans and results of monitoring and evaluation of LRGS;

- Participate in the Stove Project Appraisal Committee;

- Have the authority to regularly check the usage of LRGS money deposited at the local bank and reserve the right to withholding or withdrawing money already deposited to the LRGS subject to detection of fault or misuse of the GEF resources.

SSE/PMU

- SSE will be held accountable to UNDP and the Government of Timor-Leste for the proper and effective use of the GEF grant deposited in the LRGS;

- SSE will sign the MOU on LRGS management with local bank ;

- Prepare the LRGS operational strategy, financial plan as well as its operational regulations and criteria;

- Supervise and ensure that the LRGS 's activities are in accordance with its regulations and criteria as well as decision of the lending Bank;

- Provide technical assistances to the concerned parties in operating the guarantee fund as needed;

- Participate in the Stove Project Appraisal Committee;

- Have the authority to regularly check the usage of LRGS's money deposited at the local bank;

- SSE in collaboration with UNDP and INFUSE, is responsible for development and implementation of a strategy for transfer of the GEF grant for LRGS to the Government Treasury at the end stage of the project.

LOCAL BANK

- Manage the LRGS in accordance with Timor-Leste Law and the Provisions of MOU signed between local bank and SSE;

- Participate in the Stove Project Appraisal Committee;

- Submit the quarterly and annually reports on their operation to PMU.

- Have responsibility to submit all needed information as required by UNDP and SSE. The Fund used by LRGS will be checked two times a year. The information should be provided as follows:

- Verifications of guarantee issued from LRGS
- Total amount to be transferred to credit banks to cover the bad debts;
- Total guarantee fee collected from SMEs as beneficiaries

- Total income from collected interest for LRGS money deposited in local bank.

(Note: All these information should be included in the MOU signed between local bank and SSE).

Sustainable Follow-up Plan

During the final year (Year 4), the Project will prepare a sustainable follow-up plan that will detail how to continue the LRGS after the end of the project-life – to attract public and private financing in order to continue and scale-up the project in Timor-Leste.

ANNEX C: Terms of Reference of Key Project Personnel

1. PROJECT BOARD

The Project Board (PB) will be established to provide high level guidance and oversight to the Project. The PB will be responsible for making management decisions on a consensus basis for the Project when guidance is required by the Project Manager, including approval of project revisions. Project assurance reviews will be made by the PB at designated decision points during the running of a project, or as necessary when raised by the Project Manager.

The Project Board will play a critical role in project monitoring and evaluation by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It will ensure that required resources are committed and will arbitrate on any conflicts within the Project or will negotiate a solution to any problems with external bodies. In addition, it will approve the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager.

Potential members of the Project Board will be reviewed and recommended for approval during the UNDP Project Appraisal Committee (PAC) meeting. Representatives of other stakeholders may be included in the Board as appropriate.

The Project Board (PB) shall be comprised of the following:

- The Director General of State Secretary of Electricity, who shall be the Chairman of the PB
- A representative from NDF
- A representative from NDL
- A representative from UNDP
- A representative from Cookstove Working Group
- The Project Director (who shall act as the PB Secretary)
- The Project Manager (who shall be a non-voting member of the PB)
- Representative(s) from co-financing donors
- Representative(s) from co-financing donors

The PB will convene at least four times in a year (at the inception phase, at the mid-term phase and at the end of the project period) and on a need basis when required and called upon by the chairman.

The PB will have the following functions:

- Oversee and advise on the execution of the Project
- Monitor and supervise implementation of the Project
- Endorse the work plan
- Approve adaptations to the Project components during the Project execution, if any Evaluate the performance and impacts of the Project
- Approve Progress, Midterm and Terminal Reports of the Project

2. Project Director

The Project Director (PD) is an appointee from the Government of Timor-Leste, who is tasked to oversee the project on behalf of the Government. The PD, who will come from the Renewable Energy Division under the Department of Energy, will work in close co-operation with the Project Manager.

The duties of the PD will include, but are not limited to, the following:

- Ensure that the prior and ongoing obligations of the Government with respect to the Project are fulfilled.
- Liaise with the Government and participating government agencies to ensure that the government is apprised of the progress of the Project, and that the Project is made aware of any changes in government priorities and policies regarding sustainable rural energy aspects.
- Provide support in all aspects of the implementation of the Project.
- In consultation with other Government agencies, nominate participants for training and study tours and site visits.
- Assist in the smooth initiation and progression of the Project activities

3. Project Manager

Under the direct supervision of the UNDP CO Head of Poverty Reduction and Environment & Energy Unit, and in close cooperation with the Programme Officer and National Project Coordinator (NPC), the Project Manager is responsible for the day-to-day management and implementation of the UNDP-GEF project, including all project administrative matters. All work of the Manager will be carried out in line with the Country Programme Action Plan and in full compliance with the UNDP Rules and Regulations. The management and coordination process will be pursued through undertaking appropriate actions in program formulation, implementation and evaluation. Strong emphasis will be made on ensuring cohesion with other UNDP programs.

Job content

i. Manage the project implementation in accordance with objectives, schedule and planned budget;
ii. Manage all project activity, staff, consultants and etc., for timely implementation of requirements on Monitoring and Evaluation;
iii. Coordinate awareness creation on all project activities;
iv. Coordinate the project activities with relevant activity and initiative of the Government;
v. Ensure cooperation between the participating institutions of the project;
vi. Ensure timely preparation of annual project reports, working plans and other relevant project documents.

Qualifications

- At least 10 years work experience in project management. Previous work in international project management is an advantage
- University education in Engineering, Energy, Physics, Business Management or relevant field. A post-graduate degree (MSc, MPhil, PhD, etc.) is an advantage
- Strong interpersonal and communication skills
- Ability to take decisions
- Strong computer skills (Microsoft Office)

4. Administrative and Finance Assistant

The Administrative and Finance Assistant will work under the direct supervision of the Project Manager and provide assistance to the project implementation in the mobilization of inputs, the organization of training activities and financial management and reporting.

Job content

- Prepare all payment requests, financial record-keeping and preparation of financial reports required in line with NEX financial rules and procedures
- Assist in the recruitment and procurement processes, checking the conformity with UNDP and the Government rules and procedures
- Assist in the organization of in-country training activities, ensuring logistical arrangements

- Prepare internal and external travel arrangements for project personnel
- Maintain equipment ledgers and other data base for the project
- Take record of projects meetings and draft correspondence as required
- Maintain project filing
- Other duties which may be required

Qualifications

At least five years administrative experience,

- University degree in Business Administration (Finance or Accounting)
- Good organizational skills
- Good computer skills, including spread-sheets and database

5. International Technical Advisor – Project Management

Job content

- Provide overall technical guidance, advice and support to Project Coordinator and project team
- Assist the Project Coordinator and project team to prepare a detailed Annual Work Plan of all project activities in line with the programming and approved budget, and start and conclude them accordingly;
- Advise the Project Coordinator and project team on the project strategy and implementation methodology;
- Assist in the recruitment, supervision and management of local staff;
- Participate in the recruitment of local consultants and international experts.

Qualification

At least 5 years work experience in project management. Previous work in international project management is an advantage

- University education in engineering, energy, physics, business management or relevant field. A post-graduate degree (MSc, MPhil, PhD, etc.) is an advantage
- Strong interpersonal and communication skills
- Ability to take decisions
- Strong computer skills (Microsoft Office, Internet, e-mail)

6. International Consultant for Mid Term evaluation

The International Consultant will be recruited to conduct the Mid-term Evaluation of the Project. S/he will report to the Project Manager and act as the team leader for the following specific tasks:

- Provide guidance to the National Consultant in conducting the Mid-term Evaluation.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP.
- Identify lessons learned from the implementation of the project's activities.
- Provide guidance and specific recommendations on how the project team and UNDP can improve performance (both substantive and management) during the remaining duration of the current project.
- Provide guidance and specific recommendations for future support in the area of climate change mitigation and renewable energy for both the GOTL and UNDP to consider.
- Produce the Mid-term Evaluation Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Familiarity with climate change challenges in developing countries; previous experiences related to renewable energy and particularly biomass energy would be an advantage.
- 10 years of relevant field-based experience in monitoring and evaluation of projects.
- Familiarity with a participatory approach in project monitoring and evaluation.
- Familiarity with Timor-Leste or similar countries.
- Excellent writing and analytical skills.

6. National Consultant for Mid Term Review

The National Consultant will be recruited to conduct the Mid-term Evaluation of the Project. S/he will report to the Project Manager and support the International Consultant for the following specific tasks:

- Liaise with local stakeholders to ensure that cultural perspectives and local circumstances are taken into account and incorporated into recommendations.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP.
- Identify lessons learned from the implementation of the project's activities.
- Provide input on how the project team and UNDP can improve performance (both substantive and management) during the remaining duration of the current project.
- Provide inputs on specific recommendations for future support in the area of climate change mitigation and renewable energy for both the GOTL and UNDP to consider.
- Provide inputs to the International Consultant in preparing the Mid-term Evaluation Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Understanding of climate change mitigation and renewable energy in Timor-Leste.
- At least 5 years of work experience in the development sector in Timor-Leste.
- Excellent communication skills in English (oral and written).

8. International Consultant for Final Evaluation

The International Consultant will be recruited to conduct the Final Evaluation of the Project. S/he will report to the Project Manager and act as the team leader for the following specific tasks:

- Provide guidance to the National Consultant in conducting the Final Evaluation.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP and to what extent recommendations from the Mid-term Evaluation were implemented.
- Identify lessons learned from the implementation of the Project's activities in the following areas:
    - Relevance – the extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time
    - Effectiveness – the extent to which the project objective has been achieved or how likely it is to be achieved
    - Efficiency – the extent to which results have been delivered with the least costly resources possible
    - Results – the positive and negative, and foreseen and unforeseen, changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs,

short-to medium term outcomes, and longer-term impact including replication effects and other, local effects
  - Sustainability – the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally as well as financially and socially sustainable.

- Provide guidance and specific recommendations for future support in the area of climate change mitigation and renewable energy for both the GOTL and UNDP to consider.
- Produce the Final Evaluation Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Familiarity with climate change challenges in developing countries; previous experiences related to renewable energy and particularly biomass energy would be an advantage.
- 10 years of relevant field-based experience in monitoring and evaluation of projects.
- Familiarity with a participatory approach in project monitoring and evaluation.
- Familiarity with Timor-Leste or similar countries.
- Excellent writing and analytical skills.

9. National Consultant for Final Review

The National Consultant will be recruited to conduct the Final Evaluation of the Project. S/he will report to the Project Manager and support the International Consultant for the following specific tasks:

- Liaise with local stakeholders to ensure that cultural perspectives and local circumstances are taken into account and incorporated into recommendations.
- Assess the progress towards achievement of the project objectives as outlined in the approved Project Document.
- Look into the linkages between this project and other relevant projects/agencies and assess their effectiveness.
- Assess the structure and performance of the project management team and support provided by GEF-UNDP and to what extent recommendations from the Mid-term Evaluation were implemented.
- Identify lessons learned from the implementation of the project's activities in the following areas:
  - Relevance – the extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time
  - Effectiveness – the extent to which the project objective has been achieved or how likely it is to be achieved
  - Efficiency – the extent to which results have been delivered with the least costly resources possible
  - Results – the positive and negative, and foreseen and unforeseen, changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short-to medium term outcomes, and longer-term impact including replication effects and other, local effects
  - Sustainability – the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally as well as financially and socially sustainable.

- Provide inputs on specific recommendations for future support in the area of climate change mitigation and renewable energy for both the GOTL and UNDP to consider.
- Provide inputs to the International Consultant in preparing the Final Evaluation Report.
- Present the findings to relevant stakeholders.

Qualifications:

- Understanding of climate change mitigation and renewable energy in Timor-Leste.
- At least 5 years of work experience in the development sector in Timor-Leste.

- Excellent communication skills in English (oral and written).

10. Component Team Leader, SSE

The SSE is responsible for the execution of Component 1, 2, and 4 and jointly responsible with NFD and NFL for the execution of Components 1, 2 and 4. The SSE will appoint and provide a Component Team Leader who will lead the staff assigned by the SSE in performing the activities that are under its responsibilities. The Component Team Leader will play a key role in project execution and will report to the Project Manager of SBEPB. The Component Team Leader will be in charge and responsible for the following:

- Coordinate project implementation, monitor work progress, and ensure timely delivery of specific outputs under Component 1 to 4.
- Liaise with the Project Manager, NFD and NLD, to jointly execute project implementation, monitor work progress, and ensure timely delivery of outputs.
- Liaise with CBOs, fabricators, village technicians and rural households to finalize the mechanisms and agreements for their participation in the promotion, construction, dissemination and monitoring of efficient stoves and BET applications.
- Prepare a detailed work plan for the project at the outset of implementation, in coordination with the Project Manager, NFD and NDL, and revise it at least annually.
- Organize and conduct stakeholders meetings, technical trainings, and other events as necessary.
- Assist in the identification, selection and recruitment of consultants and other experts for the outputs under SSE responsibility.
- Supervise, coordinate, and facilitate the work of all national and international consultants retained for the different activities related to the outputs listed above and provide inputs to these consultants, whenever required.
- Participate in PMU meetings, follow up on the outcomes of such meetings and report on progress related to the outputs under SSE responsibility.
- Prepare technical specifications for equipment required for the project and manage procurement for outputs under SSE responsibility.
- Identify relevant, on-going activities by other government and non-government agencies and establish linkages.
- Build partnerships with international/regional institutions and national organizations.
- Prepare technical progress reports and other monitoring reports as described in the M&E plan for outputs under SSE responsibility. Reports should contain assessments of progress in implementing activities, including reasons for delays, if any, and recommendations on necessary improvements.

Qualifications:

- Understanding of climate change mitigation, renewable energy, biomass production and utilization and rural development in Timor-Leste and the main actors and stakeholders in this field.
- Proven experience with the implementation of development projects, particularly in the field of renewable energy.
- Proven ability to manage, monitor, and troubleshoot comparable projects.
- Excellent working knowledge of spoken and written English.
- Willingness to travel to different parts of Timor-Leste as appropriate.

11. Component Team Leader, NDF

The NDF is jointly responsible with SSE for the execution of Components 1 and 2. The NDF will appoint and provide a Component Team Leader who will lead the staff assigned by the NDF in performing the activities that are under their responsibilities. The Team Leaders will play a key role in project execution and will report to the Project Manager of SBEPB. The Component Team Leader will be in charge and responsible for the following:

- Coordinate project implementation, monitor work progress, and ensure timely delivery of Outputs 1.2 and 2.5

- Liaise with the Project Manager and NDF to jointly execute project implementation, monitor work progress, and ensure timely delivery of outputs.
- Liaise with NDF district officers, farmers managed agroforestry and rural households for activities related to sustainable fuel wood plantation and utilization.
- Prepare a detailed work plan for the project at the outset of implementation, in coordination with the Project Manager and NDF and revise it at least annually.
- Organize and conduct stakeholders meetings, technical trainings, and other events as necessary.
- Assist in the identification, selection and recruitment of consultants and other experts for the outputs under NDF responsibility.
- Supervise, coordinate, and facilitate the work of all national and international consultants retained for the different activities related to the outputs listed above and provide inputs to these consultants, whenever required.
- Participate in PMU meetings, follow up on the outcomes of such meetings and report on progress related to the outputs under NDF responsibility.
- Prepare technical specifications for equipment required for the project and manage procurement for outputs under NDF responsibility.
- Identify relevant, on-going activities by other government and non-government agencies and establish linkages.
- Build partnerships with international/regional institutions and national organizations.
- Prepare technical progress reports and other monitoring reports as described in the M&E plan for outputs under NDF responsibility. Reports should contain assessments of progress in implementing activities, including reasons for delays, if any, and recommendations on necessary improvements.

Qualifications:

- Understanding of forest management aspects, rural development and fuel wood plantation in Timor-Leste and the main actors and stakeholders in this field.
- Proven experience with the implementation of development projects, particularly in the field of sustainable forest management.
- Proven ability to manage, monitor, and troubleshoot comparable projects.
- Excellent working knowledge of spoken and written English.
- Willingness to travel to different parts of Timor-Leste as appropriate.

ANNEX D: List of organizations consulted during the Preparatory Phase

The following organizations were consulted during the project preparatory phase:

Public Sector
Ministry of Public Work
State Secretary of Electricity
Ministry of Agriculture and Fisheries
National Directorate of Forestry
National Directorate of Livestock
Ministry of Science and Technology
Ministry of Environment
SEFOPE
IADE

Professional Trade Associations
Dili Chamber of Commerce

Private Sector
Dili Institute of Technology
Startec Enterprise Ltd
MFI

Bilateral/Multilateral
UNDP
UNICEF
WFP

NGOs
International Labor Organization
Mercy Corps
Hivos
World Visions
Rai Maran
Haburas
Permatil

ANNEX E: GHG emissions calculations for the switch to improved stoves using UNFCCC Methodology AMS II G version 3 - Energy Efficiency Measures in Thermal Applications of Non Renewable Biomass

This category comprises efficiency improvements in thermal applications of non-renewable biomass. Examples of applicable technologies and measures include the introduction of high efficiency[12] biomass fired cook stoves[13] or ovens or dryers and/or energy efficiency improvements in existing biomass fired cook stoves or ovens or dryers.

Baseline emissions: It is assumed that in the absence of the project activity, the baseline scenario is the use of fossil fuels for meeting similar thermal energy needs.

1. Emission reductions are calculated as:

$$ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossilfuel} \times N_{y,i} \qquad \text{Equation (1)}$$

Where:

ER_y = Emission reductions during year *y* in t CO_2e

$B_{y,savings}$ = Quantity of woody biomass that is saved in tons per device

$f_{NRB,y}$ = Fraction of woody biomass saved by the project activity in year *y* that can be established as non-renewable biomass using survey methods or government data or default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM website[14]

$NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne, wet basis)

[12] The efficiency of the project systems as certified by a national standards body or an appropriate certifying agent recognized by that body. Alternatively, manufacturers' specifications may be used.

[13] Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%

[14] Default values endorsed by designated national authorities and approved by the Board are available at <http://cdm.unfccc.int/DNA/fNRB/index.html>.

$EF_{projected\_fossilfuel}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 t CO_2/TJ[15]

$N_{y,i}$ = Number of project devices of type *i* operating in year *y*, determined as per paragraph 22

2. $B_{y,savings}$ is estimated using the following methods:

Where:

B_{old} = Quantity of woody biomass used in the absence of the project activity in tons per device

$B_{y,new,survey}$ = Annual quantity of woody biomass used during the project activity in tons per device, determined through a survey

η_{old} = 1. Efficiency of the device being replaced (fraction); measured using representative sampling methods or based on referenced literature values use weighted average values if more than one type of device is being replaced;
2. A default value of 0.10 may be optionally used if the replaced device is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney; for other types of devices, a default value of 0.2 may be optionally used

$\eta_{new,y}$ = Efficiency of the device being deployed as part of the project activity (fraction), as determined annually[12] using the water boiling test (WBT) protocol carried out in accordance with national standards (if available) or international standards or guidelines.[16] Use weighted average values if more than one type of system is being introduced by the project activity

[15] This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50% weight is assigned to coal as the alternative solid fossil fuel (96 t CO_2/TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 t CO_2/TJ for kerosene and 63.0 t CO_2/TJ for liquefied petroleum gas (LPG).

[16] In all cases the testing protocol shall be the same for both the device being replaced and the device being deployed.

i. Domestic cookstove at 15% annual growth rate

fNRB	100	%	Non renewable biomass
NCV	0.015	TJ/tonne	
EF	71.5	tCO2/TJ	
Cold	10	%	Cookstove efficiency
Cnew	40	%	Cookstove efficiency
A	19,000	unit	Total project units
AFC	11	kg/day	Daily biomass usage
Leakage	0	%	
1-(Cold/Cnew)	0.75	1900	

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	unit	800	4,400	10,800	19,000	21,850	25,128	28,897	33,231	38,216	43,948	50,540	58,121	66,840	76,866
AFC	kg/day/unit	11	11	11	11	11	11	11	11	11	11	11	11	11	11
By	ton/yr	3,212	17,666	43,362	76,285	87,728	100,887	116,020	133,423	153,436	176,452	202,920	233,358	268,361	308,615
By, saving	ton/yr	2,409	13,250	32,522	57,214	65,796	75,665	87,015	100,067	115,077	132,339	152,190	175,018	201,271	231,462
fNRB	fraction	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Leakage	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERy	tCO2e	2,584	14,210	34,879	61,362	70,566	81,151	93,324	107,322	123,420	141,933	163,223	187,707	215,863	248,242
	TCO2e/unit	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Cum Bsaved	2,409	15,659	48,180	105,394	171,190	246,855	333,870	433,937	549,014	681,353	833,543	1,008,561	1,209,832	1,441,293
	Cum ER	2,584	16,794	51,673	113,035	183,601	264,752	358,075	465,397	588,818	730,751	893,975	1,081,682	1,297,545	1,545,787

ANNEX F: GHG emissions calculations for institutional and industrial stoves

2. Institutional stove for schools and hospitals

fNRB	100	%	Fraction of Non renewable biomass
NCV	0.015	TJ/tonne	
EF	71.5	tCO2/TJ	
Cold	8	%	Cookstove efficiency
Cnew	45	%	Cookstove efficiency
A	600	unit	Total project units
AFC	50	kg/day	Daily biomass usage
Leakage	0	%	
1-(Cold/Cnew)	0.822		

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	unit	20	110	270	600	690	794	913	1,049	1,207	1,388	1,596	1,835	2,111	2,427
AFC	kg/day/unit	50	50	50	50	50	50	50	50	50	50	50	50	50	50
By	ton/yr	365	2,008	4,928	10,950	12,593	14,481	16,654	19,152	22,024	25,328	29,127	33,496	38,521	44,299
By, saving	ton/yr	274	1,506	3,696	8,213	9,444	10,861	12,490	14,364	16,518	18,996	21,845	25,122	28,891	33,224
fNRB	fraction	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Leakage	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERy	tCO2e	294	1,615	3,964	8,808	10,129	11,648	13,396	15,405	17,716	20,373	23,429	26,944	30,985	35,633
	TCO2e/unit	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
	Cum Bsaved	274	1,779	5,475	13,688	23,132	33,993	46,483	60,847	77,365	96,361	118,207	143,329	172,219	205,443
	Cum ER	294	1,908	5,872	14,680	24,809	36,457	49,853	65,258	82,974	103,347	126,776	153,720	184,705	220,338

3. Industrial stove for cottage industry - tofu/tempe, salt, bakeries, coffee roasting

fNRB	100	%	Non renewable biomass
NCV	0.015	TJ/tonne	
EF	71.5	tCO2/TJ	
Cold	10	%	Cookstove efficiency
Cnew	50	%	Cookstove efficiency
A	400	unit	Total project units
AFC	400	kg/day	Daily biomass usage
Leakage	0	%	
1-(Cold/Cnew)	0.800		

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	unit	8	68	196	400	460	529	608	700	805	925	1,064	1,224	1,407	1,618
AFC	kg/day/unit	400	400	400	400	400	400	400	400	400	400	400	400	400	400
By	ton/yr	1,168	9,928	28,616	58,400	67,160	77,234	88,819	102,142	117,463	135,083	155,345	178,647	205,444	236,261
By, saving	ton/yr	876	7,446	21,462	43,800	50,370	57,926	66,614	76,606	88,097	101,312	116,509	133,985	154,083	177,195
fNRB	fraction	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Leakage	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERy	tCO2e	940	7,986	23,018	46,976	54,022	62,125	71,444	82,160	94,485	108,657	124,956	143,699	165,254	190,042
	TCO2e/unit	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4	117.4
	Cum Bsaved	876	8,322	29,784	73,584	123,954	181,880	248,494	325,100	413,198	514,510	631,019	765,004	919,087	1,096,282
	Cum ER	940	8,925	31,943	78,919	132,941	195,066	266,510	348,670	443,155	551,812	676,768	820,467	985,721	1,175,763