CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

Technical Assistance Response Plan – Terms of Reference

Country	Democratic Republic of Timor-Leste
Request ID#	2023000002
Title	Solar Resource, Net Metering, and Grid Codes for Distributed Energy Resources in Timor Leste
NDE	Mr. Luis dos Santos Belo, National Directorate for Climate Change, Ministry of Commerce, Industry and Environment Phone: +670 333-1118 Email: alubelo78@gmail.com Address: Fumenho Building, Rua Dom Aleixo Corte Real Mandarin Dili, Timor-Leste
Proponent	###

Summary of the CTCN technical assistance

Timor Leste has requested technical assistance to develop a net metering policy and grid code that will encourage the development and integration of distributed energy resources (DERs). The country has a population of approximately 1.32 million people, with about 200,000 households having access to electricity and a peak demand of around 85 MW. Timor Leste's economy relies heavily on oil and gas extraction and exports of natural gas. The majority of electricity production in the country comes from diesel-fired generators (approximately 256.1 MW installed on Timor Leste, 2.6 MW on Atauro Island, and 17.3 MW in Oecuse, a special administrative region bordered by Timor Barat). As a small country, distributed generation and DERs could play a significant role in its future energy production.

The implementing Partner will provide technical assistance to the government entities overseeing Timor Leste's power system and major electric utility. The country has a high potential for solar resources, estimated at 5.5-6 kWh/sq.m./day. A net metering policy would encourage the adoption and expansion of distributed solar, which could become a major energy source for the country. Grid code requirements for DERs are crucial for the stability of the grid as the amount of DERs increases.

A net energy metering policy (NEM) should consider multiple factors such as metering infrastructure, eligible technologies, system and program size caps, type of net energy metering being explored (i.e., full retail rate, feed-in tariff, no compensation, time-of-export, etc.) and the program's overall goal. Solar resource assessments can determine the potential volume of solar capacity that could be achieved through a net metering program. This evaluation typically needs highly resolved geographical information system (GIS) data on topography and land-use availability, solar resource data, and potential light detection and ranging (LiDAR) which can be used for mapping rooftop availability. The Implementing Partner will provide solar resource modeling insights to Timor Leste.

Grid codes for DERs specify how resources should provide grid support functions, respond to grid contingencies, and conditions for energization. The Implementing Partner will examine the internationally recognized Institute of Electrical and Electronics Engineers (IEEE) 1547-2018 standard for DER grid support, evaluating voltage and frequency trip and ride-through, and voltage and frequency regulation capabilities that could be integrated into the grid code.

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Agreement:

(If possible, please use electronic signatures in Microsoft Word file format)

National Designated Entity to the UNFCCC Technology Mechanism
Name: Luis dos santos Belo
Title: Chefe of Department ODS
Date: 17/09/2023
Signature:

Proponent (signature of the Proponent is optional)
Name:
Title:
Date:
Signature:

UNFCCC Climate Technology Centre and Network (CTCN)

Name: Rajiv Garg
Title: CTCN Director (*ad interim*)
Date:
Signature: 17 July 2023

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1. Background and context

Timor Leste has requested technical assistance to develop a net metering policy and grid code that will encourage the use of distributed energy resources and aid their integration into the grid. The country currently relies heavily on diesel generation, resulting in customers paying high electricity prices. Commercial losses are also high, and invoices are often not paid. Distributed generation, particularly from solar PV, could provide a cheaper alternative to diesel-fired plants. The Implementing Partner will provide technical assistance to entities of Timor Leste, including Electricidade de Timor Leste (EDTL), the Secretariat of State for Energy Policy, and potentially the Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e.

Timor Leste has a high potential for solar energy, particularly along the coastline, with an estimated solar resource of up to 5.5-6 kWh/sq.m /day. A net metering policy can encourage the adoption of distributed solar, which could become a major source of generation for the country. As distributed generation grows, grid code requirements for DERs become increasingly important to ensure grid stability. The country's major state-owned utility, EDTL, is currently looking at developing a grid code, making it an ideal time for technical assistance in developing a combined transmission and distribution grid code.

When creating a net metering policy, there are many factors to consider, such as the metering infrastructure, eligible technologies, system and program size caps, and the type of net energy metering being used (i.e., full retail rate, feed-in tariff, no compensation, time-of-export, etc.). It is also important to keep in mind the overall goal of the program. Solar resource assessments can gauge the potential volume of solar capacity that could be motivated through a net metering program but typically needs highly resolved geographical information system (GIS) data on topography and land-use availability, solar resource data, and potential light detection and ranging (LiDAR) which can be used for mapping rooftop availability. The Implementing Partner will provide Timor Leste with insights on solar resources, including expected capacity factors across the country and will train the government entities on how to use these data to further refine resource potential.

Grid codes for DERs specify how resources should provide grid support functions and respond to grid contingencies and conditions for energisation. For Timor Leste, IEEE 1547-2018 applicability will be examined, which includes voltage and frequency trip and ride-through and voltage and frequency regulation capabilities that could be integrated into the grid code. Timor Leste has a 150 kV transmission loop, along with a 20 kV ring that is a newer build. 150 kV would typically be governed by a bulk system, or transmission, grid code, whereas the 20 kV ring would be covered under distribution and DER interconnection. However, given the small system size, and the integral nature of both systems, a combined transmission and distribution grid code could be a better solution for the country.

2. Problem statement

The technical assistance provided to Timor Leste will focus on three main areas: solar resource insights, net metering policy, and distributed energy resource grid code. The Implementing Partner will prioritise the state-owned utility's specific needs in these areas.

Regarding net metering policy, the Implementing Partner will provide guidance on metering infrastructure, eligible technologies, system and program size caps, and the type of net energy metering being explored (i.e., full retail rate, feed-in tariff, no compensation, time-of-export, etc.). They will also outline the program's overall goal.

To assess the potential volume of solar capacity that could be generated through a net metering program, the Implementing Partner will perform a high-level solar resource assessment. This will include examining capacity factors across the island for different solar PV configurations and providing training on the highly resolved geographical information system (GIS) on topography and land-use availability, solar resource data, and potential light detection and ranging (LiDAR) for mapping rooftop availability that EDTL could explore in the future.

In addition, the Implementing Partner will provide training to EDTL on grid codes for distributed energy resources and a combined bulk and distribution grid code. They will examine the applicability of IEEE 1547-2018 for Timor Leste, including voltage and frequency trip and ride-through and voltage and frequency regulation capabilities that could be integrated into the grid code.

3. Logical Framework for the CTCN Technical Assistance:

(Guidance: Please note that multiple activities lead to one Output, and multiple Outputs lead to one Outcome. There can be several Outputs, but only one Outcome description capturing the CTCN technical assistance. Deliverables are the products or services to be delivered to the NDE/Proponent/CTCN based on the Activities and the Outputs.)

Objective:
The main objective of this technical assistance is to formulate a National Electricity Grid Code and develop a Net Metering Policy in Timor Leste.

Outcome:
The assistance provided to Timor Leste will focus on three main areas: solar resource, net metering policy, and distributed energy resource grid code. The Implementing Partner will provide guidance on metering infrastructure, eligible technologies, system and program size caps, and the type of net energy metering being explored. To assess the potential volume of solar capacity that could be generated through a net metering program, a high-level solar resource assessment will be performed. This will include examining capacity factors across the island for different solar PV configurations. Training on geographical information systems will also be provided. Additionally, the Implementing Partner will provide training to EDTL on grid codes for distributed energy resources. The applicability of IEEE 1547-2018 for Timor Leste will be examined, including voltage and frequency trip and ride-through, and voltage and frequency regulation capabilities that could be integrated into the grid code.

	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Output 1: Development of implementation planning and communication documents												
Activity 1: *All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance.* i) A detailed work plan of all activities, deliveries, outputs, deadlines and responsible persons/organisations and a detailed budget to implement the Response Plan. The detailed work plan and budget must be based directly on this Response Plan; ii) Based on the Implementation Plan, a Monitoring and Evaluation Plan with specific, measurable, achievable, relevant, and time-bound indicators should be developed to evaluate the timelines and appropriateness of implementation. The indicators selected in the Monitoring and Evaluation Plan should be aligned with the Closure and Data Collection Report template. This will enable the implementer to complete the CTCN Closure and Data Collection Report at the end of the technical assistance; iii) A CTCN Impact Description formulated at the beginning of the technical assistance and updated/revised once the technical assistance is fully delivered (a template will be provided); iv) A Closure and Data Collection report completed at the end of the technical assistance (a template will be provided).											
Deliverable 1: i) Detailed work plan ii) Monitoring and evaluation plan	X											

iii) CTCN Impact Description (initial and final version)
iv) Closure and Data Collection report

Output 2: ***Solar Resource Data and Insights for Timor Leste***

The Implementing Partner will provide Timor Leste with insights into the potential of solar resource in the country. The partner will conduct an examination of the solar resource potential, topography, and capacity factors across the country. Additionally, if land-use GIS data is available and of sufficient quality, the Implementing Partner will explore the possibility of using it to refine the solar resource assessment.

Activity 2: ***Solar Resource Data and Insights for Timor Leste – Irradiance, and Solar Capacity Factors***

The Implementing Partner will examine solar resource data for Timor Leste to provide insights into the renewable energy potential for the country. Leveraging solar resource datasets (e.g., National Solar Resource Database, Renewable Energy Data Explorer, etc.), the Implementing Partner will calculate solar PV capacity factors for the country for different solar configurations (e.g., fixed, 1-axis tracking, etc.). The Implementing Partner will examine using topographical data for land exclusions for developable areas and work with partners in Timor Leste to investigate whether land-use geographical information system (GIS) data is available for further exclusions (e.g., forested areas, private land, protected areas, etc.). Using land-use GIS data to refine the analysis is not guaranteed and will be included if the data is available and of sufficient quality to easily utilise.

Stakeholders: Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e

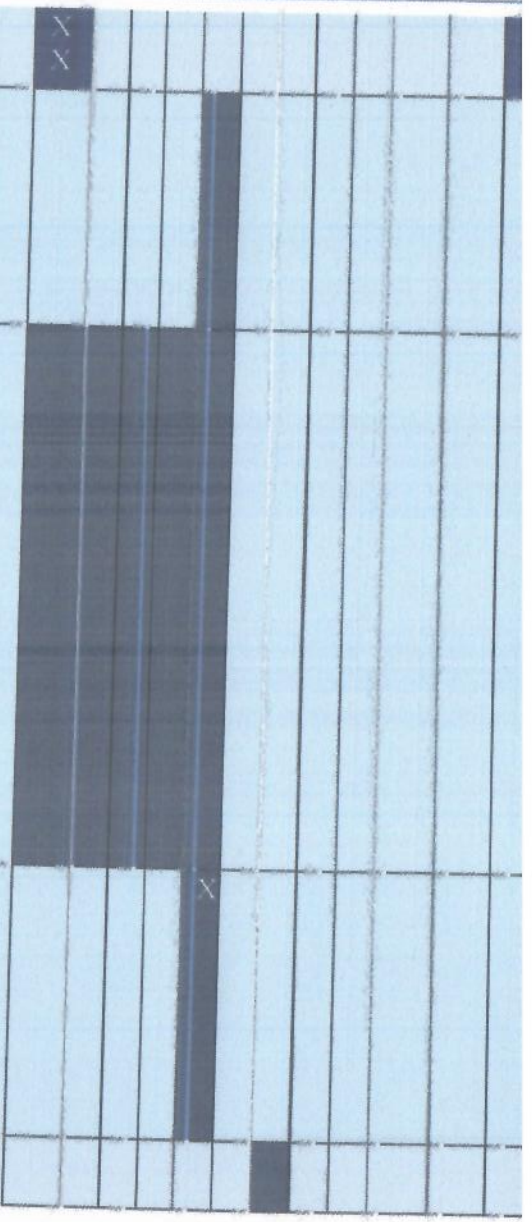
Data: Potential data includes the Implementing Partner, National Solar Resource Database (NSRDB) and RE data explorer, Timor Leste GIS datasets

Deliverable 2: ***Report on Solar Resource Data and Insights for Timor Leste***

Report detailing the solar resource potential insights for Timor Leste and providing capacity factors across the country for different solar configurations.

Stakeholders: Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e

Output 3: ***Net Energy Metering Policy for Timor Leste***



The Implementing Partner will develop a net metering policy for Timor Leste and calculate the payback period for solar projects under different scenarios. The Implementing Partner will assist Timor Leste in understanding how NEM policies have been evolving internationally as the adoption rate of solar has increased.

Stakeholders: Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e

Activity 3.1: ***Net Energy Metering Policy for Timor Leste – Program Design Options***

The Implementing Partner will develop a net metering policy for Timor Leste and explore program design options, including: type of NEM (full retail rate, feed-in tariff, no compensation for export, time-based export), technology eligibility, program and system size limits, and the type of eligible customers. The Implementing Partner will assist Timor Leste in understanding how NEM policies have evolved across utilities internationally and the metering infrastructure required to roll out a NEM program.

Stakeholders: Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e

Data: Solar resource data from Output 2, rate information from EDTL, Energy policy from the Secretariat

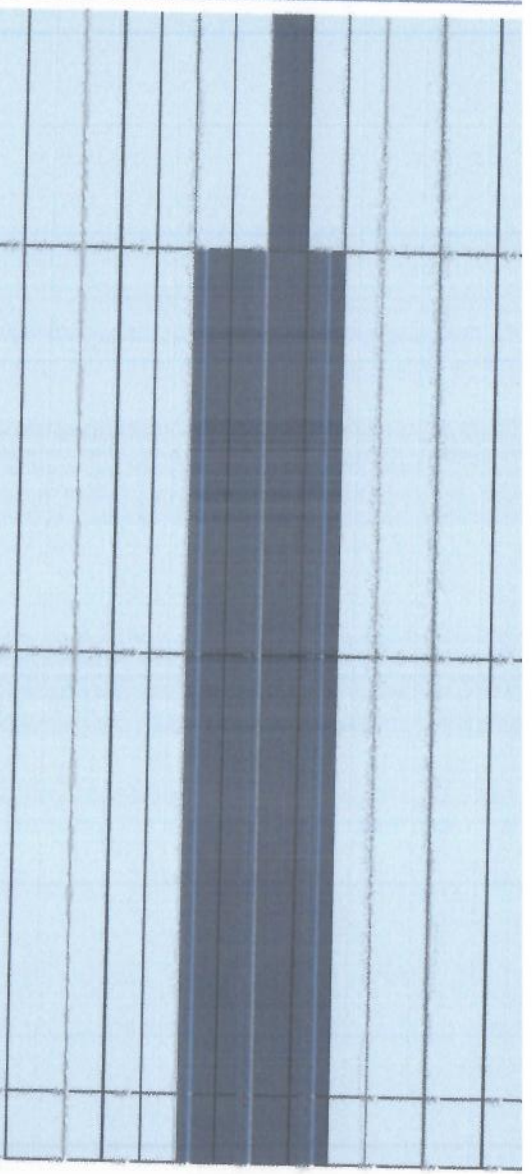
Activity 3.2: ***Net Energy Metering Policy for Timor Leste – Solar Project Payback Scenarios under Different NEM***

The Implementing Partner will examine solar payback scenarios under different NEM structures (e.g., full retail rate, feed-in tariff, no compensation for export, etc.). Additionally, the Implementing Partner will include solar+storage scenarios for NEM structures where the full retail rate is not used in remunerating export. This activity will utilise the solar resource data developed in activity 2.1. The payback scenarios will help Timor Leste policy makers understand how each NEM structures financially motivates solar adoption.

Stakeholders: Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e

Data: Solar resource data from Output 2, EDTL rates and tariffs

Activity 3.3: ***Net Energy Metering Policy for Timor Leste – Workshop for Policymakers***



The Implementing Partner will organise a workshop for policymakers and disseminate information on program design options, solar project payback scenarios based on different NEM structures and other findings related to NEM. **Stakeholders:** Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e	
Deliverable 3: ***Report on Net Energy Metering Policy*** Report on creating a net energy metering policy. Solar project payback results under different NEM scenarios for Timor Leste. **Stakeholders:** Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e	
Output 4: ***Grid Code for DERs and IBRs in Timor Leste*** In anticipating growth of inverter-based resources (IBR's) and distributed energy resources (DERs) from the potential growth in solar as a result of NEM policy, Timor Leste will need to incorporate grid support functions from inverter-based resources. The Implementing Partner will develop the grid code, examining elements of IEEE 2800 and IEEE 1547-2018 that may help safely integrate inverter-based resources **Stakeholders:** Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e	
Activity 4.1: ***Grid Code for DERs and IBRs in Timor Leste – Assessment of Current Grid Codes and Character of Service in Timor Leste*** The Implementing Partner will examine existing grid codes, both for transmission and distribution, examining frequency and voltage bounds, trip settings, and regulation services. The Implementing Partner will request EDTL for operational data (voltage and frequency for bulk and distribution), where available, to help understand the existing power quality that may inform grid code design. The Implementing Partner will also request current interconnection regulations and guidelines, if they exist, for distributed generation. **Stakeholders:** Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy, Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e	

Data: Grid Codes supplied by EDTL, potential voltage and frequency data supplied by EDTL.

Activity 4.2: ***Grid Code for DERs and IBRs in Timor Leste - Examination of Grid Support Functions from Inverter Based and Distributed Energy Resources***

The Implementing Partner will develop the grid code by examining elements of IEEE 2800 and IEEE 1547-2018 that may help safely integrate inverter-based resources. These will include; voltage and frequency trip and ride-through capabilities along with voltage and frequency regulation services. These services will be examined in the context of EDTL's grid operation, the level of DER adoption anticipated, and the current state of power quality for the Timor Leste power system.

Stakeholders: Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy
Data: Grid Codes supplied by EDTL, potential voltage and frequency data provided by ETDL.

Deliverable 4: ***Report on Grid Code for DERs and IBRs in Timor Leste***

Report on the development of grid code that could be included in future revisions of the Timor Leste grid code, including voltage and frequency trip and ride-through capabilities along with voltage and frequency regulation services.

Stakeholders: Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy

Output 5: ***GCF concept note and in-person workshop***

The Implementing Partner will develop one GCF Concept Note for a full-scale project.

The Implementing Partner will travel to Timor Leste to deliver an in-person workshop and dissemination of the findings of the project on solar resource assessment, net energy metering policy, and grid code for DERs and IBRs.

Activity 5.1: ***Development of 1 GCF Concept Note***

As per standard requirements, the GCF concept note will include a project summary, detailed project information, indicative financing/cost information and supporting documents that may include a theory of change, economic and financial models, pre-feasibility studies, evaluation reports from previous projects, and/or results of environmental and social risk screening.

Senior engineer (IE2)	• Relevant master's degree in Electrical engineering, technology, economics of power systems or other disciplines with a focus on the field of similar issues in a developing country context. • At least 8 years of working experience with issues of electricity market design, and policies for renewable integration in a developing country context. • Knowledge and experience in electrical engineering, technology and power systems in climate change adaptation and mitigation. • At least 5 references in the Asia Pacific. • Fluency in English is mandatory
National Experts	
Research engineer (NE1)	• Relevant master's degree in Electrical engineering, technology, economics of power systems or other disciplines with a focus on the field of similar issues in a developing country context. • At least 5 years of working experience with issues of the renewable energy sector in a developing country context. • Knowledge and experience in renewable energy and climate technology in climate change adaptation and mitigation. • At least 3 references in the Asia Pacific. • Fluency in English is mandatory.
Gender expert (NE2)	• Relevant master's degree in Gender studies or other disciplines with a focus on the field of gender issues in a developing country context. • At least 5 years of working experience with gender mainstreaming issues in a developing country context. • Knowledge and experience of gender mainstreaming in climate change adaptation and mitigation • At least 3 references in the Asia Pacific. • Presence in Timor Leste desired or availability to travel frequently and for long periods. • Fluency in English is mandatory.

Output 5: GCF concept note and in-person workshop					*50,490*	*56,100*
Activity 5.1: Development of 1 GCF Concept Note	IE1: 15 days IE2: 15 days NE1: 20 days NE2: 20 days				*25,200*	*28,000*
Activity 5.2: In-person workshop and project wrap-up – Compiling training and final deliverables	IE1: 8 days IE2: 8 days NE1: 10 days NE2: 10 days	International travel: 3 days	In-person workshop: 3 days		*25,290*	*28,100*
Estimated range of costing for the entire Response Plan					225,270	*250,300*

5. Profile and experience of experts

Based on the required Human Resources identified in section 4 'Resources required and itemized budget) please provide a description of the required profile of all involved experts for the implementation of the CTCN Response Plan.

Experts required	Brief description of required profile
International Experts	
Project manager (IE)	• Relevant master's degree in Electrical engineering, technology, economics of power systems or other disciplines with a focus on the field of similar issues in a developing country context. • At least 11 years of working experience with issues of electricity market design, and policies for renewable integration in a developing country context. • Knowledge and experience in electrical engineering, technology and power systems in climate change adaptation and mitigation. • At least 5 references in the Asia Pacific. • Fluency in English is mandatory.

– Program Design Options	NE2: 20 days					
Activity 3.2: Net Energy Metering Policy for Timor Leste – Solar Project Payback Scenarios under Different NEM	IE1: 15 days IE2: 15 days NE1: 20 days NE2: 20 days				*25,200*	*28,000*
Activity 3.3: Net Energy Metering Policy for Timor Leste – Workshop for Policymakers	IE1: 8 days IE2: 8 days NE1: 13 days NE2: 13 days	International travel: 3 days	In-person workshop: 3 days		*26,640*	*29,600*
Output 4: Grid Code for DERs and IBRs in Timor Leste					*50,400*	*56,000*
Activity 4.1: Grid Code for DERs and IBRs in Timor Leste - Assessment of Current Grid Codes and Character of Service in Timor Leste	IE1: 15 days IE2: 15 days NE1: 20 days NE2: 20 days				*25,200*	*28,000*
Activity 4.2: Grid Code for DERs and IBRs in Timor Leste - Examination of Grid Support Functions from Inverter Based and Distributed Energy Resources	IE1: 15 days IE2: 15 days NE1: 20 days NE2: 20 days				*25,200*	*28,000*

					Minimum	Maximum
Output 1: Development of implementation planning and communication documents					*USD 10,800*	*USD 12,000*
Activity 1: Formulation of i) Detailed work plan, ii) Monitoring and evaluation plan, iii) CTCN Impact Description, iv) Closure and Data Collection report.	IE1: 10 days IE2: 10 days				*10,800*	*12,000*
Output 2: Solar Resource Data and Insights for Timor Leste					*36,540*	*40,600*
Activity 2: Solar Resource Data and Insights for Timor Leste – Irradiance, and Solar Capacity Factors	IE1: 13 days IE2: 13 days NE1: 23 days NE2: 23 days	International travel: 3 days	In-person kick-off meeting: 3 days		*36,540*	*40,600*
Output 3: Net Energy Metering Policy for Timor Leste					*77,040*	*85,600*
Activity 3.1: Net Energy Metering Policy for Timor Leste	IE1: 15 days IE2: 15 days NE1: 20 days				*25,200*	*28,000*

Stakeholders: Green Climate Fund, GCF Accredited Entity, Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy	
Activity 5.2: ***In-person workshop and project wrap-up – Compiling training and final deliverables*** The Implementing Partner will prepare presentation materials and compile previous deliverable reports into a final and publicly available report for Timor Leste. The Implementing Partner will travel to deliver the final project presentation and material dissemination. **Stakeholders:** Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy	
Deliverable 5: ***1 GCF Concept Note, final project deliverable and in-person presentations*** Final compiled deliverable, combing deliverables 2, 3, 4 and 5 into a final report. Project presentation delivering key project findings in-person in a visit to Timor Leste. **Stakeholders:** Green Climate Fund, GCF Accredited Entity, Electricidade de Timor Leste (EDTL), Secretariat of State for Energy Policy	

4. Resources required and itemized budget:

Please provide an indicative overview of the resources required and itemized budget required to implement the CTCN technical assistance, including for M&E-related activities, using the table below. Important to note that minimum 1% of the budget should explicitly target gender specific activities related to the technical assistance (please see section 10 for further information on gender). Once the Response Plan is completed, a Response Implementation partner(s) will be selected by the Climate Technology Centre (CTC). A detailed activity-based budget for the CTCN assistance will be finalized by the CTCN and selected Implementer.

Activities and Outputs	**Input: Human Resources** *(Title, role, estimated number of days)*	**Input: Travel** *(Purpose, national vs. international, number of days)*	**Inputs: Meetings/events** *(Meeting title, number of participants, number of days)*	**Input: Equipment/Material** *(Item, purpose, buy/rent, quantity)*	**Estimated cost** *Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan*

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Annex 1. Guidance Note for the Response Plan template

In order to maximize the impact of the technical assistance provided by the CTCN and provide an effective M&E process, the Response Plan should integrate as much as possible the considerations below:

Climate Technology focus: The Response Plan should have a clear focus on climate technologies, and identify activities that enable the identification, development, deployment or diffusion of one or several specific technologies (including equipment, techniques, knowledge and skills).

Barrier removal / Problem solving: The activities should contribute to address the specific problem statement identified in the Request. The barriers identified should be those hampering the identification, development, deployment or diffusion of one or several climate technologies or climate actions. Therefore, it may be necessary to limit the CTCN Response Plan to a set of activities for technical assistance commonly agreed with the NDE (and Proponent when needed) compared to the original request submitted. The CTCN will liaise with NDEs and Proponent in case the scope of the technical assistance deviates from the original request.

Use of the CTCN assistance by stakeholders: The Response Plan should identify clearly how the products of the CTCN assistance will be used in the short term once support is delivered, by who and when, to ensure it will lead to specific impacts in the country. The activities should engage the stakeholders that will use the concrete results of the assistance to deploy the technologies, including from the private sector, the public sector, research institutions, etc.

Within the scope of CTCN resources: The cost of the technical assistance provided by the CTCN cannot exceed USD 250,000 per Response Plan. Therefore, it may be necessary to prioritize activities and limit the CTCN Response Plan to a set of priority activities commonly agreed with the Proponent and the NDE to remain under this value. Under section 4 of the Response Plan template, an indicative activity based budget should be presented. The proposed budget is indicative and should present an estimated costing range per activity, output as well as a total costing range for the delivery of the Response Plan. Once the Response Plan is finalised and published for tendering, interested parties will provide competitive offer against the indicative budget.

CTCN activities and outputs should be linkable to monitoring and evaluation indicators: All proposed activities and outputs must be linkable to monitoring and evaluation indicators that are specific, measurable, achievable, relevant, and time-bound. The monitoring and evaluation process and corresponding indicators will be developed by the Lead Implementer as part of the work plan and will allow the CTCN technology Manager to monitor the timeliness and appropriateness of the implementation.

Synergies with existing efforts: The Response Plan should focus on activities that are not already being fully supported or that are in the process of being fully supported by another national, regional or international organization. Synergies and complementarity also require that the CTCN assistance is not duplicating past activities. It is possible in the Response Plan to indicate co-financing from the government, the Proponent or another stakeholder, that will maximize the effectiveness of the CTCN assistance.

Gender mainstreaming: The CTCN mission is to build or strengthen developing countries' capacities to identify technology needs, to facilitate the preparation and implementation of technology projects and strategies taking into account gender considerations. The Response Plan must therefore describe how gender considerations will be included and monitored within the proposed activities, and any gender co-benefits that will be gained as a result of implementing the CTCN technical assistance.

3. Role of the Response Planning Design Team

The Response Planning Design Team is selected by the Climate Technology Centre (CTC). The composition of the team depends on each particular request but may include the National Designated Entity (NDE), the request Proponent, Climate Technology Manager of the CTCN, experts from the CTCN Consortium, UNIDO and UNEP experts from regional offices and other experts as needed.

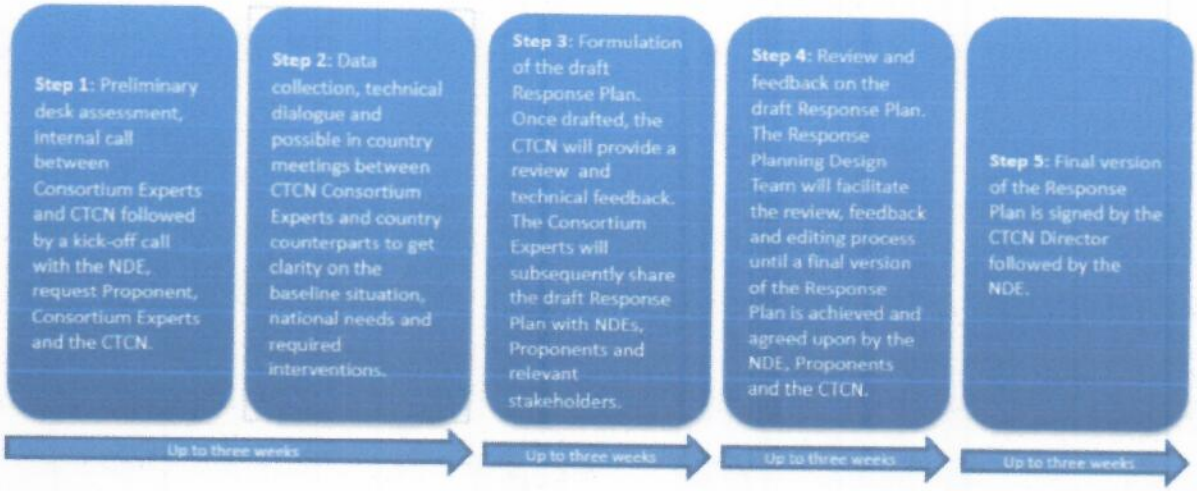
The role of CTCN Consortium experts is to lead the design of the Response Plan. The NDE will provide overall guidance on national context and priorities whereas the request Proponent will provide more detailed information on the sector, barriers and requested assistance. The Climate Technology Manager of the CTCN will provide quality assurance of timeliness and appropriateness of the Response Plan.

The Response Planning Design Team will draft all sections of the Response Plan template building on the information contained in the CTCN Request, based on expertise on the given topic and potentially further data collection, as required. This will be done by the CTCN Consortium Experts in consultation with the NDE, request Proponent and relevant stakeholders. The Response Plan has to be agreed to and approved by the NDE and the CTCN Director. This Response Plan will serve as the basis to identify, select and engage an expert institution from the Climate Technology Network or Consortium to lead the implementation of the CTCN Response Plan in the requesting country.

To the extent possible, staff from UNEP and UNIDO Regional, Sub-Regional and/or National Offices should be involve in all stages of formulation of the Response Plan to maximize synergies and avoid overlap with ongoing initiatives, as well as ensure relevance to regional and national context.

4. Process for designing the Response Plan

The Response Planning process should be completed over a period of up to 60 working days (12 weeks). Indicative steps and related timelines are laid out below:



5. Design Considerations

monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation. The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation. Upon completion of all activities and outputs, evaluation forms will be completed by the (i) NDE about overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance; and (iii) the CTCN Director about timeliness and appropriateness of the delivery of the activities and outputs.

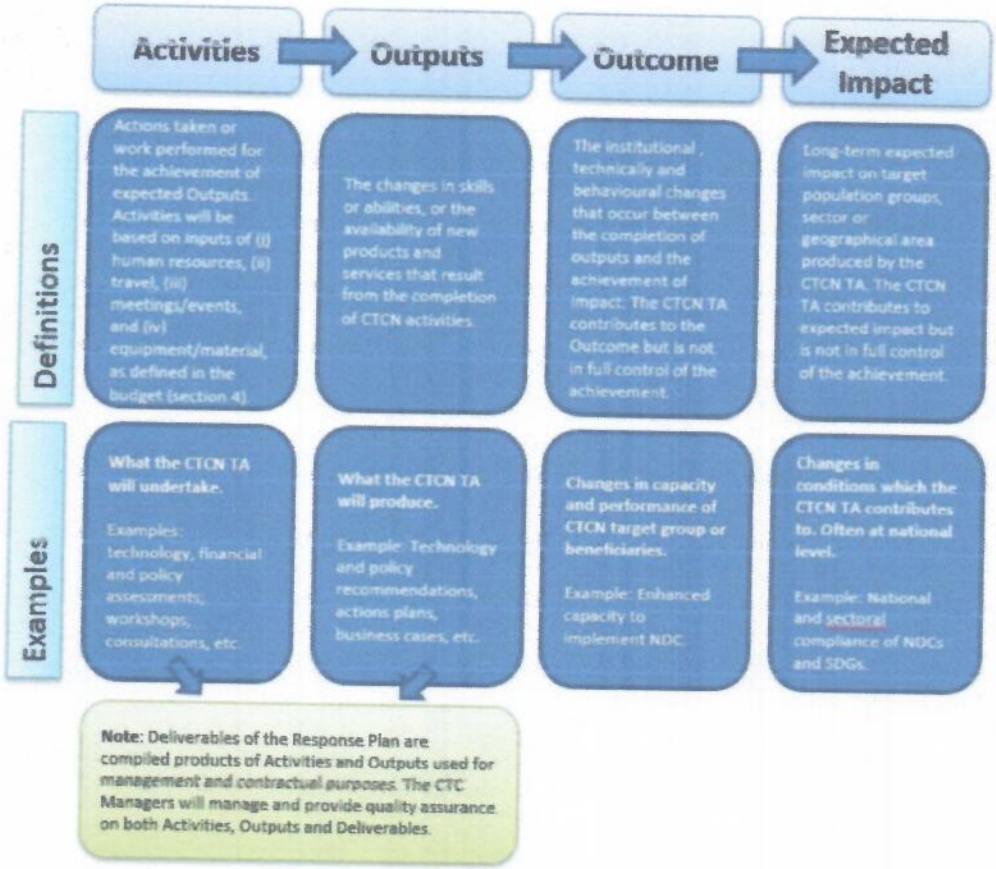
Annex 1: Guidance note for designing a Response Plan (to be deleted when submitting the Response Plan)

1. Objective of the Response Plan

The Response Plan is developed by CTCN specialists in response to a country request for technical assistance. It constitutes the Terms of Reference of the CTCN technical assistance that will be provided to the country and it provides the formulation of and subsequent basis for the monitoring and evaluation of the Response Plan implementation, as well as its expected outcomes and anticipated impacts.

2. Results chain and Logical Framework Approach to be defined in the CTCN Response Plan

The result chain is the causal sequence that stipulates the necessary flow of actions and processes to achieve desired objectives and results – beginning with inputs, moving through activities and outputs, and culminating in individual outcomes. The outcome will contribute to the desired impact in the society. The Logical Framework Approach is an analytical process used to support objectives-oriented project planning and management. It provides a set of pre-defined concepts which are used as part of an iterative process to aid structured and systematic analysis and management of the CTCN technical assistance.



8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	Promoting the use of solar PV will help reduce the impacts of emissions from diesel generation and help combat climate change.
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	
	13.2 - Integrate climate change measures into national policies, strategies and planning	
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

13. Classification of technical assistance:

Please indicate primary type of technical assistance. Optional: If desired, indicate secondary type of technical assistance.

Please tick off the relevant boxes below	*Primary*	*Secondary*
☐ 1. Decision-making tools and/or information provision	☐	☑
☐ 2. Sectoral roadmaps and strategies	☐	☑
☐ 3. Recommendations for law, policy and regulations	☐	☐
☐ 4. Financing facilitation	☐	☑
☐ 5. Private sector engagement and market creation	☐	☐
☐ 6. Research and development of technologies	☐	☐
☐ 7. Feasibility of technology options	☐	☐
☐ 8. Piloting and deployment of technologies in local conditions	☐	☐
☐ 9. Technology identification and prioritisation	☑	☐

Please note that all CTCN technical assistance contributes to strengthening the capacity of in country actors.

14. Monitoring and Evaluation process

Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The

Electricidade de Timor Leste	Vertically integrated state power utility that owns generation, transmission, and distribution in the country. Currently, EDTL is taking over operations and maintenance of the diesel generation fleet from Wärtsilä. EDTL will receive net energy metering and grid code from the Implementing Partner that may assist them in forming future net energy metering programs and designing a future grid code. Additionally, EDTL will receive solar resource data and training on modeling future solar projects.
Faculdade de Engenharia, Ciência e Tecnologia, Universidade Nacional Timor Lorosa'e	Faculty of engineering, science, and technology at the National University of Timor Leste. Faculty interested in receiving training from the Implementing Partner, and utilizing solar resource data for future analysis and research, can benefit from the Implementing Partner's technical assistance.

12. SDG Contributions:

*Instructions: Please complete the grey section below for **a maximum of three SDGs** that will be advanced through this TA. A complete list of SDGs and their targets is available here: https://sustainabledevelopment.un.org/partnership/register/.*

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
1	End poverty in all its forms everywhere	This technical assistance will facilitate the growth of solar power generation in Timor Leste, leading to reduced electricity costs for customers. Currently, the country relies heavily on costly diesel-based electricity generation. However, the promotion of solar power should help cut down expenses.
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	This technical assistance will help Timor Leste in developing new solar generation that can help improve reliability of supply and decrease retail costs.
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	

could complement that development and the development of other future solar resource sites. The work will also provide insights for the government of Timor Leste to start to decarbonise their power system and reduce expensive retail tariffs as a result of heavy reliance on diesel generation.

9. **Anticipated follow up activities after this technical assistance is completed:**

To advance Timor Leste's solar energy projects, there will be training and capacity building programs focused on solar resource modelling, net energy metering policy, and grid code and analysis. These programs will be shared with the government and EDTL to establish their net energy metering policy and grid code. The technical assistance provided will aid in the launch of solar demonstration projects and initiatives in the future.

Timor Leste and the state utility can take the following next steps after the completion of this TA:

- Use the reports and analysis techniques to further resolve the solar resource potential of Timor Leste.
- Use the net energy metering analysis to develop a comprehensive policy and roadmap.
- Use the grid code analysis to develop a comprehensive transmission and distribution grid code.
- Accelerate the development of solar PV generation capacity on the island and integrate the capacity safely onto the distribution and transmission network.

10. **Gender and co-benefits:**

Imbedded in design of the activities:	To promote gender equality, a gender expert will assess and evaluate the implementation of this technical assistance. Stakeholders will be asked to ensure a fair gender balance in presentations and training activities if applicable. Female expertise will be involved at all levels, where appropriate and available through the country's stakeholders.
Gender and co-benefits intended as result of the activities.	By implementing solar PV generation, electricity cost can be lowered and reliability can be improved. Smaller businesses, which may not have the means to afford on-site backup generation or battery energy storage, are more greatly affected by high electricity costs. This can have a disproportionate impact on women, who own a larger percentage of small businesses compared to men.

11. **Main in-country stakeholders in implementation of the technical assistance activities:**

Using the table below, please list and describe the role of in-country stakeholders, participants and beneficiaries who will be involved in or directly consulted during implementation of the assistance

In country stakeholder	Role in implementation of the technical assistance
National Designated Entity	Support the request and monitor its implementation; Request Applicant
Secretariat of State for Energy Policy	Responsible for energy policy for the government of Timor Leste. The Secretariat will receive net energy metering and grid code from the Implementing Partner that may assist them in forming future energy policy.

6. **Intended contribution to impact over time**

Short-term

The short-term impact will be providing the state-owned utility with the net metering policy and grid code. Additionally, providing insights and datasets for the solar resource potential of the island. Training will help the government and utility further their expertise on net metering, grid support functions from distributed energy resource, and solar resource modeling.

Mid-term

Mid-term, the work in this project should help enable Timor Leste to establish a net metering policy, a grid code that considers distributed energy resources. Furthermore, the work should help provide insights into growing the solar industry in Timor Leste, including solar resource datasets, and training capacity to model solar resource.

Long-term

The overall goals of this technical assistance will help Timor Leste establish new renewable energy capacity on the island, helping displace expensive and polluting diesel generation. Developing solar capacity should help lower electricity costs for the country, and lower emissions. Developing a robust grid code will help with overall system stability and ensure that renewable resources and distributed generation are integrated in a least-regret fashion.

7. **Relevance to NDC's and other national priorities**

By developing solar PV generation, Timor Leste can reduce emissions and integrate renewable energy sources, which will advance the country's National Determined Contributions (NDC). Currently, most of Timor Leste's electricity comes from diesel-fired generation, which produces a significant amount of the country's total emissions. Solar PV generation can help reduce emissions from this highly carbon-intensive source of electricity and improve the resilience of rural communities.

In addition to reducing emissions, solar generation can also help reduce expensive electricity costs, which will benefit low-income communities. By combining solar PV with battery systems, the reliability of electricity supply in remote and rural communities can also be improved. By examining coincidence factors for solar generation in Timor Leste and system demand, it can be determined if solar generation can also reduce the risk of capacity shortages, eliminate the need for fossil-fired peaking generation, and decrease greenhouse gas emissions.

2022. "Nationally Determined Contribution (NDC). Timor Leste 2022-2030."
https://unfccc.int/sites/default/files/NDC/2022-11/Timor_Leste%20Updated%20NDC%202022_2030.pdf

8. **Linkages to relevant parallel on going activities:**

Timor Leste's power system is currently undergoing changes as EDTL takes over the operation and maintenance of their diesel-fired generation from Wartsila. To guide the configuration of these generators in the future, the implementation of a grid code would be beneficial. Additionally, EDTL is exploring the possibility of transitioning one of their generation assets to natural gas, which could aid in the integration of solar PV and provide flexibility.

The UN Timor Leste compound installed a 300 kWp solar PV system which produces 400,000 kWh of clean electricity annually. The Implementing Partner's work on developing solar resource data