Technical Assistance Closure Report Template

Objective of the technical assistance (TA) Closure Report:

- To communicate publicly in one document a summary of progress made and lessons learned during the TA towards the anticipated impact (sections 1-4).
- To document qualitative and quantitative data collected during TA, for use in donor and UN reporting (Annex 1).

Steps for completing the TA closure report:

1. The lead TA implementer submits the closure report at the end of the technical assistance as a final deliverable. The TA closure report will capture outputs, outcomes and impacts of all activities conducted under the TA. Please copy and summarise relevant material from previous TA outputs/deliverables and the Response Plan, as relevant.
2. A CTCN Manager will review and revise the closure report before final approval by the CTCN Deputy Director.

Important note on public and internal use of the closure report:
Once approved by the CTCN Deputy Director, the TA closure report will be a public document available on the CTCN website www.ctc-n.org. Selected content will be used for targeted communication activities. Annex 2 is for internal use only and will not be publicly available.

Closure Report for CTCN Technical Assistance

1. Basic information

Title of response plan	**FORMULATING A NATIONAL ELECTRICITY GRID CODE AND DEVELOPMENT OF A NET METERING POLICY IN TIMOR-LESTE**
Technical assistance reference number	**3100005838**
Country / countries	**Timor-Leste**
NDE organisation	National Directorate for Climate Change, Ministry of Commerce, Industry and Environment
NDE focal point	**Mr. Luis dos Santos Belo,** National Directorate for Climate Change, Ministry of Commerce, Industry and Environment
NDE contact information	*Alubelo78@gmail.com*
Proponent focal point and organisation	**Mr. Luis dos Santos Belo,** National Directorate for Climate Change, Ministry of Commerce, Industry and Environment
Designer of the response plan	UNEP CTCN
Implementer(s) of technical assistance	**Intelligent Energy Systems (IES) and Asia Management Consulting (AMC)**
Beneficiaries	National Directorate for Climate Change, Ministry of Commerce, Industry and Environment. Electricidade de Timor-Leste Empresa Pública
Sector(s) addressed	• Renewable Energy

	• Energy Efficiency

Technologies supported	• Renewable Energy
	  ○ Solar (Solar PV)
	  ○ Solar (Building-integrated PV)
	  ○ Renewable Energy Infrastructure (Renewable energy Resource Mapping)
	  ○ Renewable Energy Infrastructure (Grid Integration for Renewables)
	• Energy Efficiency
	  ○ Appliances and Equipment (Community-based energy services)
	  ○ Energy distribution (Connection of isolated grid)

Implementation start date	**Jun-2024**
Implementation end date	**December-2025**
Total budget for implementation	**$232,690**
Description of delivered outputs and products as well as the activities undertaken to achieve them. In doing so, review the log frame of the original response plan and refer to it as appropriate	**Output 1: Development of the work plan and related communication documents** • Activity 1.1: Work plan • Activity 1.2: Monitoring and evaluation plan • Activity 1.3: Impact description document (initial and final version) • Activity 1.4: Closure and Data Collection Report **Output 2: Solar Resource Data and Insights for Timor Leste** • Activity 2.1: Solar Resource Data and Insights for Timor Leste – Irradiance, and Solar Capacity Factors **Output 3: Net Energy Metering Policy for Timor Leste** • Activity 3.1: Net Energy Metering Policy for Timor Leste – Program Design Options • Activity 3.2: Net Energy Metering Policy for Timor Leste – Solar Project Payback Scenarios under Different NEM policies • Activity 3.3: Net Energy Metering Policy for Timor Leste – Workshop for Policymakers **Output 4: Grid Code for DERs and IBRs in Timor Leste** • Activity 4.1: Grid Code for DERs and IBRs in Timor Leste - Assessment of Current Grid Codes and Character of Service in Timor Leste • Activity 4.2: Grid Code for DERs and IBRs in Timor Leste - Examination of Grid Support Functions from Inverter Based and Distributed Energy Resources **Output 5: GCF concept note and in-person workshop** • Activity 5.1: Development of 1 GCF Concept Note • Activity 5.2: In-person workshop and project wrap-up – Compiling training and final deliverables
Methodologies applied to produce outputs and products	• GIS geospatial renewable energy mapping and analysis • Cost-benefit / payback period Analysis for net-metering of solar PV rooftop • Calculation of community-based Solar PV potential, investment requirements, and benefits

	• Technical drafting of laws and regulations pertaining to grid code development for incorporating renewables and other advanced technologies • Custom-developed excel tools for training on dispatch analysis • Desktop research and application to local context
Reference to knowledge resources	N/A
Deviations	No deviation from response plan or implementation of project. No-cost extension received to allow for project stakeholders and recipients to provide more detailed feedback on project outputs.
Anticipated follow-up activities and next steps	• Development of rooftop Solar PV market deployment strategy. • Further utilization of Solar resource capacity, analysis, and capacity factor datasets. • Incorporation of Grid-Code updates and recommendations into official laws / regulations • Adoption of Net Metering Policy and mobilize institutional support. • Follow-up on formal submission requirements for GCF concept note funding proposal.

2. Lessons learned

	Lessons learned	**Recommendations**
Lessons learned from the CTCN TA process	*The CTCN TA process was straightforward and interactions with the CTCN Secretariat were always productive. Challenges faced during implementation was primarily in getting beneficiaries / counterparts to respond and provide feedback on time, which resulted in the need for us to require a no-cost extension.*	*Recommendations include* • *Require more dedicated beneficiary / recipient counterparts to be more responsive as part of the CTCN process.*
Lessons learned related to climate technology transfer	*The training component for delivering TAs that include technology transfer is critical for recipients to yield long-term benefits. There were three in-person workshops that were delivered, each covering specific technology transfer across multiple days.* *The data hand-over process for technology transfer is an important component to ensure beneficiaries can continue using and leveraging new technologies in support of their climate actions.*	*Recommendations include* • *Ensuring TAs with technology transfer have a robust in-person training component.* • *Develop data hand-over checklists that should be included in the TA closure reports.*

3. Illustration of the TA and photos

For communication purposes, please provide 2-4 Power Point slides, including illustrations or charts, describing barriers, opportunities, methodology, activities, outputs and achieved results. The illustrations must be copied into the TA Closure report but must also be delivered as power point files. Also, please provide at least five high-resolution pictures in jpg format, capturing technical assistance. The pictures should illustrate how the TA has impacted the lives of the beneficiaries in particular and the communities in general.

4. Impact Statement

The information in the table below will be used to communicate results and anticipated impacts of this technical assistance publicly. Please copy information from impact statement developed in the M&E Plan and update as relevant.

Challenge	Timor-Leste's power system with a total installed capacity of 287 MW is almost entirely reliant on diesel powered generation sources. However, this method of generation creates sustained high energy prices, thus slowing the economic development especially for small businesses. The current metering policy and grid codes impedes the integration of distributed energy resources including solar as a cheaper alternative.
CTCN Assistance	• Build Solar resource capacity map for solar feasibility and capacity factors to inform solar potential in Timor-Leste • Develop a Net Metering Policy to increase power system flexibility and engagement of all participants in the market. • Formulation of Grid Code to encourage and enhance integration of Distributed Energy Resources (DER). • Provide training in both solar resourcing and policy framework to develop domestic technical capacity for future expansion on existing work.
Anticipated impact	• Anticipated increased economic, health, well-being, infrastructure and built environment, and ecosystems resilience to climate change impacts as a result of technical assistance (#2) • Anticipated amount of funding/investment leveraged (USD) as a result of TA (disaggregated by public, private, national, and international sources, as well as between anticipated/confirmed funding) (#4)
Co-benefits: Achieved or anticipated co-benefits from the TA	• Rooftop Solar PV generation can lower cost of electricity generation and increase access to electricity for end users. • Net-Metering Policy is required to encourage rooftop Solar PV deployment and improve economic cost-benefits. • Grid Code upgrades are required to incorporate distributed energy resources. • Anticipation of investment / funding to be leveraged to deploy Community-based Solar PV.
Gender aspects of the TA	The technical assistance was supported by a gender analysis specialist. Stakeholders were required to ensure a fair gender balance in presentations and training programs as applicable. Equal opportunity should was provided to both men and women. Up to 38% of workshop participant beneficiaries were women.

Anticipated contribution to NDC	• Commitment Area 1 – Climate Risk Governance • Commitment Area 3 – Low Carbon Development • Commitment Area 4 – Climate Change Adaptation and Resilience Building
The narrative story	Timor Leste has requested technical assistance to develop a net metering policy and grid code that encourage the integration of distributed energy resources. High electricity prices result in high end user costs including small businesses slowing economic growth. The CTCN technical assistance aimed to clarify the solar resource potential and introduce policies to increase development of solar to reduce electricity costs and increase adoption of clean and reliable energy resource. Government and EDTL staff were be trained on technical capabilities relating to solar resource modelling to enable local capacity in analyzing GIS data to further refine solar potential. The solar resource assessment enabled policymakers to quantify the level of solar potential in Timor Leste and allow for further study in the development of solar generation. By introducing a net energy metering policy, the uptake of Rooftop Solar PV would be encouraged through market-based mechanisms. The development of grid code for policymakers will ensure that the increase in distributed energy resources can be utilized in a stable and secure energy system. A GCF concept note was developed to leverage investments for Community-owned Solar PV.
Contribution to SDGs	**SDG13 Climate Action** Solar resource assessment enables Timor-Leste to explore PV capacity building, reducing their reliance on diesel generators and thus reducing greenhouse gas emissions. The Net Metering Policy and Grid Code enhances Timor-Leste ability to transition to renewable energy at a standardized and national level. Overall, this technical assistance will assist Timor-Leste in achieving their NDC. **SDG7 Affordable and Clean Energy** The development of rooftop PV at utility distributed levels could replace the existing expensive diesel generation with affordable, reliable and sustainable energy. Rural areas without existing infrastructure could achieve access to electricity through rooftop PV. **SDG5 Gender Equality** Small businesses, predominately owned by women, are disproportionately affected by higher electricity costs and often do not their own source of diesel generation. The development of solar could potentially provide women more opportunity in their day to day lives relating to energy. Additionally, this technical assistance engaged with men and women equally including the training sessions.

Annex 1 Technical assistance data collection

Please add quantitative and qualitative values for the indicators selected in the M&E plan and monitored throughout the technical assistance in the tables below. Indicators which have been monitored in addition to the proposed indicators below may be added at the end of table A. Non-relevant indicators should be left blank.

A. Output and outcome indicators

Indicator Please note indicators below highlighted as **anticipated**	**Quantitative value** *Numerals only; disaggregates must sum to the total*	**Qualitative description** *List the various elements corresponding to the quantitative value as well as timelines and responsible institutions*
Total number of events organized by proponents and implementing partners	*9 (3 workshops x 3 days each)*	Three in-person workshop trips, each over a three-day person, totaling 9 events days of events / workshops held.
Number of participants in events organized by proponents and implementing partners	*172 (63 + 50 + 59)*	Workshop 1: 13-16/August/2024 • 63 Participants Workshop 2: 2-4/July/2025 • 50 Participants Field Trip 3: 30/Sept-4/Oct/2025 • 59 Participants
a) Number of men	*107*	107 total, 62%
b) Number of women	*65*	*65 total, 38%*
Number of climate technology RD&D related events		
Number of participants in climate technology RD&D events		
a) Number of men		
b) Number of women		
Number of training organized by proponents and implementing partners		Three in-person workshop trips, each over a three-day person, totalling 9 training days / workshops held.
Number of participants in trainings organized by proponents and implementing partners		Workshop 1: 13-16/August/2024 • 63 Participants Workshop 2: 2-4/July/2025 • 50 Participants Field Trip 3: 30/Sept-4/Oct/2025 • 59 Participants
a) Number of men	*107*	107 total, 62%
b) Number of women	*65*	*65 total, 38%*
Total number of institutions trained		

a) Governmental (national or subnational)	**11**	• *Ministry of Public Works* ***(MOP)*** • *Direção-Geral para a Regulação dos Setores* • *de Eletricidade, Agua e Saneamento* ***(DREGAS)*** • *National Directorate of Energy Resources* ***(DNRE)*** • *National Directorate for Climate Change* ***(DNAC)*** • *Electricidade de Timor-Leste* ***(EDTL, E.P)*** • *Ministry of Petroleum and Minerals* ***(MPM)***
b) Private sector (bank, corporation, etc.)		
c) Nongovernmental (NGO, University, etc.)		
Percentage of participants reporting satisfaction with CTCN training (from CTCN training feedback form)		
Percentage of participants reporting increased knowledge, capacity and/or understanding as a result of CTCN training (from CTCN training feedback form)		
a) Percentage of men		
b) Percentage of women		
Total number of deliverables produced during the assistance (excluding mission, progress and internal reports)	***15***	15
a) Number of communication materials, including news releases, newsletters, articles, presentations, social media postings, etc.		
b) Number of tools and technical documents strengthened, revised or developed	**6**	• Solar PV Resource assessment report • Solar PV Dataset and capacity factors • Net-Energy Metering Policy Design Options Report • Net-Energy Metering Solar Project Payback Scenarios Report • Assessment of Current Grid Code in Timor Leste Report • Upgrading Grid Code to support IBR and DER • GCF Concept note for Community-based Solar PV
c) Number of other information materials strengthened, revised or created (For example training and workshop reports, Power Points, exercise docs etc.)	**9**	• **Workshop 1:** 3 x sets of PPT and excel training materials on Solar PV GIS mapping

		• **Workshop 2:** 3 x sets of PPT and training materials on Net-Metering Policy • **Workshop 3:** 3x sets of PPT and training materials on Grid-Code
Total number of policies, strategies, plans, laws, agreements or regulations supported by the assistance	***4***	
a) Adaptation related		
b) Mitigation related		
c) Both adaptation- and mitigation related	**4**	• *Rooftop PV Deployment Plan* • *Net-Metering Policy for Solar PV* • *Grid Code upgrades, laws and regulations* • *Community-Based Solar PV project plan*
Anticipated number of policies, strategies, plans, laws, agreements or regulations proposed, adopted or implemented as a result of the TA	**4**	
a) Adaptation related		
b) Mitigation related		
c) Both adaptation- and mitigation related	**4**	• *Rooftop PV Deployment Plan* • *Net-Metering Policy for Solar PV* • *Grid Code upgrades, laws and regulations* • *Community-Based Solar PV project plan*
Anticipated number of technologies transferred or deployed as a result of CTCN support	*6*	• Solar (Solar PV) • Solar (Building-integrated PV) • Renewable Energy Infrastructure (Renewable energy Resource Mapping) • Renewable Energy Infrastructure (Grid Integration for Renewables) • Appliances and Equipment (Community-based energy services) • Energy distribution (Connection of isolated grid)
Anticipated number of collaborations facilitated or enabled as a result of technical assistance		
a) Number of South-South collaborations		
b) Number of RD&D collaborations		
c) Number of private sector collaborations		

Number of countries with strengthened National System of Innovation as a result of CTCN support	**1**	*Timor-Leste*
Insert any additional indicators here		

B. Core impact indicators

Please fill in the tables for anticipated impacts of the CTCN assistance. Every technical assistance should contribute to at least one of the indicators below. For guidance on how to report on core indicators see the 'M&E Guidance Document for TA Implementers'.

Core indicator 1	**Anticipated metric tons of CO_2 equivalent (CO_2e) emissions reduced or avoided as a result of CTCN TA** *Please add your calculations in word or excel format as an Annex to this Closure Report, where applicable.*	
	Anticipated metric tons of CO_2e reduced or avoided as a result of the TA **on annual basis**	Anticipated metric tons of CO_2e reduced or avoided as a result of the TA **in total**
Quantitative value *(emissions reductions)*	***84,758***	***1,695,160***
Unit	**tCO_2e**	**tCO_2e**
GHG assessment boundary (project emissions) Identify expected post-TA activities, associated effects and assess boundary for quantification of GHG emission reductions	The GHG assessment considered that the country-wide rooftop Solar PV assessment, the net-metering policy, and the necessary grid code upgrades will support the deployment of rooftop Solar PV in the country. It also considered the GCF concept note that was designed for encouraging developmental investment in Community-based Solar PV across 63 large towns / villages outside of Dili. The GHG assessment assumes the results of the CTCN TA will lead to the implementation of both outcomes in Timor-Leste	The total GHG emissions was calculated from considering the annual emissions that were reduced or avoided over the entire Solar PV project lifespans.
Baseline emissions Describe baseline scenario, baseline candidates, emission factors and emissions calculated	The baseline (non-intervention scenario) considers no rooftop Solar PV deployment in Timor-Leste. Baseline grid emissions factor remains based on high emitting diesel fuel consumption for the electricity sector (see assumptions below).	The baseline scenario was assumed to be constant over the calculation timeframe (see assumptions below)
Methodology Explain the method or process of verifying the indicator and how data was gathered	There were two separate methods used for each GHG calculation. The first is for **Rooftop Solar PV a**doption considered the following steps:	This step involved multiplying the annual GHG reductions across the total project lifespan of both rooftop Solar PV and Community-based Solar deployment.

	1. Detailed GIS spatial renewable energy mapping to calculate total rooftop Solar PV potential across the country. 2. Extract country-wide Solar PV capacity factor potentials. 3. Calculate projected annual energy generation output from rooftop Solar PV (includes both self-consumption and net-metering potential). 4. Utilize Timor-Leste's average grid emissions factor. 5. Calculate total annual CO_2e reduction from displacement of energy from grid with Solar PV. The second for **Community-based Solar PV**, which involved the following steps: 1. Detailed GIS spatial renewable energy mapping to estimate the suitable size of community-based Solar PV plants in 63 large towns / villages outside of Dili. 2. Apply country-wide Solar PV capacity factor potentials. 3. Calculate projected annual energy generation output from community-based Solar plants. 4. Utilize Timor-Leste's average grid emissions factor. 5. Calculate total annual CO_2e reduction from displacement of energy from grid with Solar PV.	
Assumptions Describe assumptions made during calculation and quantification of GHG reductions	Rooftop Solar PV potential based on GIS spatial mapping of Timor-Leste and analysis on suitable rooftop area: **156.2 MWp** Supported by net-metering policy and grid code updates, an estimate **30% adoption rate (46.68 MWp)** was considered. Analysis on suitable potential for Community-Based Solar PV in 63 large towns / villages outside of Dili: **16.8 MWp** Assumed rooftop PV deployment: **46.86 MWp** Analysis on community-based Solar PV potential: **16.8 MWp** Country-wide Solar PV capacity factor assumption: **20%** Timor-Leste Grid emissions factor: **0.76 t-CO_2e**	Calculating the total reduction CO_2e considered the assumed **Solar PV project lifetime of 20-years.**

	Solar PV lifetime: **20-years**	

Core indicator 2	**Anticipated increased economic, health, well-being, infrastructure and built environment, and ecosystems resilience to climate change impacts as a result of technical assistance** *Please provide a **qualitative** description of the anticipated impacts on the categories below*
Infrastructure and built environment Anticipated increased infrastructure resilience (avoided/mitigated climate induced damages and strengthened physical assets)	• Deployment of rooftop Solar PV program in Timor-Leste improves the infrastructure and built environment of the energy sector by providing households with a distributed energy resource, reducing reliance on the grid and strengthening physical assets. • Community-based Solar development leads to a lower reliance on grid energy and back-up source of energy for towns / villages during potential climate events.
Ecosystems and biodiversity Anticipated increased ecosystem resilience (areas with increased resistance to climate-induced disturbances and with improved recovery rates)	
Economic Anticipated increased economic resilience (e.g. less reliance on vulnerable economic sectors or diversification of livelihood)	• The analysis on rooftop PV payback calculations demonstrated high economic potential for households, businesses, and other sectors to deploy PV systems under a range of net-metering scenarios. • A net-metering policy combined with rooftop PV showed strong potential for reducing overall costs of electricity for consumers and providing an opportunity to sell excess energy generated to the grid. • Community-based Solar PV provides an economic potential for towns / villages outside of Dili to own physical generation assets and stimulate economic savings on electricity costs.
Health and wellbeing Anticipated increased health and wellbeing of target group (e.g. improved basic health, water and food security)	

Core indicator 3	**Anticipated number of direct and indirect beneficiaries as a result of the TA**	
	Quantitative value	**Means of verification**
Total beneficiaries	**1,164,793**	
Number of adaptation beneficiaries		*Describe calculation methods and assumptions made*

Number of mitigation beneficiaries		
Number of adaptation-and mitigation beneficiaries	**1,164,793**	An assumed 30% of all buildings in Timor-Leste would be impacted, including residential and other business sectors, translating to an estimated 80,769 households or 428,058 people (5.3 per household). There are 63 large villages / towns outside of Dili totalling 204,048 households, or 1,081,457 people total. As the Community-based Solar PV accounts for beneficiaries outside of Dili, the 30% assumption applies to the population in Dili, which is 277,488, adjusted to 83,246. Combining the values for Dili and the 63 impacted large villages / towns outside of Dili provides us with a total 1,164,793 beneficiaries. Assuming no further population growth – values have been calculated according to current population and buildings area coverage.

Core indicator 4	**Anticipated amount of funding/investment leveraged (USD) as a result of TA (disaggregated by public, private, national, and international sources, as well as between anticipated/confirmed funding)**			
	Quantitative value confirmed *in USD*	**Quantitative value anticipated** *in USD*	**Qualitative description** *List the institutions, timelines, and description or title of the investment*	**Methods** *Describe methods used for quantification of funds leveraged*
Total funding		***13,900,000***		
Anticipated amount of public funding mobilised from national/domestic sources				
Anticipated amount of public funding mobilised from international/ regional sources		**7,100,000**	**From GCF concept note proposed funding of Community-based Solar PV**	**Calculation of investment requirements and TA for Community based Solar PV**
Anticipated amount of private funding mobilised from national/domestic sources		**6,800,000**		

Anticipated amount of private funds mobilised from international/regional sources			**From GCF concept note proposed co-financing from private sources for Community-based Solar PV**	**Calculation of investment requirements and TA for Community based Solar PV**

Annex 2 (for internal use – to be filled in by the CTCN)

CTCN evaluation
This section will be completed by the relevant CTCN Technology Manager.

- Evaluation of the timeliness of the TA implementation as measured against the timeline included in the response plan;
- Evaluation of TA quality as defined in the response plan;
- Overall performance of the Implementers;
- Overall engagement of the NDE and Proponent;
- Lessons learned on the CTCN process and steps taken by the CTCN to improve.