CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

Instructions to lead Implementers for drafting the Technical Assistance Closure and Data Collection Report

Objective of the technical assistance (TA) Closure Report and Data Collection Report:

- To communicate publicly in one synthesis, document a summary of progress made and lessons learned under the technical assistance (TA) towards the anticipated impact (main template).
- Compile TA-specific information required for internal use in donor and UN reporting (annex 1).

Steps for completing the TA Closure report:

1. The lead TA implementer drafts the report at the end of the assignment as a final deliverable /product. The TA Closure report will capture all activities conducted under the TA hence it is expected that duplication of information will occur from earlier documents. 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 report before final approval by the CTCN Director.

Important note on public and internal use of the closure report:
Once approved by the CTCN Director, the TA Closure and Data Collection Report will be a public document available on the CTCN website. Annex 1 is for internal use only and will not be publicly available.

Closure and Data Collection Report for CTCN Technical Assistance

1. Basic information

Title of response plan	**Technical assistance for the creation of an accredited laboratory for testing photovoltaic modules**
Technical assistance reference number	**2016000012**
Country / countries	**Algeria**
NDE focal point and organisation	**Bouchaib Samy, Renewable Energy Development Center (CDER)**
Proponent focal point and organisation	**Yassaa Noureddine, Renewable Energy Development Center (CDER)**
Sector(s) addressed	**Energy, Electricity**
Technologies supported	Solar PV
Implementation period and total duration	**Feb 2, 2018 – June 30, 2019, 17 months**
Total budget for implementation	$167,872
Designer of the response plan	**Bethany Speer, National Renewable Energy Laboratory**
Implementer of response plan	**Dr. Peter Hacke, National Renewable Energy Laboratory**

2. Summary of all activities, outputs and products that contribute to the expected impact of the technical assistance.

Description of delivered outputs and products as well as the activities undertaken to achieve them. In doing so, review the log frame of the	• Developed and updated detailed work plan of all activities associated with implementation of this technical assistance. As the project evolved, and progress was made in advance of and during the TA implementation period, the work plan was

original response plan and refer to it as appropriate	revised to align with priorities and needs to assure highest value add. • Skype and web-based consultations throughout the TA implementation period, both to answer questions and collect data and other relevant information, and to assure the work plan aligned with on-going priorities based on progress and actual needs. • On-site 4-day training and testing of solar PV panels, both at NREL and on site at CDER labs. 3 representatives from CDER participated in a 4-day training at NREL to observe and learn from NREL researchers on testing systems and protocols. Training included both "classroom" style presentations and actual hands-on testing and analysis of various grades and types of PV panels. • Dr. Peter Hacke traveled to Algeria for a 4-day observation and training to observe and assess CDER laboratory set-up and testing procedures. Dr. Hacke provided hands-on demonstrations and assessment of the CDER laboratory and offered recommendations on test facility protocols, founded on international best practices, and equipment needed to achieve optimal testing environment. • NREL donated three multi-crystalline Si modules and one high performance > 300 W module. These modules were shipped to CDER on June 5, 2019.
Partners organisations	None
Beneficiaries	Algeria's Renewable Energy Development Center, the Government of Algeria, Algeria's business/private sector, citizens of Algeria
Methodologies applied to produce outputs and products	• Structured interviews and continuous consultations with CDER engineers • Hands-on training at NREL and CDER labs • Assessment of CDER lab space and equipment, and analysis of international best practices and standards applied to tailored recommendations to address equipment and laboratory set-up needs • Analysis of international standards and best practices for testing protocols, and tailored recommendations provided to CDER
Deviations	As CDER made progress on their own during the time lapse that occurred between the response plan development and start of TA implementation, some minor adjustments were made to align the TA with actual needs. The most significant deviation was related to the "list of donor organizations that could potentially provide resources to fund equipment purchases and additional laboratory set-up needs". After a lengthy search for organizations that would be willing to donate or provide funds for to purchase testing equipment, including inquiring with development banks and organizations, e.g., African Development Bank, NREL was not able to identify organizations able to provide donations of equipment and/or funds. In lieu of this list, NREL donated three multi-crystalline Si modules and one high performance > 300 W

	module for use as module power standards for CDER's certification testing. These modules were shipped to CDER on June 5, 2019. CDER paid for customs fees, shipping costs were paid out of project funds: approved by Rajiv and Giulia.
Achieved or anticipated gender benefits from the TA	One woman was trained during the training/pilot run at CDER in Algeria. While gender mainstreaming was not addressed in the implementation and delivery of this TA, should the Algerian PV module manufacturing and testing markets grow, more jobs could be open to women applicants. Specific policies would need to be in place to assure positive impacts for gender equity. This TA did not address policies. Algeria may address the need for gender in their Renewable Energies and Energy Efficiency Program (PEREE) or revise the PEREE to include a gender mainstreaming provision.
Achieved or anticipated co-benefits from the TA	With improvements in laboratory protocols and increased capacity for PV module testing protocols, the Government of Algeria, through CDER, can establish a domestic certification authority that can ensure the control or PV panels sold in the Algerian market and used in PV plants. As such, the PV manufacturing market would increase, facilitating economic growth and job creation. Additionally, more solar PV projects could be developed – adding more job and economic opportunities, increase energy security and resilience, and as the PV panels and associated equipment, e.g., inverters and cables, will have undergone rigorous testing to assure standards are met, the PV systems will meet quality and reliability requirements. Lastly, productive use from solar PV systems would increase to support such industries as agriculture, and provide power to road lighting, water pumping, and other uses.
Anticipated follow up activities and next steps	CDER has built capacity and increased knowledge on PV equipment quality standards and testing protocols to measure quality. As such, CDER can move forward creating an equipment certification authority and improving testing protocols, laboratory design and setup, and purchasing equipment to implement quality control measures for PV modules and related components, and subsequent design and construction of large-scale solar PV plants. CDER has requested establishing an MOU between CDER and NREL for continued collaboration.

3. Lessons learnt

	Lessons learnt	**Recommendations**
Lessons learnt for this TA. Describe essential factors contributing to successful implementation, as well as specific challenges. Recommendations include considerations on what would need to be in place for increasing success of similar efforts (i.e. regulatory, legal, stakeholders, communication, etc.)	None to report	
Lessons learnt related to climate technology transfer	Assuring quality of PV modules, both imported and manufactured domestically, will	On-going trainings as system components and technologies, such as PV

Describe opportunities, challenges and barriers for the use and deployment of the technology or technologies supported by the TA. The objective is to identify specific success factors for technology transfer	enable an uptake in solar PV projects, and assure project developers and investors that the life of the system is reliable to achieve ROI. Also, quality systems that are properly installed significantly reduce O&M costs. These factors are important to assuring successful technology transfer.	modules, quickly evolve. Maintain awareness of improvements so quality standards are adjusted to match improvements.
Lessons learnt related the CTCN process for TA	The primary challenge was associated with the time lapse between design of the response plan and implementation of the TA. CDER was able to make progress on their own during the interim so that some of the activities detailed in the response plan no longer aligned with CDER's needs and priorities. Therefore, adjustments in TA delivery were needed to assure the TA addressed recipient priorities.	1. Streamline the agreement process so that TA implementation can begin sooner. 2. Construct financial agreements between CTCN and the TA providers so that some funds are on hand within the provider's organization to allow for faster response time. 3. Provide allowances for flexibility of TA provisions within the response plan to accommodate delays and other factors that create a need for change.

4. Illustration of the TA and photos

For communication purposes, please provide 2-4 Power Point slides with illustrations or charts showing the TA process, applied 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.

5. Information for TA Impact Description

The information in the table below will be used to produce the CTCN TA Impact Description. The TA Impact description is a 2-page summary document for communication purposes.

Challenge: Approx. 500 characters with spaces	For the PEREE to succeed in scaling up total domestic installed PV, Algeria needs to assure the quality & reliability of PV modules entering the domestic market &

	proper O&M of PV plants. All modules introduced as part of PEREE must be approved by a certification laboratory in accordance with regulation. However, Algeria did not have an established domestic certification body with the capability to ensure quality control of PV modules sold on the Algerian market or used in PV plants.
CTCN Assistance: 2 to 4 bullet points. Approximately 450 characters with spaces	• Assess the status of the CDER lab at beginning of TA implementation • Provide recommendations to improve lab setup and layout, and equipment needs and specifications • Training on PV module & equipment testing processes at NREL • Provided four-day technical training and assisted with pilot run to conduct testing of PV modules at the CDER lab, including application of testing procedures taught during training at NREL • Evaluated pilot run
Anticipated impact: 2 to 4 bullet points to summarise anticipated impact. Approximately 250 characters with spaces. As a minimum, please include the impacts described in annex 1B as well as other relevant qualitative and quantitative impacts anticipated after completion of CTCN technical assistance.	• Support achieving NDC RE targets & GHG emission reduction goals • Expand solar PV domestic markets • Ability to conduct outdoor testing, maintenance & monitoring of PV power plants • Contribute to PEREE to diversify Algerian energy mix & scale-up RE
Linkages and contribution to NDC: 2 to 4 bullet points. Approximately 350 characters with spaces	• Algerian INDC for 2015 aiming to reduce GHG emissions by 7-22% over period between 2021-2030. • INDC target of reaching 27% of electricity generated by from RE by 2030. • 60% of overall RE target generated by solar PV.
The narrative story: Approximately 1200 characters with spaces	Through this project, NREL technical assistance providers worked with engineers from CDER to apply protocols for PV module and related equipment testing and certification. The solar PV market in Algeria is growing with multiple PV in response to efforts initiated by the PEREE. CDER has been in the process of establishing Algeria's first in-country laboratory with the capabilities to test PV modules and associated equipment, such as inverters

	and cables. They are also building knowledge and capacity to conduct quality control of equipment, solar PV plant construction, and control and maintenance in accordance with the International Electrotechnical Commission (IEC) 61215 standard. The technical assistance provided under this project focused on trainings and consultations to build the skills and expertise of CDER staff to conduct testing and analyze quality and reliability of PV modules entering the domestic and develop testing protocols and procedures aligned with IEC 61215. This technical assistance supported CDER with developing the necessary installation and technical capacity to contribute to the implementation of the PEREE and renewable energy electricity generation.
Contribution to SDGs: Always include contribution to SDG 13, and to the extent possible, please include contribution to 2 other SDGs, describing the contribution with a few sentences for each SDG concerned. A complete list of SDGs and their targets is available here: https://sustainabledevelopment.un.org/partnership/register/	• SDG 7 – Increased uptake of solar PV is aligned with SD7 to Ensure access to affordable, reliable, sustainable and modern energy for all • SDG 8 – With a functional certified PV module testing lab in place, operated by well-trained staff, Algeria could achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors. • SDG 9 – with an operational national certification lab to test Solar PV panels and associated equipment, as well as support evaluation power plant performance enables building a resilient infrastructure, e.g., locally/nationally manufactured PV components • SDG 13 – increase in renewables, and in this case through solar PV technologies with help to decrease the country's GHG emissions and support the NDC targets

Note: Please see examples of TA Impact Description in adaptation and mitigation at the following link:
https://www.ctc-n.org/sites/www.ctc-n.org/files/learning-reports/18106-ctcnimpactdescriptionv02.pdf
https://www.ctc-n.org/sites/www.ctc-n.org/files/learning-reports/ta_impact_description_2014000002_gcai.doc

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Annex 1 - Standardised CTCN performance indicators for donor and UN reporting

Please add quantitative values and qualitative descriptions for indicators relevant to the particular TA in the tables below. Non-relevant indicators should be left blank.

A. Activities and outputs supported by CTCN technical assistance

Please only fill in the table for activities and outputs conducted or produced directly by the CTCN assistance.

CTCN standardised performance indicators	**Quantitative value**	**Qualitative description** *List the various elements corresponding to the quantitative value*
Overview		
1. Number of work days of the international expert team spent on the implementation of the technical assistance	**75 (estimated)**	**Includes Senior Technical Lead, Project Lead, Project Assistant**
2. Number of work days of the locally-contracted expert team spent on the implementation of the technical assistance	**N/A**	**There were no contracted personnel.**
3. Number of external communication and outreach activities conducted to showcase the assistance (news release, newsletters, articles on website, events presenting the results of the technical assistance, social media postings, and presentations at events outside the technical assistance etc.)	**0**	**Please list the type of external communications here**
Events (other than trainings) held as part of the assistance		
4. Total number of events other than trainings (Aggregation of numbers in categories below)	Aggregation of numbers in categories below	
5. Number of international and multi-country (at regional or sub-regional level) technology and knowledge sharing events	**0**	*List title of events*
6. Number of participants in the events above	**N/A**	
7. Number of national technology and knowledge sharing events (national events held including national consultations)	**0**	*List title of events*
8. Number of participants in the events above	**N/A**	
9. Number of public-private events related to technologies	**0**	*List title of events*
10. Number of participants in the events above	**N/A**	
Training and capacity building activities conducted during the assistance		
11. Number of training sessions and capacity strengthening activities	**2**	1. Practically oriented training of PV Testing procedures and Site Visit to NREL 2. Technical Training and Pilot Run of PV Module Testing Procedures at CDER

12. Number of people who received the training	**3** **5**	Site training at NREL Site training at CDER
a) Number of men	**3** **4**	Site training at NREL Site training at CDER
b) Number of women	**0** **1**	Site training at NREL Site training at CDER
13. Total number of organisations trained	**1**	
a) Number of research organisations, laboratories and universities	**1**	Renewable Energy Development Center (CDER)
b) Number of private companies	**0**	*List the name of organisations trained here*
c) Number of cities and local government	**0**	*List the name of organisations trained here*
d) Number of communities	**0**	*List the name of organisations trained here*
e) Number of ministries	**0**	*List the name of organisations trained here*
f) Number of specialised governmental institutions	**Same as (a)**	Renewable Energy Development Center (CDER)
g) Number of non-profit organisations	**0**	*List the name of organisations trained here*
14. Number of participants that were significantly or moderately satisfied after the training (from CTCN training feedback form	**N/A**	NREL was not aware of the existence of this form or data collection requirement. Therefore, a training feedback form was not administered.
15. Number of participants that significantly or moderately increased their capacities thanks to the training (from CTCN training feedback form).	**N/A**	NREL was not aware of the existence of this form or data collection requirement. Therefore, a training feedback form was not administered.
a) Number of men	**7**	
b) Number of women	**1**	
Tools, technical documents and information material supported by the assistance		
16. Total number of tools, technical documents s and information material supported by the assistance (excluding mission, progress and internal reports)	**13**	
a) Number of tools strengthened, revised or developed (including tools, methodology, software, calculation systems, etc.)	**1**	• PV System Logger Costs tracking calculator
b) Number of technical documents strengthened, revised or created	**N/A**	*List the name of the documents*
c) Number of other information materials strengthened, revised or created (For example training and workshop reports, Power Points, exercise docs etc.)	**12**	• Detailed work plan • NREL Module Chambers Presentation • Outdoor test facility lab room layout presentation • UV pre-conditioning test presentation • PV System Set-up memo • PV System Diagrams

		• Electroluminescence equipment presentation • Mechanical load test apparatus presentation • Recommendations to support testing for the specific climatic conditions of Algeria presentation • Module visual inspection procedures document • Calculating PV Degradation rates using open-source software document • Reference papers on manufacturing quality and sampling plan
Policies, laws and regulations supported by the assistance		
17. Total number of policies, strategies, plans, laws, agreements or regulations supported by the assistance	**2**	• *Executive Decree no 05-465 of 2005* • *2008 Technical Regulation on Crystalline Silicon PV Modules for Terrestrial*
a) Number of policies, strategies, and plans drafted addressing climate change adaptation	**N/A**	*List the policies, strategies, plans, laws, agreements or regulations*
b) Number of policies, strategies, and plans drafted addressing climate change mitigation	**N/A**	*List the policies, strategies, plans, laws, agreements or regulations*
c) Number of documents developed to inform other policies, strategies, and plans on climate change adaptation (sectoral strategies, national development plans, etc.)	**N/A**	*List the documents*
d) Number of documents developed to inform other policies, strategies, and plans on climate change mitigation (sectoral strategies, national development plans, etc.)	**N/A**	*List the documents*
e) Number of laws, agreements, or regulations drafted addressing climate change adaptation	**N/A**	*List the laws, agreements and regulations*
f) Number of laws, agreements, or regulations drafted addressing climate change mitigation	**N/A**	*List the laws, agreements and regulations*
g) Number of documents developed to inform laws, agreements, or regulations on climate change adaptation	**N/A**	*List the documents*
h) Number of documents developed to inform laws, agreements, or regulations on climate change mitigation	**N/A**	*List the documents*
Institutional strengthening supported by the assistance		
18. Total number of institutional arrangements supported to support climate change planning	**N/A**	*List the institutional arrangements*
19. Number of organisations with increased awareness and knowledge among countries to	**1**	CDER

better own and drive national adaptation planning processes		
20. Number of organisations with increased awareness and knowledge among countries to better own and drive national mitigation planning processes	**1**	CDER
Partnerships and cooperation		
21. Number of private companies directly engaged in the assistance (that partnered with the proponent, the beneficiaries or the CTCN to implement the assistance) (Excluding the role of the CTCN and TA implementers)	**N/A**	*Please list here the names of the organisations cooperating*
22. Number of South-South collaborations enabled during or through the assistance, when stakeholders from other countries were involved in the assistance (Excluding the role of the CTCN and TA implementers)	**N/A**	*Please list here the names of the organisations cooperating*
23. Number of North-South collaborations enabled during or through the assistance, when stakeholders from other countries were involved in the assistance (Excluding the role of the CTCN and TA implementers)	**N/A**	*Please list here the names of the organisations cooperating*
24. Number of Triangular collaborations enabled during or through the assistance, when stakeholders from other countries were involved in the assistance (Excluding the role of the CTCN and TA implementers)	**N/A**	*Please list here the names of the organisations cooperating*
UNFCCC planning/support processes		
25. Number of National Adaptation Plans (NAPs) developed as part of the technical assistance	**N/A**	*List as appropriate*
26. Number of Nationally Appropriate Mitigation Actions (NAMA) developed as part of the technical assistance	**N/A**	*List as appropriate*
27. Number of Technology Needs Assessment s(TNAs) developed as part of the technical assistance	**N/A**	*List as appropriate*

B. Impacts anticipated after completion of CTCN technical assistance: core indicators

Every technical assistance should contribute to at least one indicator below

CTCN core indicators	**Quantitative value**	**Unit**	**Methodology** Explain the method or process of verifying the indicator and	**Assumptions** Indicate assumptions made during quantification	**Expected timeline** Indicate when the indicator and

			how data was gathered		value are expected to be achieved
28. **Total** anticipated amount of funding/investment mobilised (in USD) as a result of the TA	**N/A**				
a) Anticipated amount of **public funding** mobilised (in USD) from **national sources** as a result of the TA	**N/A**				
b) Anticipated amount of **public funding** mobilized (in USD) from **international and regional sources** as a result of the TA	**N/A**				
c) Anticipated amount of **private investment** mobilised (in USD) from **national sources** as a result of the TA	**N/A**				
d) Anticipated amount of **private investment** mobilised (in USD) from **international and regional sources** as a result of the TA	**N/A**				
29. Anticipated number of beneficiaries as a result of a **mitigation** TA	**Number is unknown, but the primary groups that will benefit are the government, project developers, investment and finance community, utilities, and the overall population.**	Multiple	The main benefit of the program is that CDER will be able to monitor the quality of modules coming into Nigeria. Poor quality modules would negatively impact the adoption of solar PV in Algeria.	Mitigating GHG emissions from the electricity sector by scaling up electricity generated from renewable energy sources	

30. Anticipated number of people with increased resilience as co-benefits as a result of the TA			*(please describe the calculation process, original unit etc)*		
31. Anticipated average the **total** GHG reductions in metric tons of $CO_{2\text{-}e}$, as a result of the TA	**Unknown. No specific RE projects were implemented under this TA. Therefore, there no calculations on GHG reductions resulting from this capacity building assistance – to establish PV module testing & certification protocols. The reductions are dependent on future installed projects for which the numbers are not known.**		In order to get quantitative data, we would need to have data or a graph of the anticipated ramp rate of PV in Algeria and a search on how PV would displace CO2 in relationship.	*(please also indicate the baseline year and when the indicated value is expected to be achieved)*	
32. Anticipated average **annua**l GHG reductions in metric tons of $CO_{2\text{-}e}$, as a result of the TA	**Same as 31.**			*(please also indicate the baseline year and when the indicated value is expected to be achieved)*	
33. Anticipated and projected greenhouse gas emissions reduced or avoided through 2030, in metric tons of $CO_{2\text{-}e}$, from	**Same as 31.**			*(please also indicate the baseline year and when the indicated value is expected to be achieved)*	

adopted laws, policies, regulations, or technologies related to clean energy/sustainable landscapes as a result of the TA					

C. Outputs and impacts anticipated after completion of CTCN technical assistance: standardised performance indicators

CTCN standardised performance indicators	**Quantitative value** Insert the request value and unit	**Content** List the elements included in the number provided	**Expected timeline** Indicate when the indicator and value are expected to be achieved	**Responsible institution** Indicate the institution(s) that will play leading role(s) in enabling the indicators and anticipated values to be achieved
34. Anticipated number of **policies, strategies, plans**, addressing climate change **mitigation** officially proposed, adopted, or implemented as a result of the TA	N/A	.		
35. Anticipated number of **policies, strategies, plans**, addressing climate change **adaptation** officially proposed, adopted, or implemented as a result of the TA.	N/A			
36. Anticipated number of **policies, strategies, plans**, addressing climate change on **both adaptation and mitigation** officially proposed, adopted, or implemented as a result of the TA	N/A			
37. Anticipated number of **laws or regulations** addressing climate change **mitigation** officially proposed, adopted, or implemented as a result of the TA.	1	Implementation of PEREE requirement as defined in the Executive	1 year	CDER

		Decree no 05-465 of 2005 and the 2008 Technical Regulation on crystalline silicon PV modules for terrestrial stating all PV modules introduced into the market be approved by a certification laboratory. to mitigate GHG emissions from the electricity sector by scaling up electricity generated from renewable energy sources		
38. Anticipated number **of laws or regulations** addressing climate change **adaptation** officially proposed, adopted, or implemented as a result of the TA.	N/A			
39. Anticipated number **of laws or regulations** addressing climate change **both adaptation and mitigation** officially proposed, adopted, or implemented as a result of the TA	N/A			
40. Anticipated number of public-private partnerships and collaboration created (Excluding the role of the CTCN and TA implementers)	unknown			
41. Anticipated twinning arrangements created as a result of the TA	unknown			

42. Anticipated number of technology projects to support action on low emission and climate-resilient development	13,575 MW	60% of overall RE target under PEREE	2030	Algerian Government
43. Anticipated number of strengthened National Systems of Innovation and technology innovation centres in recipient country	1			CDER & the SKTM. SKTM is the Algerian company in charge of PV plant operations.
44. Anticipated Clean Energy Generation Capacity in kWh supported by the TA	22,000,000 kWh total | 13,575,000 PV	Total RE generation target is 27% under the INDC or 33% under the PEREE. PV is ~60% of overall RE generation mix PEREE is a relevant on-going parallel activity.	2030	Algerian Government
45. Anticipated technology types effectively deployed in the country	13,575 MW	Solar PV	2030	Algerian Government
46. Anticipated UNFCCC processes implemented as a result of the TA (NAMA, NAPA, NDC, etc.)	N/A			
47. Anticipated Technology Needs Assessments (TNA) and technology Action Plans (TAP) as a result of the TA	N/A			
48. Anticipated cooperative research, development and demonstration programmes within and between developed and developing country Parties facilitated as a result of the TA	Unknown			
49. Anticipated improved climate change observation systems and related information management in developing country Parties.	N/A			

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.