

| | |
|--------------------|---|
| Country | Algeria |
| Request ID# | 201600012 |
| Title | Technical assistance for the creation of an accredited laboratory for testing photovoltaic modules |
| NDE | Bouchaib Samy Focal Point Renewable Energy Development Center (CDER) s.bouchaib@cder.dz BP 62. Route de l’observatoire, 16340 Bouzareah, Algiers, Algeria |
| Proponent | Yassaa Nouredine Director Renewable Energy Development Center (CDER) n.yassaa@cder.dz BP 62. Route de l’observatoire, 16340 Bouzareah, Algiers, Algeria |

Summary of the CTCN technical assistance

Algeria has set the goal of diversifying its primary energy mix in order to take advantage of favorable indigenous renewable energy resources; encourage involvement from national economic actors; and support the development of domestic industrial capabilities. One of the key sources of diversification will be from electricity generated by solar photovoltaic (PV) technologies, with significant national growth of the national market having already begun.

To support this market growth while ensuring that investments in solar PV are well founded and that installations will generate electricity as anticipated, the national government implemented a new regulation that all imported or locally manufactured crystalline silicon PV modules destined for terrestrial use must be certified in accordance to Executive Decree no. 05-465 of 2005. However, despite these regulations, Algeria currently does not have a domestic certification body that is capable of ensuring the control of PV modules sold on the Algerian market or used in PV plants.

CTCN technical assistance (TA) will support the Algerian Renewable Energy Development Center (CDER by its French acronym) in developing the necessary installations and technical capacity to contribute to the implementation of the Renewable Energies and Energy Efficiency Program (PEREE by its French Acronym) and the scale up of renewable energy electricity generation through quality control and reliable electricity generation of PV modules and associated technologies. This one-year technical response includes: 1) an assessment of the status of the CDER laboratory; 2) testing and certification laboratory setup assistance; 3) the development of solar PV module testing procedures; 4) a practically-oriented training of PV testing procedures and visit to the NREL testing laboratory; and 5) a pilot run of the proposed Algerian PV module testing procedures.

Agreement:

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

**National Designated Entity to the UNFCCC
Technology Mechanism**

Name: Bouchaib Samy

Title: Focal Point

Date:

Signature:



Proponent (signature of the Proponent is optional)

Name: Yassaa Noureddine

Title: Director

Date:

Signature:



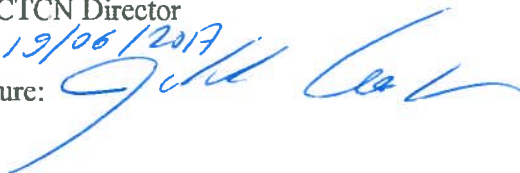
UNFCCC Climate Technology Centre and Network (CTCN)

Name: Jukka Uosukainen

Title: CTCN Director

Date: 19/06/2017

Signature:



1. Background and context

Algeria adopted the 2015 PEREE, which aims to diversify the Algerian primary energy mix away from its historical fossil fuel dependent electricity mix to take advantage of favorable indigenous renewable energy resources, encourage involvement from national economic actors, and support the development of domestic industrial capabilities. The PEREE includes a target to increase the share of electricity generated by renewable energy resources to at least 33% by 2030 with the installation of 22,000 MW of capacity by 2030, 60% (13,575 MW) of which is expected to be solar PV.

The PEREE builds off of earlier regulations such as the Executive Decree no. 05-465 of 2005 which requires all crystalline silicon PV modules destined for terrestrial use, manufactured in Algeria, or imported, be certified and the 2008 Technical Regulation on crystalline silicon PV modules for terrestrial. Together, these programs and regulations have spurred significant growth in the national solar PV market including the emergence of multiple manufacturing and installation firms.

To support domestic industrial capabilities and ensure quality along the entire electricity generation supply chain, the PEREE delegated the testing certification of PV modules and the control and monitoring of PV plants in accordance with this 2008 Technical Regulation to the Renewable Energy Development Center (CDER).

Agreement:

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Name: Yassaa Noureddine

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To support domestic industrial capabilities and ensure quality along the entire electricity generation supply chain, the PEREE delegated the testing certification of PV modules and the control and monitoring of PV plants in accordance with this 2008 Technical Regulation to the Renewable Energy Development Center (CDER).

CDER - founded in 1988- was originally mandated to develop a detailed understanding of the scientific and technical aspects associated renewable energy in Algeria. The solar PV energy division of CDER has contributed to the development of multiple isolated solar PV sites in southern Algeria to supply for domestic energy use, water pumping, road lighting, and other uses. CDER is now in the process of establishing the first in-country laboratory with the capabilities to test PV modules and associated equipment – e.g. inverters, cables etc. –, and conduct quality control of equipment, solar PV plant construction, control, and maintenance in accordance with the International Electrotechnical Commission (IEC) 61215 standard.

2. Problem statement

The solar PV market in Algeria is growing rapidly in response to the efforts initiated by the PEREE, with multiple industrial actors working on PV module manufacture – including the National Electronic Industry Company (ENIE), Condor, and Algerian PV (ALPV) – and other actors such as National Society for Electricity and Gas (SONELGAZ) working on the design and installation of large-scale solar PV plants.

For the PEREE to successfully encourage the scale up of total installed domestic installed capacity of solar PV, Algeria must ensure the quality and reliability of the PV modules that enter the domestic market as well as the proper operation and maintenance of the PV plants through their lifetimes.

All PV modules introduced as part of the PEREE or sold on the national market must be approved by a certification laboratory in accordance with the respective 2008 Technical Regulation. Additionally, any domestic PV plant reliability depends on the quality of the solar panels employed, which must withstand the often severe climatic conditions found in areas of southern Algeria.

However, Algeria currently does not have a domestic certification body that has the capability to ensure the control of manufactured and imported solar PV modules sold on the Algerian market or used in PV plants as the domestic PV market grows in response to PEREE objectives.

The reliable generation of electricity from large-scale PV plants requires monitoring and control throughout their period of operation. Due to the novelty of these technologies at scale in the Algerian power system, the appropriate monitoring of these plants by CDER will allow the collection of valuable information that will support future project and technology development for the country.

This TA will support CDER in developing the necessary installations and technical capacity to contribute to the implementation of the PEREE and the scale up of renewable energy electricity generation through quality control of PV modules and reliable electricity generation from PV power plants. Specifically, this TA will allow CDER to 1) conduct the testing according to mutually agreed upon selected procedures of the IEC 61215, “Terrestrial photovoltaic (PV) modules – Design qualification and type approval” standard and 2) oversee the control and monitoring of PV power plants in accordance with the IEC 61215 standard.

3. Logical Framework for the CTCN Technical Assistance:

| Objective: To support the creation of an Algerian laboratory with the technical capacity to conduct the testing according to mutually agreed upon selected procedures of the IEC 61215, “Terrestrial photovoltaic (PV) modules – Design qualification and type approval” standard and 2) oversee the control and monitoring of PV power plants in accordance with the IEC 61215 standard. | | | | | | | | | | | | |
|---|-------|---|---|---|---|---|---|---|---|----|----|----|
| Outcome: Domestic Algerian technical capacity for the testing and certification of solar PV modules and monitoring and control of PV power plants. | | | | | | | | | | | | |
| | Month | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Output 1: Development of implementation planning and communication documents | | | | | | | | | | | | |
| <p>Activity 1: All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance.</p> <p>i) A detailed work plan of all activities, deliveries, outputs, deadlines and responsible persons/organizations and detailed budget to implement the Response Plan. The detailed work plan and budget must be based directly on this Response Plan;</p> <p>ii) Based on the work plan, a monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators used to monitor and evaluate the timeliness and appropriateness of the implementation. Selection by mutual agreement of applicable standards for which procedures will be developed, and selection by mutual agreement of applicable procedures that will be demonstrated for CDER experts (points of contact) at NREL. The monitoring and evaluation plan should apply selected indicators from the Closure and Data Collection report template and enable the lead implementer to complete the CTCN Closure and Data collection report at the end of the assignment (please refer to item iv below and section 14 in the Response Plan);</p> <p>iii) A two-page CTCN Impact Description formulated in the beginning of the technical assistance and update/revised once the technical assistance is fully delivered (a template will be provided);</p> <p>iv) A Closure and Data Collection report completed at the end of the technical assistance (a template will be provided).</p> | | | | | | | | | | | | |
| <p>Deliverable 1:</p> <p>i) Detailed work plan</p> <p>ii) Monitoring and evaluation plan</p> <p>iii) CTCN Impact Description</p> <p>iv) Closure and Data Collection report</p> | | | | | | | | | | | | |
| <p>Output 2: Assessment of current status of CDER laboratory</p> <p>CDER will share relevant documents and descriptions of the current status of the CDER laboratory with the NREL experts. This information will be used to assess the current status, develop the following work plan</p> | | | | | | | | | | | | |

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| ii) A virtual meeting to discuss the memo and discuss questions and concerns from CDER. | | | | | | | | | | |
| <p>Output 4: Development of a Solar PV Module Testing Procedure The PV module testing procedures developed for the Algerian contexts is to evaluate modules according to selected international quality standards, based on the equipment that has already been purchased and with consideration for the equipment that will likely be purchased by CDER.</p> | | | | | | | | | | |
| <p>Activity 4.1:Review of applicable international and national testing standards and technical requirements. Experts will identify and review all selected international and national testing standards and technical requirements that the testing procedure is required to adhere to. This will be aligned with the equipment that has been purchased and has not been purchased and within the budget of the response plan</p> | | | | | | | | | | |
| <p>Activity 4.2: Testing Procedure Draft i) Drafting of the PV module testing procedures that align with applicable international and national standards and technical regulations. These are to include procedures for testing equipment that CDER currently has at its disposal as well as for the expanded procedures that would be accommodated with the purchase of additional equipment (See Activity 2 above). iii) Drafting of selected currently non-required testing procedures based on existing standards or standards under development that may support testing for the specific climatic conditions of Algeria</p> | | | | | | | | | | |
| <p>Activity 4.3: Testing Procedure Review i) Collaboration on and review of the draft PV module testing procedures with the proponent ii) Review of the proposed testing procedures with selected points of contact in Algeria</p> | | | | | | | | | | |
| <p>Deliverable 4: A document that details 1) the draft PV module testing procedure developed for the Algerian contexts that meets international quality standards and is based on the equipment that has already been purchased; 2) the additional procedures that can be implemented with the future purchase of additional testing equipment; and 3) recommendations that could support testing for the specific climatic conditions of Algeria.</p> | | | | | | | | | | |
| <p>Output 5: Practically-oriented Training of PV Testing Procedures and site visit to NREL Selected CDER experts (3 participants) will participate in a technical site visit to NREL to see a testing process and equipment at work.</p> | | | | | | | | | | |
| <p>Activity 5.1: Preparation of CDER team visit to NREL i) Planning and organization of a working visit to NREL for 3 participants from CDER. A detailed agenda for the sessions that elaborates what the testing procedures that will be observed by CDER visitors and any additional workshops or presentations to be conducted. ii) Logistical preparations for potential travel and attendance by the experts and participants of the training. This will detail the required laboratory space, equipment and personnel.</p> | | | | | | | | | | |
| <p>Activity 5.2:CDER team visit to NREL</p> | | | | | | | | | | |

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| <p>i) Evaluation of the pilot run outputs by the NREL experts ii) Drafting of output evaluation and future testing recommendations memo by NREL experts iii) Preparation of a presentation or other material for the virtual meeting to discuss the evaluation and recommendations by NREL experts.</p> | | | | | | | | | | | | | | |
| <p>Deliverables 6: i) An organized 4-day, practically-oriented technical training of CDER experts (5 participants) and initial setup of a PV testing pilot run at CDER’s laboratory in Algeria in which participants apply the testing procedures from Output 4 and complete the testing of PV modules (See Activities 6.1 and 6.2). ii) A brief memo presenting the pilot run evaluation and expert recommendations for future testing developed by NREL experts iii) Virtual presentation by the NREL experts to discuss the memo and address remaining questions and concerns of the proponent.</p> | | | | | | | | | | | | | | |

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. 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 (in US\$) | |
|--|---|--|--|--|--------------------------|---------|
| | | | | | Minimum | Maximum |
| <p>Output 1: Development of implementation planning and communication documents</p> | None | None | None | None | 9,744 | 19,075 |
| <p>Activity 1.1 Draft implementation plan development</p> | Senior Scientist, 1-2 days Project Manager, | None | Phone call or virtual meeting to review the draft implementation | None | | |

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| <i>(detailed and updated version of the response plan)</i> | <i>1-2 days</i> | | <i>plan, NREL Senior Scientist, NREL Project Manager, CTCN, NDE, Proponent, 1 hour</i> | | | |
| <i>Activity 1.2: Monitoring and evaluation plan</i> | <i>Senior Scientist, ½-1 days Project Manager, ½-1days</i> | <i>None</i> | <i>None</i> | <i>None</i> | | |
| <i>Activity 1.3: CTCN Impact Description</i> | <i>Senior Scientist, ½-1days</i> | <i>None</i> | <i>None</i> | <i>None</i> | | |
| <i>Activity 1.4: Closure and Data Collection report</i> | <i>Senior Scientist, expert, 1-2 days Project Manager, 1-2 days</i> | <i>None</i> | <i>None</i> | <i>None</i> | | |
| Output 2: <i>Assessment of current status of CDER laboratory</i> | - | - | - | - | <i>7,101</i> | <i>10,303</i> |
| <i>Activity 2: Review and assessment of the CDER laboratory current status</i> | <i>Senior Scientist, 3-4days Project manager, 1-2 days</i> | <i>None</i> | <i>None</i> | <i>None</i> | - | - |
| Output 3: <i>Testing and Certification Laboratory Setup Assistance</i> | - | - | - | - | <i>8,434</i> | <i>12,962</i> |
| <i>Activity 3.1: Laboratory Equipment Review</i> | <i>Senior Scientist, 3-4 days</i> | <i>None</i> | <i>None</i> | <i>None</i> | - | - |

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| Activity 3.2: <i>Drafting of laboratory setup memo</i> | <i>Senior Scientist, 1-2 Days Project manager, ½-1 days</i> | <i>None</i> | <i>Phone call or virtual meeting to review and discuss the laboratory setup memo, NREL Senior Scientist, NREL Project Manager, CTCN, NDE, Proponent, 1 hour</i> | <i>None</i> | - | - |
| Output 4: <i>Development of a Solar PV Module Testing Procedure</i> | - | - | - | - | 18,113 | 28,412 |
| Activity 4.1: <i>Review of applicable international and national testing standards and technical requirements.</i> | <i>Senior Scientist, 2-3 days</i> | <i>None</i> | <i>None</i> | <i>None</i> | - | - |
| Activity 4.2: <i>Testing Procedure Draft</i> | <i>Senior Scientist, 5-7 days Project manager, 1-2 days</i> | <i>None</i> | <i>None</i> | <i>None</i> | - | - |
| Activity 4.3: <i>Testing Procedure Review</i> | <i>Senior Scientist, 1-2 days Project manager, 1-2 days</i> | <i>None</i> | <i>Phone call or virtual meeting to review and discuss the draft testing procedure, NREL Senior Scientist, NREL</i> | <i>None</i> | - | - |

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|---|---|---|--|-------------|--------|--------|
| | | | <i>Project Manager, CTCN, NDE, Proponent, 1 hour</i> | | | |
| Output 5: <i>Practically -oriented Training of PV Testing Procedures and site visit at NREL</i> | - | - | - | - | 41,460 | 51,329 |
| Activity 5.3: <i>Preparation of CDER team visit to NREL</i> | <i>Senior Scientist, 2-3 days 2nd Senior Scientist, 1-2 days Project Manager, 2-3 days</i> | <i>None</i> | <i>Phone call or virtual meeting to review the draft agenda for Visit to NREL for CDER team, NREL Senior Scientist, NREL Project Manager, CTCN, NDE, Proponent, 1 hour</i> | <i>None</i> | - | - |
| Activity 5.4: <i>CDER team visit to NREL</i> | <i>Senior Scientist, 4-5 days 2nd Senior Scientist, 2-3 days Project Manager, 2-3 days</i> | <i>Travel to NREL by CDER team of 3 experts for study visit, international, 7 days, \$15,000 travel expenses (no labor)</i> | <i>None</i> | <i>None</i> | - | - |
| Output 6: <i>Practically-Oriented Training and Pilot Run Initiation at the CDER Laboratory</i> | - | - | - | - | 40,036 | 50,749 |
| Activity 6.1: <i>Preparation of</i> | <i>Senior Scientist, 4-6 days</i> | <i>None</i> | <i>Phone call or virtual meeting to review the</i> | <i>None</i> | - | - |

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| <i>Practically-Oriented Training and Pilot Run at CDER</i> | <i>Project Manager, 3-4 days</i> | | <i>draft agenda for Practically-Oriented Training, NREL Senior Scientist, NREL Project Manager, CTCN, NDE, Proponent, 1 hour</i> | | | |
| <i>Activity 6.2: Practically-Oriented Training and Pilot Run Initiation at the CDER Laboratory</i> | <i>Senior Scientist, 7-8 days</i> | <i>Travel to CDER laboratory by NREL expert, international, 7 days, \$5,000 travel expenses (no labor)</i> | <i>None</i> | <i>None</i> | <i>-</i> | <i>-</i> |
| <i>Activity 6.3: Pilot Run Evaluation</i> | <i>Senior Scientist, expert, 3-4 days Project Manager, 1-2 days</i> | <i>None</i> | <i>None</i> | <i>None</i> | <i>-</i> | <i>-</i> |
| <i>Gender Mainstreaming Analysis</i> | <i>Gender expert, 2-3 days</i> | <i>None</i> | <i>None</i> | <i>None</i> | <i>1,249</i> | <i>1,728</i> |
| Estimated range of costing for the entire Response Plan | | | | | 126,137 | 174,558 |

5. Profile and experience of experts

| Experts required | Brief description of required profile |
|-------------------------|--|
| Peter Hacke | Dr. Peter Hacke performs research and consulting for durability testing, validation, and failure analysis of PV modules, inspections for root cause of module failures in the field, and accelerated lifetime testing, including for potential induced degradation (PID), power loss, corrosion, bypass diodes, and delamination at the National Renewable Energy Laboratory (NREL). He has more than 15 years of industrial and research photovoltaic experience, and more broadly, 23 years of work in the fabrication and characterization of optoelectronic materials. |

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| | <p>Participating in International Electrotechnical Commission (IEC) TC 82 WG2, he is the project leader on IEC 62804-1 and IEC 62804-2, PID test methods for crystalline silicon and thin-film PV modules, respectively; and for IEC 60904-12 and IEC 60904-13, infrared thermography and electroluminescence imaging for PV modules, respectively. He also writes for numerous other IEC standards for safety and durability of PV modules and PV inverters.</p> <p>Dr. Hacke received his bachelor's degree in engineering from Steven Institute of Technology, a doctoral degree from North Carolina State University with a thesis on deformation modeling of solder joints in electronic packaging undergoing thermomechanical fatigue, and a master's degree in business administration from the University of New Mexico. He speaks English and French.</p> |
| Chris Deline | <p>Dr. Chris Deline is a research engineer at NREL in the PV performance and reliability group. He has coauthored several reports about the performance impacts of micro inverters and DC-DC converters in PV systems under mismatched and shaded conditions. His research includes thin-film PV performance and stabilization, mismatch and partial shading in PV systems, and distributed power electronics for PV.</p> <p>He is manages several research projects with the U.S. Department of Energy (DOE) Regional Test Centers and is co-principal investigator of research, funded by an ARPA-E grant, in collaboration with the University of Colorado to investigate PV submodule integrated DC-DC converters.</p> <p>Dr. Deline received his bachelor's, master's, and doctoral degrees from the University of Michigan, Ann Arbor, in 2003, 2005, and 2008, respectively, all in electrical engineering. His doctoral work involved experimental investigation of the magnetic nozzle region of electric propulsion thrusters at NASA's Marshall Space Flight Center in Huntsville, Alabama, and Johnson Space Center in Houston, Texas.</p> |
| Bethany Speer | <p>Bethany Speer manages NREL's contributions to a variety of international climate development programs and initiatives. She has several years of experience facilitating technical assistance, capacity building, and peer learning. Specifically, she has leadership roles on the Clean Energy Investment Accelerator, International Smart Grid Action Network, and the CTCN. She also regularly authors a variety of analyses, most recently on corporate procurement of renewable energy and economic impacts of offshore wind. Her background is in renewable energy policy and market research, having focused on project finance structures and incentives.</p> <p>Bethany has been engaged in the CTCN since 2011 and manages NREL's agreement with UNEP and United States State Department for NREL's work on the CTCN. She has led the development of several response plans and implementation of responses.</p> |

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| <p>Alison Holm</p> | <p>Alison Holm is a project leader with broad experience in developing and implementing technical assistance and public-private partnership programs, as well as managing stakeholder relationships to support high-impact, market-driven efforts. She currently works on state and local solar technical assistance programs, as well as in supporting the development of renewable energy policy strategies. Alison has held leadership roles with the Solar Technical Assistance Team (STAT), Cities Leading through Energy Analysis and Planning (Cities-LEAP), Sol Smart, and resilience planning efforts during her time at NREL.</p> <p>Alison holds a master’s in Urban and Regional Planning from the University of Colorado-Denver, and a B.A. in Sociology from the University of New Mexico.</p> |
| <p>Nathan Lee</p> | <p>Dr. Nathan Lee is a postdoctoral researcher at NREL concentrating on power sector planning activities. While at NREL Nathan has supported multiple international technical assistance initiatives. He has led the coordination of Remote Expert Assistance on Low Emissions Development Strategies (LEDS) services for the LEDS Global Partnership (REAL) as well supported the Ask an Expert (AaE) service from the Clean Energy Solution Center (CESC). He has also played a role in the development of multiple CTCN technical assistance response plans since 2016.</p> <p>Nathan received his bachelor's degree in engineering physics from Miami University of Ohio and his master’s and doctoral degrees in sustainable energy systems from the Department of Engineering of the University of Porto, Portugal as part of the Massachusetts Institute of Technology (MIT) Portugal Program. His doctoral work involved the elaboration of a decision support methodology for national energy planning in developing countries with a focus on implementation.</p> |

6. Intended contribution to impact over time

Short term

CDER will be able to contribute – as a certification body – to the successful and sustainable implementation of the PEREE through the testing of PV modules and the control and monitoring of PV power plants.

CDER will work on outdoor testing, maintenance, and monitoring of PV power plants to support the evaluation power plant performance with SKTM (Algerian company in charge of PV plant operation) and potentially other operators.

This TA will enable CDER researchers to mobilize their resources in an effective manner by refocusing these resources on activities that have tangible added value – for CDER and Algeria – and align fully with the primary role defined for CDER.

Mid term

The TA will enable CDER to become a credible provider of technical assistance to solar PV testing, certification, power plant monitoring and control as well as similar technical project management.

CDER may provide assistance to the Algerian Standards Institute (IANOR by its French acronym) in the development – or amending of applicable international standards for domestic use – of PV module standards that reflect the climate conditions in Algeria.

The CDER lab can become a Maghreb regional reference for PV testing and certification.

Long term

Successful implementation of this TA will contribute to the implementation of the PEREE program to diversify the Algerian primary energy mix and scale up of renewables while developing and utilizing local technical capabilities.

The CDER lab can act as a reference model for other African regions.

7. Relevance to NDCs and other national priorities

The Algerian Intended Nationally Determined Contribution (INDC) from 2015 aims to reduce greenhouse gas (GHG) emissions by 7-22% over the period of 2021 to 2030, compared to a business as usual scenario conditional to external financial, technology development and transfer, and capacity building support. This GHG emissions reduction will be achieved through both mitigation activities that include initiatives in the energy sector and specifically electricity generation. The INDC sets a target for 2030 of reaching 27% of electricity generated from renewable resources. The previously described PEREE aims to produce 60% of this electricity from renewable resources through solar PV technologies.

This TA will support these ambitions through ensuring the quality and reliability of locally manufactured and imported PV modules through in-country capability for testing and certifying PV modules.

8. Linkages to relevant parallel on-going activities:

The PEREE aims to diversify the Algerian primary energy mix and aims to increase the share of electricity generated by renewable energy resources to at least 33% by 2030. The planned total installed capacity of renewables is to reach 22,000 MW by 2030, and 60% (13,575 MW) of this capacity – is expected to consist of solar PV technologies.

Executive Decree no. 05-465 of 4 Dhou El Kaada 1426 of December 6, 2005 established the

requirements for evaluating compliance of technologies including solar PV modules. The Executive Decree of 2005 dictates that IANOR is responsible for the certification of all imported and locally manufactured technologies; however if necessary this authority can be delegated to other approved institutions – e.g. CDER. All imported technologies must bear the certification of a respective foreign accreditation institute that has been recognized by IANOR.

All PV modules introduced as part of the PEREE – domestically manufactured or imported and sold– must be approved by a certification laboratory in accordance with the respective technical regulation detailed in the Inter-ministerial decree of 13 Rhabie Ethani 1429 or 19 April 2008 concerning the adoption of the technical regulation on “Crystalline Silicon Photovoltaic (PV) Modules for terrestrial application”.

The PEREE was delegated the testing and certification of PV modules and the control and monitoring of PV plants in accordance with this Inter-ministerial decree to CDER. CDER is now in the process of establishing the first in-country laboratory with the capabilities to test PV modules and associated equipment and conduct quality control of equipment, solar PV plant construction, control, and maintenance in accordance with the International Electrotechnical Commission (IEC) 61215 standard.

The National Fund for Renewable Energies and Cogeneration (FNER) is essentially funded through the Algerian oil taxes, and has recently received additional financial resources. These taxes were raised from 0.5 percent to 1 percent through the Supplementary Finance Act no. 11-11 of 18 July 18, 2011. Additionally, Executive Decree no. 11-423 of December 8, 2011 set the terms for the operation of the special appropriation account no. 302-131 entitled “National Fund for Renewable Energies and Cogeneration”.

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

Once the implementation of this technical assistance has been completed the CDER PV testing lab is anticipated to be set up for successful ISO 17025 certification by an external body. The selection and contracting of such certification body will be carried out by CDER, who already has experience in this regard from the ongoing accreditation process for two other laboratories (certification of solar heating and calibration of pyranometers). Once ISO certification has been achieved CDER is expected to become a nationally accredited laboratory for testing of locally manufactured and imported PV technology to enable and accelerate the dissemination of these technologies in the country in line with national strategies and plans.

Expansion of the testing laboratory or the establishments of new testing facilities to meet the potentially increasing testing capacity needs can be an option in the medium and long term. At CDER’s option to join, NREL will continue to inform CDER about relevant international activities that NREL participates in, including the PV Quality Assurance Task Forum, so that CDER may keep abreast of developing best practices in PV reliability and quality and continue working in joint projects with NREL.

10. Gender and co-benefits:

Imbedded in design of the activities:

A gender expert will be assigned to carry out an assessment and evaluation regarding gender mainstreaming during the implementation of this technical assistance. Women make up 27 % of the total staff at CDER and hold 30 % of the higher positions. It will be ensured that these women will be represented accordingly in all training activities carried out during the implementation of

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| | this response plan, provided that it is applicable with the required expertise. Furthermore, it will be ensured that female experts are involved in all consultations to ensure their perspectives are taken into account. |
| Gender and co-benefits intended as result of the activities: | It is intended that the role of the trained female experts in the team will be strengthened to ensure equal opportunities. |

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

| In country stakeholder | Role in implementation of the technical assistance |
|---|--|
| Algerian Standards Institute (IANOR by its French acronym) | Responsible for delegating authority for testing and certifying of solar PV technologies locally manufactured and imported for sale in Algeria |
| National Electronic Industry Company (ENIE by its French acronym) | Local PV module manufacturer |
| Condor | Local PV module manufacturer |
| Algerian PV (ALPV) | Local PV module manufacturer |
| National Society for Electricity and Gas (SONELGAZ by its French acronym) | Local electricity generation company working on the design and installation of large-scale solar PV plants |

12. SDG Contributions:

| Goal | Sustainable Development Goal | Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs) |
|------|--|---|
| 1 | End poverty in all its forms everywhere | |
| 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 TA will support Algeria in diversifying the traditionally fossil fuel dependent primary energy mix through a significantly increased share of electricity generated by renewable energy resources. |
| | 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 | |
| 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 | This TA will support Algeria in reaching goals set in the Renewable Energies and Energy Efficiency Program (PEREE by its French Acronym) and NDC to mitigate GHG emissions from the electricity sector by scaling up electricity generated from renewable energy resources. |
| | 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:

| <i>Please tick off the relevant boxes below</i> | <i>Primary</i> | <i>Secondary</i> |
|--|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> 1. Technology identification and prioritization | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> 2. Research and development of new climate technologies | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> 3A. Feasibility studies for specific known climate technology options | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> 3B. Piloting of known technologies in local conditions | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> 4A. Law, policy and regulatory reform recommendations | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> 4B. Sector specific roadmap or strategy design | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> 5. Finance facilitation and market creation | <input type="checkbox"/> | <input type="checkbox"/> |

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 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.