This document serves as
1) a detailed work plan of all activities, deliveries, outputs, deadlines and responsible persons/organizations and detailed budget.
2) A monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators.

1. Implementation Plan & Communications Docs | 5 days Senior Technical Lead | 5 days Project Lead |
Selection by mutual agreement of applicable standards, procedures, and other activities that will be developed and demonstrated for CDER by NREL. Develop this implementation and monitoring plan.

Associated equipment assistance designing or specifying					
Activity	Deliveries/outputs	Deadline	Responsible persons *	Budget ++	Status
NREL provides two-page CTCN Impact Description	1.iii	Month 12	LP/VH	.02	
Closure and Data Collection report	1.iv	Month 12	LP/VH	.02	

2. Assessment of current status of CDER laboratory CDER Lab Assessment | 4.5 days Senior Technical Lead | 2.5 days Project Lead | 4.5 days Project Assistant |

Associated equipment assistance designing or specifying					
Activity	Deliveries/outputs	Deadline	Responsible persons *	Budget ++	Status
CDER sends current status information	2.i	Month 2	AK	.03	Done
NREL accesses CDER information, optimizes this work plan, and proposes tool/equipment purchases	2.ii	Month 3	PH	.03	Sent May 24th.
NREL proposes tool/equipment purchases (in conjunction with Output 3)	2.iii	Month 3	PH	.03	Ongoing – largely covered line by line in Output 3

Official deliverable Month 3: NREL assessment of the CDER laboratory status. NREL will communicate via e-mail the status of the CDER laboratory and any additional recommendations.

3. Testing and Certification Laboratory Setup Lab Set Up Assistance | 6.5 days Senior Technical Lead | 1 days Project Lead |

Associated equipment assistance designing or specifying					
Activity	Deliveries/outputs	Deadline	Responsible persons *	Budget	Status
UV preconditioning chamber (pictures, diagram)	3.1	Month 3	PH	.04	Sent April 23
Mechanical load tester (pictures, diagram)	3.1	Month 3	PH/KT	.04	Sent April 30
Hail impact tester	3.1	Month 3	KT	.04	No special information at NREL, candidate equipment discussed.
EL camera	3.1	Month 3	PH	.04	Complete EL system specified , completed March 2019
Climactic chamber	3.1	Month 3	PH	.04	Sent May 24
Laboratory setup-layout	3.2	Month 3	PH/KT	.04	Sent May 24, and covered during site visit, Floor plan recommendation sent November 12, 2018
Refer consultants that assist and check for laboratory accreditation	3.2	Month 3	PN	.04	*Performed during NREL visit. NREL references sent CDER has identified certifying agency for Algeria*
Other TBD from Task 2					

Outdoor performance test facilities					
Activity	Deliveries/outputs	Deadline	Responsible persons *	Budget	Status
Consult for building outdoor facilities. Specify materials and budget information of	3	Month 3	BS	.04	Sent April 3

NREL existing installation. Consult on system size.					

Notes:
Throughput based on 10-15 module types/y, some established and some emerging technologies

CDER has interest in outdoor monitoring of single modules, as well as 1, 2, or 3 kW arrays. This includes long term tests. These will inform which technologies perform best in the various Algerian climates and guide future investments.

Official deliverable Month 3:
i) A memo providing
1) guidance on establishment and setup of testing laboratory;
2) best practices for laboratory setup; and
3) potential partnering organizations to support the setup.
ii) A virtual meeting to discuss the memo and discuss questions and concerns from CDER.

(Output 4 Development of a Solar PV Module Testing Procedure WACC.11156.01.01.05 Develop Test Procedures | 12.5 days Senior Technical Lead | 4 days Project Lead |)

Activity	Deliveries/ outputs	Deadline	Responsible persons	Budget	Status
10.1: Visual inspection	4	Month 7	PH/KT	.05	Covered July Visit. Document supplied Jan 22
10.2: Maximum power determination – outdoor	4	Month 7	PN	.05	Covered July Visit. Document supplied Jan 22
10.3: Insulation test	4	Month 7	PH/KT	.05	Covered July Visit. Document supplied Jan 22
10.4: Measurement of temperature coefficients (outdoors)	4	Month 7	PN/IR	.05	Covered July Visit. Document supplied Jan 22
10.5: Measurement of nominal operating cell temperature (NOCT)	4	Month 7	PH/KT	.05	Covered July Visit. Document supplied Jan 22

10.6: Performance at STC and NOCT	4	Month 7	PN	.05	Covered July Visit. Document supplied Jun 30
10.7: Performance at low irradiation (outdoors)	4	Month 7	PN	.05	Covered July Visit. Document supplied Jun 30
10.8: Outdoor exposure test	4	Month 7	IR	.05	Covered July Visit. Document supplied Jun 30
10.9: Hot-spot endurance test	4	Month 7	PH	.05	Covered July Visit. Document supplied Jun 30
10.15: Wet leakage current test	4	Month 7	PH/KT	.05	Covered July Visit. Document supplied Jun 30
10.18: Bypass diode thermal test	4	Month 7	PH	.05	Covered July Visit. Document supplied Jun 30

Activity	Deliveries/outputs	Deadline	Responsible party	Budget	Status
Assist in evaluating performance evaluation methodologies of existing power plants	4	Month 7	DJ	.05	Sent April 10

Notes.
IEC 61215, in some cases, provides for several methods for achieving given module quality tests. The method performed at NREL may not be the method that CDER is most interested in. The guidance we have from CDER is to focus on NREL-implemented methods, though in some cases, this will incur costs for equipment. In some cases, NREL does not perform the requested IEC material quality test (noted by responsible person = xxx). In such cases, it will be difficult for NREL to demonstrate experience the methodologies from a position of experience. We can however discuss with other experts in the community to provide answers to CDER's open questions.

NREL will work with CDER to evaluate which standard documents CDER possesses and prioritize which should be acquired by CDER. The mandate is to, first, implement IEC 61215 protocols, then convincingly adapt or add

to them as necessary for Algeria-specific climates or requirements. This may include non-IEC 61215 based protocols for evaluating module durability.

[We have been notified of CDER's inventory of IEC standards, placed on NREL's server]

These items are to be due by Month 7, but in many cases are anticipated to be provided much earlier.

Some of these items may not require much time, others much more. Before finalizing the document, some metric for these time estimates best be included.

Official deliverable Month 7:
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.

Here, we basically explained what we do, and what we know during the site visit to NREL. We also attempted to fill in the unknowns expressed by CDER. Some discussion on how to best formalize this is necessary. It is a little difficult to write specific procedures beyond the instructions in the standard without the actual equipment set on hand at CDER (the software being developed, etc).

Output 5: Practically-oriented Training of PV Testing Procedures and site visit to NREL PV Test Training & NREL Site Visit | 9 days Senior Technical Lead | 4 days Project Lead | 5.5 days Technical Lead | plus travel/training costs

Activity	Deliveries/outputs	Deadline	Responsible party	Budget	Status
NREL Planning and organization of a working visit to NREL for 3 participants from CDER. Logistical preparations.	5.1	Month 8		.06	Done June 24
CDER team (3 participants) visit NREL to observe testing process and equipment. 4 days	5.2	Month 9	PH	.06	Done July 9-12

Official deliverable Month 9:
i) A 4 day technical visit of CDER experts (3 participants) to NREL to 1) observe operating PV module testing equipment; 2) observe the control and monitoring of PV module outdoor testing sites; and discuss best practices in PV module testing and supplemental training standards that NREL may recommend, which may be applicable to Algeria.

Regarding 2, we sent the draft standard TEST PROCEDURE FOR EXTENDED THERMAL CYCLING OF PV MODULES, and our document (paper in publication) describing our understanding of corrosion chemistry (July 10)

Output 6: Technical Training and Pilot Run of PV Module Testing Procedures at CDER Training at CDER Lab | 20 days Senior Technical Lead | 2 days Project Lead | plus travel costs

Activity	Deliveries/outputs	Deadline	Responsible party	Budget	Status
Planning and organization for practically-oriented training of PV testing procedures	6.1	Month 9	PH	.07	Dates of travel finalized Nov 28 (for Jan 13 '19 arrival, Jan 18 '19 departure)
Training and evaluation for CDER activities. 4 days	6.2, 6.3	Month 11	PH	.07	Done July 2018

Official deliverable Month 11:
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.

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++ Tasks (budget categories) fall under WACC.11156.01.01.xx, where .xx is given in the budget column