BUNDLED SOLAR PHOTOVOLTAIC PROJECT BY ACME

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Summary:

Validation purpose: The main purpose of this grouped project activity is to generate clean form of electricity through renewable solar energy sources. All the 16 project instances i.e. renewable energy generation plants to be included in this grouped project will be from within India only comprising total capacity 1,207.5 MW.

Over the 10 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 2,078,589 tCO_2e per year, thereon displacing 2,193,786 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

The objective of this validation activity is to have an independent third party for the assessment of the project design, estimated ER sheet and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0"
- the project's monitoring plan is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0"
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM Validation and Verification Standard for project activities version 02
- CDM Project Standard for project activities version 02
- CDM project cycle procedure for project activities version 02
- VCS standard v3.7[1]
- VCS guideline v3.7

Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of estimated verified emission reductions (VERs).

A risk-based approach has been followed to perform this validation and verification activity. In the course of Validation, 06 Corrective Action requests (CARs) and 00 Clarification Requests (CLs), 00

[1] http://www.v-c-s.org/project/vcs-program/rules-and-requirements/

Forward action request (FARs) were raised and successfully closed. The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and project owners have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

Verification purpose:

The proposed grouped project activity will assist development of renewable energy generation plants based on solar energy technology in India and delivering electricity to the grid.

The proposed grouped project is a voluntary action being undertaken by the project owner of the project activity. EKI Energy Services Limited (hereafter referred as "EKIESL") is acting as the other party for this project activity.

The main purpose of this grouped project activity is to generate clean form of electricity through renewable solar energy sources. All the 16 project instances i.e. renewable energy generation plants to be included in this grouped project will be from within India only comprising total capacity 1,207.5 MW.

During the Current Monitoring Period from 10/02/2017 to 28/02/2018 (First and last date included) the project activity has supplied 511,472.085 MWh of electricity, and thus contributing to the GHG reductions 484,608 tCO_2e.

The grouped Project activity is a new facility (Greenfield) and the electricity generated by the project will be exported to the Indian electricity grid. The project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The Project Proponent plans to avail the VCS benefits for the project.

During the current monitoring period, project activity undergoes continued operation since their commissioning and no major breakdown had taken place.

The objective of this verification activity is to have an independent third party for the assessment of the project design, Actual ER sheet and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0"
- the project's monitoring plan is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0"
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM Validation and Verification Standard for project activities version 02
- CDM Project Standard for project activities version 02
- CDM project cycle procedure for project activities version 02

- VCS standard v3.7[2]
- VCS guideline v3.7

A risk-based approach has been followed to perform this verification activity. In the course of verification, 02 Corrective Action requests (CARs) and 00 Clarification Requests (CLs), 01 Forward action request (FARs) were raised and successfully closed. The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and project owners have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfillment of the stated criteria of VCS.

[2] http://www.v-c-s.org/project/vcs-program/rules-and-requirements/

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Hereinafter referred as Applus+ Certification) has been appointed by "**ACME Cleantech Solutions Private Limited**" to perform the validation and verification of the project entitled "Bundled Solar Photovoltaic Project by ACME" under VCS standard and guideline version 3.7. The objective of this joint validation & verification activity is to have an independent third party for the assessment of the project design, ER sheet and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0"
- the project's monitoring plan is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0"
- the project's compliance with the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM Validation and Verification Standard for project activities version 02
- CDM Project Standard for project activities version 02
- CDM project cycle procedure for project activities version 02
- VCS standard v3.7[3]
- VCS guideline v3.7

Validation & verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of estimated verified emission reductions (VERs).

1.2 Scope and Criteria

The scope of the Joint validation and verification is the independent and objective review of the Joint Project Description & Monitoring Report. The Joint VCS PD & MR are reviewed against the relevant criteria (see 1.1) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The validation and verification was based on the guidance given in the CDM Project Standard for project activities version 02.0, CDM Project Cycle Procedure for project activities version 02.0, VCS guideline and standard version 3.7

The assessment team has employed a risk-based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the Joint VCS PD & MR. The main focus of the

[3] http://www.v-c-s.org/project/vcs-program/rules-and-requirements/

assessment team is to identify the significant risks for the project implementation and the generation of VERs. The validation and verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design and monitoring report combined.

The only purpose of the validation and verification is its usage during the registration /issuance process as part of the VCS project cycle. Therefore, LGAI Technological Center S.A. (Applus+ Certification) can't be held liable by any party for decisions made or not made based on the validation/verification opinion, which will go beyond that purpose.

1.3 Level of Assurance

The verification and validation has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS.

1.4 Summary Description of the Project

The main purpose of this grouped project activity is to generate clean form of electricity through renewable solar energy sources. All the 16 project instances i.e. renewable energy generation plants to be included in this grouped project will be from within India only comprising total capacity 1,207.5 MW. The project activity would use solar energy to generate direct current form photovoltaic modules that will be converted into alternating current by inverters. The project activity instances under grouped project activity will be grid connected and will install a new power plant (i.e. Solar Photovoltaic) at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant). The generated electricity will be supplied to grid or uses grid network for captive or third party sale.

During the 10 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 2,078,589 tCO_2e per year, thereon displacing 2,193,786 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

The project is a grouped project activity by ACME Cleantech Solutions Private Limited.

More project activity instances will be included in the grouped project activity in future. These new instances will be grid connected solar renewable energy power plants and will be comprised of small scale or large scale project activities.

The project is located State of Telangana, Karnataka, Andhra Pradesh, Rajasthan and Uttarakhand. Details of the capacity & installation dates are mentioned in the table below:

Activity Instance	SPV Name	State	Capacity (MW)	Commissioning Date
1	Sunworld Solar Power Pvt Ltd	Telangana	30	15/11/2017
	ACME Ranga Reddy Solar Power Pvt Ltd		30	02/06/2017
	ACME Medak Solar Energy Pvt Ltd		45	14/07/2017
	ACME Nizamabad Solar Energy Pvt Ltd		50	11/09/2017
	ACME PV Powertech Private Limited (Sadashivpet)		50	07/07/2017
	ACME Solar Power Technology Private Limited		50	05/02/2018
	ACME Rewari Solar Power Pvt Ltd	Karnataka	50	31/01/2018
	Acme Kurukshetra Solar Energy Pvt Ltd		50	31/01/2018

Activity Instance	SPV Name	State	Capacity (MW)	Commissioning Date
	ACME Bhiwadi Solar Power Pvt Ltd	AP	50	01/07/2018
	ACME Hisar Solar Power Private Limited		50	21/06/2018
	ACME Karnal Solar Power Private Limited		50	15/06/2018
	ACME Kaithal Solar Power Private Limited	Karnataka	40	24/01/2018
	ACME Babadham Solar Power Private Limited		40	22/01/2018
	ACME Koppal Solar Energy Private Limited		40	15/04/2018
	ACME Vijayapura Solar Energy Pvt Ltd		40	23/01/2018
	ACME Rewa Solar Energy Pvt Ltd	Rajasthan	100	24/09/2018
	ACME Chittorgarh Solar Energy Pvt. Ltd	Rajasthan	250	Yet to be commissioned
2	ACME Karimnagar Solar Power Pvt Ltd	Telangana	15	02/03/2017
3	Purvanchal Solar Power Pvt Ltd		15	23/02/2017
4	Rewanchal Solar Power Pvt Ltd		15	24/03/2017
5	Neemuch Solar Power Pvt Ltd		15	25/03/2017
6	ACME Fazilka Power Pvt Ltd (Nandipet)		15	13/03/2017
7	ACME Narwana Solar Power Pvt Ltd (Lingampet)		15	24/02/2017
8	ACME Warangal Solar Power Pvt Ltd		15	03/03/2017
9	Devishi Renewable Energy Pvt Ltd	Uttarakhand	12.5	19/02/2017
10	Devishi Solar Power Pvt Ltd		12.5	19/02/2017
11	Sunworld Energy Pvt Ltd		12.5	10/02/2017
12	ACME Yamunanagar Solar Power Pvt Ltd-1 (KOSGI)	Telangana	10	26/09/2017
13	ACME Yamunanagar Solar Power Pvt Ltd-2 (MOTHKUR)		10	17/09/2017
14	ACME Mahbubnagar Solar Energy Pvt Ltd-2 (GODHUR)		10	11/09/2017
15	ACME Mahbubnagar Solar Energy Pvt Ltd-3 (PADMAJIWADI)		10	09/09/2017
16	ACME Mahbubnagar Solar Energy Pvt Ltd-1 (MANTHANI)		10	12/09/2017
Total			**1,207.5**	

During the Current Monitoring Period from 10/02/2017 to 28/02/2018 (First and last date included) the project activity has supplied 511,472.085 MWh of electricity, and thus contributing to the GHG reductions 484,608 tCO_2e.

Project Technology Details

The technical specification for each project activity instance is given as below.

ACME Karimnagar Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	255,260 Wp & 265 Wp Modules of make - Risen/Byd
No. of modules	74088
Total Number of Invertors	12

Transformer numbers and KVA ratings	3 x 5 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp,Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Purvanchal Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	255,260 Wp & 265 Wp Modules of make - Risen
No. of modules	75600
Total Number of Invertors	12
Transformer numbers and KVA ratings	3 x 5 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Rewanchal Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	260 Wp & 265 Wp Modules of make - Risen/Byd
No. of modules	62208
Total Number of Invertors	12
Transformer numbers and KVA ratings	3 x 5 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
Neemuch Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	260 Wp & 265 Wp Modules of make - Talesun
No. of modules	73824
Total Number of Invertors	12
Transformer numbers and KVA ratings	3 x 5 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Fazilka Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	255,260 Wp & 265 Wp Modules of make - Risen
No. of modules	74640
Total Number of Invertors	12
Transformer numbers and KVA ratings	3 x 5 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)

Technical & Operational Lifetime	25 years
Sun World Solar Power Pvt. Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	260 Wp & 265 Wp Modules of make - Talesun/Byd/Yingli
No. of modules	133008, Installation WIP
Total Number of Invertors	24
Transformer numbers and KVA ratings	6 x 5 MVA & 1 Power trafo 25/30MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Ranga Reddy Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	260 Wp & 265 Wp Modules of make - Byd
No. of modules	141504
Total Number of Invertors	24
Transformer numbers and KVA ratings	6 x 5MVA & 1 x 30MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Medak Solar Energy Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	260,265 Wp & 270 Wp Modules of make - Talesun/BYD/GCL
No. of modules	220176
Total Number of Invertors	36
Transformer numbers and KVA ratings	9 x 5 MVA & 2 x 20/25 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Narwana Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	255 Wp & 260 Wp Modules of make -Byd
No. of modules	74544
Total Number of Invertors	12
Transformer numbers and KVA ratings	3 x 5 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1.25 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Warangal Solar Power Pvt Ltd	

Technical detail of the equipment	Remark
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	260,265 Wp & 270 Wp Modules of make - GCL
No. of modules	73056
Total Number of Invertors	12
Transformer numbers and KVA ratings	3 x 5 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V&360V AC, 1.25 MWp, Inverter make:-TBEA/Sungrow)
Technical & Operational Lifetime	25 years
ACME Nizamabad Solar Energy Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	260,265 Wp & 270 Wp Modules of make - Talesun/GCL
No. of modules	243816
Total Number of Invertors	20
Transformer numbers and KVA ratings	10 x 5 MVA & 2 x 25MVA
Central inverters of nominal AC power output, KVA rating , make etc	(360V AC, 2.5 MWp, Inverter make:-Sungrow)
Technical & Operational Lifetime	25 years
ACME PV Powertech Private Limited	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 25 degrees and 3 degrees
Solar photovoltaic module	265,270 Wp & 275 Wp Modules of make - Risen/Byd/GCL
No. of modules	234936 Installation WIP
Total Number of Invertors	20
Transformer numbers and KVA ratings	10 x 5 MVA & 2 x 20/25MVA
Central inverters of nominal AC power output, KVA rating , make etc	(360V AC,2.5 MWp, Inverter make:-Sungrow)
Technical & Operational Lifetime	25 years
Devishi Renewable Energy Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 20 degrees and 3 degrees
Solar photovoltaic module	255Wp & 260 Wp Modules of make -Byd
No. of modules	60144
Total Number of Invertors	12
Transformer numbers and KVA ratings	1 x 4.5 MVA & 2 x 4MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
Devishi Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 20 degrees and 3 degrees

Solar photovoltaic module	255Wp & 260 Wp Modules of make -Byd
No. of modules	60144
Total Number of Invertors	12
Transformer numbers and KVA ratings	1 x 4.5 MVA & 2 x 4 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1 MWp, Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
Sunworld Energy Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 15 degrees and 3 degrees
Solar photovoltaic module	260Wp & 265 Wp Modules of make -Byd
No. of modules	58512
Total Number of Invertors	12
Transformer numbers and KVA ratings	1 x 4.5 MVA & 2 x 4MVA
Central inverters of nominal AC power output, KVA rating , make etc	(380V AC,1 MWp,Inverter make:-TBEA)
Technical & Operational Lifetime	25 years
ACME Solar Power Technology Private Ltd	
Technical detail of the equipment	**Remark**
Technology	Photovoltaic modules on Fixed Tilt at 15 degrees and 3 degrees
Solar photovoltaic module	265 Wp &270 Wp Modules of make GCL/Yingli
No. of modules	216095 Installation WIP
Total Number of Invertors	20
Transformer numbers and KVA ratings	9 x 5MVA , 2 x 2.5MVA & 2 x 20/25 MVA
Central inverters of nominal AC power output, KVA rating , make etc	(360V AC,2.5 MWp, Inverter make:-Sungrow)
Technical & Operational Lifetime	25 years
ACME Yamunanagar Solar Power Pvt Ltd-1 (KOSGI)	
Technical detail of the equipment	**Remark**
Technology	Poly-SI
Solar photovoltaic module	Trina Solar (320Wp, 325Wp, 330Wp)
No. of modules	41880
Total Number of Invertors	08
Transformer numbers and KVA ratings	1 transformer 50KVA (Make-Powerware), 2 transformer 5000KVA (Make-AUM)
Central inverters of nominal AC power output, KVA rating , make etc	Make- Tbea, PV power- 3500KWp, Max DC voltage-1000V, MPPT volt. 550-950V, Rated AC power- 2500KW, Rated AC voltage- 380V,
Technical & Operational Lifetime	25 years
ACME Yamunanagar Solar Power Pvt Ltd-2 (MOTHKUR)	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	Talesun & ZnShine- make (rated 325 W, 320 W and 315 Watts)
No. of modules	42120

Total Number of Invertors	04 Nos. (2500 kW*4)
Transformer numbers and KVA ratings	02 Nos., 5000 kVA each
Central inverters of nominal AC power output, KVA rating , make etc	2500 kW, TBEA- make
Technical & Operational Lifetime	25 years
ACME Mahbubnagar Solar Energy Pvt Ltd-2 (GODHUR)	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	BYD-260W/265W
No. of modules	1) Jollywood: 18300 modules , 2) Trina :21200 TOTAL: 39500
Total Number of Invertors	52368 No's
Transformer numbers and KVA ratings	Make-Tbea, AC OutPut Power-1250KW
Central inverters of nominal AC power output, KVA rating , make etc	Sr.No's;20329,20330 Rating:33kv/380v
Technical & Operational Lifetime	25 years
ACME Mahbubnagar Solar Energy Pvt Ltd-3 (PADMAJIWADI)	
Technical detail of the equipment	**Remark**
Technology	1) Jollywood :- Monocrystalline 2) Trina :- Polycrystalline
Solar photovoltaic module	1. JOLLYWOOD : 370 Wp :- Voc = 47.7V,Isc = 9.98A 2. TRINA : a. 320wp = Voc = 47.7V,Isc = 9.98A b. 325wp = Voc = 45.6V,Isc = 9.19A c. 330Wp = Voc = 45.5V,Isc = 9.15A
No. of modules	1) Jollywood: 18300 modules , 2) Trina :21200 TOTAL: 39500
Total Number of Invertors	8
Transformer numbers and KVA ratings	02 Numbers and 5000 KVA,33KV/(380V*2)
Central inverters of nominal AC power output, KVA rating , make etc	MAKE : TBEA , Model : TC 1250KH-M , Rated output Power :1250 KW , Voltage : 380v AC , Currents :1899 Amps
Technical & Operational Lifetime	25 years
ACME Mahbubnagar Solar Energy Pvt Ltd-1 (MANTHANI)	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	BYD -250W,260W and 265MW
No. of modules	51960
Total Number of Invertors	8
Transformer numbers and KVA ratings	2 No's , 5MVA, Make - AUM
Central inverters of nominal AC power output, KVA rating , make etc	1250KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Vijayapura Solar Energy Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline

Solar photovoltaic module	ZN shine, Resin,Trina solar (315Wp,320Wp, 325Wp, 330Wp)
No. of modules	167600
Total Number of Invertors	32
Transformer numbers and KVA ratings	01 Nos. Power Transformer- 40000KVA 07 Nos. Inverter Transformer- 5000 KVA 02 Nos. Inverter Transformer- 2500 KVA
Central inverters of nominal AC power output, KVA rating , make etc	1250KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Bhiwadi Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	Resin, ZN shine (315 Wp, 320 Wp, 325 Wp)
No. of modules	207600
Total Number of Invertors	20
Transformer numbers and KVA ratings	04 Nos. Inverter Transformer- 10000KVA 02 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	2500KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Hisar Solar Power Private Limited	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	Telsun, Resin, ZN shine, Adani (320 Wp, 325 Wp, 330 Wp)
No. of modules	206360
Total Number of Invertors	20
Transformer numbers and KVA ratings	04 Nos. Inverter Transformer- 10000KVA 02 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	2500KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Babadham Solar Power Private Limited	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	ZN shine, Yngli,Resin,Trina solar (315Wp,320Wp, 325Wp)
No. of modules	168240
Total Number of Invertors	32

Transformer numbers and KVA ratings	01 Nos. Power Transformer- 40000KVA 08 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	1250KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Kaithal Solar Power Private Limited	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	ZN shine, Yngli,Trina solar (320Wp, 325Wp)
No. of modules	16731632
Total Number of Invertors	32
Transformer numbers and KVA ratings	01 Nos. Power Transformer- 40000KVA 08 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	1250KVA, TBEA
Technical & Operational Lifetime	25 years
Acme Rewari Solar Power Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	Trina, Resin (320Wp, 325Wp, 330Wp)
No. of modules	207040
Total Number of Invertors	40
Transformer numbers and KVA ratings	02 Nos. Power Transformer- 25000KVA 10 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	1250KVA, TBEA
Technical & Operational Lifetime	25 years
Acme Kurukshetra Solar Energy Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	Trina, Resin (320Wp, 325Wp, 330Wp)
No. of modules	208520
Total Number of Invertors	40
Transformer numbers and KVA ratings	02 Nos. Power Transformer- 25000KVA 10 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	1250KVA, TBEA

Technical & Operational Lifetime	25 years
ACME Karnal Solar Power Private Limited	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	Telsun, Resin, ZN shine, Adani (320 Wp, 325 Wp, 330 Wp)
No. of modules	206360
Total Number of Invertors	20
Transformer numbers and KVA ratings	04 Nos. Inverter Transformer- 10000KVA 02 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	2500KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Koppal Solar Energy Private Limited	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	ZN shine, Yngli,Resin,Trina solar (315Wp,320Wp, 325Wp)
No. of modules	168240
Total Number of Invertors	32
Transformer numbers and KVA ratings	01 Nos. Power Transformer- 40000KVA 08 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	1250KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Rewa Solar Energy Pvt Ltd	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline
Solar photovoltaic module	Telsun, Resin, ZN shine, Adani (320 Wp, 325 Wp, 330 Wp)
No. of modules	400000
Total Number of Invertors	20
Transformer numbers and KVA ratings	04 Nos. Inverter Transformer- 10000KVA 02 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	2500KVA, TBEA
Technical & Operational Lifetime	25 years
ACME Chittorgarh Solar Energy Pvt. Ltd	
Technical detail of the equipment	**Remark**
Technology	Polycrystalline

Solar photovoltaic module	Telsun, Resin, ZN shine, Adani (320 Wp, 325 Wp, 330 Wp)
No. of modules	400000
Total Number of Invertors	20
Transformer numbers and KVA ratings	04 Nos. Inverter Transformer- 10000KVA 02 Nos. Inverter Transformer - 5000 KVA
Central inverters of nominal AC power output, KVA rating , make etc	2500KVA, TBEA
Technical & Operational Lifetime	25 years

It is to be noted that in future there is possibility of change in module configuration of projects implemented, however project capacity of each instance will remain same as above. The timeline for Commission of the project activity is also checked by the assessment team. Assessment team checked the Commission of all the solar power plants via the commissioning Certificates and found correct.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

Validation and Verification Scope: The scope is defined as an independent and objective review of the Joint project design document and Monitoring report. The Joint VCS PD and MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard and guideline version 3.7, including the approved baseline and monitoring methodology ACM0002 version 19.0 & AMS-I.D Version 18.0 (for the present scenario in the project). The validation and verification were based on the requirements in the Validation and Verification Standard for project activities version 02.0, project standard for project activities version 02.0, project cycle procedure for project activities version 02.0 and VCS guideline and standard version 3.7.

The validation and verification are not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the combined project description and the Monitoring report.

Validation and Verification Process: The project assessment is based on the Clean Development Mechanism Validation and Verification Standard for project activities version 02.0 and VCS standard and guideline version 3.7 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

I A desk review of the Joint project design documentation and monitoring report;

II Follow-up interviews with project stakeholders;

III The resolution of outstanding issues and the issuance of the final verification/ validation report and opinion.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. LGAI Technological Center, S.A. (Applus+ Certification) has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating/verifying the identified criteria.

Appointment of the assessment team

According to the sectoral scope / technical area and experience in the sectoral or national business environment, LGAI Technological Center S.A. (Applus+ Certification) has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of LGAI Technological Center S.A. (Applus+ Certification).

The composition of audit team shall be approved by the LGAI Technological Center S.A. (Applus+ Certification) ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as pres ented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by t he assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Dr. Atul Takarkhede	LA/TE	YES	YES	YES	YES
Mr. Sukanta Das[4]	A/TE	YES	YES	YES	YES
Simon Shen	TR	YES	YES	YES	NA

The complete list of CVs is included as Appendix 3 of this report.

Document review

The Joint VCS PD & MR submitted by the Client was reviewed against the approved methodology and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in appendix 1.

[4] Mr. Sukanta Das was firstly appointed as Team Leader for this assessment and has performed the site visit with such role (as shown in Section 2.4 below). There has been a change in team composition after the site visit and the team has been configured as shown in above table for finalizing the assessment only.

Follow-up interviews

A site visit was conducted by LGAI Technological Center S.A. (Applus+ Certification) who performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report in the below sections.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the joint validation and verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification) positive conclusion on the project design and Monitoring report. The Corrective Action Requests and Clarification Requests raised by LGAI Technological Center S.A. (Applus+ Certification) were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the validation process, the concerns raised and responses given are summarized below in the appendix 2.

The Joint VCS PD & MR Version 02 submitted by project owners on 29/01/2019 respectively serve as the basis for the final assessment presented. Additional changes to the project during the joint validation and verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a joint validation and verification of the final documentation including the final Joint validation and verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the project owners the positive validation/verification opinion and relevant documents are submitted to the VCS secretariat through the VCS web-platform.

2.2 Document Review

The details of the document observed during the joint validation and verification process are listed below in appendix 1 of this report.

2.3 Interviews

The site visit for the project activity was carried out from 24/05/2018 to 30/05/2018. No sampling procedures were adopted either in document verification and all the document were cross checked to ensure conservative estimation of emission reduction. Kindly find below names of the persons interviewed (during onsite and telephonic interview later) for the site.

Sr. No.	Name of Persons	Role/Designation
1)	Mr. Anurag Jain	PP Representative (Manager EHS)
2)	Mr. R. Sreenivas	Villager

3)	Mr. Ramesh Ranawat	Villager
4)	Mr. Prakash Sahu	Consultants
5)	Mr. Ramkrishna Patil	Consultants

2.4 Site Inspections

Duration of on-site inspection: 24/05/2018 to 30/05/2018				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring.	Telangana, Karnataka, Andhra Pradesh, Madhya Pradesh[5], Rajasthan and Uttarakhand States, India	24/05/2018 to 30/05/2018	Mr. Sukanta Das

2.5 Resolution of Findings

The objective of this phase of the joint validation and verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification)'s positive conclusion on the project design and Monitoring report. The Corrective Action Requests and Clarification Requests raised by LGAI Technological Center S.A. (Applus+ Certification) were resolved during communications between the Client and LGAI Technological Center S.A. (Applus+ Certification) to guarantee the transparency of the validation process, the concerns raised and responses given are summarized below in the appendix 2.

The final Joint VCS PD & MR Version 02 submitted by project owners on 29/01/2019 serves as the basis for the final assessment presented. Additional changes to the project during the validation and verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation and verification findings	**No. of CL**	**No. of CAR**	**No. of FAR**
Project design document and Monitoring report	00	01	00
Description of project activity	00	01	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
- Demonstration of additionality	00	01	00
- Emission reductions	00	01	00
- Monitoring plan	00	00	00
-Stakeholders consultation process	00	01	00
- Public comments	00	01	00

[5] Site visit completed however, SPV located in Madhya Pradesh is removed from bundle at later stage.

Others (please specify)-Matter related to double counting- **for validation**	00	00	00
Others (please specify)-Matter related to Emission reduction calculation- **for verification** ER achieved, Matter related to feeder details, breakdown and Calibration-**for verification**	00	02	01
Total	**00**	**Validation+ Verification: 08**	**01**

The list of findings and their resolution is presented in appendix 2 of this report.

2.5.1 Forward Action Requests

One FAR was raised during the assessment process. Details of the raised FAR are given in Appendix 2 of this report.

3 VALIDATION FINDINGS

3.1 Project Details

The main purpose of this grouped project activity is to generate clean form of electricity through renewable solar energy sources. All the 16 project instances i.e. renewable energy generation plants to be included in this grouped project will be from within India only comprising total capacity 1,207.5 MW. The project activity would use solar energy to generate direct current form photovoltaic modules that will be converted into alternating current by inverters. The project activity instances under grouped project activity will be grid connected and will install a new power plant (i.e. Solar Photovoltaic) at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant). The generated electricity will be supplied to grid or uses grid network for captive or third party sale.

During the 10 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 2,078,589 tCO_2e per year, thereon displacing 2,193,786 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

The project is a grouped project activity by ACME Cleantech Solutions Private Limited.

More project activity instances will be included in the grouped project activity in future. These new instances will be grid connected solar renewable energy power plants and will be comprised of small scale or large scale project activities.

The project is located State of Telangana, Karnataka, Andhra Pradesh, Rajasthan and Uttarakhand. Details of the capacity & installation dates are mentioned in **Section 1.4** above.

During onsite visit and document review it was noted that the SPV; ACME Chittorgarh Solar Energy Pvt. Ltd is yet to be commissioned. During subsequent verification, details of the project implementation shall be verified. Hence FAR 01 was raised by assessment team.

During the Current Monitoring Period from 10/02/2017 to 28/02/2018 (First and last date included) the project activity has supplied 511,472.085 MWh of electricity, and thus contributing to the GHG reductions 484,608 tCO_2e.

Project Technology Details –

All the 16 project instances (Solar PV plants) included in this grouped project activity during this joint validation and verification are located in India comprising total capacity 1,207.5 MW.

The technical specifications are mentioned in section 1.4 of this report and same were checked during site visit.
Assessment team checked onsite and confirms that the details of the project proponent is as below:

Organization name	**ACME Cleantech Solutions Private Limited**
Contact person	Anurag Jain
Title	Manager EHS
Address	Plot No.152, Sector – 44, Gurugram -122 002, Haryana, India
Telephone	+91 95898 99649
Email	info@acme.in

Assessment team checked onsite and confirms that the details of the other entity involved is as below:

Organization name	**EKI Energy Services Limited**
Role in the project	Project Consultant
Contact person	Mr. Prakash Kr. Sahu
Title	Project Manager
Address	EnKing Embassy, Office No 201, Plot 48, Scheme 78, Part 2, Vijay Nagar, Indore- 452010, Madhya Pradesh, India.
Telephone	+91 9931158863
Email	prakash@enkingint.org

Project Start Date

Start date of the project activity is the earliest date of interconnection with the grid i.e. 10/02/2017. Assessment team checked the commission details from the commissioning certificate provided by the Government agencies.

Project crediting period Date

Assessment team confirms that the crediting period dates for the project is as below:

Crediting Period Start date: 10/02/2017

Crediting Period End date: 09/02/2027

The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times.

Project Scale and Estimated GHG Emission Reductions or Removals

Assessment team confirms that the project is a Large Project that involves setting up of 500 MW Solar Project activity project.

Project Scale	
Project	
Large project	✓

As the estimated annual average GHG emission reductions or removal per year is 2,078,589 tCO_2e which is greater than 300,000 tonnes of CO_2e per year, thus the project falls in the category of Large Project.

Year	**Estimated GHG emission reductions or removals (tCO_2e)**
Year 1	2,078,589
Year 2	2,078,589
Year 3	2,078,589
Year 4	2,078,589
Year 5	2,078,589
Year 6	2,078,589
Year 7	2,078,589
Year 8	2,078,589
Year 9	2,078,589

Year	Estimated GHG emission reductions or removals (tCO_2e)
Year 10	2,078,589
Total estimated ERs	**20,785,890**
Total number of crediting years	10
Average annual ERs	**2,078,589**

The above estimated emission reduction is confirmed by assessment team via emission reduction calculation spreadsheet. The calculation is conservative and this acceptable to the assessment team.

Project location

The project is located State of Telangana, Karnataka, Andhra Pradesh, Rajasthan and Uttarakhand. Assessment team during the validation site visit confirms via google map that the solar power plant is located at a single region and the details are as follows[6]:

Activity Instances	Name of the SPVs	Location	Latitude	Longitude
01	Sunworld Solar Power Pvt Ltd	Jagathiyal Village, Karimnagar, Telangana	18.8 N	78.9 E
	ACME Ranga Reddy Solar Power Pvt Ltd	Siricilla Village, Karimnagar Dist., Telangana	18.4 N	78.8 E
	ACME Medak Solar Energy Pvt Ltd	Annathsagar, Medak, Telangana	18.1 N	78.3 E
	ACME Nizamabad Solar Energy Pvt Ltd	Beeravelly, Adilabad, Telangana	19.1 N	78.3 E
	ACME PV Powertech Private Limited (Sadashivpet)	Annathsagar, Medak, Telangana	17.62 N	77.95 E
	ACME Solar Power Technology Private Limited	Bhongir, Nalgonda, Telangana	17.50 N	78.88 E
	Acme Rewari Solar Power Pvt Ltd	Pavgada, Tumkur, Karnataka	14.2 N	77.5 E
	Acme Kurukshetra Solar Energy Pvt Ltd	Pavgada, Tumkur, Karnataka	14.2 N	77.5 E
	ACME Bhiwadi Solar Power Pvt Ltd	Bhiwadi, Kadapa, Andhra Pradesh	14.0 N	78.50 E
	ACME Hisar Solar Power Private Limited	Hisar, Kadapa, Andhra Pradesh	14.0 N	78.50 E
	ACME Karnal Solar Power Private Limited	Karnal, Kadapa, Andhra Pradesh	14.0 N	78.50 E
	ACME Kaithal Solar Power Private Limited	Chitaguppa, Kaithal, Karnataka	17.7 N	77.2 E
	ACME Babadham Solar Power Private Limited	Amaravati, Raichur, Karnataka	16.0 N	76.9 E
	ACME Koppal Solar Energy Private Limited	Bidi, Belagavi, Karnataka	15.5 N	74.6 E
	ACME Vijayapura Solar Energy Pvt Ltd	Malchapur, Bidar, Karnataka	17.9 N	77.4 E
	ACME Rewa Solar Energy Pvt Ltd	Bhadla, Jodhpur, Rajasthan	27.46 N	71.97 E
	ACME Chittorgarh Solar Energy Pvt. Ltd	Bap, Bhadla, Jodhpur, Rajasthan	27.50 N	71.99 E

[6] Sourced from Detail Project Report of the project activity. The same is checked during the validation site visit via GPS meters.

Activity Instances	Name of the SPVs	Location	Latitude	Longitude
02	ACME Karimnagar Solar Power Pvt Ltd	Kalvasrirampur, Karimnagar, Telangana	18.5 N	79.5 E
03	Purvanchal Solar Power Pvt Ltd	Manthini, Karimnagar, Telangana	18.65 N	79.7 E
04	Rewanchal Solar Power Pvt Ltd	Jangaon, Karimnagar, Telangana	17.7 N	79.2 E
05	Neemuch Solar Power Pvt Ltd	Gudhur, Karimnagar, Telangana	18.9 N	78.60 E
06	ACME Fazilka Power Pvt Ltd (Nandipet)	Nandipet, Karimnagar, Telangana	18.9 N	78.1 E
07	ACME Narwana Solar Power Pvt Ltd (Lingampet)	Lingampet Bayampally, Nizamabad, Telangana	18.24 N	78.13 E
08	ACME Warangal Solar Power Pvt Ltd	Mallaram, Karimnagar, Telangana	18.02 N	79.28 E
09	Devishi Renewable Energy Pvt Ltd	Kailashpuri, Gadarpur, Udham Singh Nagar, Uttarakhand	29 N	79.2 E
10	Devishi Solar Power Pvt Ltd	Kailashpuri, Gadarpur, Udham Singh Nagar, Uttarakhand	29 N	79.2 E
11	Sunworld Energy Pvt Ltd	Ratanpura, Udham Singh Nagar, Uttarakhand	29.2 N	79.1 E
12	Acme Yamunanagar Solar Power Pvt Ltd-1 (KOSGI)	Kalwakurthy, Mehboobnagar, Telangana	16.4 N	77.6 E
13	Acme Yamunanagar Solar Power Pvt Ltd-2 (MOTHKUR)	Mothkur, Yadadri, Telangana	16.4 N	77.6 E
14	ACME Mahbubnagar Solar Energy Pvt Ltd-2 (GODHUR)	Kalwakurthy, Mehboobnagar, Telangana	16.4 N	77.6 E
15	ACME Mahbubnagar Solar Energy Pvt Ltd-3 (PADMAJIWADI)	Kalwakurthy, Mehboobnagar, Telangana	16.4 N	77.6 E
16	ACME Mahbubnagar Solar Energy Pvt Ltd-1 (MANTHANI)	Nagaram, Peddapally, Telangana	18.69 N	79.63 E

Conditions prior to project initiation

Assessment team during the desk review and onsite visit confirms that the project is a solar power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction. The baseline as described in section 3.3.4 of this report will continue to be the baseline in the absence of project activity.

Project compliance with applicable laws, statutes and other regulatory frameworks

Assessment team confirms that the Project has received necessary approvals for development and commissioning for the proposed solar project from the state Nodal agencies and is in compliance to the local laws and regulations. Assessment team checked the Commissioning certificates, wheeling agreement with state board, Installation report for solar power plant in the name of PP issued by state nodal agency of the respective state to confirm the project capacity and its relevant statutory requirements as per the host country regulations.

Assessment team noted that the project fulfils the norms put down by Central Pollution Control Board norms. As per Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India), final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (29/02/2016).

Being a renewable power project it falls under the category of White and thus these projects do not need clearance for Consent to operate and only needs to inform the relative State Pollution Control Board. The same is done for the project and thus it can be confirmed that it follows the local laws of the host country.

The relevant national laws and regulations pertaining to generation of energy in India are:

- Electricity Act 2003
- National Electricity Policy 2005
- Tariff Policy 2006

The Project activity conforms to all the applicable laws and regulations in India:

- Power generation using solar energy is not a legal requirement or a mandatory option.
- There are state and sectoral policies, framed primarily to encourage solar power projects. These policies have also been drafted realizing the extent of risks involved in the projects and to attract private investments.
- The Indian Electricity Act, 2003 (May 2007 Amendment) does not influence the choice of fuel used for power generation.
- There is no legal requirement on the choice of a particular technology for power generation.

Thus assessment team confirms that the project activity follows the National and local law and regulation of the host country.

Project Ownership

ACME Cleantech Solutions Private Limited is the project proponent (PP) of project activity and they have the legal right to control and operate the project activities.

The project ownership has been checked by the Assessment Team and demonstrated through below supporting documents:

1. **Commissioning certificates –** The letter from respective State Nodal Agency to the **ACME Cleantech Solutions Private Limited** for registration of commissioning of generation facility indicates that PP have the legal right to control and operate the project activities.
2. **Contract with EPC contractor –** The purchase order on the name of **ACME Cleantech Solutions Private Limited** indicates that PP has the legal right to control and operate the project activities.

Assessment team confirms that, the project ownership relies on **ACME Cleantech Solutions Private Limited.**

Emissions trading programs and other binding limits

Assessment team confirms that the Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits. Audit team checked the REC Mechanism database of India and found that the project activity is not accredited[7] / registered[8] under

[7] https://recregistryindia.nic.in/index.php/publics/accredited_regens
[8] https://recregistryindia.nic.in/index.php/publics/registered_regens

REC mechanism. Further, Declaration in effect of the same has been submitted by project proponent to audit team and found to be correct. Thus it is concluded that the project activity not involved on other Emissions trading programs and other binding limits.

Additional Information Relevant to the Project

Eligibility Criteria for grouped projects

The eligibility criteria have been provided in section 1.13 of the Joint VCS PD & MR and which includes justification for inclusion of project instances to the grouped project. The assessment of the same has been provided in the table below:

Sr. No	Eligibility Criteria	Project Activity instances eligibility	Assessment by DOE
1	**Applicability Conditions**: The project activity instances shall meet applicability conditions for applicable methodology (either AMS I.D version 18 or ACM0002 Version 19.0) as defined in section 2.2	All initial project activity instances meet respective applicability conditions of methodology ACM0002 Version 19.0 (for project activity instances having capacity greater than 15 MW) and AMS I.D Version 18.0 (for project activity instances having capacity less than 15 MW), hence this eligibility criteria is fulfilled. Please refer section 2.2 of this document for applicability criteria.	The assessment team reviewed section 2.2 of Joint VCS PD & MR including supporting documents and further conducted interviews with representatives of PP to confirm that the initial project activity instance complies with the requirements of their applied methodologies "ACM0002 version 19.0 & AMS-I.D Version 18.0". Based on the above assessment, the validation team concludes that all the new project instances comply with this eligibility criterion of the grouped project activity. Moreover, the assessment team deems this eligibility criteria to be appropriate as it complies with the requirements of eligibility criteria no. 1 (concerning applicability of methodology). Thus, the inclusion of applicability conditions as one of the eligibility criteria is appropriate to the grouped project activity. The applicability conditions (constituting this eligibility criteria) as set out in the methodology have been duly described in section 2.2 of Joint VCS PD & MR. The same shall be applied while checking for inclusion of all new project activity instances. Thus, the eligibility criterion for applicability conditions is found to be appropriate.
2	**Geographical Area**: The project activity instances to be included in the grouped project activity will be activities involving grid connected renewable electricity	All initial project activity instances being included in the grouped project are located within geographic boundaries of India. Hence this condition is fulfilled. Please refer commissioning	The validation team studied the GPS coordinates provided in sections 1.8 and 1.9 of Joint VCS PD & MR, commissioning certificates and PPAs, and further based on conducting physical inspections and interviews during site visit with representatives of

Sr. No	Eligibility Criteria	Project Activity instances eligibility	Assessment by DOE
	generation using solar technology located within India.	certificate, PPA for Geographical area of project activity.	PP confirms that all the initial project activity instances included under the current grouped project are located within the geographical boundary of India. This is deemed appropriate to the validation team. Based on the above assessment, the validation team concludes that all the new project instances comply with this eligibility criterion of the grouped project activity. Moreover, the assessment team deems this eligibility criteria to be appropriate as it complies with the requirements of eligibility criteria no. 5 (concerning geographic area). Thus, the inclusion of geographical area as one of the eligibility criteria is appropriate to the grouped project activity. The grouped project activity has considered India as a geographical area and range of co-ordinates of India are mentioned in Section 1.9 of Joint VCS PD & MR. Moreover, the baseline scenario and additionality demonstration is consistent with geographical area. The same shall be applied while checking for inclusion of all new project activity instances. Thus, the eligibility criterion for geographical area is found to be appropriate.
3	**Baseline scenario:** All Project Activity Instances shall meet the baseline definition as defined in respective methodology and as explained in section 2.4	All initial project activity instances have same baseline as per methodology as detailed in subsequent sections. Hence this eligibility criteria is fulfilled. Please refer section 2.4 of this document for baseline scenario.	The assessment team reviewed section 2.4 of the Joint VCS PD & MR, conducted physical inspections during site visit and further based on its sectoral expertise confirms that the description of baseline scenario as mentioned in the aforementioned section is accurate and meets the requirements of the applied methodologies. Based on the above assessment, the validation team concludes that all the initial project instances comply with this eligibility criterion of the grouped project activity. Moreover, the assessment team deems this eligibility criteria to be appropriate as it complies with the requirements of eligibility criteria no. 4 (concerning baseline scenario). Thus, the inclusion of baseline scenario as one of the

Sr. No	Eligibility Criteria	Project Activity instances eligibility	Assessment by DOE
			eligibility criteria is appropriate to the grouped project activity. The baseline scenario considered for the project activity as mentioned in section 2.4 of Joint VCS PD & MR is appropriate for the India as geographical area. The same shall be applied while checking for inclusion of all new project activity instances. Thus, this eligibility criterion of baseline scenario is found to be appropriate.
4	**Technology type:** The project activity instances to be included in the grouped project activity will be Greenfield activities involving grid connected renewable electricity generation using solar PV technology. The electricity should be supplied to grid, or to third party or to be used for captive purpose etc.	All initial project activity instances being included in the grouped project activity are solar PV power plants connected to grid and are green field activities. The generated electricity is supplied to grid. Hence this condition is fulfilled. Please refer PO / Commissioning certificate/PPA for the technology of project activity.	The assessment team reviewed the commissioning certificates and PPAs to confirm that the initial project activity instances are greenfield, grid-connected solar PV power plants which supply electricity to the Indian grid. Based on the above assessment, the validation team concludes that all the initial project instances comply with this eligibility criterion of the grouped project activity. Moreover, the assessment team deems this eligibility criteria to be appropriate as it complies with the requirements of eligibility criteria no. 2 and 3 (concerning application and usage of specific technology type). Thus, the inclusion of technology type as one of the eligibility criteria is appropriate to the grouped project activity. The type of technology (Solar PV) has been listed in section 1.1 of the Joint VCS PD & MR. Only solar PV project activity instances shall be applicable to be included in the grouped project activity. The same shall be applied while checking for inclusion of all new project activity instances. Thus, this eligibility criterion of technology type is found to be appropriate.
5	**Additionality:** The project activity instances to be added as part of the grouped project will meet additionality criteria as set out in respective methodologies - for Small Scale Project instances the methodology applicable will be AMS-I.D and for Large Scale Project	The first project activity instance being included in grouped project activity is large scale projects and their additionality is demonstrated as discussed in section 2.5 of this document. The project activity instance 2 to 16 are small scale project and is auto additional as discussed in section 2.5 of this document.	The assessment team reviewed section 2.5 of the Joint VCS PD & MR (and all additionality related supporting documents) to confirm that: • All large-scale initial project activity instances have been demonstrated to be additional in regard to the requirements laid out in the applied methodology and relevant requirements of the "Tool for the demonstration and assessment of

Sr. No	Eligibility Criteria	Project Activity instances eligibility	Assessment by DOE
	instances methodology applicable will be ACM0002. For small scale project, project activity instance will be auto additional. For large scale projects - investment analysis will be followed and additionality tool and methodological tool "Investment Analysis" will be used.	Hence this condition is fulfilled. Please refer section 2.5 of this document for additionality.	additionality", and methodological tool Investment Analysis. • The small scale initial project activity instance has been demonstrated to be additional in regard to the requirements laid out in the Methodological tool: Demonstration of additionality of small-scale project activities. • Refer to assessment provided in section 3.3.5 of this report for more details. Based on the above assessment, the validation team concludes that all the initial project instances comply with this eligibility criterion of the grouped project activity. Moreover, the assessment team deems this eligibility criteria to be appropriate as it complies with the requirements of eligibility criteria no. 5 (concerning additionality). Thus, the inclusion of additionality as one of the eligibility criteria is appropriate to the grouped project activity. The additionality criterion has been appropriately described in section 2.5 of VCS PD & MR. The same shall be applied while checking for inclusion of all new project activity instances. Thus, this eligibility criterion of additionality is found to be appropriate.
6	**Start Date:** The start date of each project activity instance under the grouped project should not be prior to the start date of the grouped project. The start date of each project activity instance will be determined through documentary evidence.	The start date of grouped project is considered as 10/02/2017 which is commissioning date of project activity instance Sunworld Energy Pvt Ltd and start date of all other project activity instances is after this date. Hence this condition is fulfilled. Please refer section 1.5 of this document or commissioning certificate for start date of grouped project activity.	The assessment team reviewed the Joint VCS PD & MR and the commissioning certificate and confirms that the start date of the project activity (i.e. 10/02/2017) has been accurately identified and mentioned. The start date is the earliest date of commissioning of solar PV power plant. Based on the above assessment, the validation team concludes that all the initial project instances comply with this eligibility criterion of the grouped project activity. Based on the above criterion, all new project activity instances having start date after 10/02/2017 will be included to the grouped project activity. Thus, this eligibility criterion of start date is found to be appropriate.
7	Conditions that avoid double counting of	For initial project activity instances being included in	The assessment team reviewed the declaration provided by PP and

Sr. No	Eligibility Criteria	Project Activity instances eligibility	Assessment by DOE
	emission reductions like unique identifications of project and claiming emission reduction only under one GHG program.	grouped project activity, PP declaration has been provided and these project activity instances are not participating in any other GHG program. Hence this condition is fulfilled. Please refer PP declaration for no double accounting of GHG emission reductions.	confirms that a confirmation has been provided that the grouped project activity is not participating in any other emission trading programme and other binding limits. In addition, the unique identification of the initial project activities can be demonstrated form the commissioning certificates, which details the electricity meter serial numbers which are unique for each project activity instance. Assessment team also checked with REC registry of India and confirmed that these project activity instances are not participating in any other GHG program Thus, all the initial project activity instances are successfully able demonstrate their avoidance of double counting of emission reductions. Based on the above assessment, the validation team concludes that all the initial project instances comply with this eligibility criterion of the grouped project activity. Based on the above criterion, the double counting of ER will be confirmed for inclusion of new project activity instances. Thus, this eligibility criterion of double counting of ERs is found to be appropriate.
8	The Grouped Project specific requirements stipulated by the Entity responsible for coordinating and managing grouped project for conducting local stakeholder consultations and environmental impact assessment (EIA), as applicable	For initial project activity instances being included in grouped project activity, EIA and local stakeholder consultation has been performed, the details of the event has been detailed in section 5.3	Local stakeholder consultation has been conducted at the project site for initial project activity instances. Details are mentioned in subsequent section of this document. There is no requirement for carrying out EIA for these projects in India, hence this condition is fulfilled. However, for future project activity instances carrying out LSC will be mandatory as per relevant requirements of the VCS Standard. This eligibility criterion is not applicable for initial project activity instances. However, the requirement of EIA and Local Stakeholder Consultation will be checked for inclusion of all new project activity instances. Thus, this eligibility criterion is found to be appropriate.
9	The project activity using solar PV project will supply electricity to grid or to users through grid	For initial project activity instances being included in grouped project activity, are supplying electricity to grid.	The project activity instances are solar PV power plants supplying electricity to grid. Hence this condition is fulfilled. Assessment team checked the technical

Sr. No	Eligibility Criteria	Project Activity instances eligibility	Assessment by DOE
	network.	Please refer PPA of the project activity for same.	specifications of each project instance and verified during site visit.

Leakage Management for AFOLU projects

Not applicable to the project activity.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description. The details are presented transparently to the assessment team for analysis which lead to positive conclusion for this validation and verification.

Sustainable Development

Contribution to sustainable development:

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. Assessment team found that the project contributes to sustainable development using the following ways.

Social well-being: The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation.

Economic well-being: The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state.

Technological well-being: The successful operation of project activity would lead to promotion of solar based power generation and would encourage other entrepreneurs to participate in similar projects.

Environmental well-being: Solar being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the Project activity also helps in avoiding significant amount of GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.

Project undergone continuous operation and only scheduled maintenance as per the manufacturer specification is considered. Audit team checked the maintenance records and operation log of the project activity and no unforeseen incident observed for the present monitoring period.

3.2 Participation under Other GHG Programs

The project has neither been registered nor seeking registration under any other GHG programs. The project is seeking registration only in VCS program. Audit team checked the REC Mechanism database of

India and found that the project activity is not accredited / registered under REC mechanism. Further, declaration for the same is checked and found correct by the assessment team. Also assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

1. https://www.recregistryindia.nic.in/
2. http://cdm.unfccc.int/
3. http://www.goldstandard.org/

Rejection by other GHG programs

The Project is not rejected by other GHG programs. A declaration for the same is checked and found correct by the assessment team. Also assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

1. https://www.recregistryindia.nic.in/
2. http://cdm.unfccc.int/
3. http://www.goldstandard.org/
4. www.v-c-s.org

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

Renewable energy certificates are available for trading in the host country However, the same is not availed by the project participant. The undertaking regarding the same is submitted by PP which is acceptable to the assessment team and assessment team also checked the REC web site (https://recregistryindia.nic.in/) and found the declaration to be correct.

3.3 Application of Methodology

3.3.1 Title and Reference

Assessment team checked that following two methodology and tools are applicable for the grouped project activity. The details are as below:

1. ACM0002 version 19.0
2. AMS-I.D Version 18.0

Tools referred with above methodology and applicable for project activity are:

- Tool to calculate the emission factor for an electricity system[9] - Version 07.0 (EB 100, Annex 04)
- Tool for the demonstration and assessment of additionality[10] (Version 07.0.0, EB 70, Annex 8)

[9] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

[10] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

3.3.2 Applicability

The applied baseline methodology is justified as it has been demonstrated that the proposed project activity is:

ACM0002 version 19.0:

Applicability 1: The project activity is installation of a new grid connected solar power plant (Option 1 (A)) at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and hence this criterion is applicable.

Applicability 2: The proposed project activity is an installation of a new grid connected solar power plant and hence this condition is met. The option (a) of applicability criteria 2is applicable as project is renewable energy power plant/unit.

Applicability 3: The project is installation of new solar energy-based electricity generation plants (not a hydro power plant). Hence this criteria is not applicable.

Applicability 4: The project is solar power project and thus the criterion is not applicable to this project activity.

Applicability 5: The project is solar power project and thus the criterion is not applicable to this project activity.

Applicability 6: The project is solar power project and thus the criterion is not applicable to this project activity.

Applicability 7: The project activity is installation of a new grid connected solar power project and does not involve switching from fossil fuel to renewable energy and hence this criterion is not relevant to the project activity.

&

This is a solar power plant and not a biomass fired plant and hence this applicability criterion is not applicable to the project activity.

Applicability 8: The project activity is a new grid connected solar power plant and not a retrofits, replacement or capacity additions and therefore this criterion is not applicable to the project activity.

Applicability 9: Please refer below

Applicability conditions of "Tool to calculate the emission factor for an electricity system"

- OM, BM and CM are estimated using the tool for calculating baseline emissions.
- The project activity is grid connected and thus emission factor is calculated and thus OM, BM and CM are estimated using the tool for calculating baseline emissions.
- The project activity is located in India, a non-Annex I country. Therefore, tool is applicable for the project activity.
- The project is a solar power project and there is no involvement of biofuels. Therefore, this criterion is not applicable for the project activity.

LGAI Technological Center S.A. (Applus+ Certification) confirms that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i.e. ACM0002 version 19.0 is applicable to the project activity.

AMS-I.D Version 18.0:

Applicability 1: The project activity is installation of a new grid connected wind power plant (Option 1 (A)) at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and hence this criterion is applicable.

Applicability 2: The proposed project activity is an installation of a new grid connected wind power plant and hence this condition is met.

Applicability 3: The project is installation of new wind energy-based electricity generation plants. Hence pint (a) is applicable.

Applicability 4: The project is wind power project and thus the criterion is not applicable to this project activity.

Applicability 5: The project is wind power project and thus the criterion is not applicable to this project activity.

Applicability 6: The project is wind power project and thus the criterion is not applicable to this project activity.

Applicability 7: The project activity is installation of a new grid connected wind power project

Applicability 8: The project activity is not the retrofitting or replacement of an existing facility for renewable energy generation. Hence this criteria in not applicable.

Applicability 9: The project activity is installation of a new grid connected wind power project. Hence this criteria in not applicable.

Applicability 10: The project activity is installation of a new grid connected wind power project. Hence this criteria in not applicable.

Based on the above assessment the validation team concludes that the grouped project activity (with all included project activity instances) comply with the all the relevant requirements of their respective methodologies.

3.3.3 Project Boundary

Project boundary has been ascertained and confirmed during the site visit using ACM0002 version 19.0 & AMS-I.D Version 18.0 – “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”.

Hence the project boundary includes the renewable energy power generation, sub-stations, grid and all power plants connected to grid. The proposed project activity will evacuate power to the grid. The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the VCS project power plant is connected to”.

The calculation of net electricity supplied to grid is under purview of state electricity board and project activity Owner or project activity Implementer does not have any control on it. Thus, for project activity, net electricity supplied to grid is the monitoring parameter which is used for ER calculations.

It is to be noted that metering arrangement is under control of state electricity board and PP do not have any control on it.

The sources and GHG gases involved for proposed Project activity are as below

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation.	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other emissions are emitted from the project
Project	Greenfield Solar Power Project Activity.	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	Project activity does not emit other forms of GHG emissions

3.3.4 Baseline Scenario

Assessment team confirms that being a grid connected solar energy generation project, PP developed the project based on the Methodology ACM0002 version 19.0 & AMS-I.D Version 18.0. As per methodology *if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:*

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

As per CDM Validation and Verification Standard for project activities version 02, “where the baseline scenario is not prescribed in the approved methodology, the DOE shall assess the list of identified credible alternatives to the project activity in the JOINT VCS PD & MR selected to determine the most realistic baseline scenario.” Thus, JOINT VCS PD & MR should mention the credible alternatives to the project activity in order to determine the most realistic baseline scenario. As the selected large-scale methodology clearly mention the baseline scenario and the same has been opted in this project, therefore, no further analysis on baseline is required.

Validation Team, therefore, concludes that the JOINT VCS PD & MR conforms to the guidance given by EB via CDM Validation and Verification Standard for project activities version 02 and VCS via VCS standard version 3.7.

The project activity involves setting up solar projects to harness the power of sun and solar to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

In the absence of the project activity, the equivalent amount of power would have been drawn from the Indian grid. Hence, the baseline for the project activity is the equivalent amount of power from the Indian grid.

The combined margin ($EF_{grid, CM, y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM). Calculations for this combined margin must be based on data from an official source (where available) and made publically available. The Central electricity authority (CEA) database version 13 is the latest available data at the time of JOINT VCS PD & MR submission to DOE for validation, hence same is considered for emission factor calculations.

The combined margin of the Indian grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	0.9475 tCO_2/MWh	Combined margin CO_2 emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO_2 Emission Database, Version 13.0, June 2018 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9726 tCO_2/MWh	Operating margin CO_2 emission factor for the project electricity system in year y	Calculated as the last 3 year (2014-15, 2015-16, 2016-17) generation-weighted average, sourced from Baseline CO_2 Emission Database, Version 13.0, June 2018 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	0.8723 tCO_2/MWh	Build margin CO_2 emission factor for the project electricity system in year y	Baseline CO_2 Emission Database, Version 13.0, June 2018 published by Central Electricity Authority (CEA), Government of India

Moreover, Annex 3 of the EB 22 states that national and/or sectoral policies and circumstances have to be accounted for when considering the baseline scenario. Paragraph 7(a) states that, only those national and/or sectoral policies or regulations under paragraph 6(a), i.e., type E+ policy that increase GHG emissions, that have been implemented before adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11/12/1997), shall be taken into account when developing a baseline scenario. The Electricity Act of 2003 promoted cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity (Refer Section 86(1) of Electricity Act 2003). Therefore, it could be seen that the provincial and sectoral policies are E- i.e., policies that decrease GHG emissions and are after November 2001. Hence the baseline scenario of electricity generation by grid connected fossil fuel dominated power plants is in accordance with Annex 3 of EB 22.

Assessment team thus confirmed that baseline is selected as per the applied methodology and combined margin is calculated as per the tool and thus acceptable to the assessment team.

3.3.5 Additionality

During conceptualization of the project activity, board of directors of the project proponents considered the VCS revenue to improve the project financials. During the board meeting for board of Directors decided that they would consider VCS revenue for their project activity. In continuation to the board decision, PP issued the respective purchase order for the supply of solar plant.

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

The proposed project activity is not the first-of-its-kind. Hence not applicable.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

The purpose of the project activity is to generate electrical power using solar energy and feed the electricity generated to the grid. Hence, the following alternatives are considered:

Alternative 1: The proposed project activity without VCS benefit;

Alternative 2: Continuation of the current situation, i.e., electricity will continue to be generated by the existing generation mix operating in the grid.

Having regard to the fact that the project activity under consideration is a solar power project, validation team is convinced that there are no other realistic and credible alternatives. Both the alternatives are in compliance with all applicable legal and regulatory requirements as;

- the implementation of project activity is a voluntary initiative and is not mandatory or a legal requirement;
- the applicable environmental regulations do not restrict the use of solar energy; and
- There is no legal requirement on the choice of a particular technology.

Assessment team noted that the project fulfils the norms put down by Central Pollution Control Board. As per Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India), final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (29/02/2016).

The newly introduced White category of industries pertains to those industrial sectors which are practically non-polluting such as Biscuit trays etc. from rolled PVC sheet (using automatic vacuum forming machines), Cotton and woollen hosiers making (Dry process only without any dying/washing operation), Electric lamp (bulb) and CFL manufacturing by assembling only, Scientific and mathematical instrument manufacturing, Solar power generation through photovoltaic cell, wind power and mini hydel power (less than 25 MW).
There shall be no necessity of obtaining the "Consent to Establish/Operate'' for White category of industries. Intimation to concerned SPCB / PCC is sufficient.
Being a renewable power project it falls under the category of White and thus these projects do not need clearance for Consent to operate and only needs to inform the relative State pollution control board. The same is done for the project and thus it can be confirmed that it follows the local laws of the host country.

Due to above categorization of white category and being the renewable in nature, the project activity does not emit any emissions. Thus there are no any other surplus regulatory requirement for the project activity. This is found to be accepted by assessment team.

However, of the two alternatives identified, alternative (i) cannot be considered realistic as further analysis in the following paragraph reveals that it is not economically feasible option. Hence, alternative (ii) alone could be justified as realistic, credible and plausible alternative to the PP.

Validation team is, therefore, convinced that the project developer has taken into consideration all realistic and credible alternatives (having regard to the governing methodologies) including the project being undertaken as a non-VCS activity and continuation of current scenario. The identification of alternatives is in conformity with the guidance given by the tool.

Outcome of Sub-step 1a: All the realistic alternatives for the project activity have been enlisted above.

Sub-step 1b: Consistency with mandatory laws and regulations:

The alternative(s) shall be in compliance with all applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution. (This sub-step does not consider national and local policies that do not have legally-binding status.)
Both the alternatives are in compliance with all applicable legal and regulatory requirements as;

- The implementation of project activity is a voluntary initiative and is not mandatory or a legal requirement;
- The applicable environmental regulations do not restrict the use of solar energy; and
- There is no legal requirement on the choice of a particular technology.

Moreover, Outcome of Sub-step 1b: Hence, both the alternatives enlisted above are found to comply with the mandatory laws and regulations taking into account the enforcement of the legislations in the region or country and EB decisions on national and/or sectoral policies and regulations. However, Alternative 2 has been selected as the appropriate baseline alternative for this project activity.

Step 2: Investment analysis

Determine whether the proposed project activity is economically or financially less attractive than at least one other alternative, identified in step 1, without the revenue from the sale of emission reductions credits. To conduct the investment analysis, use the following sub-steps:

Sub-step 2a: Determine appropriate analysis method and Sub-step 2b (Option III): Apply benchmark analysis

<u>a) Suitability of investment analysis, financial indicator and benchmark:</u>

Project developer had demonstrated that the financial returns of the proposed VCS project activity would be insufficient to justify the required capital investment as per CDM Validation and Verification Standard for project activities version 02.0. In the Initial Joint VCS PD & MR version 01. PP has adopted a conservative approach to identify the benchmark for the project activity. The project is earning revenue from the installation of the project activity. Thus simple cost analysis (Option I) is not appropriate. Also in the absence of the project activity grid electricity would have been the obvious choice for the Project which requires no investment. Hence investment comparison analysis (Option II) is also not appropriate for the project activity. Therefore, benchmark analysis (Option III) is used for the project activity as per project type and decision-making context. Therefore, the Expected return on equity is considered appropriate benchmark. Accordingly, the post-tax Equity IRR has been considered as the relevant financial indicator for the project activity which is acceptable to the assessment team. Moreover, the financial indicator selected by the PP is correct based on the fact that tool do not restrict the PP to either use project IRR or Equity IRR. This is under the prerogative of the PP to select appropriate indicator based on his preferences to know the IRR based on his equity investment or debt investment. The same is thus acceptable to the assessment team. Assessment team however checked the Equity IRR calculation and found that input assumptions used for the calculation of Equity IRR are applicable at the time of investment decision of the project and thus is in accordance with the relevant guideline of the tool.

As per Methodological tool “Investment Analysis” Version 07, “In situations where an investment analysis is carried out in nominal terms and the available IRR benchmarks are in real terms, project participants shall convert the real term values of benchmarks to nominal values by adding the inflation rate. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period. If this information is not available, the target inflation rate of the central bank shall be used. If this information is also not available, then the average forecasted inflation rate for the host country published by the IMF (International Monetary Fund World Economic Outlook) or the World Bank for the next five years after the start of the project activity shall be used”.

The investment analysis has been carried out in Nominal terms. Accordingly, default value has been adjusted by adding suitable forecasted inflation rate taken from RBI (Central Bank, India). PROJECT OWNERS have calculated Benchmark based on WPI mean inflation rate. As per appendix A of Methodological tool “Investment Analysis” Version 07, the inflation forecast should be for the duration of the crediting period. However, since RBI provides forecast inflation only for 5 & 10 years, the project investor has calculated benchmark using 10 years durations and the same is considered as Benchmark for the project activity.

As Methodological tool “Investment Analysis” Version 07 the cost of equity is determined by selecting the values provided in the Appendix, i.e. Default values for cost of equity (expected return on equity) is presented below:

Appendix A in Methodological tool “Investment Analysis” Version 07 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = 11.10%

The Required return on equity (benchmark) was computed in the following manner:

Nominal Benchmark[11] = {(1+Real Benchmark)*(1+Inflation rate)} -1

Where:

- Default value for Real Benchmark = 11.10% (as per Appendix of Methodological tool “Investment Analysis” Version 07)

- Inflation Rate forecast by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India & in case where RBI Inflation forecast was not available, average Inflation rate forecast for India has been sourced from IMF web site.

Benchmark estimation:

Appendix in Methodological tool “Investment Analysis” Version 07 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = **11.10%**

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[11] As per Fisher Equation, https://en.wikipedia.org/wiki/Fisher_equation

Inflation Forecast for India as per RBI website[12]:

Since RBI publishes the inflation forecast for 5 years and 10 years, PP has considered the maximum 10 year inflation considering the renewable crediting period of total 30 years.

Thus benchmark has been selected for this project activity as follows

Name of the Investor/Owner/SPVs	Benchmark
Sunworld Solar Power Pvt Ltd	15.32%
ACME Ranga Reddy Solar Power Pvt Ltd	15.32%
ACME Medak Solar Energy Pvt Ltd	15.32%
ACME Nizamabad Solar Energy Pvt Ltd	15.32%
ACME PV Powertech Private Limited (Sadashivpet)	15.32%
ACME Solar Power Technology Private Limited	15.32%
ACME Rewari Solar Power Pvt Ltd	15.21%
ACME Kurukshetra Solar Energy Pvt Ltd	15.21%
ACME Bhiwadi Solar Power Pvt Ltd	14.88%
ACME Hisar Solar Power Private Limited	14.88%
ACME Karnal Solar Power Private Limited	15.50%
ACME Kaithal Solar Power Private Limited	15.50%
ACME Babadham Solar Power Private Limited	15.50%
ACME Koppal Solar Energy Private Limited	15.50%
ACME Vijayapura Solar Energy Pvt Ltd	15.50%
ACME Rewa Solar Energy Pvt Ltd	15.05%
ACME Chittorgarh Solar Energy Pvt. Ltd	15.05%

b) Parameters and assumptions used:

The project activity is a renewable source of electricity generation and supplies the electricity to the INDIAN Electricity grid. The key parameters which determine the Equity IRR of the project activity are project cost, PLF and profitability estimates.
In the revised Joint VCS PD& MR Version 02, the project cost is based on the DPR (Detailed project report)/offer letter. The details of the DPR/offer letter are as below:

Project cost as per the DPR & Purchase Order

Name of the Investor/Owner/SPVs	Project Capacity (MW)	Project Cost (In Million)	Actual Project Cost (In Million)	DPR Date	Investment Decision Date
Sunworld Solar Power Pvt Ltd	30	2,400	2271.3	15/12/2015	11/10/2017
ACME Ranga Reddy Solar Power Pvt Ltd	30	2,400	2242.2	15/12/2015	01/11/2016
ACME Medak Solar Energy Pvt Ltd	45	3,593	3378.0	15/12/2015	01/11/2016

[12] https://rbi.org.in/Scripts/PublicationsView.aspx?id=16202

Name of the Investor/Owner/SPVs	Project Capacity (MW)	Project Cost (In Million)	Actual Project Cost (In Million)	DPR Date	Investment Decision Date
ACME Nizamabad Solar Energy Pvt Ltd	50	3,891	3833.6	15/01/2016	10/11/2016
ACME PV Powertech Private Limited (Sadashivpet)	50	3,826	3768.9	15/12/2015	10/12/2016
ACME Solar Power Technology Private Limited	50	3,826	3644.6	15/12/2015	10/12/2016
ACME Rewari Solar Power Pvt Ltd	50	3,825	3211.4	15/04/2016	16/06/2017
ACME Kurukshetra Solar Energy Pvt Ltd	50	3,825	3289.3	15/04/2016	16/06/2017
ACME Bhiwadi Solar Power Pvt Ltd	50	3,700	3458.9	19/05/2016	17/12/2017
ACME Hisar Solar Power Private Limited	50	3,700	3457.1	19/05/2016	17/12/2017
ACME Karnal Solar Power Private Limited	50	3,700	3456.0	19/05/2016	17/12/2017
ACME Kaithal Solar Power Private Limited	40	2,400	2896.4	28/02/2017	17/12/2017
ACME Babadham Solar Power Private Limited	40	2,400	2672.2	28/02/2017	17/12/2017
ACME Koppal Solar Energy Private Limited	40	2,400	2784.3	28/02/2017	17/12/2017
ACME Vijayapura Solar Energy Pvt Ltd	40	2,400	2723.3	28/02/2017	17/12/2017
ACME Rewa Solar Energy Pvt Ltd	100	5,128	4849.5	08/03/2018	15/04/2018
ACME Chittorgarh Solar Energy Pvt. Ltd	250	10,619	Not commissioned	08/03/2018	15/04/2018

DPR has been submitted to validation team. The DPR were available during decision making and financial profitability of the project was decided based on this DPR. Validation team checked the DPR of the project activity and found that consideration of the project cost in revised Joint VCS PD& MR Version 02 is correct and it is in line with Appendix of Methodological tool “Investment Analysis” Version 07 as well as in compliance to CDM Validation and Verification Standard for project activities version 02. Hence, the project cost consideration is justified. Assessment team checked the actual project cost and still the project do not breach the benchmark. The sensitivity analysis below confirms the same. Since the actual cost is considered there is no way the cost can go up and thus the same is assessed to be correct.

In India, infrastructure projects are generally entitled to a debt equity ratio of 70:30. However, depending on the relationship of the client with the bank, its credit rating and collaterals offered, banks consider higher debt equity ratio also. The debt equity ratio for the project is 70:30. Assessment team checked the order for the respective state regarding ratio of debt and equity which was available at the time of investment decision and found that the ratio of Debt to equity was considered correctly for the present validation condition.

The profitability of the project, which forms the basis for IRR calculation is based on installed capacity, PLF, electricity tariff, O&M cost, depreciation and taxation.

c) Assessment of Plant Load Factor (PLF):

PP considered the Plant load factor from a third party engineering company/offer letter, for expected electricity generation estimation. They are contracted by the PPs for this project. PP has submitted the copies of the PLFs estimation report to the assessment team.

PLF as per 3rd party PLF report/Offer Letter

Name of the Investor/Owner/SPVs	PLF As per DPR
Sunworld Solar Power Pvt Ltd	19.0%
ACME Ranga Reddy Solar Power Pvt Ltd	19.0%
ACME Medak Solar Energy Pvt Ltd	19.0%
ACME Nizamabad Solar Energy Pvt Ltd	19.0%
ACME PV Powertech Private Limited (Sadashivpet)	19.0%
ACME Solar Power Technology Private Limited	19.0%
ACME Rewari Solar Power Pvt Ltd	19.0%
ACME Kurukshetra Solar Energy Pvt Ltd	19.0%
ACME Bhiwadi Solar Power Pvt Ltd	19.0%
ACME Hisar Solar Power Private Limited	19.0%
ACME Karnal Solar Power Private Limited	19.0%
ACME Kaithal Solar Power Private Limited	19.0%
ACME Babadham Solar Power Private Limited	19.0%
ACME Koppal Solar Energy Private Limited	19.0%
ACME Vijayapura Solar Energy Pvt Ltd	19.0%
ACME Rewa Solar Energy Pvt Ltd	23.5%
ACME Chittorgarh Solar Energy Pvt. Ltd	23.5%

PLF estimation in offer letter is in line with Para 3 (b) Annex 11, EB 48 and acceptable to the assessment team. The deration factor for IRR calculation is sourced from offer letter which was available to the PP at the time of investment decision. Hence the value is considered correct.

Further, actual comparison is not possible since the data available for shorter period.

D) Assessment of Electricity Tariff:

Tariff rate as per Wheeling Agreement and SERC (= State Electricity regulatory commission)

Name of the Investor/Owner/SPVs	Tariff Rate (as per SERC)	Tariff Rate (as per PPA)
Sunworld Solar Power Pvt Ltd	5.59	5.59
ACME Ranga Reddy Solar Power Pvt Ltd	5.59	5.59

Name of the Investor/Owner/SPVs	Tariff Rate (as per SERC)	Tariff Rate (as per PPA)
ACME Medak Solar Energy Pvt Ltd	5.59	5.59
ACME Nizamabad Solar Energy Pvt Ltd	5.59	5.59
ACME PV Powertech Private Limited (Sadashivpet)	5.59	5.59
ACME Solar Power Technology Private Limited	5.59	5.59
ACME Rewari Solar Power Pvt Ltd	5.59	4.79
ACME Kurukshetra Solar Energy Pvt Ltd	5.59	4.79
ACME Bhiwadi Solar Power Pvt Ltd	5.59	4.43
ACME Hisar Solar Power Private Limited	5.59	4.43
ACME Karnal Solar Power Private Limited	5.59	4.43
ACME Kaithal Solar Power Private Limited	4.79	4.43
ACME Babadham Solar Power Private Limited	4.79	4.43
ACME Koppal Solar Energy Private Limited	4.79	4.43
ACME Vijayapura Solar Energy Pvt Ltd	4.79	4.43
ACME Rewa Solar Energy Pvt Ltd	2.44	2.44
ACME Chittorgarh Solar Energy Pvt. Ltd	3.00	

Validation team assessed the tariff and found that same value was available during decision making and in conformity with guidance Appendix of Methodological tool “Investment Analysis” Version 07. Furthermore, assessment team has also checked the actual tariff in the PPA/Wheeling Agreement signed for further substantiation as these values are available during the validation stage. IRR is still below benchmark with the consideration of Wheeling Agreement signed which is valid for total operational lifetime of the project.

e) Assessment of O& M cost:

O&M as per DPR

Name of the Investor/Owner/SPVs	Project Capacity (MW)	O&M Cost (In Million)
Sunworld Solar Power Pvt Ltd	30	39.00
ACME Ranga Reddy Solar Power Pvt Ltd	30	39.00
ACME Medak Solar Energy Pvt Ltd	45	58.50
ACME Nizamabad Solar Energy Pvt Ltd	50	65.00
ACME PV Powertech Private Limited (Sadashivpet)	50	65.00
ACME Solar Power Technology Private Limited	50	65.00
ACME Rewari Solar Power Pvt Ltd	50	65.00
ACME Kurukshetra Solar Energy Pvt Ltd	50	65.00
ACME Bhiwadi Solar Power Pvt Ltd	50	60.00
ACME Hisar Solar Power Private Limited	50	60.00
ACME Karnal Solar Power Private Limited	50	60.00
ACME Kaithal Solar Power Private Limited	40	48.00
ACME Babadham Solar Power Private Limited	40	48.00
ACME Koppal Solar Energy Private Limited	40	48.00

Name of the Investor/Owner/SPVs	Project Capacity (MW)	O&M Cost (In Million)
ACME Vijayapura Solar Energy Pvt Ltd	40	48.00
ACME Rewa Solar Energy Pvt Ltd	100	70.00
ACME Chittorgarh Solar Energy Pvt. Ltd	250	350.75

The DPR has been used in the financial calculation as same was available during decision making and hence applicable. According to Appendix of Methodological tool “Investment Analysis” Version 07, the cost should be based on the input parameters available at the time of decision making and the PP has submitted offer letter supporting this consideration. Therefore, considering the above assessment, validation team concluded that the O&M cost considered from respective DPR in the computation of financial indicator is in conformity with guidance Appendix of Methodological tool “Investment Analysis” Version 07.

F) Assessment of Tax computation:

The project developer has adopted book depreciation rates as per Schedule XIV of the Companies Act, 1956 for computing book profit and Income Tax Act 1961 stipulated for income tax calculation, which are in conformity with the accepted accounting principles adopted by the company and income tax laws in the host country. The block of assets has been computed for depreciation purpose as per the accepted accounting principles. Tax liability has been calculated as per the income tax rules and the rulings given. In computing the income tax liability, the project developers have considered Tax holiday (u/s 80IA of the Income Tax Act, 1961). Accelerated depreciation on plant and machinery is also sourced from IT act. The tax rates assumed corresponds to the tax rate prevailing at the time of taking decision (conformity to Appendix of EB85, Annex 12). Hence, these assumptions are appropriate during decision making context.

g)Cross checking parameters:

<table>
<tr><th>Name of the parameter</th><th>DOE assessment</th></tr>
<tr><td>Project Cost</td><td>The details of the proposed project activity are given below.
<table>
<tr><th>Name of the Investor/Owner/SPVs</th><th>Project Capacity (MW)</th><th>Project Cost (In Million)</th><th>Actual Project Cost (In Million)</th></tr>
<tr><td>Sunworld Solar Power Pvt Ltd</td><td>30</td><td>2,400</td><td>2271.3</td></tr>
<tr><td>ACME Ranga Reddy Solar Power Pvt Ltd</td><td>30</td><td>2,400</td><td>2242.2</td></tr>
<tr><td>ACME Medak Solar Energy Pvt Ltd</td><td>45</td><td>3,593</td><td>3378.0</td></tr>
<tr><td>ACME Nizamabad Solar Energy Pvt Ltd</td><td>50</td><td>3,891</td><td>3833.6</td></tr>
<tr><td>ACME PV Powertech Private Limited (Sadashivpet)</td><td>50</td><td>3,826</td><td>3768.9</td></tr>
<tr><td>ACME Solar Power Technology Private Limited</td><td>50</td><td>3,826</td><td>3644.6</td></tr>
<tr><td>ACME Rewari Solar Power Pvt Ltd</td><td>50</td><td>3,825</td><td>3211.4</td></tr>
<tr><td>ACME Kurukshetra Solar Energy</td><td>50</td><td>3,825</td><td>3289.3</td></tr>
</table></td></tr>
</table>

	Pvt Ltd			
	ACME Bhiwadi Solar Power Pvt Ltd	50	3,700	3458.9
	ACME Hisar Solar Power Private Limited	50	3,700	3457.1
	ACME Karnal Solar Power Private Limited	50	3,700	3456.0
	ACME Kaithal Solar Power Private Limited	40	2,400	2896.4
	ACME Babadham Solar Power Private Limited	40	2,400	2672.2
	ACME Koppal Solar Energy Private Limited	40	2,400	2784.3
	ACME Vijayapura Solar Energy Pvt Ltd	40	2,400	2723.3
	ACME Rewa Solar Energy Pvt Ltd	100	5,128	4849.5
	ACME Chittorgarh Solar Energy Pvt. Ltd	250	10,619	Not commissioned

The project cost has been considered from DPR and was available at the time decision made for the project activity.

The DOE has also checked the actual cost of the each project site from the PO and found that, the reduction in project cost is within the range of sensitivity analysis. Since the comparison is done with actual project cost and hence, increase of the same in future is not possible. Thus, the project activity is additional with actual project cost.

The difference in actual project cost for different project site is due to time difference, manufacturer, different EPC contractor, negotiation skills of individual PP etc.

The assessment team also checked the respective state tariff orders and found that project cost considered for project is found to be appropriate.

Based on sectoral scope expert and local knowledge, the project cost considered as per DPR for the proposed project activity is found to be appropriate for solar projects. Also since the actual cost is available to DOE and IRR is still within benchmark and thus the same is acceptable.Since the comparison is done with actual project cost, the increase of the same in future is not possible. Thus assessment team is of the opinion that project is still additional with the consideration of actual project cost for the project activity.

O&M cost and Escalation in the operational expense =5(%)- Standard practice in

The details of the proposed project activity are given below.

Name of the Investor/Owner/SPVs	Project Capacity (MW)	O&M Cost (In Million)
Sunworld Solar Power Pvt Ltd	30	39.00
ACME Ranga Reddy Solar Power Pvt Ltd	30	39.00
ACME Medak Solar Energy Pvt Ltd	45	58.50
ACME Nizamabad Solar Energy Pvt Ltd	50	65.00
ACME PV Powertech Private Limited (Sadashivpet)	50	65.00

India	ACME Solar Power Technology Private Limited	50	65.00
	ACME Rewari Solar Power Pvt Ltd	50	65.00
	ACME Kurukshetra Solar Energy Pvt Ltd	50	65.00
	ACME Bhiwadi Solar Power Pvt Ltd	50	60.00
	ACME Hisar Solar Power Private Limited	50	60.00
	ACME Karnal Solar Power Private Limited	50	60.00
	ACME Kaithal Solar Power Private Limited	40	48.00
	ACME Babadham Solar Power Private Limited	40	48.00
	ACME Koppal Solar Energy Private Limited	40	48.00
	ACME Vijayapura Solar Energy Pvt Ltd	40	48.00
	ACME Rewa Solar Energy Pvt Ltd	100	70.00
	ACME Chittorgarh Solar Energy Pvt. Ltd	250	350.75

The O&M cost has been considered from DPR and was available at the time decision made for the project activity.

Benchmark for the project as described above along with actual O&M value, the project is still additional.

Based on sectoral scope expert and local knowledge, the project O&M cost and its escalation considered as per DPR for the proposed project activity is found to be appropriate for solar projects. Also since the O&M cost is available to DOE and IRR is still within benchmark and thus the same is acceptable.

Tariff

The Tariff rate has been considered from State tariff Order and the same was available at the time decision made for the project activity.

The DOE has also checked the PPA for each project site and found there are no changes in tariff rate and is within threshold limit. Thus the project activity is additional with actual Tariff rate.

Name of the Investor/Owner/SPVs	Tariff Rate (as per SERC)	Tariff Rate (as per PPA)
Sunworld Solar Power Pvt Ltd	5.59	5.59
ACME Ranga Reddy Solar Power Pvt Ltd	5.59	5.59
ACME Medak Solar Energy Pvt Ltd	5.59	5.59
ACME Nizamabad Solar Energy Pvt Ltd	5.59	5.59
ACME PV Powertech Private Limited (Sadashivpet)	5.59	5.59
ACME Solar Power Technology Private Limited	5.59	5.59
ACME Rewari Solar Power Pvt Ltd	5.59	4.79
ACME Kurukshetra Solar Energy Pvt Ltd	5.59	4.79
ACME Bhiwadi Solar Power Pvt Ltd	5.59	4.43
ACME Hisar Solar Power Private Limited	5.59	4.43
ACME Karnal Solar Power Private Limited	5.59	4.43
ACME Kaithal Solar Power Private Limited	4.79	4.43
ACME Babadham Solar Power Private Limited	4.79	4.43

ACME Koppal Solar Energy Private Limited	4.79	4.43
ACME Vijayapura Solar Energy Pvt Ltd	4.79	4.43
ACME Rewa Solar Energy Pvt Ltd	2.44	2.44
ACME Chittorgarh Solar Energy Pvt. Ltd	3.00	NA

The tariff considered is levellised tariff and hence there is no any escalation. This is found to be appropriate and found to be accepted.

Since the IRR is still below benchmark with the consideration of PPA signed which is valid for total operational lifetime of the project, assessment team confirms that the project is still additional with actual Tariff rate. Moreover, in the above table the order from State electricity tariff order is checked and it is confirmed that Wheeling Agreement signed with the rate as mentioned above and hence increase of the same is not possible.

Based on sectoral scope expert and local knowledge, the project tariff rate considered as per state tariff order for the proposed project activity is found to be appropriate.

PLF

The details of the proposed project activity are given below.

Name of the Investor/Owner/SPVs	PLF As per DPR
Sunworld Solar Power Pvt Ltd	19.0%
ACME Ranga Reddy Solar Power Pvt Ltd	19.0%
ACME Medak Solar Energy Pvt Ltd	19.0%
ACME Nizamabad Solar Energy Pvt Ltd	19.0%
ACME PV Powertech Private Limited (Sadashivpet)	19.0%
ACME Solar Power Technology Private Limited	19.0%
ACME Rewari Solar Power Pvt Ltd	19.0%
ACME Kurukshetra Solar Energy Pvt Ltd	19.0%
ACME Bhiwadi Solar Power Pvt Ltd	19.0%
ACME Hisar Solar Power Private Limited	19.0%
ACME Karnal Solar Power Private Limited	19.0%
ACME Kaithal Solar Power Private Limited	19.0%
ACME Babadham Solar Power Private Limited	19.0%
ACME Koppal Solar Energy Private Limited	19.0%
ACME Vijayapura Solar Energy Pvt Ltd	19.0%
ACME Rewa Solar Energy Pvt Ltd	23.5%
ACME Chittorgarh Solar Energy Pvt. Ltd	23.5%

Validation team assessed the DPR. Same report has been used in the financials and the emission reduction calculation. PLF estimation by 3rd party engineering company is in line with Para 3 (b) Annex 11, EB 48 and acceptable to the assessment team.

The PLF has been taken from the DPR, and the same has been checked and found that PLF considered for the project activity in within the range of sensitivity analysis and found to be appropriate.

Assessment team confirms that since with the value as mentioned in the tariff order for State Electricity regulatory commission report are considered and still the IRR is still below the

	benchmark, hence the project is additional.
Tax Rates	**Income tax rate (%)**: 30.00% **MAT (Minimum Alternate tax) (%)**: 33.00% **Service Tax (%)**: 15.00% The above table shows the tax rate considered for individual project Owner and the same is found suitable. Assessment team noted that the project developer has adopted book depreciation rates as per Schedule XIV of the Companies Act, 1956 for computing book profit and Income Tax Act 1961 stipulated for income tax calculation, which are in conformity with the accepted accounting principles adopted by the company and income tax laws in the host country i.e. INDIA. Tax liability has been calculated as per the income tax rules and the rulings given. In computing the income tax liability, the project developers have considered Tax holiday (u/s 80IA of the Income Tax Act, 1961). Accelerated depreciation on plant and machinery is also sourced from IT act. The tax rates assumed corresponds to the tax rate prevailing at the time of taking decision. Hence, these assumptions are appropriate during decision making context and thus acceptable to the assessment team. No further assessment is required as the Values are directly procured from Income Tax Act, 1961 which is standard guideline for Tax value in India.

Sensitivity analysis:

The Guidance on Appendix of Methodological tool “Investment Analysis” Version 07 requires the robustness of the conclusion arrived at to be proved through a sensitivity analysis by varying the critical assumptions to a reasonable variation. The project developer has identified Plant Load Factor (PLF), Project cost, Electricity tariff and O&M cost as critical assumptions. These critical parameters constitute more than 20% of either total project costs or total project revenues. The sensitivity analysis reveals that even under more favourable conditions, the IRR without CDM revenue would not cross the benchmark return as given in the following table:

Sensitivity Analysis of Sunworld Solar Power Pvt Ltd.

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	6.90%	4.68%	13.15%	16.55%
O&M	10.34 %	4.68%	9.37%	-92.54%
Project Cost	12.65 %	4.68%	7.80%	-18.29%
Tariff Rate	6.90%	4.68%	13.15%	16.55%

Sensitivity Analysis of ACME Ranga Reddy Solar Power Private Limited.

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**

PLF	2.74%	5.13%	7.77%	33.66%
O&M	5.56%	5.13%	4.49%	-159.30%
Project Cost	7.24%	5.13%	3.51%	-33.24%
Tariff Rate	2.74%	5.13%	7.77%	33.65%

ACME Medak Solar Energy Pvt Ltd.

Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	2.16%	4.51%	7.15%	36.90%
O&M	5.16%	4.51%	3.85%	-175.99%
Project Cost	6.62%	4.51%	2.94%	-35.22%
Tariff Rate	2.16%	4.51%	7.15%	36.90%

ACME Nizamabad Solar Energy Pvt Ltd.

Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	2.76%	5.15%	7.84%	35.79%
O&M	5.79%	5.15%	4.50%	-167.94%
Project Cost	7.31%	5.15%	3.53%	-34.19%
Tariff Rate	2.76%	5.15%	7.84%	35.79%

ACME PV Powertech Private Limited.

Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	2.92%	5.49%	8.47%	30.32%
O&M	6.18%	5.49%	4.78%	-142.94%
Project Cost	7.87%	5.49%	3.77%	-30.54%
Tariff Rate	2.92%	5.49%	8.47%	30.32%

ACME Solar Power Technology Private Limited.

Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	2.92%	5.49%	8.47%	30.32%
O&M	6.18%	5.49%	4.78%	-142.94%
Project Cost	7.87%	5.49%	3.77%	-30.54%
Tariff Rate	2.92%	5.49%	8.47%	30.32%

ACME Rewari Solar Power Pvt Ltd.

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	3.16%	5.65%	8.49%	31.40%
O&M	6.31%	5.65%	4.98%	-147.90%
Project Cost	7.93%	5.65%	3.96%	-31.63%
Tariff Rate	3.16%	5.65%	8.49%	31.40%

ACME Kurukshetra Solar Energy Pvt Ltd

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	3.16%	5.65%	8.49%	31.40%
O&M	6.31%	5.65%	4.98%	-147.90%
Project Cost	7.93%	5.65%	3.96%	-31.63%
Tariff Rate	3.16%	5.65%	8.49%	31.40%

ACME Bhiwadi Solar Power Pvt Ltd

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	3.99%	6.66%	9.81%	26.18%
O&M	7.40%	6.66%	6.00%	-136.35%
Project Cost	9.23%	6.66%	4.82%	-27.00%
Tariff Rate	3.99%	6.66%	9.81%	26.18%

ACME Hisar Solar Power Private Limited

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	3.99%	6.66%	9.81%	26.18%
O&M	7.40%	6.66%	6.00%	-136.35%
Project Cost	9.23%	6.66%	4.82%	-27.00%
Tariff Rate	3.99%	6.66%	9.81%	26.18%

ACME Karnal Solar Power Private Limited

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	3.99%	6.66%	9.81%	26.18%
O&M	7.40%	6.66%	6.00%	-136.35%
Project Cost	9.23%	6.66%	4.82%	-27.00%
Tariff Rate	3.99%	6.66%	9.81%	26.18%

ACME Kaithal Solar Power Private Limited

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	7.35%	6.87%	14.09%	14.11%
O&M	11.49%	6.87%	9.92%	-68.47%
Project Cost	13.31%	6.87%	8.42%	-17.13%
Tariff Rate	7.35%	6.87%	14.09%	14.12%

ACME Babadham Solar Power Private Limited

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	3.90%	6.87%	9.88%	26.74%
O&M	7.69%	6.87%	5.99%	-117.44%
Project Cost	9.13%	6.87%	4.89%	-29.45%
Tariff Rate	3.90%	6.87%	9.88%	26.74%

ACME Koppal Solar Energy Private Limited

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	3.90%	6.87%	9.88%	26.74%
O&M	7.69%	6.87%	5.99%	-117.44%
Project Cost	9.13%	6.87%	4.89%	-29.45%
Tariff Rate	3.90%	6.87%	9.88%	26.74%

ACME Vijayapura Solar Energy Pvt Ltd

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	3.90%	6.87%	9.88%	26.74%
O&M	7.69%	6.87%	5.99%	-117.44%
Project Cost	9.13%	6.87%	4.89%	-29.45%
Tariff Rate	3.90%	6.87%	9.88%	26.74%

ACME Rewa Solar Energy Pvt Ltd

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	4.69%	7.16%	9.83%	26.58%
O&M	7.71%	7.16%	6.61%	-144.24%
Project Cost	9.94%	7.16%	5.41%	-25.21%
Tariff Rate	5.09%	7.16%	9.43%	29.87%

ACME Chittorgarh Solar Energy Pvt Ltd

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	1.37%	6.14%	9.89%	20.18%
O&M	7.17%	6.14%	3.63%	-57.79%
Project Cost	8.44%	6.14%	3.30%	-22.05%
Tariff Rate	1.37%	6.14%	9.89%	20.18%

The results of sensitivity analysis show that even with a variation of +10% & -10% in project cost, O&M cost, PLF and Tariff Rate Equity IRR is significantly lower than the benchmark. And it is evident from the results given above; the project remains additional even under the most favourable conditions.

Common Practice analysis:

The common practice analysis is proved by following points as per the requirement of Methodological tool "Common Practice", version 03.1 EB 84, Annex 7[13]:

1. Applicable Geographical Area (Para 9): The Andhra Pradesh, Telangana, Uttarakhand, Karnataka, and Rajasthan state has been considered as the applicable geographical area for this project. PP had considered these states as geo-graphical area due to regulatory regime since applicable power tariff structure for renewable energy projects is unique for all the states across national boundary of India; which is based on Electricity Act 2003 (EA 2003), section 82 which clearly mentions "Every State Government shall, within six months from the appointed date, by notification, constitute for the purposes of this Act, a Commission for the State to be known as the (name of the State) Electricity Regulatory Commission" Appropriateness of the same has been checked and confirmed from EA 2003 (*http://www.cercind.gov.in/08022007/Act-with-amendment.pdf/40*/).

Furthermore, following significant points on the State specific policy & regulatory framework on the renewable energy projects with special emphasis to solar power projects have been validated:

- Electricity Act 2003 (EA 2003) has changed the legal and regulatory framework for the renewable energy sector in India. The EA 2003 mandates policy formulation to promote renewable sources of energy by the federal government, the State governments and the State Electricity Regulatory Commissions (=SERCs) within their jurisdictions.

- The Electricity Act 2003 introduced some enabling provisions conducive to accelerated development of grid connected renewable energy sources. Under Section 61(h), promotion of cogeneration and generation of electricity from renewable sources of energy has been made the explicit responsibility of SERCs, which are bound by law to take these considerations into account while drafting their terms and conditions for tariff regulations. Nearly all SERCs have issued their tariff regulations incorporating suitable clauses, which will enable them to provide a preferential treatment to renewable energy (RE) during the tariff determination process. The SERCs determine the tariff for all renewable energy projects across the States, and the state-owned power Distribution Companies (DISCOMs) ensure grid connectivity to the renewable energy project sites.

[13] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf

- EA 2003 has initiated the adoption of the National Tariff Policy, 2006 as one of the key policies, National Tariff Policy (2006) framed under the Section 3 of the EA 2003. As per the excerpt from National Tariff Policy, 2006; pursuant to provisions of section 86(1)(e) of the EA 2003, the Appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by 01/04/2006.

- As mandated under section 86(1)(e) of the Electricity Act (2003), by 26/06/2012 SERCs had fixed quotas (in terms of % of electricity being handled by the power utility) to procure power from renewable energy sources. The mandate, which is called a Renewable Purchase Specification (RPS), varies from 0.5% to 14% in various states over varying time-scales. Few states have come out with technology specific RPSs. Besides, the state regulators determine the tariff for all RE projects in the states and ensure connectivity to the grid through extension of power evacuation from the RE project sites.

- At present thirteen SERCs have declared preferential feed–in tariffs (FITs) for purchase of electricity generated from solar power projects established in respective states, which varies from state to state in India. All the SERCs have adopted a ‘cost plus’ methodology to fix the feed–in tariff, which varies across the states depending upon the state resources, project cost and more importantly the tariff regulations of SERCs. Solar power related tariff polices in different states also has difference in regulatory and policy incentives. Several states have implemented fiscal and financial incentives for renewable energy generation, including; energy buy back (i.e. a guarantee from an electricity company that they will buy the renewable power produced); preferential grid connection and transportation charges and electricity tax exemptions.

Therefore the investment climate for the renewable energy projects varies from State to State within India due to state specific local policy & regulatory framework as outlined by the State Electricity Regulatory Commissions of the respective state. This difference in investment condition leads to essential distinction among solar energy projects between different States of the host country India.

Thus, the specific geographical area i.e. states of the project activities for the common practice analysis of the proposed project activity is considered and thus the same is acceptable to the assessment team.

2. Measure (Para 10): The project activity reduces greenhouse gas emissions by generating electricity using renewable energy source- solar. Therefore, the project activity falls under the following measure:

(b) Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies.

3. Output (Para 11): The project activity produces electricity. Therefore, electricity is considered as output of the project activity.

4. Different Technologies (Para 12): The project activity uses solar energy for producing electricity and hence as per Para 12(a), the technologies which use energy source/ fuel other than solar will be considered as the different technologies for the project activity.

For the concerned project activity, Common Practice Analysis has been carried out for 1,015 MW capacity solar Power Projects in these states which is developed by **ACME Cleantech Solutions Private Limited**.

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB 84, Annex 7:

Step (1): Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.

Range	Capacity	Unit
+50%	1,522.5	MW
Capacity of the proposed project activity	1,015.0	MW
-50%	507.5	MW

Step (2): Identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

(a) The projects are located in the applicable geographical area;

(b) The projects apply the same measure as the proposed project activity;

(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;

(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;

(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;

(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

a) As the projects are located in these states of India, therefore, projects in the geographical area of these states has been chosen for analysis. The project activity involves generation of electricity from solar energy. The project activity is located in these states in India and the policy applicable for the solar projects is regulated by respective state policy. The policies/tariff for each state is regulated by State Electricity Regulatory Commissions of respective states and they differ for respective states. The project implemented in these states is claimed as different since the policies and regulations differ in each state. Each state has different policies regarding renewable energy, hence these states are considered as geographical region for common practise analysis.

b) The project activity is a green-field solar power project and uses measure (b) "Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies". Therefore, projects applying same measure (b) are candidates for similar projects.

c) The energy source used by the project activity is solar energy. Hence, only solar energy projects have been considered for analysis.

d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.

e) The capacity range of the projects is within the applicable capacity range from 507.5 MW to 1522.5 MW.

f) The start date of the concerned project activity is 10/02/2017. Therefore projects, which have started commercial operation before 10/02/2017, have been considered for analysis.

Numbers of Similar projects identified, which fulfil above-mentioned conditioned are

N_{solar}= 0

Step (3): Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}.

CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the power plants identified is provided to the DOE. After excluding the registered and under validation projects the total number of projects.

N_{all} = 0

Step (4): Within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}.

As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis two criteria:

1. Size of Installation – Since project activity is large scale project, small and micro scale projects are considered as different technology project. Based on this criteria, there are no any different technology project out of similar identified projects.

2. Investment climate on the date of the investment decision – For proposed project activity, there are no any different technology project considered out of similar identified projects.

Hence, projects where either of the conditions is satisfied those projects are counted for calculating N_{diff} projects.

N_{diff} = 0

Step (5): Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

Calculate $F=1-N_{diff}/N_{all}$

$F = 1-(0/0) = 1$

As per methodological tool “common practise” version 03.1, the proposed project activity is a “common practice” within a sector in the applicable geographical area if the factor F is greater than 0.2 and N_{all} - N_{diff} is greater than 3.

Thus if both conditions are fulfilled, then project activity will be a common practise otherwise, the project activity is treated as not a common practise.

Outcome of Common Practise analysis:

As,

i. F = 1; is greater than 0.2

ii. N_{all} - N_{diff} = 0; is not greater than 3

Thus, the proposed project activity is not a "common practice" within a sector in the applicable geographical area.

The above discussions show that solar power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional and the assessment team considers the approach and calculations acceptable as per the requirements in the methodological tool.

3.3.6 Quantification of GHG Emission Reductions and Removals

Assessment team checked the baseline, project and leakage calculation and confirm that the evaluation of baseline, project and leakage is as per the approved methodology and formula used to calculate the same is correct. The detail analysis is as below:

Baseline Emission:

As per the approved consolidated Methodology ACM0002 version 19.0 & AMS-I.D Version 18.0:

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid- connected power plants. The baseline emissions are to be calculated as follows:

$$\mathbf{BE_y = EG_{PJ,y} \times EF_{grid,CM,y}}$$

Where:

BE_y = Baseline emissions in year y (t CO_2/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

The grid emission factor is calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values. The value of combined margin is sourced from Baseline CO_2 Emission Database, Version 13, June 2018 published by Central Electricity Authority (CEA), Government of India. CEA calculates the data based on Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0. No further assessment is required for grid emission calculation as the ex-ante value is sourced directly from the Govt. of India database.

Emission factor (EF_y):

EF_y= $EF_{grid,CM,y}$= 0.9475 t CO_2/MWh. This value is fixed ex-ante for the crediting period.

$EG_{PJ,y}$ is calculated based on capacity (Checked from the manufacturer specification), PLF= sourced from offer letter thus fulfilling the requirement of Para 3 (b), Annex 11 EB 48 and 8,760 (365*24) annual hours. Moreover, $EG_{PJ,y}$ is a monitoring parameter and the actual value will be obtained during the verification of the project activity.

BE_y= 2,193,786 x 0.9475 = 2,078,589 tCO_2.

Project Emission:

As per the approved consolidated ACM0002 version 19.0 & AMS-I.D Version 18.0:"For most renewable energy power generation project activities, PE_y = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$\mathbf{PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}}$$

Where:

PE_y = Project emissions in year y (t CO_2e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO_2/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO_2e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO_2e/yr)

As the project activity is the installation of a new grid-connected Solar Power plant and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants, and from water reservoirs of hydro power plants. Therefore $PE_{FF,y,}$ $PE_{GP,y}$, $PE_{HP,y}$ are equal to zero and thus, PE_y = 0.

Leakage Emission:

Leakage emission is not considered as per the requirement of ACM0002 version 19.0 & AMS-I.D Version 18.0.

Net Emission reduction:

As per the para 43 of AMS I.D, version 18.0, the formula to calculate the emission reduction is $ER_y = BE_y – PE_y – LE_y$

As per the para 57 of ACM0002, version 19.0, the formula to calculate the emission reduction is $ER_y = BE_y – PEy$

As the project activity is a solar project, there is no any leakage emissions from the project activity.

Hence, LE_y = 0

Therefore, Emission Reductions for this project activity are calculated as follows:

$ER_y = BE_y – PE_y$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e/yr)
BE_y	=	Baseline emissions in year *y* (t CO_2/yr)
PE_y	=	Project emissions in year *y* (t CO_2e/yr)

Therefore, Net GHG Emission Reductions and Removals are calculated as follows:
$ER_y = BE_y – PE_y$

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
Year 1	2,078,589	0	0	2,078,589
Year 2	2,078,589	0	0	2,078,589
Year 3	2,078,589	0	0	2,078,589
Year 4	2,078,589	0	0	2,078,589
Year 5	2,078,589	0	0	2,078,589
Year 6	2,078,589	0	0	2,078,589
Year 7	2,078,589	0	0	2,078,589
Year 8	2,078,589	0	0	2,078,589
Year 9	2,078,589	0	0	2,078,589
Year 10	2,078,589	0	0	2,078,589
Total	**20,785,890**	**0**	**0**	**20,785,890**

3.3.7 Methodology Deviations

Assessment team confirms that No methodology deviation is applicable for the present project activity.

3.3.8 Monitoring Plan

Assessment team checked the monitoring practice onsite and also checked the guideline of respective State electricity regulatory commission. The detail analysis is as below:

<u>Parameters determined ex-ante:</u>

Baseline emission factor of INDIAN Grid is establish ex-ante based on Tool to calculate the grid emission factor, using a combined approach consisting 75 % operating margin and 25 % build margin. The emission coefficient from official data published in Central Electricity Authority (CEA) CO_2 Baseline database available to the project participant at the time of submission of joint VCS PD & MR for joint validation & Verification and global stakeholder's consultation process. CEA is an official source of Ministry of Power, Government of India have worked out baseline as CO_2 baseline database. The assumption were verified by the validation team and found to be correct.

Parameters determined ex-post:
The parameters monitored ex-post involves net electricity supplied to the grid (calculated from electricity exported and imported) to the INDIAN grid by the project activity.

As per the Joint VCS PD & MR Version 02, Joint Energy Meter Reading Report will be the source of data during verification. The DOE will use the same source for verification of emission reductions.

In accordance with the methodology requirement, net electricity supplied by the project activity is obtained from Joint Energy Meter Reading Report issued by State electricity authority which provide input values (apportioned $EG_{export,y}$ and apportioned $EG_{import,y}$), used for calculation of $EG_{PJ,y}$ by the project activity and forms the basis for emission reduction calculation. Electricity export to the grid and import from the grid is metered by 0.2s accuracy class main and check tri-vector energy meters located at the substation at plant. These meters are sealed & under the control of respective State Utility. The main meter reading is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of state utility and O&M personnel.

In the event of failure of main meter, the check meter will be used in monitoring the electricity data. The agency is experienced in the monitoring system and is managing O&M of numerous other solar farm projects. The validation team therefore is of the opinion that the project participant through the O&M agency is capable of implementing the monitoring plan in the context of the project activity.

Calibration of all the meters is done by state electricity board officials as per the industry standards. However, the calibration will be done once in a 5 year[14] for all the project activity. The energy meter recording the export and import from the grid at substation is under the control and supervision of state electricity board officials. Similarly O&M contractor is responsible for monitoring of the generation data at CMS.

It is reported that the data will be kept for 2 years following the end of the crediting period or till the last issuance of VERs for the project activity whichever occurs later.

The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit.

3.4 Non-Permanence Risk Analysis

Not applicable for the present project activity.

[14] http://powermin.nic.in/whats_new/pdf/Metering_Regulations.pdf, page 12

4 SAFEGUARDS

4.1 No Net Harm

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation.

As project is a renewable energy project hence there is no negative environmental and socio impact effect and the same can be summarized in the below table:

S. No.	Indicator	Assessment team opinion
1	Air quality	The project generates clean energy which replaces the fossil fuel intensive electricity generation. Also report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013. This report clearly mentioned that solar farms operations do not result in direct air pollution. Adequate measures were taken to mitigate the envisaged impacts like spraying water on the road side to reduce dust level, etc. This was confirmed by the local stakeholders. Therefore, it is validated that mitigation measures were robustly implemented on ground for air quality issues project will have a positive impact on air quality.
2	Water quality and quantity	The project has no effect on water quality and quantity because it neither generates any waste not consume any water. It was validated during on-site assessment that there was no requirement of water for operations of solar plant and the only usage of water was for drinking and sanitation purpose. The consumption of freshwater during construction was also pretty much limited as confirmed by the local stakeholders. Hence the parameter is indicated as neutral and the same is acceptable to the DOE
3	Soil condition	There are negligible impacts envisaged during operation of the project activity. For mitigating the impacts during construction, various mitigation measures were taken which is validated from the plant records of PP and the interview with local villagers. The top soil excavated during construction, was stockpiled and used for compaction. The roads were not paved and soling was done with excavated earth & rock material, so land disturbance could be minimized. It was also confirmed that, the vegetation done at site helps for soil erosion. The same is confirmed during the stakeholder meetings during onsite visit. Therefore, it can be concluded that the project has no effect on soil conditions during its operation because it has no waste coming out.
4	Biodiversity	During the validation site visit it was observed that the condition of ground vegetation will be gradually improved; No rare species has been found in the around area. The project site is not on the migration route of migratory bird. As Such solar power plants do not have any obstruction in the path of migratory birds. With the implementation of Project, the greening water will be increased

S. No.	Indicator	Assessment team opinion
		significantly; the biodiversity in the vicinity will be improved with the vegetation improvement. NO negative impact envisaged.
5	Employment Generation	The project activity employed local population as skilled workers as well as security guards which were envisaged during the validation site visit. The personnel employed by the project activity are also provided trainings and exposed to various awareness programs therefore a positive indicator has been accepted.
6	Livelihood of the poor	The project is associated with infrastructure development like roads in the nearby areas and promoting economic activities like grants to local school and communities temples etc. Positive impact envisaged.

4.2 Environmental Impact

The project activity is expected to have positive impacts and no significant adverse environmental impacts are foreseen. Since, the project activity is an electricity generation from renewable source (i.e. solar energy) therefore no negative impact are envisaged. There is no mandatory legal requirement for carrying out an environmental impact assessment in the host country. The Ministry of Environment, Forests & Climate change (MoEFCC), Government of India (GoI) notification [15] dated 14/09/2006 regarding the requirement of Environment Impact Assessment (EIA) studies states that any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. The list includes thirty nine project activities that require EIA studies. The solar power projects are not included in this list and thus an EIA study is not required.

4.3 Local Stakeholder Consultation

As per the VCS requirements, it is necessary to invite the relevant stakeholders, prior of the validation process. Moreover, the stakeholder meeting took place on or near project site prior to the start date of the project activity which fulfill the requirement of project standard for project activities version 02.The DOE checked the relevance of the dates during the validation site visit. The detail of the invitation date and stakeholder meeting date is as below:

Project Instance	SPVs Names	Invitation Dates	LSHM Dates
1	Sunworld Solar Power Pvt Ltd	30/09/2017	11/10/2017
	ACME Ranga Reddy Solar Power Pvt Ltd	22/10/2016	01/11/2016
	ACME Medak Solar Energy Pvt Ltd	22/10/2016	01/11/2016
	ACME Nizamabad Solar Energy Pvt Ltd	31/10/2016	10/11/2016
	ACME PV Powertech Private Limited (Sadashivpet)	30/11/2016	10/12/2016
	ACME Solar Power Technology Private Limited	01/12/2016	10/12/2016
	ACME Rewari Solar Power Pvt Ltd	06/06/2017	16/06/2017
	ACME Kurukshetra Solar Energy Pvt Ltd		

[15] http://envfor.nic.in/legis/eia/so1533.pdf

Project Instance	SPVs Names	Invitation Dates	LSHM Dates
	ACME Bhiwadi Solar Power Pvt Ltd	07/12/2017	17/12/2017
	ACME Hisar Solar Power Private Limited		
	ACME Karnal Solar Power Private Limited		
	ACME Kaithal Solar Power Private Limited	07/12/2017	17/12/2017
	ACME Babadham Solar Power Private Limited		
	ACME Koppal Solar Energy Private Limited		
	ACME Vijayapura Solar Energy Pvt Ltd		
	ACME Rewa Solar Energy Pvt Ltd	05/04/2018	15/04/2018
	ACME Chittorgarh Solar Energy Pvt. Ltd	05/04/2018	15/04/2018
2	ACME Karimnagar Solar Power Pvt Ltd	31/10/2016	10/11/2016
3	Purvanchal Solar Power Pvt Ltd		
4	Rewanchal Solar Power Pvt Ltd		
5	Neemuch Solar Power Pvt Ltd		
6	ACME Fazilka Power Pvt Ltd (Nandipet)	08/03/2017	18/03/2017
7	ACME Narwana Solar Power Pvt Ltd (Lingampet)	03/10/2016	13/10/2016
8	ACME Warangal Solar Power Pvt Ltd	22/10/2016	01/11/2016
9	Devishi Renewable Energy Pvt Ltd	08/07/2016	20/07/2016
10	Devishi Solar Power Pvt Ltd		
11	Sunworld Energy Pvt Ltd		
12	ACME Yamunanagar Solar Power Pvt Ltd/1 (KOSGI)	03/10/2016	13/10/2016
13	ACME Yamunanagar Solar Power Pvt Ltd-2 (MOTHKUR)		
14	ACME Mahbubnagar Solar Energy Pvt Ltd-2 (GODHUR)	03/10/2016	10/11/2016
15	ACME Mahbubnagar Solar Energy Pvt Ltd-3 (PADMAJIWADI)		
16	ACME Mahbubnagar Solar Energy Pvt Ltd-1 (MANTHANI)		

All the stakeholders have been invited through public notice to attend the stakeholders meeting. The local stakeholders' consultation meeting was attended by local persons including local villagers, local vendors and technology suppliers.

The stakeholders identified by the project participant were local villagers who are the major population of the particular area, local communities and gram panchayat (Village head), panel supplier, project proponent representatives, O&M Team and other people involved in the project. Validation team verified the list of participants who attended the stakeholder meeting and feedback questionnaire and confirms the stakeholders identified are relevant. Validation team verified the list of participants who attended the stakeholder meeting and feedback questionnaire and confirms the stakeholders identified are relevant. The validation team also verified the minutes of meeting to note that no negative comments were received and the same was cross checked with the information obtained during follow up interviews with the stakeholder's. Moreover, assessment team during the validation site visit also noted that a grievance register is also put onsite for the stakeholder to comment on any grievances during the operation lifetime of the project activity, The grievances from the stakeholder if found suitable will be addressed immediately by the top management and thus the approach is found appropriate for the project activity.

The interactions with some of the stakeholders during the site visit are presented below:

Name of the stakeholder	Mr. R. Sreenivas (Villager)
DOE questions: Did the solar power plant have any adverse impact on the nearby areas? Answer: NO. Solar plant have no adverse impact on surrounding area. DOE questions: Did the plant have impact on any crop fields? Answer: The plant is implemented in barren land and there were no any fertile land or crop which is damaged.	

Name of the stakeholder	Mr. Ramesh Ranawat (Villager)
DOE questions: Did the power project generated employment opportunities for locals? Answer: Yes. Employment given to locals in O&M activities for technically educated persons and unskilled labours in construction & related work.	

Thus Validation team is of the opinion that the stakeholder meeting was adequate and appropriate.

4.4 Public Comments

Assessment team noted that this project was open for public comment from 06/04/2018 – 06/05/2018. No comments were received.

The detail were checked by the assessment team in the following web platform

https://www.vcsprojectdatabase.org/#/pipeline_details/PL1792

5 VERIFICATION FINDINGS

5.1 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the Joint VCS PD & MR. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the Joint VCS PD & MR.
Findings	CAR 07 raised on this section and closed successfully. Please refer Appendix 1 for further details
Conclusion	The baseline Emissions for a given year is calculated by multiplying the energy baseline (EB) with the regional grid emission factor. The grid in this case would be the 'INDIAN Grid' **Formula Used:-** $\mathbf{BE_y = EG_{PJ,y} \times EF_{grid,CM,y}}$ Where: BE_y = Baseline emissions in year y (t CO_2/yr) $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr) $EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool

	to calculate the emission factor for an electricity system" (t CO_2/MWh) The verification team has checked the entire monthly JMR report and invoices applicable for the monitoring period as per the project activity applied for verifications and found all the parameters are monitored and recorded as per the monitoring plan in the Joint VCS PD & MR. The verification team has crosschecked the emission reduction sheet and monitoring report data with the JMR sheet and invoice bills and found all the values are matching.

5.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the break down log for the monitoring period. During the verification site visit the feeder wise location of the solar plants is also checked. The Calibration details of the monitoring meters are also checked with calibration certificates.
Findings	CAR 08 raised on this section and closed successfully. Please refer Appendix 1 for further details
Conclusion	The metering arrangement is tri-vector bi-directional energy meters (main and check) at the State Electricity Board (SEB) substation. These meters record several parameters including electricity exported & imported. Moreover, the meters are located at the HT side of the transformer and are of accuracy class of 0.2s for each project activity applied for verification. These electricity meters are being used by state electricity board for JMR (Joint Meter Reading) electricity generation statements. The Net electricity supplied to the grid is then calculated from export and import values. The net electricity exported to the grid is also cross checked from the invoices raised to respective state electricity board which is in line with Methodology requirement for large scale project activity. Hence assessment team confirmed that the value of net electricity exported to the grid as used in emission reduction calculation is correct. Electricity export to the grid and import from the grid is metered by main and check tri-vector energy meters. The main meter reading is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of state utility and O&M personnel. In the event of failure of main meter, the check meter will be used in monitoring the electricity data. The agency is experienced in the monitoring system and is managing O&M of numerous other solar farm projects. The validation team therefore is of the opinion that the project participant through the O&M agency is capable of implementing the monitoring plan in the context of the project activity. Calibration of all the meters is done by state electricity board officials as per the industry standards. However, the calibration is done once in a 5 year[16]. The details of Calibration of the meters are mentioned in Appendix 5 of this report. The energy meter recording the export and import from the grid at substation is under the control and supervision of state electricity board officials. Similarly O&M contractor is responsible for monitoring of the generation data at CMS. It is reported that the data will be kept for 2 years following the end of the

[16]http://powermin.nic.in/whats_new/pdf/Metering_Regulations.pdf, page 12

	crediting periodor till the last issuance of VERs for the project activity whichever occurs later. The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit. On-site visit and interview with O&M personnel also confirms that the operational and organizational chart as mentioned in Joint VCS PD & MR is as per the site practice and thus assessment team confirms that the details are correct. The break down log is checked and found that the plant undergone scheduled maintenance and break down. No unforced error observed.

6 VALIDATION AND VERIFICATION CONCLUSION

Applus+ Certification has been engaged by **ACME Cleantech Solutions Private Limited** to perform the Joint validation and verification of the "Bundled Solar Photovoltaic Project by ACME"

The management of the project participant/owner is responsible for the preparation of the GHG emissions data and the reported/estimated GHG emissions reductions on the basis set out within the project's Monitoring Plan in the Joint VCS PD & MR and the approved methodology ACM0002 version 19.0 & AMS-I.D Version 18.0.

Our Validation approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board and VCS board. Our approach is risk-based, drawing on an understanding of the risks associated with estimated GHG emissions data and the controls in place to mitigate these. The validation can confirm that:

- The projects description compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7

- The project's baseline and additionality is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0 for large scale and small scale projects respectively.

- The project's monitoring plan is assessed against "ACM0002 version 19.0 & AMS-I.D Version 18.0 for large scale and small scale projects respectively.

- A risk based approach has been followed to perform this validation activity. The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews with Project Owner have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence for positive validation opinion as per the requirement of VCS.

Our Verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in Monitoring Report is as per the PD
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.
- No limitation observed for the present verification

Verification period: 10/02/2017 to 28/02/2018 (first and last date included)

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
10/02/2017 to 31/12/2017	343,762	0	0	343,762
01/01/2018 to 28/02/2018	140,846	0	0	140,846
Total	**484,608**	0	0	**484,608**

The estimated emission reduction to be achieved from the project activity for the current monitoring period is 514,438 [17] tCO_2e, whereas actual emission reductions achieved are 484,608 tCO_2e, which is approximately 5.80% lower than the estimated emission reductions. The generation of electricity depends upon many other climatic conditions, and not within the control of the project participant. The lower generation during the current verification period is hence due to certain natural conditions. Comparison of individual instance is given below:

Activity Instance	SPVs	Capacity (MW)	Operational Days	ER Estimated	Actual ER	Variation (%)
1	Sunworld Solar Power Pvt Ltd	30	106	13739	14463	5.27
	ACME Ranga Reddy Solar Power Pvt	30	272	35255	34381	-2.48

[17] These estimation is based on annual (365 days) estimation of ER and current monitoring period days.

Activity Instance	SPVs	Capacity (MW)	Operational Days	ER Estimated	Actual ER	Variation (%)
	Ltd					
	ACME Medak Solar Energy Pvt Ltd	45	230	44717	54495	21.87
	ACME Nizamabad Solar Energy Pvt Ltd	50	171	36940	42523	15.11
	ACME PV Powertech Private Limited (Sadashivpet)	50	237	51198	56504	10.36
	ACME Solar Power Technology Private Limited	50	24	5184	3500	-32.48
	Acme Rewari Solar Power Pvt Ltd	50	29	6264	6699	6.95
	Acme Kurukshetra Solar Energy Pvt Ltd	50	29	6264	5384	-14.04
	ACME Bhiwadi Solar Power Pvt Ltd	50	0	0	0	0
	ACME Hisar Solar Power Private Limited	50	0	0	0	0
	ACME Karnal Solar Power Private Limited	50	0	0	0	0
	ACME Kaithal Solar Power Private Limited	40	36	6221	528	-91.52
	ACME Babadham Solar Power Private Limited	40	38	6567	627	-90.45
	ACME Koppal Solar Energy Private Limited	40	0	0	0	0
	ACME Vijayapura Solar Energy Pvt Ltd	40	37	6394	592	-90.74
	ACME Rewa Solar Energy Pvt Ltd	100	0	0	0	0
	ACME Chittorgarh Solar Energy Pvt. Ltd	250		0	0	0
2	ACME Karimnagar Solar Power Pvt Ltd	15	364	27500	23254	-15.44
3	Purvanchal Solar Power Pvt Ltd	15	371	28029	25341	-9.59
4	Rewanchal Solar Power Pvt Ltd	15	342	25838	15967	-38.20
5	Neemuch Solar Power Pvt Ltd	15	341	25762	25931	0.66
6	ACME Fazilka Power Pvt Ltd (Nandipet)	15	353	26669	25273	-5.23
7	ACME Narwana Solar Power Pvt Ltd (Lingampet)	15	370	27953	27354	-2.14
8	ACME Warangal Solar Power Pvt Ltd	15	363	27424	26245	-4.30
9	Devishi Renewable Energy Pvt Ltd	12.5	375	21318	17933	-15.88
10	Devishi Solar Power Pvt Ltd	12.5	375	21318	18329	-14.02
11	Sunworld Energy Pvt Ltd	12.5	384	21830	17957	-17.74
12	Acme Yamunanagar Solar Power Pvt Ltd-1 (KOSGI)	10	156	7857	6750	-14.09
13	Acme Yamunanagar Solar Power Pvt Ltd-2 (MOTHKUR)	10	165	8310	6982	-15.98
14	ACME Mahbubnagar Solar Energy Pvt Ltd-2 (GODHUR)	10	171	8612	9268	7.62
15	ACME Mahbubnagar Solar Energy Pvt Ltd-3 (PADMAJIWADI)	10	173	8713	9177	5.33
16	ACME Mahbubnagar Solar Energy Pvt Ltd-1 (MANTHANI)	10	170	8562	9151	6.88

Assessment team checked the same found to be appropriate and accepted.

APPENDIX 1: DOCUMENTS REVIEWED DURING VALIDATION AND VERIFICATION

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificates	Commissioning certificates of the solar panels.	Project participant
2.	NA	Contract of the other entity with the DOE	Contract of the other entity with the DOE	Project participant
3.	NA	Technical specifications	Technical specifications of solar panels from manufacturers	Project participant
4.	NA	Draft Joint VCS PD&MR Version 01 Revised Joint VCS PD&MR Version 02	17/03/2018 29/01/2019	Project participant
5.	NA	Combined Emission Calculation sheet- version 01- estimated & Actual	29/01/2019	Project participant
6.		IRR calculation sheet Ver-01	29/01/2019	Project participant
7.	NA	The operational lifetime of the project activity from the manufacturer = (Technical specefications)	Manufacturer technical specifications	Project participant
8.	NA	Reference link is provided.	SERC order of the respective states RBI: Reserve Bank of India www.rbi.org.in Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in Income tax act 1961 http://law.incometaxindia.gov.in/DIT/ VCS: Verified Carbon Standard www.v-c-s.org	Independent Search
9.	NA	Tools/ guidelines used in the project activity	UNFCCC CDM web site • Tool to calculate the emission factor for an electricity system version 07 • UNFCCC Methodology: ACM0002 version 19.0 • UNFCCC Methodology: AMS-I.D Version 18.0 • Glossary of CDM terms version 07 • VCS joint validation and verification report template Version 3.1 • Tool for the demonstration and assessment of additionality version 07	UNFCCC
10.	NA	Calibration details of the project activity undergoing verification	Please refer to Appendix 5	Project participant

No.	Author	Title	References to the document	Provider
11.	NA	DPR/Offer letters/PLF	DPR / Offer letters /PLF reports for Individual project owners	Project participant
12.	NA	JMR records+ Invoices for the complete monitoring period	JMR records+ Invoices for the respective states	Project participant
13.	NA	PPA Agreement	Power purchase Agreement/Third party agreement between Project Proponent & State Utility/buyer	Project participant
14.	NA	Actual O&M agreement	O&M agreements for all sites	Project participant
15.	NA	VCS Declaration	Declaration from PP for Participation under Other GHG Programs	Project participant

APPENDIX 2: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS, FORWARD ACTION REQUESTS (CAR/CL/FAR)

CAR ID	01	**Section no.**	1	**Date:** 30/05/2018
Description of CAR				
During the document review it was observed that following details are missing in section 1 of the joint PD+MR version 01: 1. A summary description of the technologies/measures for individual Hydro turbine as per the respective state (e.g., plant, equipment, process, or management or conservation measure) included in the project and the status of their implementation. Supporting for technical measures is also not submitted to DOE. 2. The relevant implementation dates (e.g., dates of construction, continued operation periods). Supporting regarding Commissions certificate is also missing. 3. The total GHG emission reductions or removals generated in this monitoring period. 4. The compliance of section 1.11 is not as VCS PD template. Corrective action is required 5. The scenario prior to project activity is not described in section 1.10 of the VCS PD. The scenario as mentioned in section 2.4 is similar or different? Kindly take corrective action Corrective action is sought for the same.				
Project participant response				**Date:** 23/01/2019
1. Technology description along with implementation dates has been added to the section 1 of the joint PD+MR. Supporting documents is being provided with this submission. *2. Implementation dates has been added to the section 01.* *3. Total GHG removal in this monitoring period has been added to section 1.* 4. *Section 1.11 has been updates as per the VCS PD template* 5. *Section 1.10 has been updated.*				
Documentation provided by project participant				
Joint PD+MR V2 and Calibration details				
DOE assessment				**Date:** 05/02/2019
1. Technology details and commissioning dates updated now in revised joint VCS PD & MR. 2. Sections revised along with implementation dates. 3. GHG emission reductions achieved during this monitoring period now have been added. 4. Templated now corrected as per VCS guidelines. 5. Pre-project scenario has been now updated. CAR closed				

CAR ID	02	**Section no.**	1.12.3 to 1.12.5	**Date:** 30/05/2018
Description of CAR				
During the desk review it was observed that the details regarding REC benefits were not provided. Please provide appropriate link for the same and also proper documents to confirm that the PP will not claim other form of environmental credit for the monitoring period concerned. Moreover, PP should also produce documentary evidence that it has not participated in any other form of GHG emission/rejected by				

any other form of GHG program for the current monitoring period. Corrective action is sought for the same and documents are required to be submitted for further analysis.	
Project participant response	**Date:** 23/01/2019
PP has neither seeking registration with other GHG mechanism nor in Indian REC mechanism. The same can be verified through publically available web link https://recregistryindia.nic.in/index.php/publics/accredited_regens, also a declaration regarding non participation in any other form of GHG emission credits and REC has been provided.	
Documentation provided by project participant	
Declaration letter	
DOE assessment	**Date:** 05/02/2019
Declaration has been submitted by PP and found correct. Assessment team also cross checked the same with REC registry of India. CAR closed.	

CAR ID	03	**Section no.**	2.5	**Date:** 30/05/2018
Description of CAR				
During the desk review of the PDD and onsite visit document verifications, APPLUS team observed following inconsistency in the additionality determination : 1. Following documents are missing and thus the IRR calculation is reserved: a. PLF reports b. All the input value (e.g. Offer letters, DPR (if any), Loan sanction if any, Insurance etc.) 2. IRR calculation is reserved as no IRR sheets are provided 3. The supporting documents for the Common practice analysis are not submitted to the DOE. Common practice analysis is thus reserved till the submission of the same. Additionality section of the VCS PD version 01 is reserved till the documents and IRR sheet are submitted.				
Project participant response				**Date:** 23/01/2019
1. Documents regarding input parameters have been provided with this submission. *2. Project IRR is being submitted with this submission.* *CPA analysis sheet is being submitted.*				
Documentation provided by project participant				
IRR sheets, DPR reports, CPA analysis and investment supporting documents.				
DOE assessment				**Date:** 05/02/2019
IRR calculation sheet submitted along with all supporting and found that the project activity is additional. CAR closed.				

CAR ID	04	**Section no.**	3	**Date:** 30/05/2018
Description of CAR				
Assessment team found during desk review is that emission reduction sheet is missing for the project activity. Hence estimated ER in section 3 of the Joint PD and MR is thus reserved.				
Project participant response				**Date:** 23/01/2019
Updated ER sheet is being provided.				
Documentation provided by project participant				
ER V2, JMRs and Invoices.				
DOE assessment				**Date:** 05/02/2019
Revised Joint VCS PD & MR and ER sheets submitted and found inline. CAR closed.				

CAR ID	05	**Section no.**	5.3	**Date:** 30/05/2018
Description of CAR				
During the desk review related to stakeholder consultation following observation is made by the APPLUS project team: 1.The stakeholder documentation is also not provided to the DOE 2. The site photograph of LSHC meeting is not provided to the DOE. Corrective action is this sought for the same.				
Project participant response				**Date:** 23/01/2019
Stakeholder consultation details has been updated in Joint PD+MR: *1. Stakeholder documentation is being provided.* *Site meeting photograph is being submitted with this submission*				
Documentation provided by project participant				
Stakeholder documents and relevant photographs.				
DOE assessment				**Date:** 05/02/2019
Stakeholder's consultation details have been submitted and found correct. CAR closed.				

CAR ID	06	**Section no.**	5.4	**Date:** 30/05/2018
Description of CAR				
During the desk review it is observed that the section in the VCS PD & MR do not contains details of Public comments (if any). Corrective action is sought.				
Project participant response				**Date:** 23/01/2019
Section 5.3 has been updated in the joint PD+MR				
Documentation provided by project participant				
Joint PD+MR V2				
DOE assessment				**Date:** 05/02/2019
Section has been now revised with relevant details. CAR closed.				

CAR ID	07	**Section no.**	3 & 6	**Date:** 30/05/2018
Description of CAR				
Assessment team found during desk review is that emission reduction sheet is missing for the project activity. JMR sheets and the invoices are missing. The claimed ER is thus reserved till submission of proper documents.				
Project participant response				**Date:** 23/01/2019
Updated ER sheet is being provided with this submission.				
Documentation provided by project participant				
ER sheet, JMR and Invoices				
DOE assessment				**Date:** 05/02/2019
Revised Joint VCS PD & MR and ER sheets corrected appropriately. CAR closed.				

<table>
<tr><td>CAR ID</td><td>08</td><td>Section no.</td><td>Appendix</td><td>Date: 30/05/2018</td></tr>
<tr><td colspan="5">Description of CAR</td></tr>
<tr><td colspan="5">The calibration certificates of and details for the individual PP are missing. The assessment is thus reserved until the calibration details are submitted.

The breakdown details for the complete monitoring period is missing. Log records are not submitted to DOE. Corrective action is sought in joint PD and MR and supporting documents are sought for the same.

The feeder details are missing. Corrective action is sought in joint PD and MR and supporting documents are sought for the same.</td></tr>
<tr><td colspan="4">Project participant response</td><td>Date: 23/01/2019</td></tr>
<tr><td colspan="5">The calibration details have been updated in Joint PD+MR Appendix 2.0. The calibration certificates is been provided with the submission. There is no breakdown report during the current monitoring period. Main Meter and check meter details has been updated in the Appendix 1 of the Joint PD+MR.</td></tr>
<tr><td colspan="5">Documentation provided by project participant</td></tr>
<tr><td colspan="5">Calibration Certificates</td></tr>
<tr><td colspan="4">DOE assessment</td><td>Date: 05/02/2019</td></tr>
<tr><td colspan="5">Revised Joint VCS PD corrected appropriately and relevant information added. CAR closed.</td></tr>
</table>

<table>
<tr><td>FAR ID</td><td>01</td><td>Section no.</td><td>Joint VCS PD & MR</td><td>Date: 30/05/2018</td></tr>
<tr><td colspan="5">Description of FAR</td></tr>
<tr><td colspan="5">During onsite visit and document review it was noted that the SPV; ACME Chittorgarh Solar Energy Pvt. Ltd is yet to be commissioned. During subsequent verification, details of the project implementation shall be verified.</td></tr>
<tr><td colspan="4">Project participant response</td><td>Date:</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="5">Documentation provided by project participant</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="4">DOE assessment</td><td>Date:</td></tr>
<tr><td colspan="5"></td></tr>
</table>

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Lead Auditor/ Technical Expert	OR	Takarkhede	Atul	TQC-Outsourced entity	No	No	Yes	Yes
2.	Auditor/ Technical Expert	OR	Das	Sukanta	TQC-Outsourced entity	Yes	Yes	Yes	Yes

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	EI	Shen	Simon	LGAI Technological Center S.A. (Applus+ Certification)
2.	Approver	IR	Sendin	Juan	LGAI Technological Center S.A. (Applus+ Certification)

Short CVs of the Team:

1. Dr. Atul Takarkhede counts with 9 years of experience in field of Environmental Auditing, consulting and accreditation. He is an Expert in ISO 9001-14001, CO2/GHG Reporting, Carbon Foot Print, Energy, Water and Waste Management Reporting for organizations environmental performance. His professional portfolio is mainly related with carrying out EIA, conducting QA/QC of EIA Reports; Conducting Environmental/water Audits; NABET requirements appliance. Furthermore, he counts with solid experience on CDM-VCS-GS consultancy and auditing. He has Ph.D. (Environmental Science) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical reports related to environmental science. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APPLUS certification to carry out GHG audit.

2. Meng (Simon) Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ LGAI for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years.

3. Mr. Sukanta Das has a Master of Technology (2008), Science (2006) and a Bachelor in Physics (2004) by the Universities of Tezpur Central University/Indian Institute of Technology Bombay and Gauhati. He counts with overall Experience of almost 9 years in GHG/ Warehouse/lean audits regarding:

   Onshore wind energy/biomass co-generation tri-generation systems/Hydro power plant (Run-off/Dam Based), Supercritical boilers projects in power plants, Waste heat recovery projects in Cement industries, Electric arc furnace project in Steel industries, Nitrous Oxide abatement project in Chemical industries, Biomass projects in Pharmaceutical industries, Replacement of Furnace oil to natural gas in Oil and Gas industries, Waste water treatment projects, Methane avoidance projects etc.

   Regarding his Onsite Visit experience, it can be highlighted the Regions of Republic of India, Germany, Middle-east, Morocco and Bangladesh.

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
OM	Operating Margin
GWP	Global Warming potential
JMR	Joint Metering reading
RBI	Reserve Bank Of India

APPENDIX 5: CALIBRATION DETAILS

Project Instance Number	Name of the SPVs	Capacity (MW)	Main Meter Details	Check Meter Details	Calibration Date	Next Calibration
1	Sunworld Solar Power Pvt Ltd	30	SL. No. APZ00191 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00192 Make: Secure Accuracy class: 0.2 s	15/11/2017	14/11/2022
	ACME Ranga Reddy Solar Power Pvt Ltd	30	SL. No. APZ00197 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00198 Make: Secure Accuracy class: 0.2 s	02/06/2017	01/06/2022
	ACME Medak Solar Energy Pvt Ltd	45	SL. No. APZ00188 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00189 Make: Secure Accuracy class: 0.2 s	14/07/2017	13/07/2022
	ACME Nizamabad Solar Energy Pvt Ltd	50	SL. No. APZ00194 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00195 Make: Secure Accuracy class: 0.2 s	11/09/2017	10/09/2022
	ACME PV Powertech Private Limited (Sadashivpet)	50	SL. No. APZ00200 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00201 Make: Secure Accuracy class: 0.2 s	07/07/2017	06/07/2022
	ACME Solar Power Technology Private Limited	50	SL. No. APZ00185 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00186 Make: Secure Accuracy class: 0.2 s	05/02/2018	04/02/2023
	ACME Rewari Solar Power Pvt Ltd	50	Line 1 (25 MW) SL. No. 17151088 Make: L&T Class: 0.2s Line 2 (25 MW) SL. No. 17151076 Make: L&T Class: 0.2s	Line 1 (25 MW) SL. No. 17151035 Make: L&T Class: 0.2s Line 2 (25 MW) SL. No. 17151090 Make: L&T Class: 0.2s	31/01/2018	30/01/2023
	ACME Kurukshetra Solar Energy Pvt Ltd	50	For RR No. KSPDCL-R2-A21 Main Meter- 17125700 Accuracy Class-0.2s For RR No. KSPDCL-R2-A22 Main Meter- 17151006 Accuracy Class- 0.2s	For RR No. KSPDCL-R2-A21 Check Meter-17125702 Accuracy Class-0.2s For RR No. KSPDCL-R2-A21 Check Meter-17151039 Accuracy Class-0.2s	31/01/2018	30/01/2023
	ACME Bhiwadi Solar Power Pvt Ltd	50	SL. No. APZ00264 Make: Secure Accuracy Class: 0.2s	SL. No. APZ00265 Make: Secure Accuracy Class: 0.2s	01/07/2018	30/06/2023
	ACME Hisar Solar Power Private Limited	50	SL. No. APZ00226 Make: Secure Accuracy Class: 0.2s	SL. No. APZ00227 Make: Secure Accuracy Class: 0.2s	21/06/2018	20/06/2023
	ACME Karnal Solar Power Private Limited	50	SL. No. APZ00260 Make: Secure Accuracy Class: 0.2s	SL. No. APZ00261 Make: Secure Accuracy Class: 0.2s	15/06/2018	14/06/2023
	ACME Kaithal Solar Power	40	SL. No. 17054932 Accuracy class: 0.2 s	SL. No. 17054938 Accuracy class: 0.2 s	24/01/2018	23/01/2023

Project Instance Number	Name of the SPVs	Capacity (MW)	Main Meter Details	Check Meter Details	Calibration Date	Next Calibration
	Private Limited					
	ACME Babadham Solar Power Private Limited	40	SL. No. 16113468 Accuracy class: 0.2 s	SL. No. 17069195 Accuracy class: 0.2 s	22/01/2018	21/01/2023
	ACME Koppal Solar Energy Private Limited	40	SL. No. 17115504 Accuracy class: 0.2 s	SL. No. 17069212 Accuracy class: 0.2 s	15/04/2018	14/04/2023
	ACME Vijayapura Solar Energy Pvt Ltd	40	SL. No. 17054962 Accuracy class: 0.2 s	SL. No. 17054957 Accuracy class: 0.2 s	23/01/2018	22/01/2023
	ACME Rewa Solar Energy Pvt Ltd	100	SL. No. 18053541 Make: L&T Accuracy Class: 0.2s	Check Meter: 18053542 Make: L&T Accuracy Class: 0.2s	24/09/2018	23/09/2023
	ACME Chittorgarh Solar Energy Pvt. Ltd	250	Yet to be commissioned			
2	ACME Karimnagar Solar Power Pvt Ltd	15	SL. No. APZ00131 Make: Secure Apex 150 Accuracy class: 0.2 s	SL. No. APZ00132 Make: Secure Apex 150 Accuracy class: 0.2 s	02/03/2017	01/03/2022
3	Purvanchal Solar Power Pvt Ltd	15	SL. No. APZ00101 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00102 Make: Secure Accuracy class: 0.2 s	23/02/2017	22/02/2022
4	Rewanchal Solar Power Pvt Ltd	15	SL. No. APZ00106 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00107 Make: Secure Accuracy class: 0.2 s	24/03/2017	23/03/2022
5	Neemuch Solar Power Pvt Ltd	15	SL. No. APZ00111 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00112 Make: Secure Accuracy class: 0.2 s	25/03/2017	24/03/2022
6	ACME Fazilka Power Pvt Ltd (Nandipet)	15	SL. No. APZ001116 Make: Secure Accuracy class: 0.2 s	SL. No. APZ001115 Make: Secure Accuracy class: 0.2 s	13/03/2017	12/03/2022
7	ACME Narwana Solar Power Pvt Ltd (Lingampet)	15	SL. No. APZ00126 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00127 Make: Secure Accuracy class: 0.2 s	24/02/2017	23/02/2022
8	ACME Warangal Solar Power Pvt Ltd	15	SL. No. APZ00121 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00122 Make: Secure Accuracy class: 0.2 s	03/03/2017	02/03/2022
9	Devishi Renewable Energy Pvt Ltd	13	SL. No. UKD02401 Make: Secure Accuracy class: 0.2 s	SL. No. UKD02402 Make: Secure Accuracy class: 0.2 s	19/02/2017	18/02/2022
10	Devishi Solar Power Pvt Ltd	13	SL. No. UKD02400 Make: Secure Accuracy class: 0.2 s	SL. No. UKD02399 Make: Secure Accuracy class: 0.2 s	19/02/2017	18/02/2022
11	Sunworld Energy Pvt Ltd	13	SL. No. UKD02407 Make: Secure Accuracy class: 0.2 s	SL. No. UKD02412 Make: Secure Accuracy class: 0.2 s	10/02/2017	09/02/2022
12	ACME	10	SL. No. APZ00321	SL. No. APZ00322	26/09/2017	25/09/2022

Project Instance Number	Name of the SPVs	Capacity (MW)	Main Meter Details	Check Meter Details	Calibration Date	Next Calibration
	Yamunanagar Solar Power Pvt Ltd/1 (KOSGI)		Make: Secure Accuracy class: 0.2 s	Make: Secure Accuracy class: 0.2 s		
13	ACME Yamunanagar Solar Power Pvt Ltd/2 (MOTHKUR)	10	SL. No. APZ00316 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00317 Make: Secure Accuracy class: 0.2 s	17/09/2017	16/09/2022
14	ACME Mahbubnagar Solar Energy Pvt Ltd/2 (GODHUR)	10	SL. No. APZ00301 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00302 Make: Secure Accuracy class: 0.2 s	11/09/2017	10/09/2022
15	ACME Mahbubnagar Solar Energy Pvt Ltd-3 (PADMAJIWADI)	10	SL. No. APZ00312 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00313 Make: Secure Accuracy class: 0.2 s	09/09/2017	08/09/2022
16	ACME Mahbubnagar Solar Energy Pvt Ltd-1 (MANTHANI)	10	SL. No. APZ00306 Make: Secure Accuracy class: 0.2 s	SL. No. APZ00307 Make: Secure Accuracy class: 0.2 s	12/09/2017	11/09/2022

Since the calibration frequency of the meters are once in five years, the calibration is valid during the current monitoring period. Hence, no error factor has been applied due to delay in calibration.