NEGROS ISLAND SOLAR POWER INC. PROJECT

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Summary:

A brief description of the project:

The Negros Island Solar Power Inc. Project (hereafter referred as "project activity" involves the installation of 32MW (which includes two (02) phases of 18 MW and 14 MW) La Carlota Solar Power PV Plant and 48MW Manapla Solar Power Plant (La Carlota - Phase I +Phase II = 27.2 MW AC and Manapla -40.5 MW AC). The total installed capacity of the project is 80MW (to 67.7 MW AC) .

The purpose of the project activity is to generate power using renewable energy source (solar energy) and sell the power generated to the state grid. The project activity is located on Negros Island, within the Cebu-Negros-Panay sub-grid of the Visayas electricity grid.

A brief description of the validation and verification:

The PP has commissioned Carbon Check (India) Private Ltd. (CCIPL), to carry out a combined validation and verification of their project "Negros Island Solar Power Inc. Project", with regards to the relevant requirements of VCS Standard Version 3.7 /B02/.

The purpose and scope of validation:

The purpose of the validation is to have a thorough and independent assessment of the proposed project activity against the applicable VCS requirements, in particular, the project's baseline, monitoring plan and the project's compliance with relevant VCS and host party criteria. These are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. 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 emission reductions. CCIPL's objective is to perform a thorough, independent assessment of the validation of the project activity.

The validation scope is defined as an independent and objective review of the Joint PD & MR /2/. The Joint PD & MR /2/ is reviewed against the relevant criteria and guidance documents provided by VCS which included the following:

VCS Program Guide (v3.7), VCS Standard (v3.7), Program Definitions (v3.7), Registration & Issuance Process (v3.8) and in line with the VCS Validation and Verification Manual (v3.2) applicable at the time in order to confirm that the project meets the applicability conditions of the selected baseline and monitoring methodology namely ACM0002 (version 17.0) /B01/ and also assess the claims and assumptions made in the Joint PD & MR /2/ without limitation on the information provided by the project proponents.

The purpose and scope of verification:

The purpose of the verification is to review the Joint VCS PD & MR /2/ for the monitoring results and verify that monitoring methodology was implemented according to monitoring plan and monitoring data, further based on review of ER sheet /04/ confirm that the reductions in anthropogenic emissions by sources is sufficient, definitive and presented in a concise and transparent manner. In particular,

monitoring plan, Joint VCS PD & MR /2/, ER sheet /04/ and the project's compliance with relevant VCS, UNFCCC and host party criteria are verified in order to confirm that the project has been implemented in accordance with design and conservative assumptions, as documented.

The scope of the verification is:

- To verify the project implementation and operation with respect to the Joint PD & MR /2/.
- To verify the implemented monitoring plan with the Joint PD & MR /2/ and applied baseline and monitoring methodology /B01/.
- To verify that the actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that the reported emission reductions are complete and accurate in order to be certified.

The method and criteria used for validation and verification:

I. A desk review of the project description documents
   - A review of data and information;
   - Cross checks between information provided in the Joint PD & MR and information from sources with all necessary means without limitations to the information provided by the project proponent;

II. On-site visit and follow-up interviews with project stakeholders
   - Interviews with relevant stakeholders in host country with personnel having knowledge with the project development via telephone, email or direct on-site visits;

III. Reference to available information relating to projects or technologies similar to project under validation and review based on the approved methodology being applied for the appropriateness of formulae and accuracy of calculations.

IV. Review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;

V. Evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;

VI. Resolution of outstanding issues and the issuance of the final validation report and opinion.

The number of findings raised during validation and verification:

During the course of combined validation and verification, a total of 06 findings were raised and satisfactorily closed, which includes:
04 Corrective Action Request (CAR);
02 Clarification Requests (CLs);
00 Forward Action requests (FARs).
The Joint PD & MR /2/, emissions reduction calculations /4/ along with the supporting documents provided are considered to be in line with the VCS requirements /B02/. The validation team has detected no further uncertainties or quality restriction.

Summary of the validation and verification conclusion:

CCIPL hereby confirms that the project is fulfilling the criteria specified by Joint PD & MR template version 3.1 /B02/, VCS Standard version 3.7 /B02/ and applied methodology ACM0002 (version 17.0) /B01/, and hence be successfully validated, verified and further certified for emission reductions under VCS. CCIPL confirms a combined positive validation and verification opinion confirming the project complies with the applicable VCS requirements, thus recommending the project for registration and issuance.

In CCIPL's opinion, the estimated emission reductions reported for the "Negros Island Solar Power Inc. Project" in the Joint PD & MR are fairly and correctly stated. CCIPL is therefore able to certify that the "Negros Island Solar Power Inc. Project" is expected to reduce 66,039 tCO_2e per annum during the crediting period of 10 years.

During the current monitoring period from 02-March-2016 to 25-November-2017 (including both days), the project has generated 104,351 tCO_2e.

CCIPL does not assume any responsibility towards the issuance and utilisation of VCUs hereby verified and certified. Request for issuance of VCUs shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration. The verification of reported emission reductions is based on the information made available to CCIPL and the engagement conditions detailed in this report. Hence, CCIPL cannot be held liable by any party for decisions made or not made based on this report.

Table of Contents

1 INTRODUCTION

1.1 Objective

The PP has commissioned the VVB, Carbon Check (India) Private Ltd. to perform a joint validation and verification of the VCS bundled Project Activity "Negros Island Solar Power Inc. Project". The objective of the combined validation and verification is to have an independent third party assessment of the Joint PD & MR/2/ and supporting documentation to ensure compliance with the rules, regulations and guidelines laid out in the following CDM and VCS requirements: documents:

- VCS Program Guide (v3.7)
- VCS Standard (v3.7)
- VCS Program Definitions (v3.7)
- VCS Registration & Issuance Process (v3.8)
- VCS Validation and Verification Manual (v 3.2)
- UNFCC CDM approved methodology ACM0002 (version 17.0)
- The project's additionality justification is assessed against "Tool for the demonstration and assessment of additionality", Version 07.0.0

Validation and 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 verified carbon units (VCUs). This report contains the findings and resolutions from the validation and verification of the project activity.

1.2 Scope and Criteria

The scope of joint validation and verification scope is defined as an independent and objective review of the Joint PD & MR/2/ against the relevant criteria and decisions of the VCS, CDM including the approved baseline and monitoring methodology. CCIPL has employed a risk-based approach in the validation, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The validation is not meant to provide any consulting towards the project proponents. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

The only purpose of the validation and verification is its usage during the registration /issuance process as part of the VCS project cycle. Therefore, CCIPL cannot be held liable by any party for decisions made or not made based on the validation 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 Negros Island Solar Power Inc. Project (hereafter referred as "project activity" involves the installation of 32MW (which includes two (02) phases of 18 MW and 14 MW) La Carlota Solar Power PV Plant and 48MW Manapla Solar Power Plant. The total installed capacity of the project is 80MW (which corresponds/equivalent to 67.7 MW AC) intended to provide daytime power to the grid throughout the year.

The purpose of the project activity is to generate power using renewable energy source (solar energy) and sell the power generated to the state grid. The project activity is located on Negros Island, within the Cebu-Negros-Panay sub-grid of the Visayas electricity grid.

The total estimated GHG emission reductions expected for the bundled project is 660,390 tCO_2e for the entire crediting period (of ten years). Thus, the estimated annual average emission reductions will be 66,039 tCO_2e.

The total actual GHG emission reduction for the bundled project is 104,351 tCO2e for the current monitoring period ranging from 02-March-2016 to 25-November-2017 (including both days).

This was confirmed based on review of Joint PD & MR /2/, ER verification spreadsheet /04/, Metering Reading reports/11/ and Invoices issued /12/.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

The PP has commissioned Carbon Check (India) Private Ltd., to carry out joint validation and verification of the project "Negros Island Solar Power Inc. Project", with regards to the relevant requirements of VCS Standard Version 3.7 /B04/.

The method and criteria used for validation and verification consists of the following three phases:

1. Completeness check and desk review of the Joint PD & MR, baseline and monitoring methodology, applicable tools and other relevant documents;
2. On-site visit (including follow-up interviews with project stakeholders, when deemed necessary).
3. Resolution of outstanding issues and the issuance of the final Joint Validation & Verification report and if applicable the VCS Validation and Verification Deeds of Representation.

Validation Process:

The validation process includes thorough and independent assessment of the proposed project activity against the applicable VCS requirements, in particular, the project's baseline, additionality, monitoring plan and the project's compliance with relevant VCS and host party criteria. The joint assessment of the project and to confirm that the project meets the applicability conditions of the selected baseline and monitoring methodology, ACM0002 (version 17.0)/B01/ and assess the claims and assumptions made in the Joint PD & MR /2/ without limitation on the information provided by the project proponents. The overall validation was conducted using CCIPL's internal procedures.

Verification Process:

The verification process involves thorough review of the monitoring results and confirming that the monitoring methodology was implemented according to the monitoring plan and monitoring data which is used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and presented in a concise and transparent manner.

In particular, the monitoring plan, emission reduction calculations and the project's compliance with relevant VCS and host Party criteria are verified in order to confirm that the bundled project has been implemented in accordance with the Joint PD & MR/2/ and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the Joint PD & MR/2/ and approved monitoring methodology/B01/.

2.2 Document Review

During the document review, CCIPL has applied standard auditing techniques to assess the quality of information provided. The joint validation and verification was performed primarily based on the review of the Joint PD & MR /2/ and the supporting documentation.

For validation, this process includes:

- A review of data and information presented to verify completeness and consistency in accordance with VCS Standard (version 3.7) /B04/ requirements;
- A review of the project description and monitoring methodology, paying particular attention to the applicability conditions of the methodology and baseline and additionality related requirements
- A review of the monitoring plan and the project's compliance with relevant VCS criteria.

For verification, this process includes:

- A review of data and information presented by the PP to verify their completeness
- A review of the MP and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the QA/QC procedures, and
- An evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

The Joint PD & MR /1/ was initially reviewed and CCIPL requested the PP to present the supporting information and documents. The documents were reviewed by CCIPL. Through the assessment process, the revised Joint PD & MR /2/ and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by the assessment team.

The following table outlines the documentation reviewed during the verification:

Category A documents (documents from the PP)

Sl. No.	List of pertinent documents
/1/	Joint PD & MR, version 1, dated 18/03/2017
/2/	Final Joint PD & MR, version 3, dated 10/02/2018
/3/	Emission reduction spreadsheet corresponding to /1/
/4/	Emission reduction spreadsheet corresponding to /2/
/5/	IRR spreadsheet
/6/	Evidence of the commissioning of the Solar PV projects/Commissioning certificates for each site.
/7/	Evidence for the technical specifications of the project equipment (Solar PV Modules, Inverters, Transformers and monitoring equipment i.e. electricity meters) including the photographs of name plate data/information.
/8/	Evidence of the grid connectivity and sale of power to the grid (Wholesale Electric Spot Market)
/9/	a) Plant Layout drawing. b) Single line diagram showing the electricity generation, transmission, evacuation and metering system.
/10/	Evidence for the input parameters used for the investment analysis.
/11/	Copies of the monthly energy meter readings (Electricity export and electricity import) covering the entire monitoring period-(downloaded password protected excel sheet from National Grid Corporation of The Philippines)
/12/	Philippines electricity market corporation (WESM) invoices to the project proponent under the WESM (Wholesale Electric Spot Market) registration for cross check of the energy meter readings covering the monitoring period
/13/	Calibration certificates for the energy meters covering the monitoring period
/14/	Manufacturer specification of the electricity meter used for the calibration including the requirement on calibration.
/15/	Evidence (proof) of data used OM & BM: email from DNA of Philippines (DOE) to PP
/16/	Statutory clearances as applicable for the project
/17/	Proof of training and competency of the project operators
/18/	Evidence (media used to invite comments, minutes of meeting for the project, presentation of the meeting, attendance sheet, minutes of meeting & photographs of the meeting etc.) pertaining to local stakeholder consultation of the project
/19/	Company registration certificate of the PP
/20/	Declaration(s) from Project proponent on the following (for section 1.12 of the Joint PD & MR):

	a) Project not registered or under process of registration in any other Emissions Trading Programs and Other Binding Limits. b) Project not registered or under process of getting and Other Forms of Environmental Credit c) The project has not been registered and is not seeking registration under any other GHG program. d) Projects not Rejected by Other GHG Programs
/21/	• Initial Environmental Examination (IEE) Report. • Environmental Compliance Certificate (ECC).

Category B documents (other documents referenced)

Sl. No.	List of pertinent documents
/B01/	Approved CDM monitoring methodology: ACM0002: Grid-connected electricity generation from renewable sources - Version 17.0
/B02/	VCS Requirements: • Verified Carbon Standard Program Guide, v3.7; • Verified Carbon Standard, v3.7; • VCS Program Definitions, Ver. 3.7 • VCS Registration and Issuance Process, v3.8 • VCS Validation and Verification Manual, v3.2 • VCS Joint Project Description & Monitoring Report Template, v3.1 • VCS Joint Validation & Verification Report Template, v3.1
/B03/	CDM Validation and Verification Standard, version 09.0 CDM Project Standard, version 09.0
/B04/	Tool to calculate the emission factor for an electricity system, version 06.0
/B05/	Emission Factor published by DNA of Philippines
/B06/	Methodological Tool: Tool for the demonstration and assessment of additionality, version 07.0
/B07/	Methodological Tool: Investment analysis, version 08.0
/B08/	Methodological Tool: Common practice, version 03.1

2.3 Interviews

The key personnel interviewed and the main topics of the interviews are summarized in the table below:

During Site visit:

	Date	Name	Organization	Topic
/i/	18/01/2018 to 19/01/2018	Camille Ang	Macquarie Infrastructure Advisory (Philippines) Inc.	• Project Design and technical specifications • Project Implementation status • Project start date • Project Location(s) • Environmental Impacts
/ii/	18/01/2018 to 19/01/2018	Lord Lee Van Burgos	AC Energy Devco	• Project Design and technical specifications • Project Implementation status • Project start date • Project Location(s) • Environmental Impacts
/iii/	18/01/2018 to 19/01/2018	Ray Vincent P. Enriquez	AC Energy Devco	• Electricity metering and calibration requirements • Transmission and distribution of generated electricity
/iv/	18/01/2018 to 19/01/2018	Pham Tra Giang	Consultant	• Project Design and technical specifications • Project Implementation status • Project start date • Project Location(s) • Baseline Scenario • Baseline Identification and Additionality • Estimated ER calculations • Qualification and Training • Monitoring and reporting documentation • Quality Assurance-Management and operating system • Environmental Impacts • Compliance with relevant national and state laws • Roles and responsibility • Actual ER calculations
/v/	18/01/2018	Angelito	Local Stakeholder	Local Stakeholders Consultation
/vi/	18/01/2018	Ronald Duenas	Local Stakeholder	Local Stakeholders Consultation
/vii/	18/01/2018	Jobmapie	Local Stakeholder	Local Stakeholders Consultation
/viii/	18/01/2018	Jessie	Local Stakeholder	Local Stakeholders Consultation
/ix/	18/01/2018	Junie Alpas	Local Stakeholder	Local Stakeholders Consultation

2.4 Site Inspections

A site visit was undertaken on 18/01/2018 to 19/01/2018 in Negros Occidental, Philippines (two sites– La Carlota and Manapla) to confirm the project description as provided in the Joint PD & MR /2/. During the OSV, topics as outlined in the tables in the section 2.3 were discussed/ focused on. The site visit was conducted to assess the implementation and operation of the project activity and to review evidence and interview key personnel to confirm the project design, implementation, operations, monitoring plan, QA/QC procedures, environmental impacts and stakeholders of the project.

2.5 Resolution of Findings

This section summarises the findings from the joint validation and verification of the bundled project activity. In this section, the findings from the document review, site visit, assessments and interviews are provided. Material discrepancies identified during the joint validation and verification process are addressed either as CARs or CLs. Carbon Check has identified, discussed these issues within the Joint Validation & Verification report in Appendix 2.

Clarification requests (CLs): Project reporting lacks transparency and further information is needed to determine if a material discrepancy is present.

Corrective action requests (CARs): The VVB has identified a material discrepancy or non-conformance that the project proponent must address.

The final Joint PD & MR/2/ submitted by PP 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 VCS objectives. The two VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

A total of 04 CARs and 02 CLs had been raised for the joint validation and verification of the project activity and all are satisfactorily closed.

2.5.1 Forward Action Requests

Forward Action Request (FAR) is to be raised when the monitoring and reporting require attention and/or adjustment for the next verification period. FARs does not relate to VCS requirements for issuance of ERs achieved during subject monitoring.

CCIPL has not raised any FAR during this joint validation and verification.

3 VALIDATION FINDINGS

3.1 Project Details

The Negros Island Solar Power Inc. Project (hereafter referred as "project activity" involves the installation of 32MW DC (which includes two (02) phases of 18 MW and 14 MW) La Carlota Solar Power PV Plant (which corresponds/equivalent to 27.2 MW AC) and 48MW DC Manapla Solar Power Plant (which corresponds/equivalent to 40.5 MW AC). The total installed capacity of the project is 80MW DC (which corresponds/equivalent to 67.7 MW AC) /07/. The number of SPV modules as verified during the onsite inspection for La Carlota Phase 1, phase 2 and Manapla approximately 70,000 modules, 54,000 modules and 179,000 modules respectively.

Location of the project /06/,/08/

La Carlota 32MW Solar Power Plant

The La Carlota Solar plant includes two (02) phases of 18 MW and 14 MW. The City of La Carlota is located at the Southwest part of Central Negros Occidental, bounded on the north by the City of Bago, on the east by the mountain ranges of Kanlaon Volcano, on the southwest by the town of La Castellana, on the south by the town of Pontevedra and on the west by the town of San Enrique. It lies on geographical coordinates between 122° 56' 5" and 122° 56' 25" East Longitude and 10° 25' 10" and 10° 25' 40" North Latitude.

Manapla 48MW Solar Power Plant

The Municipality of Manapla is situated at 10º57'00" latitude and 123º07'30" longitude. It is approximately 44.7 kilometers away from the city of Bacolod and it is located at the northern part of the province. It is bounded by Cadiz City on the east, by Victorias on the south and Guimaras Strait on the Western and northern portion. The plant is located on Latitude: 10.9° North Latitude and 123.2° East Longitude.

The Project has received necessary approvals /16/, /21/ for development and commissioning for each plant from the local authorities (e.g. Department of Energy, Department of Environment and Natural Resources, etc.) and is in compliance to the local laws and regulations.

The WESM (Wholesale Electric Spot Market) registration /08/, Commissioning Certificates (released by Department of Energy) /06/ are the project ownership documents which are executed only when the project activity compliance laws and regulatory requirements. These documents /06/,/08/ also demonstrates grid connectivity of the project and thus complies with the requirement of applied baseline and monitoring methodology /B01/.

The relevant implementation dates are in the table below:

Event	**32MW La Carlota**	**48MW Manapla**
Commissioning Date /06/	02/03/2016 (Start date of the project activity as per VCSA requirement i.e. the day when the project start generating emission reductions)	08/03/2016

The purpose of the project activity is to generate electricity by the utilization of renewable solar PV technology and further selling the generated energy to the Visayas Grid. In the Pre- project scenario the entire 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 (primarily based upon fossil fuels). As validated the project is estimated to reduce 66,039 tCO2e per year (annual average), by displacing 119,312 MWh/year amount of electricity from the generation-mix of power plants connected to the Philippine electricity grid, which is mainly dominated by thermal/ fossil fuel-based power plant. This was confirmed based on the review of ER validation spreadsheet /4/ and other supporting documents like DPRs /6/. The total estimated emission reductions during the entire crediting period of 10 years is approximately 660,390 tCO2e. The project scale is Project as the expected ERs from the grouped project activity is less than 300,000 tCO2e/year. The project crediting period starts on 02/03/2016 and ends on 01/03/2026 with a total crediting period of 10 years (renewable two times).

The emission reductions of the project during the first monitoring period (02/03/2016-25/11/2017) is 104,351 tCO_2.

The Project is owned by Individual investors hence it possesses right of use of ER credits. The Ownership is demonstrated through the following documents.

- ✓ Commissioning certificates for solar plant in the name of Project Owner issued by Department of Energy /06/.
- ✓ The project also has been approved for Wholesale Electricity Spot Market (WESM) for sale of electricity by the PP /08/.

Technology used in the project

The main components of the solar farm include the photovoltaic (PV) modules, solar cable connectors, current and voltage controller, and inverter. The project activity is generating power using solar energy, which is a renewable source of energy. The solar PV system mainly consists of PV modules, module mounting structures, junction boxes, Inverters, regulators, monitoring devices etc. The solar PV cells convert solar radiation into DC current. The solar panels are installed in arrays. The modules in the each array are connected in parallel and/or series in order to get the preferred current & voltage which match with the rated input parameters of the inverter. The Inverter connected in each array converts the DC current to AC current. The electricity collected from all the inverters in La Carlota is stepped up to 13.8 kV and in Manapla is stepped up to 13.8 kV through 13.8kV/405V/405V transformers. The 13.8 kV electricity is further stepped up to 69 kV and up to 138 kV at 138/69kV substation and then supplied to Visayas grid. The operational life time of the project activity is 25 years.

Technical specification /07/ of solar PV module and other components /07/ installed in the project:

Category	**La Carlota (32 MW DC)**	**Manapla (48 MW DC)**		
PV Module				
Module Model	Conergy PH 260P	Conergy PE 265P	Conergy PE 275M	Conergy PE 270M
Module type	Framed	Framed	Framed	Framed
Nominal output	260W	265W	275W	270W
Unit Nom. Power	260 Wp	265 Wp	275 Wp	270 Wp
Number of PV modules	123,096 (Phase 1 18MW: 69,240 modules	92,352	34,632	52,056

	Phase 2 14MW: 53,856 modules)			
Total nomimal Power Output	Phase 1: 18,002 kWp Phase 2: 14,003 kWp	24,473 kWp	9,524 kWp	14,055 kWp
No. of cells	60	60	60	60
Cell dimensions	156x156mm	156x156mm	156x156mm	156x156mm
Cell type	Polycrystalline cell, 3-busbar technology	Polycrystalline, 3-busbar technology	Monocrystalline, 3-busbar technology	Monocrystalline, 3-busbar technology
Module weight	19.5kg	18.2kg	18.2kg	18.2kg
Maximum permissible load	5,400Pa	5,400Pa	5,400Pa	5,400Pa
Maximum permissible system voltage	1,000V	1,000V	1,000V	1,000V
Inverter				
Inverter model	Sunny Central 850CP XT	Sunny Central 900CP XT		
Operating voltage	568-850V	596-850V		
Unit Nom.Power	850 kWac	900 kWac		
No. of inverter	32 units (Phase 1 18MW: 18 units Phase 2 14MW: 14 units)	23 units	9 units	13 units
Total Power	Phase 1: 15,300 kWac	20,700 kWac	8,100 kWac	11,700 kWac

	Phase 2: 11,900 kWac			
Transformer				
Serial No.	VN01106 3- phase transformer	75660		
No. of transformer	01 set	01 set		
Highest rate power	35/35 MVA	50 MVA		
Voltage	69 ± 8 x 1.25%/13.8 kV	69 ± 8 x 1.25% Steps		
Frequency	60Hz	60 Hz		

It has been confirmed in the Joint PD & MR /2/ that the project or any of its components are not seeking registration and has not been registered under any GHG program.

Based on its assessment through review of relevant documentation (as cited above), the assessment team confirms that the description given in the Joint PD & MR /2/ is accurate, complete, and provides an understanding of the nature of the project, and the project has been implemented as described in the Joint PD & MR /2/.

3.2 Participation under Other GHG Programs

Not applicable

3.3 Application of Methodology

3.3.1 Title and Reference

The bundled project uses the following approved large-scale CDM methodology:

ACM0002: Grid-connected electricity generation from renewable sources (version 17.0) /B01/.

In addition, the project activity also uses the following tools:

- Tool to calculate the emission factor for an electricity system --- Version 06.0, /B04/
- Tool for the demonstration and assessment of additionality --- Version 07.0.0 /B06/

The methodologies and the tools referenced are valid at the time of joint validation and verification of the bundled project activity have been checked and confirmed by the assessment team.

3.3.2 Applicability

The bundled project activity applies the approved large-scale CDM methodology; ACM0002, version 17.0 /B01/. Applicability criteria for the baseline line methodologies are assessed by the validation team by means of document review and interview. Validation team confirms that the project activity meets the criteria of the applied methodologies.

Applicability criteria as per methodology /B01/	Justification from PP /2/	Means of validation
1. This methodology is applicable to grid-connected renewable energy power generation project activities that: a. Install a Greenfield power plant; b. Involve a capacity addition to (an) existing plant(s); c. Involve a retrofit of (an) existing operating plants/units; d. Involve a rehabilitation of (an) existing plant(s)/unit(s);or e. Involve a replacement of (an) existing plant(s)/unit(s).	Applicable. The project activity involves installing a new 32MW La Carlota and a new 48MW Manapla solar power plants at the site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plants)	The validation team reviewed the Joint PD & MR /2/, commissioning certificate /06/, agreement for sale of electricity /08/ and conducting physical inspections during OSV combined with interviewing representatives of PP/i/,/ii/,/iv/ confirms that the current project activity involves generation of electricity through renewable energy by operation of green field solar PV power plants that supply electricity to the Philippine electricity grid. Thus, based on the above, the assessment team concludes that the project activity has successfully complied with requirements of the current applicability criteria of the applied

		methodology ACM0002, (version 17.0) /B01/.
2. The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	Applicable The Project consists of the installation of a new 32MW La Carlota and 48MW Manapla solar power plants.	The validation team reviewed the Joint PD & MR /2/ and by conducting physical inspections during OSV combined with interviewing representatives of PP /i/,/ii/,/iv/ confirms that the current project activity involves installation and operation of solar PV power plants thereby resulting in generation of electricity through renewable energy. Thus, based on the above, the assessment team concludes that the bundled project activity has successfully complied with requirements of the current applicability criteria of the applied methodology ACM0002, (version 17.0) /B01/.
3. In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	Not relevant as the project activity does not involve capacity addition, retrofit or replacement of any existing solar power plant.	Criterion not applicable as the project is a Greenfield project.
4. In case of hydro power plants, one of the following conditions shall apply: a. The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or b. The project activity is implemented in existing single	Not relevant as the project activity consists of a new 32MW La Carlota and 48MW Manapla solar power plants	Criterion not applicable as the project is a solar power project.

or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m2; or c. The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m2; or d. The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3),is lower than or equal to 4 W/m2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4),is greater than 4 W/m2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2 shall be: a) Lower than or equal to 15 MW; and b) Less than 10 per cent of the total installed capacity of integrated hydro power project.		
5. In the case of integrated hydro power projects, project proponent shall: • Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or • Provide an analysis of the water balance covering the	Not relevant as the project activity consists of a new 32MW La Carlota and 48MW Manapla solar power plants	Criterion not applicable as the project is a solar power project.

water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.		
6. The methodology is not applicable to: • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants/units.	Not relevant for project activity since: The project activity is a Greenfield solar energy project, so there will be no fuel switching.	Criterion not applicable as the project is a Greenfield solar PV power project.
7. In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The project activity involves a new grid connected solar power plant and not a retrofit, replacement or capacity additions and therefore this criterion is not applicable to the project activity.	Criterion not applicable as the project is a Greenfield project.
8. In addition, the applicability conditions included in the tools referred to below apply.	Please refer below for the demonstration provided by the	The validation team reviewed the Joint PD & MR /2/ and confirms that the current

	project proponent in the Joint VCS PD & MR.	project activity complies with the applicability conditions included in the referred tools. Thus, based on the above, the assessment team concludes that the bundled project activity has successfully complied with requirements of the current applicability criteria of the applied methodology ACM0002, (version 17.0) /B01/.

In addition, the applicability conditions included in the tools applied and referred to above apply as follows:

Applicability Conditions	**Justification /01/,/02/**
"Tool for the demonstration and assessment of additionality", version 07.0.0: Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	The chosen methodology prescribes the use of this tool. Please refer to section 2.5 below for more details.
"Tool to calculate the emission factor for an electricity system", version 06.0: 1. This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). 2. Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, the conditions specified in "Appendix 2: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the	1. The Project Activity is the installation of 32MW La Carlota and a new 48MW Manapla solar power plants supplying electricity to the national Grid. 2. The emission factor for the project electricity system has been calculated for grid power plants only.

reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity. 3. In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex-I country. 4. Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	3. The project electricity system is located in a non-Annex I country. 4. The project is not relevant to biofuels use.

3.3.3 Project Boundary

As per §22 of the applied methodology /B01/ the project boundary is defined as:

"*The spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to*."

The information regarding the project boundary has been also correctly given in the Joint PD & MR /2/.

The assessment team confirms that the project boundary for the project instances is based on the applied methodologies /B01/ and that there are no sources and gases within the boundary.

The physical delineation of the project boundary and the description of the emission sources and GHGs that are included in the boundary are appropriate for the purpose of calculating project and baseline emissions for the bundled project.

3.3.4 Baseline Scenario

To describe the baseline scenario the PP has employed the requirements listed under §24 of the applied methodology /B01/ which states that:

"If the project activity is the installation of a Greenfield power plant, the baseline scenario is 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 that the current bundled project involves installation and operation of greenfield, grid-connected solar power plants, the above assigned baseline scenario is deemed to be consistent. This was confirmed based sectoral expertise of the assessment team and further by reviewing the Joint PD & MR /2/, DPRs /6/, Power purchase agreements /11/ and conducting physical inspections during OSV combined with interviewing representatives of PP /i/,/ii/,/iv/.

Hence, the baseline for the project activity is the equivalent amount of power from the Luzon-Visayas grid.

The combined margin ($EF_{grid,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) (having weightage 25%) and build margin (BM) (having

weightage 75%). Calculations for this combined margin must be based on data from an official source of CEA database (where available) and made publically available.

The combined margin of the Luzon-Visayas Grid used for the project activity is as follows[1]:

Parameter	Value	Nomenclature	Source
$EF_{grid,y}$	0.5535 tCO_2/MWh	Combined margin CO2 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 Department of Energy[2]
$EF_{grid,OM,y}$	0.6032 tCO_2/MWh	Operating margin CO2 emission factor for the project electricity system in year y	The data are obtained from Department of Energy /15/.
$EF_{grid,BM,y}$	0.4044 tCO2/MWh	Build margin CO2 emission factor for the project electricity system in year y	The data are obtained from Department of Energy /15/.

Thus, the baseline scenario has been identified in line with the requirements of the applied methodology ACM0002 (version 17.0) /B01/ and is deemed to be appropriate and justified.

3.3.5 Additionality

The project is large scale project. Therefore, in accordance with ACM0002, the additionality of the project has been demonstrated based on the valid version of the "Tool for demonstration and assessment of additionality" (Ver 07) /B06/ and the "Methodological Tool: Investment analysis" (Ver 08) /B07/. For the above reasons, this approach has been assessed to be appropriate for the assessment of additionality for this project activity.

Alternatives:

This is a solar PV power project and is based on the Methodology ACM0002 Ver. 17.0 The methodology states, "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".

Since the approved methodology ACM0002 used by the project activity prescribes the baseline scenario, no further analysis of alternatives is required for the project activity.

Investment analysis:

a) Suitability of investment analysis, financial indicator and benchmark:

[1] https://www.doe.gov.ph/national-grid-emission-factor-ngef

[2] https://www.doe.gov.ph/national-grid-emission-factor-ngef

PP had demonstrated that the financial returns of the proposed VCS project activity would be insufficient to justify the required capital investment as per VVS version 09. 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 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 analysis is also not appropriate for the project activity. Therefore, benchmark analysis is used for the project activity as per project type and decision making context. The choice of post-tax equity IRR and the corresponding benchmark is considered appropriate by the validation team.

The equity IRR needs to be compared with an appropriate benchmark. Following the "Tool-Investment Analysis" Version 08:", paragraph 19 states, "If the benchmark is based on parameters that are standard in the market, the cost of equity should be determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors".Thus the project participant applies the following benchmark calculation to determine the appropriate benchmark for this project.

Determine the cost of equity using default value (appendix A) of the Tool "Investment Analysis" Version 08:**,**

Applying the default values approach, the expected return on equity for the Philippines is 10.31% (energy industries, Ba3 rating) in accordance with guidance from EB62, convert into nominal values by adding the inflation rate by applying the average forecasted inflation rate by the IMF.

The benchmark is calculated by the following equation by Irving Fisher[3]:

$$(1 + r_n) = (1 + r_r) \times (1 + i)$$

where:

r_n *is the nominal interest rate (or nominal return on equity in this case)*

r_r *is the real interest rate (or real return on equity in this case)*

i *is the rate of inflation*

	Real Return on Equity (ROE) (r_r)	**Inflation (i)**	**Nominal ROE (r_n)**
Benchmark	10.31% (The Philippines, Group 1)[4]	3.02%[5]	13.64%

In conclusion, the return of equity of **13.64%** applied as the cost of equity for power generation projects in the Philippines at the date of decision making of the proposed project fulfils the requirements of the Tool "Investment Analysis" Version 08.. Validation team deemed the calculated benchmark as appropriate and correct.

b) Parameters and assumptions used:

[3] http://everything.explained.at/Fisher_equation/

[4] Appendix A, "Guidelines on the Assessment of Investment Analysis", version 05 (Annex 5 of EB 62)

[5] Source: World Economic Outlook Database, October 2017.

The important parameters, which determine the equity IRR of the project, are project cost, plf, financing pattern and profitability estimates.

Parameters used in the calculation of the Equity Internal Rate of Return

Variable	Value employed	Source and the assessment
Inflation rate, Philippines	3.01%	Verified from the average inflation /10/ rate of the Philippines economy for period from 2017-2022[6]
Inflation rate, Singapore	1.58%	Verified from the average inflation rate /10/ of the Singapore economy for period from 2017-2022[7]
Investment		
Total investment cost before VAT, PHP'000	020,291)	
Investment including premium	(5,576,606)	Consolidating payment instructions to investors, cross checked by review of provided document /10/
Investment into company	(5,196,559)	Audited Balance Sheet, cross checked by review of provided document /10/
Premium paid to TL	(318,605)	Consolidating payment instructions to investors, cross checked by review of provided document /10/
Transaction costs	(61,441)	Consolidating payment instructions to investors, cross checked by review of provided document /10/
Release of holdback amounts	(382,244)	Internal calculation - Holdback reconciliation, cross checked by review of provided document /10/
Operations		
Total Installed capacity (MW) including:	80	Technical Specifications - GHD Study, cross checked by review of provided document /10/
La Carlota	32	

[6] Source: World Economic Outlook Database, October 2017

[7] Source: World Economic Outlook Database, October 2017

Manapla	48	
Annual generation (MWh, 2015)	119,312	Technical Specifications - GHD Study, cross checked by review of provided document /10/
La Carlota	47,273	
Manapla	72,040	
Investment horizon (years)	25 years	Site Lease term, cross checked by review of provided document /10/
Power tariff (PHP/kWh)		historical until Sep 2017; forecast: maximum historical WESM price inflated by Philipppine CPI (see financial statements) , cross checked by review of provided document /10/
La Carlota	3.53	
Manapla	3.56	
Annual O&M cost (PHP'000, Oct 2016 - Sep 2017)	(513,415)	- Audited and unaudited financial statements 2016 - Unaudtied financial statements as of Sep 2017 - Major contracts (Conergy, PRSS, land lease, management contracts) , cross checked by review of provided document /10/
Annual depreciation	Plant: 25 years useful life Non-plant: 5 years useful life	2016 audited financial statements, cross checked by review of provided document /10/
Taxes		
Government share	1.0%	Renewable Energy Act of 2008 (http://www.lawphil.net/statutes/repacts/ra2008/ra_9513_2008.html) , cross checked by review of provided document /10/
Income Tax rate	10.0%	Renewable Energy Act of 2008 (http://www.lawphil.net/statutes/repacts/ra2008/ra_9513_2008.html) , cross checked by review of provided document /10/
Income Tax Holiday (years)	7	Renewable Energy Act of 2008 (http://www.lawphil.net/statutes/repacts/ra2008/ra_9513_2008.html) , cross checked by review of provided document /10/

c) Cross checking of the parameters:

The cost of solar projects, electricity tariff, O&M cost, depreciation and tax rate have been cross checked with , cross checked by review of provided document /10/. The offer value has been used in the financial calculation as same was available during decision making and hence applicable. The same is acceptable

to the assessment team. Validation team thus checked the conformity with the accepted accounting principles adopted by the company and income tax laws in the host country.

The documents supporting the financial calculations, in the opinion of Validation Team, are therefore authentic and conform to the guidance given by CDM EB. All the input parameters considered in computation, the basis, correctness and appropriateness thereof are checked and found correct.

d) Assessment of correctness of computation:

The assessment involved checking the data input taken from provided document /10/, adoption of correct accounting principle and arithmetical accuracy. Validation Team checked the documents and ensured that appropriate input has been taken in the project cost and projections. The arithmetical accuracy was also found to be correct. The equity IRR has been computed for a period of 25 years, which is the life time of the project and is in conformity with the Methodological Tool: Investment Analysis, version 07.0. The principle adopted conforms to the accepted accounting and taxation principles. Validation team also confirms that rest of the input parameters are considered appropriately and are in line with the Methodological Tool: Investment Analysis, version 08.0.

	Internal Rate of Return (IRR)
Project without VER revenues	*-1.28%*
Benchmark	*13.64%*

Sensitivity analysis:

The Methodological Tool: Investment Analysis, version 08.0 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 developers have identified Plant Load Factor (PLF), Project cost, Electricity tariff and O&M cost as critical assumptions. *The tool for the demonstration and assessment of additionality requires that a sensitivity analysis is conducted to check whether, under reasonable variations in the critical assumptions, the results of the analysis remain unaltered. We have used as critical assumptions:*

- *Total investment cost*
- *O&M costs*
- *Tariff*
- *Power Production*

In the sensitivity analysis, variations of ±10% have been considered in the critical assumptions.

Results of the sensitivity analysis – impact of variations in critical assumptions on IRR

Percentage Variation	***-10%***	***0%***	***+10%***

Critical assumption			
Total investment cost	-0.62%	-1.28%	-1.86%
O&M cost	-1.18%	-1.28%	-1.38%
Tariff	-3.11%	-1.28%	0.21%
Power Production	-3.11%	-1.28%	0.21%

Validation team confirms that the IRR remains below the benchmark with 10% variations of the key parameters, which can already be considered conservative variations for sensitivity analysis. This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark). Thus, it can be easily concluded that project activity is additional & is not business as usual scenario.

Having regard to the assessment of conformity of additionality demonstration and benchmark selection to the latest version of the guidance issued by CDM EB on the assessment of investment analysis, plausibility and appropriateness of parameters used and correctness of financial calculations, Validation Team concludes that the project scenario is not economically feasible without benefits from VCUs sales.

Common practice analysis:

Validation team confirms that as the project activity involves in generating electricity by utilizing solar power resource which is one of renewable energies, then the project is considered to apply the measure (ii) indicated in paragraph 13b of Tool for the demonstration and assessment of additionality (version 07.0.0) as below:

(ii) Switch of technology with or without change of energy source including energy efficiency improvement as well as **use of renewable energies** (example: energy efficiency improvements, power generation based on renewable energy);

The latest version of the Tool "Common practice" version 03.1 shall be applied to demonstrate the common practice analysis following the steps below:

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

The proposed project has a capacity of 80 MW. The output range as +/-50% of the design capacity of the proposed project activity is 40MW – 120 MW.

(ii) Step 2: Identify similar projects (both carbon and non-carbon) which fulfill all of the following conditions:

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

The applicable geographical area for the proposed project is the whole host country (the Philippines).

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

The proposed project activity is a power generation based on renewable solar energy. As per the definition of "Measure" prescribed in the "Guidelines on common practice" (version 02.0), all projects of power generation based on renewable energy are considered.

(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;

The proposed project activity uses solar power resource and hence only solar power generation projects indicated in step (b) above are considered.

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

The proposed project activity only generates electricity. All solar projects indicated in step (c) with electricity generation are considered.

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

Installed capacity from 40MW to 120MW as assessed in step 1 are considered.

(f) The project started commercial operation before the project design document (joint PD and MR) is published for public comment on VCS website or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Since the Joint PD and MR of the proposed project published for public comment on VCS website would be on 31 December 2017 which is later than the start date of the project on 02 March 2016. Hence the common practice analysis will include all solar power projects (Carbon revenue and non carbon revenue) as the same measure, same energy source as the proposed project activity within the applicable output range determined in Step 1 and that have started commercial operation before the start date of the project activity on 02 March 2016.

Validation Team based on information and reference [information published by the Department of Energy of the Philippines up to 2017 (release date October 2017)[8] which is the latest information at time of PDD uploading in VCS website as of December 2017] provided in the VCS PD noted that following are the operational solar projects that are falling into range of 40MW-120MW:

No.	Name of the project	Date of commissioning	Installed capacity (MW)
1	MAJESTIC	Mar 2015	41.3
2	PETROSOLAR	Feb 2016	50.1

[8] https://www.doe.gov.ph/sites/default/files/pdf/electric_power/existing_power_plants/existing_power_plants_luzon_june_2017.pdf (release date, 10 August 2017)

https://www.doe.gov.ph/sites/default/files/pdf/electric_power/existing_power_plants/existing_power_plants_visayas_june_2017.pdf (release date, 10 August 2017)

https://www.doe.gov.ph/sites/default/files/pdf/electric_power/existing_power_plants/existing_power_plants_mindanao_june_2017.pdf (release date, 10 August 2017)

	The proposed Project activity	02 Mar 2016	80

(iii) 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}.

As resulted in step 2, N_{all} =2.

(iv) 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}.

From the information published on DOE (department of energy website), the two solar power projects listed in step 3 above were qualified for FIT which is an incentive policy for renewable energy projects in Philippines.

No.	Name of the project	Date of commissioning	Installed capacity (MW)	Feed-In Tariff (Approved for Renewable Energy)
1	MAJESTIC	Mar 2015	41.3	YES
2	PETROSOLAR	Feb 2016	50.1	YES
	The Project activity	02 Mar 2016	80	NO

The demonstration of technologies which is different and not comparable is in compliance of the Tool: common practice version 03.1, paragraph 12 *(d) Investment climate on the date of the investment decision, inter alia:*

(i) Access to technology;

(ii) Subsidies or other financial flows;

(iii) Promotional policies;

(iv) Legal regulations.

Since the project is under Wholesale Electricity Spot Market ("WESM") and the two other projects were in Feed-In Tariff (FIT), PP has correctly demonstrated that those projects under Feed-In Tariff are different and not comparable since it falls under bullet (ii) above and the same in acceptable to the validation team.

Then N_{diff} = 2

(v) 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.

F = 1 -2/2 = 0, less than 0.2, and

N_{all}-N_{diff} = 2-2 =0, less than 3.

As per methodological tool "common practice" 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.

Both conditions are fulfilled with the results mentioned above. Hence, the project activity is entirely not a common practice in the Philippines.

In the above background, Validation Team concludes that the project is not a business-as-usual scenario and is additional. The VCS benefits would enable the project to become financially attractive.

3.3.6 Quantification of GHG Emission Reductions and Removals

The equations and choices provided in the applied methodology ACM0002 (version 17.0) /B01/ and all other methodological tools are correctly quoted in the Joint PD & MR /2/. The emission reductions of the bundled project would be calculated using the formulae mentioned in the applied methodology /B01/.

Validation team based on the review of the Joint PD & MR /2/, confirms that the formulae are correctly presented for the determination of emissions reductions. The parameters and equations presented in the Joint PD & MR /2/, as well as other applicable documents, have been compared with the information and requirements presented in the applied methodology /B01/. An equation comparison has also been made to ensure consistency between all the formulae presented in the Joint PD & MR /2/ and ER validation spreadsheet /4/ and the applied methodology /B01/.

Baseline Emissions:

The baseline emissions associated with the applied methodology are calculated as:

$$\mathbf{BEy = EG_{PJ,\,y} * EF_{grid,\,CM,\,y}} \qquad \mathbf{(1)}$$

Where:

BEy= Baseline emissions in year y (tCO_2e/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 VCS 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" (tCO_2e/MWh)

The estimation of the baseline energy generation was done by using the total installed capacity of the project activity, yearly generation hour and plant load factor. The project activity involves installation of 80 MW grid connected power plants in Philippines. This was confirmed based on assessment of Joint PD & MR /2/ and ER validation spreadsheet /4/.

Assessment for calculating the value of grid emission factor:

Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors according to the procedure prescribed in the "Tool to calculate the emission factor for an electricity system" version 06.0 /B04/. The data for calculation of the grid emission factor is sourced from Philippines DNA (DOE website) which is the latest available data. The baseline

emission factor calculation is checked by the validation team and found that the calculation is transparent and conservative.

The combined margin of the Luzon-Visayas Grid used for the project activity is as follows[9]:

Parameter	Value	Nomenclature	Source
$EF_{grid,y}$	0.5535 tCO_2/MWh	Combined margin CO2 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)
$EF_{grid,OM,y}$	0.6032 tCO_2/MWh	Operating margin CO2 emission factor for the project electricity system in year y	The data are obtained from Department of Energy /15/.
$EF_{grid,BM,y}$	0.4044 tCO2/MWh	Build margin CO2 emission factor for the project electricity system in year y	The data are obtained from Department of Energy /15/.

Thus, the emission factor for the project is calculated to be EFy = 0.5535 tCO_2e/MWh and it is fixed ex ante for the crediting period. Considering this process, combined margin emission factor has been considered and same value is confirmed correct.

Project Emissions:

The current bundled project involves solar technology which is a renewable energy source. Thus, as per §36 the ACM002 (version 17) /B01/ there are no project related emissions associated with the current project.

Thus, PEy = 0.

Leakage Emissions:

As per the section 5.6 of the applied methodology ACM0002 (version 17) /B01/, no other leakage emissions are considered. Thus, the leakage is considered as zero, therefore

LEy = 0

Emission Reductions:

The emissions reductions associated with the applied methodology are calculated as:

ERy = BEy – PEy

ERy = Emission reductions in year y (t CO2e/yr)
BEy = Baseline emissions in year y (t CO2/yr)
PEy = Project emissions in year y (t CO2e/yr)

As PEy = 0

[9] https://www.doe.gov.ph/national-grid-emission-factor-ngef

ERy = BEy

The assessment team confirms that the applied methodology and the referenced tools have been applied correctly to calculate baseline emissions and net GHG emission reductions the project crediting period.

3.3.7 Methodology Deviations

Not applicable

3.3.8 Monitoring Plan

The bundled project employs the large-scale approved CDM methodology namely ACM0002 (version 17.0) /B01/ and in accordance with the same, the parameters to be monitored ex-post are given below:

Parameters to be monitored:

Sl. No.	Parameter(s)	Units	Description	Source of monitoring data
1	$EG_{PJ,y}$	MWh	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y	Monthly meter readings & invoices

Thus, the parameter to be monitored ex-post involves monitoring of net electricity supplied to the grid (calculated from electricity exported and imported) to the grid by the bundled project activity.

As mentioned in the Joint PD & MR /2/, Meter Readings (JMRs) will serve as source of monthly values of net electricity supplied by the bundled project. The electricity generation data recorded in the JMRs shall form the basis of the emission reductions calculations. The assessment team shall review the same for verification of emission reduction results.

In order to measure the net export electricity supplied to the grid two bi-directional electricity meters (main meter and check meter) are installed at the respective substations of the two sites and the meters are sealed and under the control of the National Grid Corporation of the Philippines (NGCP).

The calibration of all electricity meters is under the jurisdiction of the National Grid Corporation of the Philippines (NGCP) and shall be conducted as per the existing industry standards. The calibration frequency for the electricity meters installed under project is 1 year.

Based on the review of the Joint PD & MR /2/, the assessment team confirms that detailed monitoring procedures, monitoring structure, management team, monitoring items and functions have been clearly demonstrated.

All electricity data will be archived electronically and further maintained for the entire crediting period plus two years.

Based on the above assessment the validation team concludes that the PP is capable to implement the monitoring plan and hence confirms compliance of VCS guidelines /B02/ and the applied methodology /B01/.

3.4 Non-Permanence Risk Analysis

Not applicable

4 SAFEGUARDS

4.1 No Net Harm

The IEE studies /21/ for the project did not identify any significant environmental impacts from the proposed project activity.

The identified impacts are the following[10]:

Issues	**Assessment of Impact** /21/	**Mitigation Measures**/21/
Construction Phase		
Land	Vegetation disturbance /Secondary growth sugarcane plant & grasses	1. Design and implement an appropriate landscape for greening area 2. Designate location for equipment, and areas of the site which should be kept free of traffic, equipment, and storage.
	Increased storm water, runoff and soil erosion	1. Improve existing side drainage channel to absorb surface runoff. 2. Storm water management that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention basin with outlet control structure. 3. Ensure that construction vehicles are restricted to use existing graded roads. 4. Site excavation works to be planned such that a section is completed and rehabilitated before another section begins. 5. Interconnected open drains will be provided on site.

[10] IEE Report

	Soil and Water pollution	Use of an integrated solid waste management system i.e. through a hierarchy of options: • Waste reduction • Reuse and Recycle • Waste processing • Waste disposal (Disposal to LGU landfill)
		• Provide facilities for proper handling and storage of construction materials to reduce the amount of wastes. • Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction wastes generated over time. • Provide proper storage for scrap materials. • Use building materials that have minimal or no packaging to avoid the generation of excessive packaging wastes. • Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce wastes at site. • Dispose waste more responsibly by contracting a registered waste handler who will dispose the wastes at designated sites or landfills only. • Placement of collection bins for segregated wastes to be provided at designated points on site.
Air	Degradation of ambient air quality	▪ Sprinkle water on graded access routes when necessary to reduce dust generation by construction vehicles; ▪ Wash truck tires to remove dirt and mud before leaving the site; ▪ Ensure strict enforcement of onsite speed limit regulations; ▪ Provision of traffic signages at the ingress and outgress of the project site; ▪ Personal Protective equipment to be provided to employees and worn. ▪ Vehicle idling time shall be minimized; ▪ Monitor and brief truck drivers to avoid unnecessary revving engines of stationary vehicles and to switch off engines whenever possible; ▪ Vehicles delivering construction materials to site should be adequately maintained to reduce exhaust emissions. ▪ Only trucks with engines maintained will be permitted to deliver fuel supplies to reduce emissions
	Disturbance to residents	▪ Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used. ▪ Sensitize construction drivers to avoid revving of vehicle engines or hooting ▪ Ensure that construction machinery are kept in good condition to reduce noise; ▪ Ensure that all generators and heavy duty equipment are insulated or placed in enclosures (containers) to minimize ambient noise levels.

		▪ The noisy construction works will entirely be planned to be during daytime when most of the neighbors are awake.
Water	Increase water demand	▪ Promptly detect and repair of water pipe and tank leaks ▪ Briefing to construction workers to conserve water by avoiding unnecessary use of water; ▪ Ensure taps are not running when not in use
	Generation of sewage	▪ Provision of septic tank ▪ Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated
	Oil spills	▪ Install oil trapping equipment in areas when there a likelihood of oil spillage such during the maintenance of construction equipment. Soil in such an area will be well protected from contamination
People	Accidents and fatalities	▪ Ensure compliance with the Occupational Safety and Health Act (OSHA) provisions e.g. employees to be provided with appropriate PPE
Operation Phase		
Land	Soil and water pollution	▪ Prepare solid waste management plan ▪ Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Resource recovery 5. Disposal to LGU land fill. ▪ Ensure that wastes generated at the plant are efficiently managed through recycling, reusing and proper disposal procedures.
	Surface and ground water contamination from sewage	▪ Provide adequate and safe means of handling sewage generated at the plant (provision of 3- chamber septic tank) ▪ Ensure regular monitoring of the sewage discharged from the project to ensure that the stipulated sewage/effluent discharge rules and standards are not violated
	Power resource competition	▪ Switch off electrical equipment, appliances and lights when not being used ▪ Install occupation sensing lighting at various consultant locations such as storage areas which are not in use all the time ▪ Install energy saving fixtures within the plant. ▪ Monitor energy use during the operation of the project and set targets for efficient energy use ▪ Brief and train workers to use energy efficiently. ▪ Utilization of solar power for project operation
	Water resource competition	▪ Enforcement of water conservation policy within the plant ▪ Regular check up for water leakage ▪ Install water conserving taps that turn-off automatically when water is not being used

Air	Dust emissions	▪ Suitable wet suppression techniques need to be utilized in all exposed areas ▪ Enforce low speed limits for vehicles moving within the site
People	Increased health and safety impacts (accidents and fatalities)	▪ Implement all necessary measures to ensure health and safety of the plant workers and the general public during operation of the power plant as stipulated in the Occupational Safety and Health Act (DOLE) ▪ Ensure compliance with the Occupational Safety and Health Act (OSHA) provisions e.g. employees to be provided with appropriate PPE

The above assessments indicate that the project is not expected to cause any significant long-term adverse effects to the environment /21/.

4.2 Environmental Impact

The current project activity is the installation and operation of solar power plants which would result in generation of clean, renewable energy. Thus, the project activity is not expected to have any significant adverse environmental impacts. Moreover, the project activity would help promote environmental and socio-economic well-being in the region. Mandated by Presidential Decree No. 1586, as drafted by the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR), an environmental impact assessment is required for a project such as the proposed project, and was undertaken by conducting an Initial Environmental Examination (IEE) Report /21/.

The Initial Environmental Examination Report /21/ for the La Carlota and Manapla Solar Power Plants was conducted in May 2014 to secure the Environmental Compliance Certificate (ECC) which has been released by the DENR on 02/06/2014 and 21/07/2014 respectively and amended on 02/08/2016 for La Carlota and 25/05/2015 for Manapla solar power plant.

4.3 Local Stakeholder Consultation

In line with the VCS requirements, a local stakeholder consultation meeting /18/ has been organized by the project proponent on 21 December 2017 for both La Carlota and Manapla Solar Power Plants.

In this meeting /18/, the opinion of the stakeholders with regard to the project, has been gathered.

The stakeholder consultation meeting /18/ was held on 21 December 2017, there were 21 participants in total joined the meetings in La Carlota and Manapla solar power plants. The key comments made by the local stakeholders were all answered during the local stakeholder consultation meeting and have also been provided in the VCS PD /01/. The proof /18/ for local stakeholder consultation like Invitation letter, list of attendees, evaluation form filled by the local stakeholders meeting have been provided to the validation team as the evidence of Local Stakeholder Consultation. The local stakeholders were also interviewed during the site visit. Validation team considers the local stakeholder consultation to be adequate for the project activity and that the comments received have been duly taken into account.

Validation team confirms that the local stakeholder consultation conducted meets the requirements as provided in § 162-§165 of the VVS, version 09/B01-1/.

4.4 Public Comments

This project was open for public comment from 10 January - 09 February 2018. No comments were received.

5 VERIFICATION FINDINGS

5.1 Accuracy of GHG Emission Reduction and Removal Calculations

The data and parameters used to calculate the GHG emission reductions and removals have been listed below:

Parameters with Default Values (ex-ante parameters):

Parameter	Description	Value	Unit	Source
$EF_{grid,OM,y}$	Operating Margin CO_2 emission factor in year y	0.6032	tCO_2/MWh	The data are obtained from Department of Energy /15/.
$EF_{grid,BM,y}$	Build Margin CO_2 emission factor in year y	0.4044	tCO_2/MWh	The data are obtained from Department of Energy /15/.
$EF_{grid,CM,y}$	Combined Margin CO_2 emission factor in year y	0.5535	tCO_2/MWh	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values.

Parameter(s) monitored ex-post:

Monitoring Parameter Requirement	Assessment by the DOE
Data / Parameter:	**$EG_{facility,y}$**
Measuring frequency/Time Interval:	Continuous monitoring, hourly measurement and at least monthly recording
Reporting value:	188,529.940
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	The monitoring of this parameter has been done through recording of electricity (import and export) data by bi-directional electricity meters. The supplied electricity are being measured continuously and recorded monthly by National Grid Corporation of the Philippines (NGCP). There bi-directional meter (to measure the export and import of electricity) at NGCP substation at respective sites. The recorded electricity export and import /11/ is being downloaded by NGCP on monthly basis from the meters and being shared with PO through a email which contains password protected excel sheet. Basis of this excel sheet as shared by NGCP, Phillippine electricity market corporation (WESM) sends invoices /12/ to the project proponent under the WESM (Wholesale Electric Spot Market) registration. Verification team noted that the value of electricity exported to the grid is matching between the two documents, i.e. password protected excel sheet /11/ and Phillippine electricity market corporation (WESM) invoices for the project proponent /12/ however the value of import does not matches. The reason for such difference is that WESM adjusts T & D loss for the electricity imported by the Project proponent and thus import value as referred in the WESM invoice is lower and correctly considered by the project proponent for emission reduction calculation. This is a conservative approach.

<table>
<tr><td></td><td>Verification team has reviewed all monthly password protected excel sheet /03/ as shared by NGCP as a part of review of project operation to check the electricity exported and imported by the project. Furthermore, the WESM invoices /12/ are also verified to cross the data of electricity export and import.</td></tr>
<tr><td>Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?</td><td>Yes, the accuracy of the electricity meters (monitoring equipment) is as stated in the Joint PD & MR /2/.</td></tr>
<tr><td>Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification</td><td>Yes, the calibration frequency is Yearly which is in conformance with national standards.</td></tr>
<tr><td>Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?</td><td>Yes, the calibration interval is in line with the monitoring plan provided in the Joint PD & MR /2/.</td></tr>
<tr><td>Company performing the calibration (internal or external calibration):</td><td>External calibration. The calibration of all electricity meters is under the jurisdiction of the state electricity board and shall be conducted as per the existing industry standards.</td></tr>
<tr><td>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</td><td>Yes</td></tr>
<tr><td>Is (are) calibration(s) valid for the whole reporting period?</td><td>Yes, calibration is valid for the whole reporting period.

Manapla Site:

<table>
<tr><td>Type</td><td>Electricity meter</td></tr>
<tr><td>Accuracy class</td><td>Class 0.2</td></tr>
<tr><td>Serial Number (Meter 1- main)</td><td>153631349</td></tr>
<tr><td>Serial Number (Meter 2-check)</td><td>15882039</td></tr>
<tr><td>Calibration Dates /13/</td><td>As verified during the on site inspection, the meters are calibrated annually. The calibration is being done by the testing division of National Grid Corporation of the Philippines (NGCP).

a) Calibration certificate dated 24/02/2016 for meter S. No.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td></td><td>153631349 & meter S. No 15882039

b) Calibration certificate dated 11/02/2017 for meter S. No. 153631349 & meter S. No 15882039</td></tr>
</table>

LA CARLOTA SITE:
<table>
<tr><td>Type</td><td>Electricity meter</td></tr>
<tr><td>Accuracy class</td><td>Class 0.2</td></tr>
<tr><td>Serial Number (Meter 1- main)</td><td>153631320</td></tr>
<tr><td>Serial Number (Meter 2-check)</td><td>15882036</td></tr>
<tr><td>Calibration Dates /13/</td><td>As verified during the on site inspection, the meters are calibrated annually. The calibration is being done by the testing division of National Grid Corporation of the Philippines (NGCP).

a) Calibration certificate dated 17/01/2016 for meter S. No. 153631320 & meter S. No 15882036
b) Calibration certificate dated 11/02/2017 for meter S. No. 153631320 & meter S. No 15882036</td></tr>
</table>
</td></tr>
<tr><td>If applicable, has the reported data been cross-checked with other available data?</td><td>Yes, the assessment team cross-checked the electricity data provided in the ER verification spreadsheets with the monthly reading reports /11/ and Invoices issued by WESM /12/.</td></tr>
<tr><td>How were the values in the monitoring report verified?</td><td>Through review of the ER verification spreadsheets /04/ provided by PP. In addition, the verification team performed further cross checks with monthly reports /11/ and Invoices issued by WESM /12/.</td></tr>
<tr><td>Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?</td><td>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC procedures are in place.</td></tr>
<tr><td>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered</td><td>NA</td></tr>
</table>

monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	

The equations for calculation of emission reduction as provided in the Joint PD & MR /2/ and confirmed with the applied methodology ACM0002 (version 17.0) /B01/ have been checked and found to be correct. The values as provided in the Joint PD & MR /2/ have been compared with ER verification sheet /04/ and raw values from monthly Meter Reading reports /11/,/12/ and Invoices issued /12/ to ensure that no manual transposition errors between data sets have occurred. The assessment team confirms that that all electricity generation values are matching between the above three documents. Moreover, the formulae applied in the ER spreadsheet /04/ were also reviewed and found to be consistent with the applied methodologies.

The assessment team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the formulae laid out in the applied methodology ACM0002 (version 17.0) /B02/ and requirements of the monitoring plan.

The total number of emission reductions for the monitoring period is 104,351 tCO_2e.

5.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

The quality of supporting documents that are provided by the PP as evidence is adequate. Raw values from Meter Reading reports /11/ and Invoices /12/ are provided, which tallies with the data provided in the ER verification spreadsheet /04/.

Competent employees are recruited for the management and operation of the project. The quality of supporting evidences submitted to DOE for verification is adequate and found to be verifiable. Meter Reading reports /11/, Invoices /12/ and other supporting documents related to quality and maintenance were checked by the assessment team to confirm the authenticity of the documents and to check the correctness of the calculations. The assessment team for the records and future reference also obtains copies of these documents. The detailed information flow with the roles and responsibilities of the individuals and the monitoring system have been discussed and found to be appropriate.

Based on the above, the assessment team confirms the sufficiency and appropriateness of the quality of evidence provided by the PP to determine the GHG reductions and further deems them to be acceptable.

6 VALIDATION AND VERIFICATION CONCLUSION

CCIPL has performed a joint validation and verification of the VCS bundled project activity “Negros Island Solar Power Inc. Project” in Philippines.

The joint validation and verification process was performed on the basis of all guidance and criteria as provided in VCS Standard (version 3.7), VCS Program Guide (version 3.7), VCS Validation and Verification Manual (version 3.2) and Registration & Issuance Process (version 3.8) /B02/.

The conclusions of validation and verification process can be individually summarised as follows:

Validation Conclusion:

The bundled project activity provides the information in Joint PD & MR /2/ as required by VCS Standard, version 3.6 /B02/ and Validation and Verification Manual, version 3.2 /B02/ and in CCIPL’s opinion meets the requirements of the applied baseline and monitoring methodology, ACM002 (version 17.0) /B01/ and is likely to achieve the estimated emission reductions. The validation has been performed using a risk-based

approach, as described above. The expected emission reductions from the project activity during the course of its crediting period (ten years) will be 660,390 tCO_2e.
CCIPL concludes the validation with a positive opinion and confirms that the VCS Project Activity "Negros Island Solar Power Inc. Project" in Philippines, as described in the Joint PD & MR /2/ meets all applicable VCS requirements, including those specified in the CDM Project Standard /B03/, relevant methodologies, tools and guidelines.

The selected baseline and monitoring methodology ACM002 (version 17.0) /B01/ is applicable to the project and correctly applied. CCIPL therefore requests the registration of the project as a VCS project activity.

Verification Conclusion:

- ✓ All components of the project are implemented and installed as planned and described in the Joint PD & MR /2/ and the project activity conforms with the verification and validation criteria for project and their GHG emission reductions or removals set out in the VCS Standard (version 3.7) /B02/.
- ✓ The monitoring plan is in accordance with the applied approved methodology, i.e. ACM002 (version 17.0) /B01/ and monitoring plan as sought out in the Joint PD & MR /2/.
- ✓ The monitoring system is in place and functional. The project has generated verifiable GHG emission reductions.

As the result of the verification of VCS VERs, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. CCIPL herewith confirms that the project has achieved emission reductions in the below mentioned reporting period. The project complies with the verification criteria for projects and their GHG emissions reductions or removals set out in VCS Standard (version 3.7) /B02/.

Verification period: From 02nd March 2016 to 25th November 2017 (both days 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)
Year 2016	49,437	0	0	49,437
Year 2017	54,914	0	0	54,914
Total	104,351	0	0	104,351

CCIPL confirms a positive verification opinion confirming that the bundled project complies with the applicable VCS requirements, thus recommending the project for issuance.

APPENDIX 1: ABBREVIATIONS

BE	Baseline emissions
CAR	Corrective action request
CCIPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification
DOE	Designated Operational Entity
DOE Philippines	Department of Energy, Philippines
ERs	Emission reductions
FAR	Forward action request
GHG	Greenhouse gas
kW	Kilo Watt
kWh	Kilo Watt hour
MP	Monitoring plan
MR	Monitoring Report
MW	Mega Watt
MWh	Mega Watt hour
NA	Not applicable
O&M	Operation & Maintenance
PD	Project Description
PP	Project proponent
PS	Project Standard
QA/QC	Quality Assurance / Quality Control
tCO_2e	Tonne of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	VCS Association
VCU	Verified Carbon Unit
VVM	Validation and Verification Manual
VVS	Validation and Verification Standard

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APPENDIX 2: FINDINGS LOG

Finding	**CAR 01**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	During the OSV, it was revealed that La Carlota site consists of two phases which are geographically distinct. This aspect needs to be transparently explained in the joint PD/monitoring report.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The details of La Carlota site has been included in the revised joint PD/MR.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The required details has been provided in the joint PD/monitoring report, checked and confirmed by the VVB team, CAR is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	**CAR-02**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	Project proponent is requested to provide further details on the type and number of SPV modules (exact number of SPV modules with type) and other components of the project (such as type, number and capacity of inverters, transformers etc.) used in the project. Furthermore, it is important to provide capacity both in DC (based on installed SPV modules) and AC (based on capacity of inverters & Wholesale Electricity Spot Market (“WESM”) registration).		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The details of SPV modules and other components of the project have been provided in the revised joint PD/MR.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The details of SPV modules and other components of the project have been provided in the revised joint PD/MR, checked and confirmed by the VVB team. The AC (based on capacity of inverters & Wholesale Electricity Spot Market (“WESM”) registration) hasn’t been provided and hence CAR is open.		

Finding	**CAR-02**
Corrective Action or clarification #2 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The AC (based on capacity of inverters & commissioning certificate) has been provided in the joint PD/MR.
DOE Assessment #2 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The required details have been provided in the joint PD/monitoring report, checked and confirmed by the VVB team, CAR is closed.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	**CAR-03**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	The step-up voltage provided in section 1.8 of the project seems to be incorrect. Project Proponent is requested to correct the same.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The section 1.8 of the Joint PD and MR has been revised accordingly.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The required correction has been made in the joint PD/monitoring report, checked and confirmed by the VVB team, CAR is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	**CAR 04**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	The calibration details (dates) provided in the Appendix 1 of Joint PD & MR are incorrect.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The calibration dates in Appendix 1 of Joint PD/MR have been corrected following calibration records.		

Finding	**CAR 04**
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The required correction has been made in the joint PD/monitoring report, checked and confirmed by the VVB team, CAR is closed.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	**CL 01**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	As per the Joint PD & MR, emission factor for the grid has been fixed ex-ante however the same has been listed as a monitoring parameter. Project proponent is requested to clarify the same.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	Following the Tool to calculate the emission factor for an electricity system, the emission factor for the grid has been fixed ex-ante throughout the first crediting period, but needs to be updated for the second crediting period based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. Hence it has also been listed as a monitoring parameter in section 4.2 of joint PD/MR.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Based on above clarification, it is noted that the factor is fixed ex-ante for the first crediting. Thus it is not correct to provide the parameter in the section of ex-post parameters. CL is open.		
Corrective Action or clarification #2*(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The emission factor has been removed from the section of ex-post parameters. Please refer to the updated joint PD/MR for review.		
DOE Assessment #2 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The required correction has been made in the joint PD/monitoring report, checked and confirmed by the VVB team, CAR is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

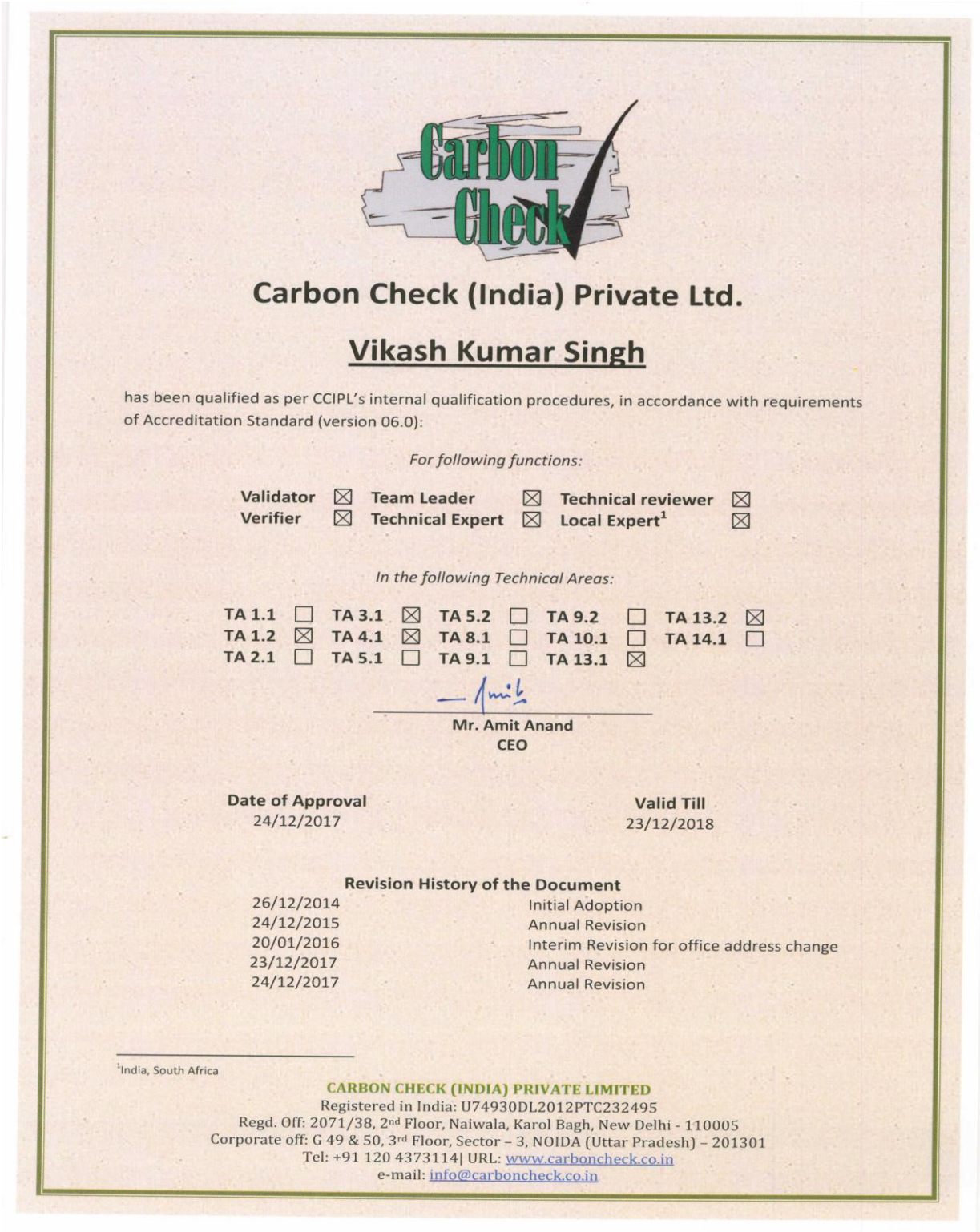
Finding	**CL 02**		
Classification	☐ CAR	☒ CL	☐ FAR

Finding	**CL 02**
Description of finding *(DOE)*	During the OSV, existence of Diesel Generator (for back up purposes) were revealed at both sites. This aspect needs to be transparently explained in the joint PD/monitoring report while doing Project Proponent is requested to clarify why this emission source has been excluded.
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The Diesel Generator (DG) is for auxiliary backup to power the control building and switchgear room in case of calamities or grid unavailability with long power outage. The DG is operated for 30 minutes per month at minimum power to ensure run ability in case needed. Furthermore, as per paragraph 38 of applied Methodology ACM002 "Large-scale Consolidated Methodology: Grid –connected electricity generation from renewable sources" version 17.0, *for all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected.* The emission of DG therefore has been excluded from project emission calculation.
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Based on above response and review of paragraph 38 of applied Methodology ACM002 "Large-scale Consolidated Methodology: Grid –connected electricity generation from renewable sources" version 17.0, CL is closed.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Editorial findings (corrected by the project proponent):

In section 5.1 of the Joint PD and Monitoring Report, there are reference of "wind power project", which seems to be typographical mistake.

APPENDIX 3: COMPETENCE CERTIFICATES



Carbon Check

Carbon Check (India) Private Ltd.

Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Expert[1]	☒

In the following Technical Areas:

TA 1.1	☐	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☒
TA 1.2	☒	TA 4.1	☒	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Amit Anand
CEO

Date of Approval	Valid Till
24/12/2017	23/12/2018

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision

[1] India, South Africa

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Registered in India: U74930DL2012PTC232495
Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
Corporate off: G 49 & 50, 3rd Floor, Sector – 3, NOIDA (Uttar Pradesh) – 201301
Tel: +91 120 4373114| URL: www.carboncheck.co.in
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Carbon Check (India) Private Ltd.

Anubhav Dimri

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Expert[1]	☒

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☐
TA 1.2	☒	TA 4.1	☐	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
24/12/2017

Valid Till
23/12/2018

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision

[1]India, South Africa

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