




**Validation report form for
CDM project activities
(Version 04.0)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title of the project activity	Solar PV based power generation by Voltas Green in Mauritius
Scale of the project activity	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
Version number of the validation report	02
Completion date of the validation report	22/11/2019
Version number of the PDD to which this report applies	03
Date when PDD was uploaded for global stakeholder consultation	13/10/2018
Project participants	Voltas Green Limited
Host Party	Mauritius
Applied methodologies and standardized baselines	Methodology: AMS I.D. - Grid connected renewable electricity generation, Version 18.0, valid from 28/11/2014 Standardized baseline: Not Applicable
Mandatory sectoral scopes	Sectoral Scope:01 - Energy industries (renewable- / non-renewable sources)
Conditional sectoral scopes	N/A
Estimated amount of annual average GHG emission reductions or GHG removals by sinks	22,690 tCO ₂ e
Name and UNFCCC reference number of the DOE	Name: KBS Certification Services Pvt. Ltd. UNFCCC reference number: E-0051
Name, position and signature of the approver of the validation report	 Kaushal Goyal Managing Director KBS Certification Services Pvt. Ltd.

SECTION A. Executive summary

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The purpose of this project activity is to generate clean form of electricity through renewable solar energy source. The proposed project activity involves installation and operation of 12.24 MWac /5/6/8/ Solar PV power project based on polycrystalline technology at Queen Victoria site, FUEL substation, District of Flacq, Mauritius by Voltas Green Limited. The project activity involves ground mount fix structure installation and operation of a green field solar photovoltaic (PV) power plant. The project activity will consist of 55,728 PV module of capacity 270 Wp each at standard test conditions and 5 inverters manufactured by SMA Solar Technology having capacity 2750 kVA each, resulting into 12.24 MWac capacity. As the proposed capacity of the project activity is less than 15MW and it uses renewable resource to generate power, hence project qualifies as small scale project Type-I, renewable energy project.

In the absence of project activity, an equivalent amount of electricity would have been generated by grid connected power plants, which is predominantly based on fossil fuels. On the contrary the operation of solar modules is emission free throughout the lifetime of the project activity. As per the applicable methodology the baseline scenario for the project activity is the grid based electricity system, which is also the pre-project scenario. The spatial extent of project boundary is project activity and national grid including grid connected power plant.

The net generated electricity from the project activity will be supplied to national grid through long term power purchase agreement (PPA). The project activity will be displacing the estimated annual net electricity generation i.e. 22,885 MWh from the national grid, which otherwise would have been generated by grid connected power plant. The project activity doesn't involve any GHG emission sources. The estimated annual average and the total CO₂e emission reduction by the project activity over the first renewable crediting period of 7 years are expected to be 22,690 tCO₂e and 158,830 tCO₂e. The proposed project activity of Voltas Green Limited would assist in achieving sustainable development of the host country

The major components of the solar project are the solar modules, module mounting structures, transformer etc. The solar modules are mounted on the module mounting structures. The solar module is a packaged, connected assembly of solar cells which uses the incident photons from the sun light and converts it into electricity. The solar module generates DC power, which is converted to AC power with the help of inverters. Third party based on mean annual global solar radiation of Mauritius estimates the generation potential as 22.885 GWh/year after deducting various losses due to inverter etc.

The proposed project activity will displace fossil based electricity from the grid, thereby resulting in emission reduction as in absence of the project activity equivalent electricity would have been generated from fossil fuel based thermal power plants. The project will transfer solar PV technology, methods and skills to Mauritius and demonstrate its applicability and efficiency, thus widening its accessibility. The technology for solar PV power generation is still at starting stage of consideration in the country. The average lifetime of the modules under project activity is around 25 years as per the modules specifications.

The solar project converts the incident sunlight into electricity and is a GHG emission free form of energy generation. The technology and the project do not pose any adverse threat to the environment and contribute positively in reducing GHG emissions by displacing energy generation from fossil fuel powered projects. The proposed project activity is environmentally safe to implement and operate.

Objective

The purpose of validation is to ensure a thorough, independent assessment of proposed CDM project activity submitted for registration as a proposed CDM project activity against the applicable CDM requirements.

In particular, the project's baseline, the monitoring plan (MP) and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. The validation is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reduction (CER). UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board.

Scope

The scope of the validation is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. KBS has employed a rule-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs. The validation was based on the requirements in the CDM Validation and Verification Standard for project activities, version 02.0.

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

Validation Process and Methodology:

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

Once the project is made available for the global stakeholder consultation process, the members of the assessment team carried out:

1. the desk review of documents and evidences submitted by the project participant in context of the reference CDM rules and guidelines issued by CDM EB,
2. undertaking/conducting site visit, interview or interactions with the representative of the project participant,
3. reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and
4. preparing a draft validation opinion based on the auditing findings and conclusions
5. technical review of the draft validation opinion along with other documents as appropriate by an independent competent technical review team
6. finalization of the validation opinion (this report)

The prepared validation report and other supporting documents then undergo an internal quality control before being submitted to the CDM-EB.

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

Conclusion

The proposed CDM project activity will result in displacing fossil fuel-based electricity with electricity generated from a renewable source, thus reductions of greenhouse gas (GHG) emissions that are real, measurable and give long-term benefits to the mitigation of climate change. In our opinion, the project meets all relevant UNFCCC, CDM criteria and all relevant host country criteria.

The project correctly applies methodology AMS I.D-Grid connected renewable electricity generation, Version 18.0, valid from 28/11/2014. It is demonstrated that the project is not a likely baseline scenario. The emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The net annual output is conservatively expected at approximately 22,885 MWh on a yearly average over the 7-year crediting period (renewable). The emission reductions from the project are estimated to be 22,690 tCO₂e (on an yearly average) over 7 year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achievable given the underlying assumptions do not change.

The validation has been performed following the requirements of the latest version of the CDM VVS for project activities, version 02.0. The project will hence be recommended by KBS for request for registration with the UNFCCC.

SECTION B. Validation team, technical reviewer and approver**B.1. Validation team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Validation findings
1.	Team Leader and Technical Expert (TA 1.2)	IR	Badaya	Rohit	Central Office	✓	✓	✓	✓
2.	Validator	IR	Kandari	Sanjay	Central Office	✓			✓
3.	Local Expert	EI	Pottayya	Preeshnee	Central Office		✓	✓	

B.2. Technical reviewer and approver of the validation report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical Reviewer	IR	Sharma	Chetan Swaroop	Central Office
2.	Manager Technical & Certification	IR	Sharma	Chetan Swaroop	Central Office
3.	Authorizer	IR	Goyal	Kaushal	Central Office

SECTION C. Means of validation**C.1. Desk/document review**

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The validation is performed primarily as a document review of the publicly available project design document version 01 dated 10/10/2018 and the subsequent versions 03 (final) dated 04/11/2019. The assessment is performed by a validation team using a validation protocol. The cross checks between information provided in the PDD and information from sources other than those used, if available, the validation team's sectoral or local expertise and, if necessary, independent background investigations. The details of the document reviewed/referenced during the validation process are listed below in Appendix 3 of this report.

CAR 03 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.

C.2. On-site inspection

The site visit has been conducted for the project activity and details have been provided as below:

Duration of on-site inspection: 22/11/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	Physical inspection of the project site (validation of project description, check of project boundary, monitoring locations and project timelines)	Queen Victoria site, Fuel Substation, District of Flacq, Mauritius	22/11/2018	Rohit Badaya Preeshnee Pottayya
2.	Discussion and review of records (e.g., letter of approval, MoC form, baseline establishment, additionality, prior CDM consideration, environmental impacts, local stakeholder consultation process, operational lifetime, starting date of project and crediting period)	Queen Victoria site, Fuel Substation, District of Flacq, Mauritius	22/11/2018	Rohit Badaya Preeshnee Pottayya
3.	Discussion and review of calculation (baseline/project/leakage emissions and emission reductions)	Queen Victoria site, Fuel Substation, District of Flacq, Mauritius	22/11/2018	Rohit Badaya Preeshnee Pottayya
4.	Review of completeness of ex ante and ex post parameters and such validation	Queen Victoria site, Fuel Substation, District of Flacq, Mauritius	22/11/2018	Rohit Badaya Preeshnee Pottayya
5.	Monitoring plan (feasibility, QA/QC procedures, responsibility and recording of monitoring results and sampling methods, if applied)	Queen Victoria site, Fuel Substation, District of Flacq, Mauritius	22/11/2018	Rohit Badaya Preeshnee Pottayya
6.	Others aspects (ODA check/public funding, project category check, Debundling/Bundling aspects etc.)	Queen Victoria site, Fuel Substation, District of Flacq, Mauritius	22/11/2018	Rohit Badaya Preeshnee Pottayya
7.	Feedback and interactions with local stakeholders	Queen Victoria site, Fuel Substation, District of Flacq, Mauritius	22/11/2018	Rohit Badaya Preeshnee Pottayya

C.3. Interviews

N o.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1	Lacle	Cedric	Technician, Quadran	22/11/2018	Project implementation Commissioning schedule, and monitoring, technical specifications, technical description, operations and training, Monitoring set-up, Monitoring database management, QA/QC procedure, Environmental Impact Analysis, LSC process	Rohit Badaya Preeshnee Pottayya
2	J.	Pascal	Electrician, Sotratch	22/11/2018	Project implementation Commissioning schedule, and monitoring, technical specifications, technical description, operations and training, Monitoring set-up, Monitoring database management, QA/QC procedure, Environmental Impact Analysis, LSC process	Rohit Badaya Preeshnee Pottayya
3	N.	Julio	Electrician, Sotratch	22/11/2018	Project implementation Commissioning schedule, and monitoring, technical specifications, technical description, operations and training, Monitoring set-up, Monitoring database management, QA/QC procedure, Environmental Impact Analysis, LSC process	Rohit Badaya Preeshnee Pottayya
4		Rashid	Helper, Sotratch	22/11/2018	Project implementation, operations and training, Monitoring set-up	Rohit Badaya Preeshnee Pottayya
5	Chand	Phool	Consultant, PA Research Consultants	22/11/2018	Completion of CDM PDD, project description, Baseline emission, Additionality, emission reduction calculations, monitoring set-up	Rohit Badaya Preeshnee Pottayya
6		Afzal	Supervisor, Sotratch	22/11/2018	Project implementation Commissioning schedule, and monitoring, technical specifications, technical description, operations and training, Monitoring set-up, Monitoring database management, QA/QC procedure, Environmental Impact Analysis, LSC process	Rohit Badaya Preeshnee Pottayya

7	Gaering	Olivier	Project Manager, Quadran	22/11/2018	Project implementation Commissioning schedule, and monitoring, technical specifications, technical description, operations and training, Monitoring set-up, Monitoring database management, QA/QC procedure, Environmental Impact Analysis, LSC process	Rohit Badaya Preeshnee Pottayya
8	Arthur	Guillemot	Engineer, Quadran	22/11/2018	Monitoring database management, QA/QC procedure, Environmental Impact Analysis, LSC process	Rohit Badaya Preeshnee Pottayya
9	Pascal	Patient	Accountant , Quadran	22/11/2018	Financial aspects	Rohit Badaya Preeshnee Pottayya

C.4. Sampling approach

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The assessment team does not apply any sampling approach for the project activity. The site visit was conducted for the complete solar project at the locations/site as mentioned in the PDD.

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Demonstration of prior consideration of the CDM	CL 01	-	-
Identification of project type	CL 01	-	-
General description of project activity	CL 01	CAR 01, CAR 03	-
Application and selection of methodologies and standardized baselines			
- Application of methodologies and standardized baselines	-	CAR 01	-
- Deviation from methodology and/or methodological tool	-	-	-
- Clarification on applicability of methodology, tool and/or standardized baseline	-	-	-
- Project boundary, sources and GHGs	-	-	-
- Baseline scenario	-	CAR 04	-
- Demonstration of additionality	-	-	-
- Estimation of emission reductions or net anthropogenic removals	CL 01	CAR 01	-
- Monitoring plan	CL 01	CAR 02	-
Start date, crediting period type and duration	CL 01	-	-
Environmental impacts	CL 01	-	-
Local stakeholder consultation	CL 01	-	-
Sustainable development co-benefits	-	-	-
Approval	CL 01	-	-
Authorization	CL 01	-	-

Modalities of communication	CL 01	-	-
Global stakeholder consultation	-	-	-
Others (Supporting documents)	CL 01	-	-
Total	01	04	00

The major changes to the webhosted PDD (version 1.0) as compared to the final PDD (version 3) /1//2/ are summarized as follows:

Webhosted PDD (version 1.0)	Final PDD (version 3)	Reason for the revisions
The project capacity was mentioned as 13.75 MWac	The project capacity has been corrected to 12.24 MWac	The revised capacity is the correct capacity as was observed during the site visit. The same capacity is also available in the EPC Contract, ESPA, EIA Report and EIA License granted to the project activity and hence found correct
The Standardized baseline: "ASB0019: Grid emission factor of Mauritius – Version 01.0" has been used for the calculation of emission factor	The "Tool to calculate the emission factor for an electricity system, version 07.0" and "Grid Emission Factor, Mauritius dated July 2018 prepared by Central Electricity Board (CEB)" has been used for the calculation of emission factor	The revision is appropriate since the Standardized baseline: "ASB0019: Grid emission factor of Mauritius – Version 01.0" which was used at the time of Global stakeholder consultation has been expired and hence not applicable. The "Tool to calculate the emission factor for an electricity system, version 07.0" and "Grid Emission Factor, Mauritius dated July 2018 prepared by Central Electricity Board (CEB)" has been used for the calculation of emission factor which is in compliance with the applied methodology and hence found correct.
The module efficiency was mentioned as 15.4%	The module efficiency has been corrected to 16.5%	The corrected module efficiency is inline with the module specifications provided by the technology supplier
The version of the Tool and Guidelines were applied which were applicable at the time of webhosting of the PDD.	The version of the Tool and Guidelines have been updated to latest version as available on the UNFCCC website	The version of the Tool and Guidelines have been updated to latest version as available on the UNFCCC website
The start date was mentioned as 01/12/2018	The start date has been corrected to 01/12/2017, which is the effective date of EPC	The start date has been corrected to 01/12/2017, which is based on the EPC contract. The same was confirmed through the EPC contract and found correct.
The PLF considered was 19% and no source of data was provided	The estimated electricity generation of 22,885 MWh (as per third party assessment report) has now been	The PLF/estimated electricity generation of 22,885 MWh has been considered based on the third party assessment report,

	considered.	which is inline with the EB 48 Annex-11 guideline and found correct.
The estimated emission reductions were 22,107 tCO ₂	The estimated emission reductions revised to 22,690 tCO ₂	The emission reductions have been revised to 22,690 tCO ₂ due to revisions as mentioned above
The Letter of Approval details not provided in the PDD	The Letter of Approval has now been provided	The details on the Letter of Approval was found correct based on the LoA submitted to assessment team.

SECTION D. Validation findings

D.1. Demonstration of prior consideration of the CDM

Means of validation	<p>The start date of the project activity is 01/12/2017 which is the effective date of EPC contract between Voltas Green Ltd. and Quadran O&M (Mauritius) Ltd. Hence the start date is in line with the "Glossary: CDM terms version-10.0" and falls after 02/08/2008. In line with the paragraph 41 of the CDM VVS for project activities, version 02.0, the PP had informed host Party DNA and UNFCCC secretariat in writing of their intention to seek CDM status and the same has been confirmed to have been received on 18/05/2018 as per the UNFCCC website. The same is within 180 days of the start date of the project activity and hence meets the requirements of the prior consideration of CDM.</p> <p>Based on the document review and site visit, the assessment team was able to establish that project activity is a greenfield project and the start date indicated is the signed EPC contract between Voltas Green Ltd. and Quadran O&M (Mauritius) Ltd. Hence the start date is in line with the "Glossary: CDM terms, version-10.0". The assessment team was able to conclude that the "Prior consideration of the CDM" has been met by the project activity.</p>
Findings	Nil
Conclusion	<p>Based on the document review and site visit, the assessment team has established that the project activity is a greenfield activity. The start date of the project activity is 01/12/2017 in line with the Glossary: CDM terms (ver10.0).</p> <p>As per the Glossary: CDM terms (ver10.0), The "start date" for the project activity is <i>"the date on which the project participants commit to making expenditures for the construction or modification of the main equipment or facility". Where a contract is signed for such expenditures (e.g. for procurement of a wind turbine), it is the date on which the contract is signed. In other cases, it is the date on which such expenditures are incurred. If the CDM project activity or CPA involves more than one of such contracts or incurred expenditures, it is the first of the respective dates"</i>.</p> <p>Since the project participant signed EPC Contract on 01/12/2017 involving the expenses for the construction of the solar PV plant. Hence the date "01/12/2017" has been considered as start date of the project activity. No real action took place prior to the start date (01/12/2017) which involved any confirmation on commitments to making the expenditures for the project activity</p> <p>The assessment team has confirmed the name of the project activity in the list of notification received by the UNFCCC available on the UNFCCC website. The intimation to the UNFCCC which is within 180 days of the start date (01/12/2017) of the project activity and hence the prior consideration has been demonstrated. The assessment team considers that the CDM was seriously considered in the decision</p>

	to implement the project and complies with paragraph 46 of CDM VVS for project activity, V02.0.
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D.2. Identification of project type

Means of validation	<p>The proposed project activity is a renewable resource (solar) based greenfield power project with installed capacity 12.24 MWac or 15.05 MWdc capacity. The actual power sent to grid is based on the actual capacity of 12.24 MWac, which has further been used for the calculation of emission reductions. Since the capacity 12.24 MWac is the maximum capacity based on which the actual power is generated and sent to the grid and hence the capacity of the project activity is less than 15 MW and the project falls under the category of small-scale capacity. The project is eligible to as type I small-scale CDM project activity and can apply approved small scale methodology. The project activity applies the small scale methodology "AMS I.D-Grid connected renewable electricity generation, (Version 18.0)" stipulated for category I.D of the "simplified modalities and procedures for small scale CDM project activity".</p> <p>The validation team has confirmed the capacity of the proposed project activity by the review of documents and during onsite visit and is of opinion that project activity is eligible as small-scale CDM project activity and can use the simplified baseline and monitoring methodology.</p> <p>De-bundling: The project activity is an independent activity and not a de-bundled component of a larger project activity. The validation team has confirmed that there is no registered small scale CDM project activity or a request for registration made by Voltas Green Limited (project participant) in the same project category and technology/measure or one that has been registered in the previous two years; whose project boundary is within 1 kilometers of the project boundary of the proposed small scale project activity at the closest point.</p> <p>It has been confirmed from official website of UNFCCC (project search interface), discussions held during the site visit and through local expertise that there is no registered solar power project or project under request for registration in Mauritius, where Voltas Green Limited has participated as project participant and nor project is registered in last two years.</p> <p>Based on the above discussion, validation team confirm that the proposed project activity is not a de-bundled component of a larger project activity.</p>
Findings	CAR01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<ul style="list-style-type: none"> a) The validation team is of opinion that applied small scale approved baseline and monitoring methodology is approved by UNFCCC and PDD has used the version of the applied baseline and monitoring methodology that is valid at the time of request for registration. b) The PDD has mentioned and correctly applied the tools and guidance relevant as per applied methodology. c) The project activity is eligible as a small scale project activity and complies with the requirement stipulated in paragraph 161 of VVS V02.0 /17/. d) The proposed project activity is not a de-bundled component of a larger project activity and complies with the requirement stipulated in paragraph 162, 163 and 168-171 of VVS V02.0 /17/.

D.3. General description of project activity

Means of validation	<p>The proposed project activity is a renewable resource (solar) based greenfield power project with installed capacity 12.24 MWac or 15.05 MWdc capacity /6/. The proposed project activity involves installation and operation of 12.24 MWac Solar PV power project based on polycrystalline technology. Since the capacity of 12.24 MWac is maximum capacity based on which the actual power is generated and sent to the grid and hence the capacity of the project activity is less than 15 MW and the project falls under the category of small-scale capacity. The project will be located at Queen Victoria site, FUEL substation, District of Flacq, Mauritius by</p>
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	<p>Voltas Green Limited. The project site is well connected to nearest town by road. geographic coordinates: S-20°13' 44.92" ; E-57°42'8.65"</p> <p>In the absence of the project activity an equivalent amount of electricity would have been generated from the connected/ new power plants in the national grid, which are predominantly based on fossil fuels. On the contrary the operation of solar modules is emission free throughout the lifetime of the project activity. The solar project converts the incident sunlight into electricity and is a GHG emission free form of energy generation. The technology and the project do not pose any adverse threat to the environment and contribute positively in reducing GHG emissions by displacing energy generation from fossil fuel powered projects. The proposed project activity is environmentally safe to implement and operate.</p> <p>The proposed project activity will displace fossil based electricity from the grid, thereby resulting in emission reduction as in absence of the project activity equivalent electricity would have been generated from fossil fuel based thermal power plants.</p> <p>As per the applicable methodology, the baseline scenario for the project activity is the grid based electricity system, which is also the pre-project scenario. The spatial extent of project boundary is project activity and national grid including grid connected power plant. The proposed project activity of Voltas Green Limited would assist in achieving sustainable development of the host country.</p> <p>The major components of the solar project are the solar modules, module mounting structures, transformer etc. The solar modules are mounted on the module mounting structures. The solar module is a packaged, connected assembly of solar cells which uses the incident photons from the sun light and converts it into electricity. The solar module generates DC power, which is converted to AC power with the help of inverters.</p> <p>The proposed project consists of setting-up 55,728 solar PV panels with an installed capacity of 12.24 MWac to produce electricity, which will be supplied to the grid of the Central Electricity Board (CEB). The project activity involves ground mount fix structure installation and operation of a green field solar photovoltaic (PV) power plant. They are of high-efficiency, poly- crystalline silicon solar cells with high transmission and tempered glass, which results in module efficiency of up to 16.5%.</p> <p>The average lifetime of the modules under project activity is around 25 years as per the module specifications. Third party based on mean annual global solar radiation of Mauritius estimates the generation potential as 22.885 GWh/year after deducting various losses due to inverter etc. As the proposed capacity of the project activity is less than 15MW and its uses renewable resource to generate power, hence project qualifies as small scale project Type-I, Renewable Energy Project.</p> <p>The net generated electricity from the project activity will be supplied to national grid through long-term power purchase agreement (PPA) /8/. The project activity will be displacing the estimated annual net electricity generation i.e. 22,885 MWh from the national grid, which otherwise would have been generated by grid connected power plant. The project activity doesn't involve any GHG emission sources. The estimated annual average and the total CO₂e emission reduction by the project activity over the first renewable crediting period of 7 years are expected to be 22,690 tCO₂e/year and 158,830 tCO₂e.</p>
Findings	CL 01, CAR 01 & CAR 03 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The assessment team confirms that</p> <p>a) The project description as mentioned in PDD is validated by reviewing the technical specifications, contract signed, permits obtained and other related documents and the same has also been confirmed during site visit by interviewing the technical personnel involved in project activity.</p> <p>b) The on-site inspection was conducted by the validation team as described under section C.2 and C.3 of the validation report.</p>

	b) Based on discussion above the assessment team confirms that project description provided in PDD is complete and accurate.
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D.4. Application and selection of methodologies and standardized baselines

D.4.1. Application of methodologies and standardized baselines

Means of validation	<p>The proposed project activity is a renewable source based power project with installed capacity 12.24 MWac. As the capacity of the project activity is less than 15 MW threshold, the project is eligible to as type I small-scale CDM project activity and can apply a simplified baseline and monitoring methodology. The project activity has applied the baseline and monitoring methodology “AMS I.D.-Grid connected renewable electricity generation, Version 18.0”, valid from 28/11/2014” stipulated for category I.D. of the “simplified modalities and procedures for small scale CDM project activity”.</p> <p>The validation team has verified the technical specifications, single line diagram, contract signed, permits obtained and other related documents and the same has also been confirmed during site visit by interviewing the technical personnel involved in project activity. The applicability condition of the small scale approved methodology AMS I.D, version 18 referred to in the approved methodology, in context of project activity is demonstrated in PDD. The assessment team has validated the documentation referred to in the PDD and verified the documentation content for verifying the justification of the applicability of the methodology and confirmed that the documentation referred to in the PDD is correctly quoted and interpreted. The assessment team has also cross-checked the information provided in the PDD with the documentation other than from the PDD based on the local and sectoral knowledge of the assessment team. The summary of the project compliance with applicability criteria is listed below:</p> <p><u>Applicability No.1:</u> The project activity involves installation and operation of 12.24 MWac solar PV based power generation project. The net electricity generated will be supplied to grid. The same was confirmed during the site visit. Hence this criterion is applicable and met by the project activity.</p> <p><u>Applicability No.2:</u> As per Table No 2 of AMS – I. D. / Version 18, the AMS I.D /24/ is applicable to the project activity. Hence this criterion is applicable and met by the project activity.</p> <p><u>Applicability No.3:</u> The renewable solar PV power generation unit implemented by the project activity is a new installation (Greenfield) project activity and PP does not have any power generation projects prior to the implementation of the project activity. The actual power sent to grid is based on the actual capacity of 12.24 MWac, which has further been used for the calculation of emission reductions The installed capacity of the generation unit will be 12.24 MWac, i.e. does not exceed the limit of 15 MW. Hence this criterion is applicable and met by the project activity.</p> <p><u>Applicability No.4:</u> The project activity does not involve a hydro power plant, hence this criterion is not applicable to the project activity.</p> <p><u>Applicability No.5:</u> The project does not have any non-renewable component and co-firing system and consists of a 100% renewable component not exceeding the eligibility limit of 15 MW (a Type I small scale CDM project activity). Hence this criterion is not applicable to the project activity.</p> <p><u>Applicability No.6:</u> The project activity does not involve a combined heat and power (cogeneration) system, hence this criterion is not applicable to the project activity.</p> <p><u>Applicability No.7:</u> The project is a Greenfield project and does not involve the addition of renewable energy generation units at an existing renewable energy facility, hence this criterion is not applicable to the project activity.</p> <p><u>Applicability No.8:</u> The project activity does not involve any retrofitting or</p>
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	<p>replacement of existing facilities, hence this criterion is not applicable to the project activity.</p> <p><u>Applicability No.9:</u> The proposed project activity is a solar PV based power project, hence criterion not applicable to the project activity.</p> <p><u>Applicability No.10:</u> The proposed project activity is solar PV based power generation project and does not involve biomass, hence the criterion is not applicable to the project activity.</p> <p>The validation team has assessed the applicability requirements and cross-verified with the supporting information and interviewed the PP, in consultation with local expertise, and found the applicability conditions of the methodology AMS I.D, version 18.0 to the project activity as reasonable and acceptable.</p>
Findings	CL 01 & CAR 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The validation team confirms that:</p> <ul style="list-style-type: none"> (a) The validation team is of opinion that applied small scale approved baseline and monitoring methodology is approved by UNFCCC and PDD has used the latest version of the applied baseline and monitoring methodology that is valid at the time of request for registration. (b) It has criteria assessed each applicability condition listed in the selected methodology and the relevant information contained in the PDD against these criteria. (c) The PDD has mentioned and correctly applied the tools and guidance relevant as per applied methodology. <p>Based on discussion above, the validation team confirms that the applicability conditions of the selected approved small scale methodology AMS I.D V18.0 is appropriately described in PDD, which is reasonable and acceptable.</p>

D.4.2. Deviation from methodology and/or methodological tool

Means of validation	All the criteria of the applicability conditions under the selected methodology were correctly addressed by the PP under section B.2 of PDD. It was found to be in compliance with the CDM methodology AMS I.D. version 18.0 and relevant tools.
Findings	No finding was raised
Conclusion	The deviation of the methodology/tools is not a requirement as the project activity fulfils the requirement of the applied methodology AMS I.D. version 18.0. Hence no deviation in the applicability criteria was observed by the validation team.

D.4.3. Clarification on applicability of methodology, tool and/or standardized baseline

Means of validation	The PDD has been checked in line with the requirements of the AMS.I.D version 18 and relevant tool/guidelines by the assessment team, which is found correct.
Findings	Nil
Conclusion	The latest applicable version of the methodology and tools/guidelines has been applied by the project activity in the PDD. No clarification has been sought on the applicability of the methodology and relevant tools applied to the project activity. The same has also been confirmed during the site visit.

D.4.4. Project boundary, sources and GHGs

Means of validation	<p>As per the paragraph 18 of AMS-I.D., Version 18, “<i>the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to</i>”. The components of the project boundary mentioned in the PDD were found to be in compliance with applied methodology.</p> <p>The validation team conducted the on-site inspection to confirm the appropriateness of the project boundary identified. The validation team confirmed during the site visit that all GHG sources required by the methodology have been included within the project boundary. It was assessed by physical inspection that no emission sources related to project activity will cause any deviation from the</p>
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	<p>applicability of the methodology or accuracy of the emission reductions. The project boundary is clearly depicted with the help of a line diagram in section B.3 of the PDD and duly verified by the validation team during the site visit and was found appropriate.</p> <p>The geographic boundary of the project activity includes the project implementer's plant, inverters and sub-stations. The proposed project activity will evacuate the power to the grid. Therefore, all the power plants contributing electricity to the Central Electricity Board (CEB) have been considered in the project boundary for the purpose of baseline estimation. The project activity targets reduction of CO₂e as main GHG greenhouse gas in the baseline of project activity.</p> <p>Further, based on review of the final PDD and site visit the validation team considers that the PDD has included all the sources of emission within project boundary and there are no sources of GHG emission left out which will contribute more than 1% of expected annual emission reduction by the project activity, which are not addressed by the applied methodology.</p>
Findings	NIL
Conclusion	<p>a) The accuracy and completeness of the project boundary mentioned in PDD is validated by the review of technical specifications, single line diagram, contract signed, permits obtained and other related documents.</p> <p>b) The identified boundary and selected sources and gases are justified for the project activity.</p> <p>c) The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which is expected to contribute more than 1% of the overall expected average annual emission reductions, which are not addressed by AMS I.D. version 18.0.</p> <p>d) The validation team is with opinion that PDD has correctly identified and included all the sources of GHG emission relevant to project activity.</p>

D.4.5. Baseline scenario

Means of validation	<p>The baseline scenario as depicted in the PDD is checked during the validation site visit and also during the interview with the plant officials.</p> <p>The project activity involves installation of 12.24 MWac solar PV based power generation project. The generated power will be exported to grid, which otherwise would have been generated by grid, which possesses a mix of generation types with fossil fuel fired power plants.</p> <p>As per para 19 of AMS-I.D. (Version 18) "<i>the baseline scenario is that the 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 into the grid</i>". Project activity supplies electricity to grid of Mauritius. In the absence of the project activity same amount electricity would have been generated from grid, in which the electricity is generated by the fossil fuel intensive power plant. Thus, baseline is in line with para 19 of AMS-I.D. (Version 18).</p> <p>Para 22 of AMS-I.D. (Version 18) calculates baseline emissions as: $BE_y = EG_{PJ,y} \times EF_{grid,y}$</p> <p>where, BE_y = Baseline Emissions in year y; t CO₂ $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh) $EF_{grid,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "<i>Tool to calculate the emission factor for an electricity system</i>" (tCO₂/MWh)</p> <p>Accordingly, the emission factor of the grid will be used to estimate emission reductions. As per para 23 of AMS-I.D. (Version 18), PP has chosen option (a) and used the combined margin (CM) approach to calculate emission factor, as official</p>
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data is available for operating margin (OM) and build margin (BM) values, whereas no such data exists in the public domain to support choice of option (b). Hence,

$$EF_{\text{grid},y} = EF_{\text{grid,CM},y}$$

The “*Grid Emission Factor, Mauritius dated July 2018 prepared by Central Electricity Board (CEB)*”, has been used for the calculation of baseline emissions and emission reductions /15/. The PP had initially applied the “*Standardized Baseline (ASB0019)*” at the time of submission of PDD to DOE for validation and Global stakeholder consultation (13/10/2018-11/11/2018). However during the course of validation, the “*Standardized Baseline (ASB0019)*” has been expired, hence PP has used the grid emission factor from the “*Grid Emission Factor calculations, Mauritius dated July 2018 prepared by Central Electricity Board (CEB)*” applicable at the time of submission of the PDD for validation. The DOE has checked the confirmation provided by the CEB on the validity of emission factor /15/ and hence found correct. The same emission factor has also been found to be used in other CDM projects in Mauritius which has already been approved by the UNFCCC /16/.

Data Used

Parameters	Description	Source
$EF_{\text{grid,OM},y}$	Operating margin CO ₂ emission factor for the grid in year y	Calculated as per “ <i>Tool to calculate the emission factor for an electricity system (version 07.0.0)</i> ” /25/ using data from “ <i>Grid Emission Factor, Mauritius, dated July 2018 by Central Electricity Board</i> ” /15/ which has been found correct.
$EF_{\text{grid,BM},y}$	Build margin CO ₂ emission factor for the grid in year y	Calculated as per “ <i>Tool to calculate the emission factor for an electricity system (version 07.0.0)</i> ” /25/ using data from “ <i>Grid Emission Factor, Mauritius, dated July 2018 by Central Electricity Board</i> ” /15/ which has been found correct.
$EF_{\text{grid,CM},y}$	Combined margin CO ₂ emission factor for the grid in year y	Calculated as per “ <i>Tool to calculate the emission factor for an electricity system (Version 07.0.0)</i> ” /25/ using data from “ <i>Grid Emission Factor, Mauritius, dated July 2018 by Central Electricity Board</i> ” /15/. The combined margin has been calculated based on the operating margin and build margin.
$EG_{PJ,y}$ (or PLF)	Quantity of net electricity supplied to the grid by the project activity during the year y / Plant Load Factor	Estimated electricity generation based on the “ <i>Third Party Solar assessment</i> ” /9/. During the crediting period, the records of actual net electricity supply to the

	<p>grid will be used.</p> <p>Since the electricity generation (or PLF) is based on the Third party report contracted by project participants and hence it is in line with para 3 (b) of EB48 Annex-11 and hence accepted.</p>
	<p>The facilities, systems and equipment in the baseline scenario and how the project provide the same type and level of services are further described in section A.3 & B.3 of the PDD and found correct.</p>
Findings	<p>CAR 04 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.</p>
Conclusion	<p>The validation team confirms the following;</p> <ol style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD /1/, including their references and sources; All documentation used by project participants as the basis for assumptions and source of data for establishing the baseline scenario is correctly quoted and interpreted in the PDD; All assumptions and data used in the PDD are justified appropriately and considered reasonable in the context of the proposed project activity; All relevant policies and circumstances have been identified and correctly considered in the PDD, in accordance with the guidance by the CDM Executive Board. The baseline methodology and the applicable tool(s) have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions; The validation team also concluded that the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

D.4.6. Demonstration of additionality

Means of validation	<p>The start date of the project activity is 01/12/2017 which is the date on which the project participant signed EPC contract involving the expenses for the construction of the solar PV plant. Hence the start date is in line with the "Glossary - CDM terms version-10.0" /20/ and falls after 02/08/2008. In line with the paragraph 41 of the CDM VVS for project activities, version 02.0, PP had informed host Party DNA and UNFCCC secretariat in writing of their intention to seek CDM status within 180 days of the start date of the project activity. The same has been confirmed to have been received on 18/05/2018 as per the details provided on the UNFCCC website and hence within 180 days of the start date of the project activity.</p> <p>In accordance with the "<i>Tool for demonstration of additionality of small-scale project activities, version-12.0</i>", PP shall provide an explanation to show that the project activity would not have occurred due to at least one of the following barrier</p> <ul style="list-style-type: none"> Investment barrier: Technological barrier: Barrier due to prevailing practice: Other barriers <p>The project activity reduces anthropogenic emissions of greenhouse gases that would have occurred in absence of the project activity. As per the 6 (c) decision 17/CP.77 Para 43, a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.</p> <p>Hence the PP has applied latest version of <i>Methodological Tool: Demonstration of additionality of small-scale project activities, version 12.0</i>. As per the paragraph 10</p>
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	<p>of the applied Tool, “<i>project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers: investment barrier, technological barrier, barrier due to prevailing practice, other barriers</i>”.</p> <p>However as per the paragraph 11 of the Tool, <i>documentation of barriers, as per paragraph 10 above, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of:</i></p> <p><i>The following grid-connected and off-grid renewable electricity generation technologies:</i></p> <ul style="list-style-type: none"> (a) <i>Solar technologies (photovoltaic and solar thermal electricity generation);</i> (b) <i>Off-shore wind technologies;</i> (c) <i>Marine technologies (wave, tidal);</i> (d) <i>Building-integrated wind turbines or household rooftop wind turbines of a size up to 100 kW;</i> (e) <i>Biomass internal gasification combined cycle (BIGCC)</i> <p>The following off-grid electricity generation technologies where the individual units do not exceed the thresholds indicated in parentheses with the aggregate project installed capacity not exceeding the 15 MW threshold:</p> <ul style="list-style-type: none"> (a) Micro/pico-hydro (with power plant size up to 100 kW); (b) Micro/pico-wind turbine (up to 100 kW); (c) PV-wind hybrid (up to 100 kW); (d) Geothermal (up to 200 kW); (e) Biomass gasification/biogas (up to 100 kW); <p>As the subject project is the installation of a new small scale solar photovoltaic power plant with aggregated installed capacity 12.24 MWac, which is below the threshold of 15 MW and would contribute in reducing GHG emissions below that would have occurred in the absence of the instant project activity, therefore the same may be considered to be additional. Since the project activity consists of grid connected solar photovoltaic renewable electricity generation technology, the project is automatically additional and no further demonstrations of barriers are required.</p> <p>Since the project participant signed EPC Contract on 01/12/2017 /6/ involving the expenses for the construction of the solar PV plant. Hence the date “01/12/2017” has been considered as start date of the project activity. No real action took place prior to the start date (01/12/2017) which involved any confirmation on commitments to making the expenditures for the project activity. In line with the paragraph 41 of the CDM VVS for project activities, version 02.0, PP had informed host Party DNA and UNFCCC secretariat in writing of their intention to seek CDM status within 180 days of the start date of the project activity. The same has been confirmed to have been received on 18/05/2018 as per the details provided on the UNFCCC website and hence within 180 days of the start date of the project activity. Hence the project has demonstrated prior consideration as well as the project is automatically additional.</p>
Findings	CL 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The information mentioned in the PDD is duly supported by evidences quoted therein. The validation team has described all steps taken, and sources of information used to cross-check the information contained in the PDD. The validation team determined that the evidence assessed is credible, where appropriate.</p> <p>The validation team confirms;</p> <ul style="list-style-type: none"> a) The validated start date of the project activity is appropriate and in accordance with the Glossary of CDM terms, version 10; b) The proposed CDM project activity complies with the applicable requirements

	<p>related to the prior consideration of the CDM (notification to host Party DNA and UNFCCC were given within the stipulated time frame or earlier).</p> <p>c) The proposed project is activity is automatically additional in line with the paragraph 11 of the “<i>Demonstration of additionality of small-scale project activities, version 12.0</i>” /22/.</p> <p>d) The validation team confirms that proposed project activity is additional in accordance with the requirement stipulated in paragraph 86-90 of CDM VVS for project activities, V02.0 /17/.</p> <p>Therefore, it can be concluded that the project activity is additional and requires CDM revenues to the project activity.</p>
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D.4.7. Estimation of emission reductions or net anthropogenic removals

Means of validation	<p>The emission reduction (ER_y) due to project activity during a given year y has been calculated in the PDD as the difference between baseline emissions (BE_y), project emissions (PE_y) and leakage emissions, as per the formulae given below</p> $ER_y = BE_y - PE_y - L_y$ <p>where, ER_y = Emission reductions in the year y; tCO₂e BE_y = Emissions in the baseline in the year, y; tCO₂e PE_y = Project emissions in the year, y; tCO₂e L_y = Leakage in the year, y; tCO₂e</p> <p>This is a renewable power generation project, the entire power generated from the project activity will be supplied to grid. This form of energy generation has no associated GHG emissions. So, the emission reductions will just depend on the quantity of electricity being supplied to the grid, which would have been otherwise generated in grid.</p> <p>As per para 22 of AMS-I.D. (Version 18), the “<i>Baseline emissions include only CO₂ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows</i>”:</p> $BE_y = EG_{PJ,y} \times EF_{grid,y}$ <p>where, BE_y = Baseline Emissions in year y; tCO₂</p> <p>EG_{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)</p> <p>EF_{grid,y} = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “<i>Tool to calculate the emission factor for an electricity system</i>” (tCO₂/MWh)</p> <p>Calculation of EG_{PJ,y} As proposed project activity is a greenfield project, in accordance with para 26 of applied methodology EG_{PJ,y} = EG_{PJ,facility,y}</p> <p>where, EG_{PJ,facility,y}: Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)</p> <p>EG_{PJ,y} = 22,885 MWh as per the “<i>Third Party Solar assessment</i>” for estimating the electricity generation (or PLF) from the project activity.</p>
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here,

The Electricity Generation (or PLF) has been calculated in line with the paragraph 3(b) of the *"Guidelines for the reporting and validation of Plant Load Factors, version 01 (EB 48, Annex 11)" /21/*. Moreover the electricity generation/PLF does not affect the additionality, as the project does not involve any investment analysis since the project is auto-additional. The actual values of net electricity output shall be used during the monitoring period once the project begins operation.

Calculation of BEy

Calculation of baseline emissions i.e. BEy, requires calculation of grid emission factor ($EF_{grid,y}$), which is being presented below.

As per para 23 of the applied methodology, the emission factor can be calculated in a transparent and conservative manner as follows:

- (a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the Tool to calculate the Emission Factor for an electricity system; or
- (b) The weighted average emissions (in tCO_2/MWh) of the current generation mix. The data of the year in which project generation occurs must be used

The PP has chosen option a i.e. combined margin (CM) consisting of combination OM and BM. The *"Tool to calculate the emission factor for an electricity system (Version 07.0.0)"*, has been used to determine the CO_2 emission factor for displacement of electricity generated by power plants in an electricity system.

The grid emission factor ($EF_{grid,y}$) is determined ex-ante. As per the *"Tool to calculate the emission factor for an electricity-system" (Version 07.0.0)" /25/*, the emission factor is not monitored during the crediting period of each project activity but shall be updated at the renewal of the crediting period of the project activity. The tool indicates six steps for the calculation of the combined margin (CM) emission factor. The *"Grid Emission Factor, Mauritius dated July 2018 prepared by Central Electricity Board" /15/* is used to calculate the emission factor of grid.

As per the paragraph 23 of the applied methodology, the emission factor can be calculated in a transparent and conservative manner as follows:

- (a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the *"Tool to calculate the Emission Factor for an electricity system"*; or
- (b) The weighted average emissions (in tCO_2/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The PP has chosen option a i.e. combined margin (CM) consisting of combination OM and BM. The *"Tool to calculate the emission factor for an electricity system (Version 07.0.0)"*, has been used to determine the CO_2 emission factor for displacement of electricity generated by power plants in an electricity system, by calculating the combined margin emission factor (CM) of that electricity system.

Option (a) has been considered to calculate the grid emission factor as per the *'Tool to calculate the emission factor for an electricity system'* since data is available from an official source.

The *"Grid Emission Factor, Mauritius dated July 2018 prepared by Central Electricity Board (CEB)"*, has been used for the calculation of emission reductions. The PP had initially applied the Standardized Baseline (ASB0019) at the time of submission of PDD to DOE for validation and Global stakeholder consultation (13/10/2018-11/11/2018). However during the course of validation, the *"Standardized Baseline (ASB0019)"* was expired, hence PP has used the grid emission factor from the *"Grid Emission Factor calculations, Mauritius dated July 2018 prepared by Central Electricity Board (CEB)"* applicable at the time of submission of PDD for validation. The DOE has checked the confirmation provided

by the CEB on the validity of emission factor and hence found correct. The same emission factor has also been found to be used in other CDM projects in Mauritius which has already been approved by the UNFCCC /16/.

As per the "*Tool to calculate the emission factor for an electricity system*" Version 07.0", EB 100, Annex 4, the following steps have been followed.

1. This step involves identifying the relevant electricity system. As per the Tool, "for determining the electricity emission factors, identify the relevant electricity system. Similarly, identify any connected electricity systems". It also states that, "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used". Since the project supplies electricity to the national grid of Mauritius i.e. Central Electricity Board (CEB), emissions generated due to the electricity generated by the CEB grid as per CM calculations will serve as the baseline for this project and hence found correct.
2. Since there are no off-grid power plants in Mauritius, Option I is selected for the calculation of both the operating margin (OM) and build margin (BM) emission factors and hence found correct.
3. The Simple OM method (a) can be used when low-cost/must run resources constitute less than 50% of the total amount of the power generation on the grid, in average of the five most recent years. The PP has demonstrated in the PDD that the hydropower, bagasse, landfill gas and more recently solar PV and wind represent all of the low-cost/must run resources with a total share not exceeding 20.4% between 2015 and 2017. Therefore, method (a) has been found to be the most appropriate method to calculate the OM emission factor.
4. For the calculation of OM emission factor, the consumption data for each fossil fuel used to power the different power plants were obtained from the CEB. The calculation of the OM is based on data for the years 2015, 2016 and 2017 as provided in the Section B.6.1 of the PDD, which is found correct. The value of OM is calculated to be 1.0282 tCO₂ MWh, which is appropriate.
5. PP has calculated the build margin emission factor based on the generation-weighted average emission factor (tCO₂/MWh) of all power units m during the most recent year y for which electricity generation data is available (2017 in present case). Hence the build margin has been arrived as 0.8814 tCO₂/MWh, which is found appropriate.
6. The combined margin is the weighted average of the simple operating Margin and the build margin. As per the '*Tool to calculate the emission factor for an electricity system (Version 07.0.0)*', for second and third crediting period allows to weigh the operating margin and Build margin at 25% and 75%, respectively

$$EF_{\text{grid,CM,y}} = (EF_{\text{OM,y}} \times w_{\text{OM}}) + (EF_{\text{BM,y}} \times w_{\text{BM}})$$

Where:

$EF_{\text{grid,BM,y}}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh);

$EF_{\text{grid,OM,y}}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh);

w_{OM} = Weighting of operating margin emissions factor (%); and

w_{BM} = Weighting of build margin emissions factor (%).

The following default values should be used for w_{OM} and w_{BM} :

(a) Wind and solar power generation project activities: $w_{\text{OM}} = 0.75$ and $w_{\text{BM}} = 0.25$ (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods;

(b) All other projects: $w_{\text{OM}} = 0.5$ and $w_{\text{BM}} = 0.5$ for the first crediting period, and $w_{\text{OM}} = 0.25$ and $w_{\text{BM}} = 0.75$ for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

	<p>As the proposed project activity is solar PV based power generation option a is used as below</p> $EF_{grid,CM,y} = (EF_{grid,OM,y} \times 75\%) + (EF_{grid,BM,y} \times 25\%)$ <p>Electronic spreadsheet showing calculation of all these parameters is being submitted separately and the final values are presented below:</p> <p>Combined margin emission factor of grid $EF_{grid,CM,y} = 0.9915 \text{ tCO}_2\text{e/MWh}$</p> <p>The combined margin thus obtained shall be fixed ex-ante for the entire crediting period of the project activity. The OM and BM have been fixed ex-ante for the third renewal crediting period of the project activity.</p> <p>Project emissions: Not applicable as this is a solar energy based power generation project. Hence the project emissions have been considered as zero inline with the para 39 of the applied methodology. $PE_y = 0$</p> <p>Leakage emissions: No leakage emissions occur due to this project activity. $LE_y = 0$</p> <p>Emission reductions: $ER_y = BE_y - PE_y - LE_y$ or $ER_y = BE_y$ as $PE_y = 0$ and $LE_y = 0$ $ER_y = 22,690 \text{ tCO}_2/\text{annum}$ The ex-ante estimates given in the PDD and Emission reduction excel-sheet are correct and all input parameters have been separately validated and thus emission reduction calculations are found appropriate.</p>
Findings	CL 01, CAR 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The validation team confirms the following;</p> <ol style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD, including their references and sources; All data sources and assumptions used are listed and referenced in the PDD and are appropriate. Calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimation of the emission reductions; All values used in the PDD are considered reasonable in the context of the proposed project activity; The baseline methodology and the applicable tool(s) have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions; All estimates of the emissions can be replicated using the data and parameter values provided in the PDD. No sampling has been applied in the project activity

D.4.8. Monitoring plan

Means of validation	<p>The monitoring plan is available in Section B.7 of the PDD based on the approved monitoring methodology AMS-I.D., Version 18 and is correctly applied to the project activity. The monitoring plan has been found to be in compliance with the requirements of the applied methodology. The monitoring plan includes the parameter - "$EG_{PJ,y}$ (Net quantity of electricity supplied to the grid by the project activity during the year y)". The validation team confirmed that the above parameter is sufficient to calculate the baseline emissions (or emission reductions) in accordance with the methodology and are correctly reported in the PDD. The project emissions and leakage emissions are zero in line with the applied methodology.</p>
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	<p>The parameter '$EG_{PJ,y}$' shall be measured continuously by electricity meters, hourly measured and monthly recorded. The net electricity exported to the grid by solar plant will be measured by Central Electricity Board (CEB) on the basis of monthly Meter Reading (MR) using Trivector (TVM) energy meters with accuracy class 0.5s.</p> <p>It is reported that the data will be kept for 2 years following the end of the crediting period. The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit.</p> <p>The project activity is operated and managed by the project proponent with the help of site in charge (personal from the project proponent) and site O&M contractor. The project proponent has entered into comprehensive Operation & Maintenance contract. There will be two meters installed at substation i.e. main meter and check meter of accuracy class 0.5s, where in case of failure of main meter, reading from check meter shall be used for determination of net electricity exported to grid. The meters are tri-vector meters and are capable of recording export as well as import. The electricity exported and imported by the project activity will be recorded on a monthly basis by the representative of the PP and Central Electricity Board.</p> <p>Data management and QA/QC:</p> <p>The net electricity generated by the project activity will be monitored continuously by the electricity meters (s) at CEB sub-station. There will be two trivector meters (one main meter and one check meter) of 0.5s accuracy class at substation. If some defect occurs to any meter, the other meter can be used to obtain the reading. All meters will be calibrated at least once in four years by utility officials or its representatives as per the CEB guidelines. The measurement results will be crosschecked with records of electricity sold such as invoices. Copies of the break-up sheet, invoices raised to CEB will be retained and archived for the entire crediting period plus two years by the project proponent.</p> <p>The Operation and Maintenance team has been trained for emergency situations. Operation and maintenance team will train the staff on operation and maintenance aspects of the plant. The training will ensure preventive maintenance and better operational control for the plant. The project teams have the responsibility of monitor and document the electricity generated and also safe keeping of the recorded data. The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner.</p>
Findings	CL 01, CAR 02 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The validation team confirms that</p> <ol style="list-style-type: none"> The monitoring plan described in the PDD is complying with the requirements of the selected methodology. Based on the physical site visit, the monitoring arrangement described in the monitoring plan is feasible within the project design. The validation team confirms that the project participant will be able to implement the described monitoring plan. The means of implementation of the monitoring plan are sufficient to ensure that the emission reduction achieved from the proposed project activity is verifiable and thereby satisfying the requirement of VVS, Version 02.0. The monitoring plan will give opportunity for real measurements of achieved emission reductions. <p>The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit.</p>

D.5. Start date, crediting period type and duration

Means of validation	The start date of the project activity is 01/12/2017 (signing of EPC) which is the date on which the project participant signed EPC contract involving the significant expenses for the construction of the solar PV plant. Hence the start date line with
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	<p>the “Glossary - CDM terms” version-10.0”, which is the first real action and financial commitment by the PP towards implementation of the project activity. No real action took place prior to the start date (01/12/2017) which involved any confirmation on commitments to making the expenditures for the project activity.</p> <p>A renewable crediting period has been chosen with the length of current crediting period of 7 years has been selected by PP in the PDD. The start date of the crediting period is stated as 25/11/2019 or the date of registration, whichever is later. The operational lifetime of project activity is 25 years which is validated from the technical specifications of the Solar PV modules submitted to the DOE and found appropriate.</p>
Findings	CL01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The start date and the crediting period type has been validated and found to be correct. The PDD mentions renewal crediting period and the same is acceptable to the assessment team. The length of the crediting period is 7 years.</p> <p>The validation team confirms;</p> <ol style="list-style-type: none"> The start date of the project activity indicated in the PDD has been validated as per the definition of the start date provided in the Glossary of CDM terms; The expected operational lifetime of the proposed CDM project activity has been indicated in the PDD and is deemed reasonable; A renewable crediting period has been selected by PP in accordance with para 82 of the CDM PS; The start date of the crediting period of proposed CDM project activity is based on implementation plan and among the stated start date of crediting period in the PDD or date of registration, whichever is later, will be considered/applied.

D.6. Environmental impacts

Means of validation	<p>The purpose of this project activity is to generate clean form of electricity through renewable solar energy source. The project is a small-scale project activity, which involves the development, construction and operation of a greenfield solar PV plant. The implementation of this project could lead to negative impacts on the biophysical and human environment. Hence, it was required to carry out an environmental assessment of the project in accordance with the national regulations on integrating environmental concerns into development actions.</p> <p>As per the amended Environmental Protection Act (EPA, 2008), an Environment Impact Assessment (EIA) is required for “Power Generating Plants”. The PP has contracted the services of Sustainable Resource Management Limited (EIA Consultant) to carry out an Environmental Impact Assessment and to produce an EIA Report for their proposed project. This EIA aims to maximize positive impacts and minimize negative impacts that the project under consideration could have on the environment. The stipulations of the EPA 2008 have been closely monitored during the conduct of the study in view of achieving total compliance to all environmental requirements prescribed by regulations in force in the Republic of Mauritius.</p>
Findings	CL 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>As outlined in the EIA report, the site does not encompass any sensitive flora or fauna given that it is for most of its extent bare land with mainly bushes and shrubs. However, the project area has been dully surveyed by a floral and faunal expert and a terrestrial biodiversity report duly produced. The survey has established that the project site does not harbour any endemic or indigenous floral or faunal species. Besides, the site is devoid of any hydrological features such as river, spring or wetland.</p> <p>From evidence compiled above, it has been assessed that the environmental impacts associated with the installation and operation of the proposed solar PV power plants will be minimal. Moreover, the proposed mitigating measures will comply with industry standards and applicable regulations. Consequently, an EIA</p>

License has been granted by the Department of Environment on September 05, 2017 having reference number ENV/DOE/EIA/1720.

D.7. Local stakeholder consultation

Means of validation	<p>The comments by local stakeholders have been invited in an open and transparent manner. A summary of the comments received has been provided including, how due account was taken of the comments received.</p> <p>The local stakeholder consultation meeting for the project activity has been conducted on 03/10/2018 at Queen Victoria Community Centre from 5.00 PM to 6.00 PM. The PP has identified relevant stakeholders as nearby villagers, employees, nodal agency and NGOs; the Stakeholders were informed by publishing stakeholder notice in Newspaper "l'express du mercredi" dated 20/09/2018.</p> <p>There were no negative comments raised by stakeholders in local stakeholder consultation meetings and due to the associated benefits stakeholders have appreciated the proposed project activity.</p> <p>The validation team also verified through the stakeholder summary documents and the same was cross checked with the information obtained during follow up interviews with the stakeholder's.</p> <p>Validation team is of the opinion that the stakeholder meeting was adequate and appropriate.</p>
Findings	CL01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>As per the CDM requirements, it is necessary to invite the relevant stakeholders, before the validation process starts. The validation team confirms that the summary of stakeholders' comments reported in PDD is complete. In the opinion of the validation team, the local stakeholder consultation process was adequately conducted by the project participant to receive unbiased comments from the all the stakeholders. By reviewing the stakeholder consultation summary submitted by the PP, the assessment team validated that the queries raised by the local stakeholders have been answered satisfactorily.</p> <p>The local stakeholder consultation summary document, attendance sheet has been checked by the assessment team. During the validation site visit, assessment team also interviewed some of the stakeholder present during the meeting with PP and found that stakeholder consultation process was appropriate and hence inline with the requirements of the VVS.</p>

D.8. Sustainable development co-benefits

Means of validation	The copy of Letter of Approval (LoA) issued by the DNA office of Mauritius, "Ministry of Social Security, National Solidarity and Environment and Sustainable Development" bearing Letter Ref. No: ENV/CLI/CDM dated 25/09/2019 has been checked by the assessment team. The LoA mentions that the project corresponds to the country's sustainable development objectives.
Findings	CL 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	The LoA from the DNA of Mauritius has been checked and verified to be correct. The host country is Mauritius. The Party fulfils the participation criteria, which has approved and authorized the project activity and the project participant. The Letter of Approval confirms that the project assists in achieving the sustainable development.

D.9. Approval

Means of validation	The Host country for this project activity is Mauritius. Mauritius ratified the Kyoto protocol on 09/05/2001. The same was checked against the UNFCCC webpage (https://unfccc.int/node/61113) and found consistent.
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	<p>The copy of Letter of Approval (LoA) issued by the DNA office of Mauritius, “Ministry of Social Security, National Solidarity and Environment and Sustainable Development” bearing Letter Ref. No: ENV/CLI/CDM dated 25/09/2019 was made available by the PP to the assessment team. The same was checked against the UNFCCC webpage (http://cdm.unfccc.int/DNA/index.html) and was found to be consistent with regards to the designated issuing authority personnel and thus accepted. The Letter of Approval (LoA) from the Party confirmed that the host party involved has approved the project activity titled “Solar PV based power generation by Voltas Green in Mauritius”, which complies with the requirement stipulated in the paragraph 139 of VVS, version 02.0</p> <p>The name of the project activity and the PP (Voltas Green Limited) in the Letter of Approval issued by the Host Country DNA office was verified against summary page and Appendix 1 of the final version of the PDD and was found to be consistent and hence accepted.</p> <p>The Letter of Approval also confirms that:</p> <ul style="list-style-type: none"> (a) Mauritius has ratified the Kyoto Protocol on 09/05/2001 and hence the host country is a Party to the Kyoto Protocol. (b) Participation is voluntary: (c) The proposed CDM project activity contributes to Sustainable Development of Mauritius as per the requirement of paragraph 140 (c) of VVS version 02.0. (d) The proposed CDM project activity reflects national laws and texts of Mauritius and authorizes (Voltas Green Limited), as authorized participant. <p>The Letter of Approval is unconditional with respect to (a) to (d) mentioned above.</p> <p>It is further confirmed in accordance with paragraphs 145 of the VVS, version 02.0 that:</p> <ul style="list-style-type: none"> • The letter of approval issued by the DNA office of Mauritius, “Ministry of Social Security, National Solidarity and Environment and Sustainable Development” bearing Letter Ref. No: ENV/CLI/CDM dated 25/09/2019 have been received. • The authenticity of the Letter of Approval (LoA) issued by the Mauritius DNA i.e. “Ministry of Social Security, National Solidarity and Environment and Sustainable Development” was not doubted. No concern was raised by the assessment team having local region expertise with respect to authenticity of the letter. The designated issuing authority personnel of the DNA of Host country was checked against the UNFCCC webpage (http://cdm.unfccc.int/DNA/index.html) and was found to be consistent. Further the LoA of the project activity issued by the DNA of Mauritius was compared to the LoA of similar project issued by the same DNA (as available on UNFCCC website). No inconsistency was found. <p>It was confirmed that the letter of approval has been issued by the Designated National Authority (DNA) office of Mauritius and it is valid for the proposed CDM project activity under validation. Thus the Letter of Approval was found to be authentic and thus accepted.</p> <p>It was confirmed that the letter of approval conforms to all the requirement of the paragraphs 139-146 of VVS, version 02.0.</p>
Findings	CL 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The validation team confirms that the Letter of Approval meets all the CDM requirements contained in the VVS version 02.0 which are as follows:</p> <ul style="list-style-type: none"> a) The LoA was received without any supportive. b) The LoA was received directly from the PP. c) The authenticity of the LoA was not doubted. d) The LoA is in accordance with paragraph 139-146 of VVS, version 02.0 <p>The LoA does not refer to any specific version of the PDD. The Letter submitted by the PP has been accepted by the validation team.</p>

D.10. Authorization

Means of validation	<p>The Host country for this project activity is Mauritius. The PP details are listed in tabular form in Section A.4 of the final PDD. The LoA from the DNA office of Mauritius authorizes the participation of Voltas Green Limited, therefore the PP is authorized by the host Party. This was found in line with the para 147 of VVS, version 02.0. Also the project participant listed in tabular form in Section A.4 of the PDD is consistent with the contact details provided in Appendix 1 of the PDD.</p> <p>The validation team also confirms that no entities other than those authorized as the project participant is included under Section A.4 and Appendix 1 of the PDD.</p> <p>No Annex I Party has been identified in the latest version of the PDD and therefore no further Letter of Approval was required.</p> <p>The Letter of Approval conforms to all the requirement of the paragraph 147-151 of VVS, version 02.0 and hence accepted.</p>
Findings	CL 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	The letter of approval issued by the Mauritius DNA has authorized the participation of the project proponent in the CDM scheme.

D.11. Modalities of communication

Means of validation	<p>As required in paragraph 152 of CDM VVS for project activities, V02.0, the PP has submitted Modalities of Communication (MoC) document /14/, the assessment team has verified that the name of primary authorized signatory and alternate authorized signatory for future communication related to the corresponding scope of authority with UNFCCC. The same has also been confirmed during site visit and during the discussions with PP.</p> <p>The assessment team can confirm that the signatory and contact details on the MoC are authorized and credible, the MoC is prepared using latest version of F-CDM-MOC form and paragraph 159 of "CDM VVS for project activities, V02.0" /17/. The MOC is correctly filled including the Modalities of Communication statement (Annex-I).</p>
Findings	CL 01 was raised and closed satisfactorily. The finding is discussed in Appendix 04 of the validation report.
Conclusion	<p>The assessment team confirms that:</p> <ul style="list-style-type: none"> a) The MoC is correctly filled using the latest F-CDM-MOC form version-03.0 b) The MoC is directly received from the PP c) The modalities of communication statement is correctly filled and includes the specimen signature of authorised signatory.

D.12. Global stakeholder consultation

Means of validation	<p>The PDD was made publicly available through the dedicated interface on the UNFCCC CDM website for global stakeholder consultation at the following URL: https://cdm.unfccc.int/Projects/Validation/DB/UC7R4C4BGN2HI50HC59A9Z61T8C_D0S/view.html</p> <p>The duration of the period for submission of comments for the global stakeholder consultation was 30 days from 13/10/2018 to 11/11/2018.</p> <p>There were no comments received during this period. The UNFCCC webpage has been checked to confirm on the GSC comments.</p>
Findings	No findings are raised during the validation process.
Conclusion	<p>The PDD had been made public for a period of 30 days and no comments were received during the GSC process.</p> <p>No comments received during the global stakeholder consultation process.</p>

SECTION E. Internal quality control

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Following the completion of the assessment process and a recommendation by the assessment team, the validation opinion prepared by Team Leader is independently reviewed by internal Technical Reviewer. TR reviews if all the KBS procedures have been followed and all conclusions are justified in accordance with applicable standards, procedures, guidance and CDM decisions. The TR either is qualified for the technical area within the CDM sectoral scope(s) applicable to project activity or is supported by qualified independent technical expert at this stage.

The Technical Reviewer will either accept or reject the recommendation made by the assessment team. The findings can be raised at this stage and PP must resolve them within agreed timeline.

The opinion recommended by Technical Reviewer will be confirmed by Manager Technical & Certification and finally authorized by the Managing Director on behalf of KBS as final validation opinion. The Technical Reviewer and Manager T&C may be same person.

SECTION F. Validation opinion

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KBS Certification Services Pvt. Ltd. has been contracted by Voltas Green Limited to perform a validation of the project:

Project title: Solar PV based power generation by Voltas Green in Mauritius

Host Country: Mauritius

The validation was performed in accordance with the UNFCCC criteria for the Clean Development Mechanism, CDM VVS for project activities, V02.0 and related Standards/Guidance and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The proposed CDM project activity will result in reductions of greenhouse gas (GHG) emissions that are real, measurable and give long-term benefits to the mitigation of climate change. In our opinion, the project meets all relevant UNFCCC, CDM criteria and all relevant host country criteria.

The project correctly applies the methodology AMS I.D - Grid connected renewable electricity generation, Version 18.0, valid from 28/11/2014 (Version 18.0). It is demonstrated that the project is not a likely baseline scenario. The emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be 22,690 tCO₂e (annual average) over 7 year crediting period (renewable) starting from 25/11/2019. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achievable given the underlying assumptions do not change.

The project will hence be recommended by KBS for request for registration with the UNFCCC.

Appendix 1. Abbreviations

Abbreviations	Full texts
AMS	Approved Methodology for Small-scale project activities
BE	Baseline Emissions
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CdTe	Cadmium Telluride
CM	Combined Margin
CER	Certified Emission Reduction
CL	Clarification request
COP	Conference of Parties
DOE	Designated Operational Entity
DNA	Designated National Authority
DR	Document Review
EB	Executive Board
EF	Emission Factor
EPC	Engineering and Procurement and Construction contract
ERs	Emission Reductions
ESIS	Environmental and Social Impact Statement
ESMS	Environmental and Social Management System
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GSC	Global Stakeholder Consultation
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LSC	Local Stakeholder Consultation
LE	Leakage Emissions
LoA	Letter of Approval/Authorization
ISO	International Organization for Standardization
MOP	Meeting of Parties
MoC	Modalities of Communication
MoU	Memorandum of Understanding
MoV	Means of Verification
MP	Monitoring Plan
OM	Operating Margin
PA	Project Activity
PDD	Project Design Document
PE	Project Emissions
PP	Project Participant
PPA	Power Purchase Agreement
PS	Project Standard for project activities
PO	Purchase Order
PCP	Project Cycle Procedure for project activities
QA/QC	Quality Assurance/Quality Control
RfR	Request for Registration
SCADA	Supervisory Control And Data Acquisition
SD	Sustainable Development
T&C	Technical & Certification
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation & Verification Standard for project activities

Appendix 2. Competence of team members and technical reviewers

Personnel Name:		Rohit Badaya	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
	TA 1.2: Energy generation from renewable energy sources		
Energy demand	TA 3.1. Energy Demand		
Waste Handling and Disposal	TA 13.1 Solid waste and wastewater TA 13.2 Manure		
Approved By	Manager Competency & Training		
Approval date:	16/10/2017		

Personnel Name:		Sanjay Kandari	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
	TA 1.2: Energy generation from renewable energy sources		
Energy Demand	TA 3.1. Energy demand		
Waste handling and Disposal	TA 13.1. Solid waste and wastewater TA 13.2. Manure		
Approved by (Manager C & T)	Akhilesh Joshi		
Approval date:	11/12/2015		

Personnel Name:		Chetan Swaroop Sharma	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
	TA 1.2: Energy generation from renewable energy sources		
Energy Demand	TA 3.1. Energy demand		

Waste handling and disposal	TA 13.1. Solid waste and wastewater TA 13.2. Manure
Approved by (Manager C & T)	Sanjay Kandari
Approval date:	01/05/2017

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	PP	Project Design Document (version 01) Project Design Document (version 03)	10/10/2018 04/11/2019	PP
2	PP	Emission Reductions Excelsheet (corresponding to initial PDD) Emission Reductions Excelsheet (corresponding to final PDD)	10/10/2018 04/11/2019	PP
3	Ministry of Social Security, National Solidarity and Environment and Sustainable Development	Letter of Approval from the Host Party	25/09/2019	PP
4	PP	Single Line Diagram for the Solar PV Power Plant.	-	PP
5	Technology supplier	Technical Specifications for the PV modules installed under the project activity	-	PP
6	Technology supplier	EPC contract	-	PP
7	3E France SARL	Completion Certificate of the Solar PV plant	12/12/2018	PP
8	PP and CEB	Energy Supply and Purchase Agreement between Voltas Green Ltd. and Central Electricity Board, Mauritius	16/12/2016	PP
9	Third Party	Third party report for solar power plant installed under the project activity	-	PP
10	PP	Training records	-	PP

11	PP	Stakeholder Consultation meeting: 1. Notice for Local Stakeholder Consultation Meeting for CDM project 2. Consultation Meeting Report for the CDM project 3. Attendance sheet for Local Stakeholder Consultation Meeting on CDM project		PP
12	Sustainable Resource Management Ltd	Environmental Impact Assessment Report for the project activity	February 2017	PP
13	Ministry of Social Security, National Solidarity and Environment and Sustainable Development	EIA Licence granted by Department of Environment on September 05, 2017 having reference number ENV/DOE/EIA/1720	05/09/2017	PP
14	PP	Modalities of Communication	14/10/2019	PP
15	Central Electricity Board, Mauritius	Email from the CEB confirming on the Grid Emission Factor, Mauritius dated July 2018 prepared by Central Electricity Board (CEB) which was also sent to CDM Executive for approval	dated 12/11/2019	PP
16	-	CDM Registered Projects in Mauritius: 1. CDM Reference Number: 1048 2. CDM Reference Number: 10483	Registration dated 31/05/2019 Registration dated 31/05/2019	UNFCCC
17	UNFCCC website	CDM VVS for project activities, version 02.0	-	UNFCCC website
18	UNFCCC website	CDM PS for project activities, version 02.0	-	UNFCCC website
19	UNFCCC website	CDM PCP for project activities, version 02.0	-	UNFCCC website
20	UNFCCC website	Glossary: CDM terms, version-10.0	-	UNFCCC website
21	UNFCCC website	Guidelines for the reporting and validation of plant load factors, version 01 (EB 48 Annex 11)	-	UNFCCC website
22	UNFCCC website	Demonstration of additionality of small-scale project activities, version 12.0"	-	UNFCCC website
23	UNFCCC website	Project design document form (CDM-PDD-Form), version 11	-	UNFCCC website
24	UNFCCC website	AMS I.D. - Grid connected renewable electricity generation, Version 18.0 https://cdm.unfccc.int/filestorage/2/P/7/2P7FS6ZQAR84LG3NMKYUH50WI9ODBC/EB81_repan24_AMS-I.D_ver18.pdf?t=bXJ8cTFkMGNnfDBubh5Y-9th-uSb_UfJF3Xh	valid from 28/11/2014	UNFCCC website
25	UNFCCC website	Tool to calculate the emission factor for an electricity system (version 07.0.0) https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf	-	UNFCCC website

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CLs from this validation

CL ID	01	Section no.	-	Date:	27/11/2018
Description of CL					
<ol style="list-style-type: none"> PP is requested to submit the Emission Reductions calculation sheet for review. The PP is requested to provide the following supporting documents for the project activity. <ol style="list-style-type: none"> Letter of Approval from the Host Party EPC contract Technical Specifications from the Manufacturer Commissioning Certificate of the Solar PV plant Power Purchase Agreements Basis for the Plant Load Factor/Electricity Generation considered for the project activity Stakeholder Consultation meeting: <ol style="list-style-type: none"> Minute of meeting Signed attendance sheet Public notification Environmental Impact Assessment Report EIA Licence granted by Department of Environment on December 07, 2017 having reference number ENV/DOE/EIA/1728 Signed Modalities of Communication 					
Project participant response					Date: 16/10/2019
<i>The applicable the supportive provided along with this response as mentioned above.</i>					
Documentation provided by project participant					
<ol style="list-style-type: none"> EPC contract Letter of approval from DNA MoC Power Purchase Agreement EIA License EIA Report Commissioning certificates Stakeholder Minutes of Meeting Attendance sheet Public notice for local stakeholder Single line diagram 					
DOE assessment					Date: 17/10/2019
The required documents have now been provided to the assessment team. Hence the issue is closed.					

Table 2. CARs from this validation

CAR ID	01	Section no.	A.1, B.6.3	Date:	27/11/2018
Description of CAR					
<ol style="list-style-type: none"> As per the project details provided under Section A.1 of the PDD, the total PV modules are 55728, with the capacity of 270 Wp each. Hence this results into the total capacity of 15.05 which is more than the small scale capacity of 15 MW. Hence PP shall clarify as how the project falls within the small-scale limit requirements of the small-scale project activities. The PP has used the capacity of 12.24 MWac for the calculations of electricity generation and hence emission reductions in Section B.6.3 of the PDD. PP is requested to check as why the total capacity as per the installed power generation capacity (or installed capacity or nameplate capacity as per page 16-f of the AMS I-D, version 18) which is 15.04656 MW not considered for the calculations. 					
Project participant response					Date: 16/10/2019
1. The DC installed capacity is 15.05 MW, however the installed capacity of power plant will be in terms					

<p>of AC, which is in actual can be supplied to grid, the AC installed capacity of the project activity is 12.24MW which is being used for emission reduction is appropriate. The proposed project activity is eligible to used small scale methodology. There was an error in AC capacity the same is corrected.</p> <p>2. The installed capacity is aggregated and is considered as AC power potential which is appropriate in case of the proposed project activity.</p>	
Documentation provided by project participant	
<p>EPC</p> <p>Solar PV module Technical specification</p> <p>Inverter Technical Specification</p>	
DOE assessment	Date: 17/10/2019
<p>1. The proposed project activity is a renewable resource (solar) based greenfield power project with installed capacity 12.24 MWac or 15.05 MWdc capacity. The actual power sent to grid is based on the actual capacity of 12.24 MWac, which has further been used for the calculation of emission reductions and hence the capacity of the project activity is less than 15 MW and the project falls under the category of small-scale capacity. Hence the issue is closed.</p> <p>2. The proposed project activity is a renewable resource (solar) based greenfield power project with installed capacity 12.24 MWac or 15.05 MWdc capacity. The actual power sent to grid is based on the actual capacity of 12.24 MWac, which has further been used for the calculation of emission reductions which is found correct and conservative. Hence the issue is closed.</p>	

CAR ID	02	Section no.	B.7	Date: 27/11/2018
Description of CAR				
<p>1. All the parameter as per the applied methodology to be monitored in the Section B.7.1 of the PDD. Further the PP is requested to use the symbol of parameter in line with the applied methodology.</p> <p>2. The PP is requested to provide the basis of the calibration frequency of once in three years as provided in the PDD.</p>				
Project participant response				Date: 16/10/2019
<p>1. The proposed project activity is solar PV based power generation and supplied generated electricity to grid, as the solar project does not have any mechanical component to use grid electricity, hence only one parameter is required to monitor.</p> <p>2. As per CEB Mauritius they perform the calibration on 5 years basis, which is not in control of PP, hence the same period was used, which has been corrected to 4 years, though the calibration frequency will be decided by CEB only.</p>				
Documentation provided by project participant				
PDD Version-03				
DOE assessment				Date: 17/10/2019
<p>1. The parameter has now been used as per the applied methodology in Section B.7.1 of the PDD and hence the issue is closed.</p> <p>2. The justification provided by the PP is acceptable and the same was also confirmed during the site visit. Hence the issue is closed.</p>				

CAR ID	03	Section no.	-	Date: 09/10/2019
Description of CAR				
The version of the PDD template available on the UNFCCC has been updated. Hence PP is requested to update and submit the revised PDD in the latest version of the PDD template as available on the UNFCCC.				
Project participant response				Date: 16/10/2019
The revised PDD is now prepared using latest template available on UNFCCC website i.e. Version-11.				
Documentation provided by project participant				
PDD Version-03				
DOE assessment				Date: 17/10/2019
PP has now submitted the PDD in the latest version of the PDD template (version 11) as available on the UNFCCC. Hence the issue is closed.				

CAR ID	04	Section no.	Section B	Date: 09/10/2019
Description of CAR				

PP has applied the Standard baseline (ASB0019: Grid emission factor of Mauritius – Version 01.0) for the calculation of emission factor. However the standardized baseline has already expired and hence PP is requested to take necessary action in this regard.	
Project participant response	Date: 16/10/2019
<i>The standard baseline ASB0019: Grid emission factor of Mauritius – Version 01.0 was valid at the time of webhosting of PDD for global stakeholder comments, however the same is expired in Jan 2019. The grid emission factor is now updated based on data made available by Central Electricity Board, Mauritius dated July 2018. As the data is provided by CEB the same is considered appropriate and authentic.</i>	
Documentation provided by project participant	
<i>PDD Version-03 ER spreadsheet Version-02</i>	
DOE assessment	Date: 17/10/2019
The the Standard baseline (ASB0019: Grid emission factor of Mauritius – Version 01.0) for the calculation of emission factor has been expired and not currently applicable. The grid emission factor is now updated based on data made available by Central Electricity Board, Mauritius dated July 2018. The same has been considered as authentic and reliable. Hence the issue is closed.	

Table 3. FARs from this validation

FAR ID	Xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN); • Make editorial improvements.
03.1	11 January 2018	Editorial revision to remove an erroneously included instruction paragraph in section D.2 (Identification of project type).
03.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
02.0	22 July 2016	EB 90, Annex 3 Revision to include provisions related to automatically additional project activities.
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: project activities, validation report		