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	Cam Lam VN Solar Power Plant
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the validation report	2.2
Completion date of the validation report	14/11/2019
Version number of the PDD to which this report applies	3.2
Date when PDD was uploaded for global stakeholder consultation	28/08/2019
Project participants	Hanwha Energy Corporation Cam Lam Solar Joint Stock Company
Host Party	Viet Nam
Applied methodologies and standardized baselines	ACM0002: Grid-connected electricity generation from renewable sources(version 19.0)
Mandatory sectoral scopes	1 - Energy industries (renewable-/non-renewable sources)
Conditional sectoral scopes, if applicable	N/A
Estimated amount of annual average GHG emission reductions or GHG removals by sinks	66,991 tCO_2
Name and UNFCCC reference number of the DOE	Korean Foundation for Quality (KFQ) E-0025
Name, position and signature of the approver of the validation report	Yu Shim JEONG YS JEONG Technical Managing Director

SECTION A. Executive summary

Korean Foundation for Quality (KFQ) has been engaged by Hanwha Energy Corporation to perform a validation of the “Cam Lam VN Solar Power Plant” in Viet Nam. This report summarizes the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM PA, as well as criteria given to provide for consistent project operations, monitoring and reporting. The term “UNFCCC criteria” refers to Article 12 of the Kyoto Protocol, including but not limited to version 2.0 of CDM Validation and Verification Standard for project activity (hereinafter VVS), version 2.0 of CDM Project Stand for project activity (hereinafter PS), applied methodology and the subsequent decisions by the CDM Executive Board as well as host country criteria. This report contains the findings and resolutions from the validation and a validation opinion.

Description of the project activity

The project activity is grid-connected solar power plant in the host country, which comprises of constructing 50MW solar power plant in Cam Ranh City, Khanh Hoa Province, Viet Nam. The generated electricity is supplied to the national Grid, which is dominated by fossil fuel-based power generation and hydro power generation thus resulting in reduction of emissions of greenhouse gases.

The project applies methodology “ACM0002_Grid connected electricity generation from renewable sources (version 19.0)”. The project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project in accordance with the UNFCCC CDM requirements for additionality.

Validation objective

The purpose of a validation is to have an independent third party assess the project design. 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. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

Validation scope

The validation scope is defined as an independent and objective review of the project design document (PDD), the project’s baseline study, monitoring plan and other relevant documents. The information in these documents is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed on the Marrakech Accords and the relevant decisions by the CDM Executive Board including the approved baseline and monitoring methodology.

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

Validation Process

The validation consisted of the following 3 phases:

(a) Document review, involving:

(i) A review of data and information;
(ii) Cross checks between information provided in the PDD and information from sources other than those used, if available, the DOE's sectoral or local expertise and, if necessary, independent background investigations;

(b) Follow-up actions (e.g. on-site inspection and telephone or e-mail interviews), including:
(i) Interviews with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation;
(ii) Cross checks between information provided by interviewed personnel (i.e. by checking sources or other interviews) to ensure that no relevant information has been omitted;

(c) Resolution of outstanding issues and the issuance of the final validation report and opinion.

Conclusion
Conclusions of validation are summarized as follows:

- The project is in line with all relevant host country criteria (Viet Nam) and all relevant UNFCCC requirements for CDM. Project activity approval has been obtained from DNA of host country (Viet Nam).
- The project´s additionality is sufficiently justified and referenced in the PDD.
- The monitoring plan is transparent and adequate.
- The sustainable development is sufficiently justified and referenced.
- The calculation of the project emission removals is carried out in a transparent and conservative manner, so that the calculated emission removals of 66,991CO_2e are most likely to be achieved within the first 7-year renewable crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

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 (*)	IR	LEE	Mi Jung	KFQ	√	√	√	√
2	Validator (*)	IR	PARK	Su Hyun	KFQ	√	-	-	√
3	Validator (*)	IR	MOON	Seon Young	KFQ	√	√	√	√
4	Local expert	IR	KIM	Ban Seok	KFQ	√	-	-	-

(*) means personnel with technical expertise in technical area 1.2.

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	KANG	Yeong Gyeong	KFQ
2	Approver	IR	JEONG	Yu Shim	KFQ

Please refer to Appendix 2 below for demonstration of hot the team meets the competence required for the validation.

SECTION C. Means of validation

C.1. Desk/document review

The Project Design Document (PDD) version 01 was submitted on 07/02/2019 and reviewed with additional background documents related to the project design including baseline and additionality of the project. All documents reviewed or referenced during the validation are listed in Appendix 3. Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data. The list of documents reviewed during the validation process is mentioned in the Appendix 3 of this report.

KFQ's verification process takes into consideration all the CDM rules and guidance applicable to the project activity, e.g. CDM Validation and Verification Standard for Project Activities, CDM Project Standard, CDM Project Cycle Procedure, Checklist for requests for registration of project activities, and relevant decisions, clarifications and guidance from the CMP and the Board.

During the desk review, KFQ has applied standard auditing techniques to assess the quality of information provided. The following activities were performed:

- Review the compliance of the PDD with the guidance for completing the PDD form;
- Verify the completeness of the data and the information presented;
- Review the monitoring plan and monitoring methodology. Check the compliance of the MR with respect to the monitoring plan and verify that the applied methodology was carried out. Particular attention to coverage of all monitoring parameters, the frequency of measurements, the quality of the metering equipment including calibration requirements and the quality assurance and quality control procedures was paid;
- Review the calculations and assumptions used to obtain GHG data and ER;
- Evaluate the data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

C.2. On-site inspection

Duration of on-site inspection: 22/03/2019 to 24/03/2019				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Confirmation of information provided in the PDD and documentation with other resources	Cam Nghia Ward, Cam Ranh City, Khanh Hoa	22/03/2019 ~ 24/03/2019	Mi Jung LEE Seon Young MOON

		Province		
2.	Assessment of application of selected baseline and monitoring methodologies, baseline scenario, additionality demonstration	Cam Nghia Ward, Cam Ranh City, Khanh Hoa Province	22/03/2019 ~ 24/03/2019	Mi Jung LEE Seon Young MOON
3.	Assessment of emission reduction calculation, monitoring plan and approval and authorisation	Cam Nghia Ward, Cam Ranh City, Khanh Hoa Province	22/03/2019 ~ 24/03/2019	Mi Jung LEE Seon Young MOON
4.	Confirmation of environmental impacts and stakeholder consultation	Cam Nghia Ward, Cam Ranh City, Khanh Hoa Province	22/03/2019 ~ 24/03/2019	Mi Jung LEE Seon Young MOON
5.	Assessment of duration and crediting period	Cam Nghia Ward, Cam Ranh City, Khanh Hoa Province	22/03/2019 ~ 24/03/2019	Mi Jung LEE Seon Young MOON
6.	Confirmation of approval and authorization.	Cam Nghia Ward, Cam Ranh City, Khanh Hoa Province	22/03/2019 ~ 24/03/2019	Mi Jung LEE Seon Young MOON

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	NAM	Sang Jae	Hanwha Energy Corporation	22/03/2019 ~ 24/03/2019	Project design and general support	Mi Jung LEE Seon Young MOON
2.	CHOI	Ga Eun	Hanwha Energy Corporation	22/03/2019 ~ 24/03/2019	Project design and general support	Mi Jung LEE Seon Young MOON
3.	KIM	Jae Young	Ecoeye Co., Ltd.	22/03/2019 ~ 24/03/2019	Application of selected baseline and monitoring methodologies, baseline scenario, additionality demonstration	Mi Jung LEE Seon Young MOON
4.	EO	Kwang Sun	Ecoeye Co., Ltd.	22/03/2019 ~ 24/03/2019	Emission reduction calculation, monitoring plan	Mi Jung LEE Seon Young MOON
5.	YANG	Seung In	Hanwha Energy Corporation	23/03/2019 ~ 24/03/2019	Monitoring plan, QA/QC procedures, Sustainability aspects of the project	Mi Jung LEE Seon Young MOON
6.	MOON	Tae Hoon	Hanwha Engineering & Construction	23/03/2019 ~ 24/03/2019	Project design, Monitoring plan, QA/QC procedures	Mi Jung LEE Seon Young MOON
7.	Le	Thi Thuy	Local residents	23/03/2019 ~ 24/03/2019	LSC, Project description	Mi Jung LEE Seon Young MOON
8.	Ho	Thans Dam	Local residents	23/03/2019 ~ 24/03/2019	LSC, Project description	Mi Jung LEE Seon Young MOON
9.	Tu Auang	Inliy	EVN	22/03/2019	Socio-economic impacts of the project activity, Sustainability aspects of the project	Mi Jung LEE Seon Young MOON

C.4. Sampling approach

No sampling approach used during the validation.

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	0	0	0
Identification of project type	0	0	0
Description of project activity	3	0	0
Application and selection of methodologies and standardized baselines	1	2	0
- Application of methodologies and standardized baselines	0	0	0
- Deviation from methodology and/or methodological tool	0	0	0
- Clarification on applicability of methodology,	0	0	0

tool and/or standardized baseline			
- Project boundary, sources and GHGs	0	0	0
- Baseline scenario	1	0	0
- Demonstration of additionality	0	1	0
- Estimation of emission reductions or net anthropogenic removals	0	0	0
- Monitoring plan	0	1	0
Start date, crediting period type and duration	0	0	0
Environmental impacts	0	0	0
Local stakeholder consultation	0	0	0
Sustainable development co-benefits	0	0	0
Approval	0	1	0
Authorization	0	0	0
Modalities of communication	0	1	0
Global stakeholder consultation	0	0	0
Others (please specify)	0	0	0
Total	4	4	0

SECTION D. Validation findings

D.1. Demonstration of prior consideration of the CDM

Means of validation	The validation team determined whether CDM benefits were considered necessary in the decision to undertake the project as a proposed CDM project activity if the starting date of the proposed CDM project activity is prior to the start of validation, which is the date of publication of the PDD for global stakeholder consultation.
Findings	As per Section 4.1 of the "CDM Project Cycle Procedure for project activities version 02.0", if the start date of the project is after 2nd August 2008, "the project participants shall notify the designated national authority (DNA) of the host Party of the project activity, if the DNA exists, and the secretariat in writing of the commencement of the project activity and their intention to seek the CDM status for the project activity, or, through a DOE, publish the PDD for global stakeholder consultation within 180 days of the start date of the project activity". The start date of this project activity is determined as 01 October 2018 which is dated of EPC contract between PP and Hanwha Engineering & Construction Corp. The validation team checked submitted evidence such as EPC contract signed on 01/10/2018, and it has been validated as per "Glossary-CDM Terms (version 10.0)". Thus, the PP informed a Viet Nam DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status of the project activity. The validation team checked the UNFCCC CDM website for prior consideration notifications and confirms that the prior consideration notification appears in the UNFCCC website[1] on the date of 30/11/2018. In addition, intention to seek CDM status was submitted to the Host Party DNA on 30/11/2018 and it was confirmed through official document for prior consideration notification to Host Party DNA and email communications. All notifications were provided within 180 days of the project activity start date. Therefore, the CDM prior consideration by project participants is correctly demonstrated, as per paragraph 41 of the VVS of PA (Version 02.0) and Para. 6&7 of the CDM PCP for PA (Version 02.0). Also the PDD was published for the GSC for in the period of 08/02/2019 ~09/03/2019. The same was validated from the web link on UNFCCC website[2]. However, it was identified that all the business license and approval relating to this project activity were approved under the title "Cam Lam VN Solar Power Plant" in the course of LoA issuance and the title was different from the title of PDD for GSC

[1] https://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html

[2] https://cdm.unfccc.int/Projects/Validation/DB/CMAIC8AHZSH5THBQVB4YTTI0VMANJ0/view.html

	(08/02/2019) and notification to secretariat (30/11/2018). Thus, it was unavoidable to reupload the PDD for GSC to ensure consistency with the title of business license (Cam Lam VN Solar Power Plant) as per the Viet Nam DNA' criteria for LoA issuance. The PP reuploaded PDD for GSC on 28/08/2019 [3] under the recommendation by CDM secretariat made on 30/06/2019. As there is only change in the title of PDD, and there were no significant changes to the project design and application of methodology that already applied, ACM0002 (Version 19.0), the validation team could conclude that this project activity has been fulfilled the relevant requirements in VVS and PCP.
Conclusion	Based on documented evidences mentioned above, on-site assessment and interview with the PP, the validation team confirms that CDM prior consideration by PP is correctly demonstrated, as per paragraph 41 of the VVS of PA (Version 02.0) and section 4 of the CDM PCP for PA (Version 02.0). The start date of the project is 01 October 2018 (date of EPC contract) which is the earliest date at which either the implementation or construction or real action of a CDM project activity begins. The PP also informed Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status within 180 days of starting date of project activity.

D.2. Identification of project type

Means of validation	The validation team determine whether the project participants identified the type of CDM project activity they intend to design and implement in accordance with the "CDM project standard for project activities". Also, DOE determine the PDD has been completed using the valid version of the PDD form appropriate to the type of the proposed CDM project activity.
Findings	The proposed project activity is a renewable source grid connected power project with installed capacity 50MW. As the capacity of the project is larger than 15MW, the project activity is eligible to as type I large-scale CDM project activity. The project activity applied ACM0002 (version 19.0), which also uses the 'Tool to calculate the emission factor for an electricity system', version 7.0. The validation team has confirmed the capacity of the proposed project activity by reviewing Feasibility Study Report (hereinafter FSR), module purchase contract between PP and module provider (Hanwha Q CELLS Korea), approval of environmental protection report and interview with PP during on-site assessment and is of opinion that project activity is eligible as large-scale CDM project activity. The validation team also validated that PDD has been completed using the valid version of the PDD form (Version 11.0) appropriate to the type of the proposed CDM project activity and following instructions therein.
Conclusion	The validation team is of opinion that applied ACM0002 (Version 19.0) 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. The PDD has mentioned and correctly applied the tools and guidance relevant as per applied methodology. The project activity is eligible as a large-scale project activity and complies with the requirements stipulated in VVS (version 02.0).

D.3. Description of project activity

Means of validation	By means of comparison of the PDD submitted by the project participants, review of all supporting documents and interviews with project participant representatives, the validation team has assessed the description of the proposed CDM project activity in accordance with applicable related validation requirements.
Findings	The proposed project activity is a new renewable source based grid-connected power project with an installed capacity of 50MW. It is not a capacity addition or retrofit or replacement of any other existing solar power plant and will supply generated electricity to the national grid. The location of the proposed project activity is at Cam Nghia Ward in Cam Ranh City of Khanh Hoa Province, Viet Nam. The geographical coordinates of the project activity is 11°42`50``N, 108°40`33``E and it was confirmed during site visit. However it's information in the PDD version 1.0 (published version of PDD) is slightly different as what the validation team

[3] https://cdm.unfccc.int/Projects/Validation/DB/G70YFODPUHGSEVZBXI3QTOFY07IPAC/view.html

	confirmed during on-site assessment (**Refer to Appendix 4/Table 1/CL ID 01**). After the PPs have submitted the revised PDD (version 3.2), validation team checked revised geographical coordinates of the proposed project activity in the PDD (Version 3.2) and confirmed that correct information was provided. It was crosschecked with the geographical coordinates that were checked by the validation team during on-site assessment as well as FSR, approval or environmental protection plan and etc. During on-site assessment, it was checked that this proposed project activity will be equipped with 127,904 modules (76,170 modules of Q.PEAK DUO L-G5.2 390 and 51,744 modules of Q.PEAK DUO L-G5.2 385 respectively) and 18 inverters (SG2500HV) of 2,500kW each, which will convert direct current into alternating current electricity. The inverters connected to transformers where the electricity transmit to through 110kVCam Ranh transmission line before feeding to the national grid. It is also checked through FSR, module purchase contract as well as interview technical supervisor at the project site. However, capacity of module and total number of modules in the PDD (Version 1.0) is not consistent with what the validation team identified (**Refer to Appendix 4/Table 1/CL ID 02**). After the PPs have submitted the PDD (version 3.2), it was checked that actual number and capacity of modules equipped at the project site was provided. The validation team confirmed that information provided in the PDD regarding modules is correct and appropriate. The net generated electricity supplied to the national grid of Viet Nam as conformed from PPA (Power Purchase Agreement) made between PP and EVN (Electricity of Viet Nam). According to the PDD (Version 1.0), the project will replace anthropogenic emissions of greenhouse gases estimated to be 62,788t CO_2e per year, thereon displacing 78,831 MWh/yr amount of electricity from the power plants connected to the Viet Nam national grid. However, evidence of estimation of electricity would be generated by this project activity and estimated annual emission reduction were not provided. (**Refer to Appendix 4/Table 1/CL ID 03**). After the PPs have submitted the PDD (version 3.2), validation team checked estimated annual electricity generation by this proposed project activity (78,885 MWh) against FSR including simulation report of electricity generation, PPA and other related evidence and confirmed that correct information was provided. Regarding the estimated annual emission reduction, it is corrected as 66,691 t CO_2e and final value was calculated based on corrected annual electricity generation (78,885 MWh) by this proposed project activity and emission factor. Please refer section D.4.5 for the ex-ante emission factor and section D.4.7 for estimation of emission reduction. The technical specification including the installed capacity and electricity generation by this proposed project activity have been verified from the FSR, PPA and technical specification of the project activity provided by manufacturer and also confirmed by interviewing with technical representatives of the PP during the site visit. The life time of the project activity will be 25 years and it was confirmed as per the FSR and the specification of module and inverter provided by its manufacturers. The PDD proposes a renewable crediting period of 7 years with maximum of 2 renewals has been chosen by the PP for the project activity. The validation team has further confirmed that the project activity is a greenfield project and the project description provided in PDD by interviewing the technical personnel involved in development of Cam Lam VN Solar Power Plant during the site visit from 22/03/2019 to 24/03/2019.
Conclusion	KFQ confirms that the project description as mentioned in PDD (version 3.2) is validated by reviewing the FSR, signed EPC contract, permits obtained regarding project construction & operation, PPA signed and the same has also been confirmed during site visit by interviewing the technical personnel involved in project activity. Based on discussion above KFQ confirms that project description provided in PDD is correct and appropriate.

	The raised CLs (ID 01, ID 02 and ID 03) have been completely resolved.

D.4. Application and selection of methodologies and standardized baselines

D.4.1. Application of methodologies and standardized baselines

Means of validation	By means of project participants selected approved methodologies, any applicable tools, and/or the approved standardized baselines to the project activity.
Findings	The proposed project activity is a renewable resource grid connected power project with installed capacity 50MW. The project activity is more than 15MW threshold; the project is eligible to as type I large-scale CDM project activity. The project applies approved methodology (Grid connected electricity generation from renewable sources – ACM 0002 Version 19.0) for proposed CDM project activity, which also uses the "Tool to calculate the emission factor for an electricity system" version 7.0. The validation team has verified the technical parameters from the approved FSR, PPA and purchase orders. The applicability condition of the ACM 0002 (version 19.0) and the "Tool to calculate the emission factor for an electricity system (version 7.0)" referred to in the approved methodology, in context of project activity is demonstrated in PDD. The summary of the project compliance with applicability criteria is listed below:

ACM0002 (Version 19.0) applicability conditions	Conclusion made by validation team
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	The proposed CDM project activity involves the installation of greenfield 50 MW solar power plant. The validation team reviewed EPC contract, PPA for the conformance. The electricity generated from the project activity will be exported to the national grid of Viet Nam. Based on the above assessment and review of PPA, the validation team confirms that the proposed CDM project activity is a Green Field grid connected renewable power generation project based on solar energy. Hence, this applicability condition is fulfilled.
The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission	From the EPC contract and PPA and the physical verification at the site, it is confirmed that the project activity is a greenfield project and not a retrofit or replacement of older PV panels. Based on the physical site visit and the documentary evidence, the validation team is able to confirm that the project activity is a Greenfield project and not a capacity addition. Hence, this applicability condition is not relevant to the proposed CDM project activity

	section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum	
	The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	As described in the above applicability conditions, the proposed project activity is a solar based power project and hence this condition is not relevant to the proposed CDM project activity. Physical verification at the site confirmed that the project activity is not an add up of a renewable and nonrenewable component and only Solar PV panels are involved in the project activity having a total capacity of 50 MW, which classifies as a large scale project activity (> 15 MW). The project activity does not involve switching from fossil fuels to renewable energy sources at the project activity site nor is a biomass fired power plant.
	The validation team has assessed the applicability requirements and cross-verified with the supporting information and interviewed the PP and found the applicability conditions of the methodology ACM 0002 (version 19.0) to the project activity is reasonable and acceptable. And it was identified that no standardized baseline was used in this proposed project activity.	
Conclusion	The validation team is of opinion that applied 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. Also, the PDD has mentioned and correctly applied the tools and guidance relevant as per applied methodology. Based on discussion above, the validation team confirms that the applicability conditions of the selected approved methodology ACM 0002 (version 19.0) is appropriately described in PDD and the project activity satisfies all the applicable conditions for the applied methodology.	

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

Means of validation	As per VVS (version 2.0), the validation has determined whether the PP deviated from the approved baseline and monitoring methodology and/or methodological tool.
Findings	No deviation from the applied methodology and/or methodological tool is envisaged for the project activity.
Conclusion	There is no deviation from the applied methodology reported in this submission.

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

Means of validation	By means of requesting clarification of the methodology, the tool and/or the standardized baseline in accordance with the relevant VVS and PS for project activity.
Findings	As per VVS version 2.0, the validation team has determined to ensure that the request is not submitted with the intention of revising an approved methodology, an approved tool and/or an approved standardized baseline to expand its applicability.
Conclusion	There is no such request made along with this submission.

D.4.4. Project boundary, sources and GHGs

Means of validation	By means of comparison of the PDD with the applied CDM methodologies, the validation team has assessed the project boundary in accordance with applicable related validation requirements in the VVS.

Findings	According to the applied methodology ACM 0002 (version 19.0), the physical project boundary includes solar module systems installed under the project activity and the power plant is connected to the national grid. The project boundary has been validated through site visit. The selection of the grid in the system boundary for the project activity is in line with the CDM EB guidance regarding selection of geographical and system boundaries as provided in "Tool to calculate the emission factor for an electricity system". Further, based on review of the PDD (version 3.2) 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. The GHG emissions which are included/excluded in the project boundary have been clearly indicated in the PDD.
Conclusion	The accuracy and completeness of the project boundary mentioned in PDD (version 3.2) is validated by the review of FSR, PPA, interviewing the technical personnel involved in the project activity and on-site observation. The identified boundary and selected sources and gases are justified for the project activity. 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 reduction, which are not addressed by ACM 0002 version 19.0. The validation team is with opinion that PDD has correctly identified and included all the sources of GHG emission relevant to project activity.

D.4.5. Baseline scenario

Means of validation	By means of comparison of the PDD with the applied CDM methodology, the validation team has assessed the baseline scenario in accordance with applicable related validation requirements in the VVS.
Findings	The project activity is installation of a new grid connected renewable resource (solar) based power plant, the PP has identified the plausible baseline scenario in accordance with applied methodology ACM0002, version 19.0. as, "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". Therefore, in accordance with the above, the baseline for the project activity is continuation of the pre-project scenario wherein the equivalent amount of electricity as generated by the project activity shall be generated at the thermal dominated grid connected power plants resulting in CO_2e emissions. The same is line with all national policies and there is no policies or regulations which mandates the project participant to implement the project activity. Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The combined emission factor has been calculated as per para. 22 of the methodology ACM0002, version 19.0 and TOOL07, Tool to calculate the emission factor for an electricity system, version 07.1. The combined margin (CM) is consisting of combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the TOOL07. The PP adopts the ex-ante calculation of emission factors of the grid and the combined margin emission factor for national grid of Viet Nam has been calculated as 0.7695 tCO_2 / MWh. It has been calculated using the source published in March 2017 from the Ministry of Natural Resources and Environment Viet Nam. However, evidence of emission factor applied in estimation of baseline emission was not provided to the validation team. (**Refer to Appendix 4/Table 1/CL ID 04**). The combined margin emission factor for national grid of Viet Nam in the revised PDD (version 3.2) has been calculated as 0.8492 tCO_2/MWh. It has been calculated based on the data provided by Ministry of Natural Resources and Environment Viet

Nam in March 2019[4]. This state body has provided the grid emission factor using the 'Tool to calculate the emission factor for an electricity system, version 07.0'. This data was the latest publicly available data at the time of publishing the PDD for the global stakeholder consultation.

The emission factors are as follows:

Parameter	Value	Source
$EF_{OM,y}$: Operating Margin Emission Factor (tCO_2/MWh)	0.8336 tCO_2/MWh	Ministry of Natural Resources and Environment Viet Nam (March 2019)
$EF_{BM,y}$: Build Margin Emission Factor (tCO_2/MWh)	0.8961 tCO_2/MWh	
$EF_{CM,y}$: Combined Margin Emission Factor (tCO_2/MWh)	0.8492 tCO_2/MWh	

The $EF_{OM,y}$ is based on the generation-weighted average CO_2 emissions based on the most recent data available at the time of submission of the PDD to the DOE for validation. Hence the generation-weighted average has been calculated based on the three years data (2015, 2016 and 2017), hence found correct.

The $EF_{BM,y}$ has been sourced based on the most recent information (year 2017) available at the time of PDD submission to the DOE for validation, hence found correct.
Since the emission factors have been sourced from the data published by government authority, hence it has been accepted by the validation team.

Since the applied methodology has already defined the baseline scenario, no further analysis is required according to the VVS Version 2.0.

Conclusion

The validation team could confirm that the assumptions, calculations and rationales used for identification of baseline scenario correctly quoted and interpreted in the PDD (version 3.2) along with their sources and references. The national/sectoral regulations relevant to project activity has been considered, which establishes that no existing regulation impair the baseline scenario identified in PDD. The assessment team was also able to check the authenticity of the data/sources used provided by Viet Nam Government.

The raised CL (ID 04) has been completely resolved.

D.4.6. Demonstration of additionality

Means of validation

By means of comparison of the PDD with the applied CDM methodologies, the validation team has assessed the additionality of the project activity in accordance with applicable related validation requirements in the VVS.

Findings

The additionality of the proposed project activity has been demonstrated based on applied methodology ACM0002 (version 19.0). As per the ACM0002 version 19.0, PP demonstrated its additionality based on the simplified procedure to demonstrate additionality (= positive list). The technology adopted solar photovoltaic technologies thus this proposed project activity is automatically additional if following condition is met at the time of PDD submission.

- The percentage share of total installed capacity of the specific technology in the total installed grid connected power generation capacity in the host country is equal to or less than two per cent: or
- The total installed capacity of the technology in the host country is less than or equal to 50 MW

As per published PDD version 1.0, total installed grid connected power generation capacity is 42,135 MW and the installed grid connected solar photovoltaic power plants are 11 MW which is approx. 0.026%. However, evidences of it have not

[4] http://www.dcc.gov.vn/van-ban-phap-luat/1054/Nghien-cuu,-xay-dung-he-so-phat-thai-(EF)-cua-luoi-dien-Viet-Nam-(Kèm-CV-330/BDKH-GNPT).html

	been submitted to the validation team. (**Refer to Appendix 4/Table 2/CAR ID 01**) Regarding the CAR ID 01, PPs have revised PDD (version 3.2) and submitted to DOE with evidence such as 2017 Annual Report issued by EVN (Electricity of Vietnam) on 02/02/2018. According to this Report, total installed grid connected power generation capacity in the Viet Nam is 42,135MW. The validation team checked public available website to confirm whether this evidence is the latest version at the time of PDD submission, and could conclude that the Report is credible and appropriate source to use as reference. In case of installed grid connected solar photovoltaic power plants, PP adopted it from IRENA (International Renewable Energy Agency) Renewable Energy Statistics 2019 as there was no any officially published references to apply. According to this statistic, capacity of solar photovoltaic in Viet Nam is 106MW and it is sum of grid connected and non-grid connected solar power plants thus share of solar PV is less than 2% to total installed grid connected power generation capacity. It is also assessed via interview with EVN confirming that this project activity comes under positive list in the Viet Nam thus the validation team conclude that the project meets the additionality criteria as specified and is additional.
Conclusion	As per the paragraph 28 and 29 of the applied methodology ACM0002 (Version 19.0) and para.86~90 of VVS for PA (version 02.0), this project activity automatically additional. The raised CAR (ID 01) has been completely resolved.

D.4.7. Estimation of emission reductions or net anthropogenic removals

Means of validation	By comparing the PDD with the applied methodology, methodological tools, technical supporting information, and the presented calculations, the validation team has assessed the estimated emission reductions of the project activity in accordance with applicable related validation requirements.
Findings	The baseline emissions as discussed in section D.4.5 of this report will include emissions that would have occurred in the absence of the project activity. The emission reduction calculation has been done as per the methodology ACM 0002 version 19. **Baseline Emission (BEy)** $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ Where • BE_y = Baseline Emissions in year y (tCO_2) • $EG_{PJ,y}$= Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh) • $EF_{grid,CM,y}$= Grid emission factor (MWh/tCO_2) PP has estimated the baseline energy generation considering the capacity of the project activity, yearly generation hour and plant load factor. Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors according to the procedure prescribed in the "Tool to calculate the emission factor for an electricity system" version 7.0 which is sourced from Ministry of Natural Resources and Environment of Viet Nam and forms the part of emission reduction calculation. The baseline emission factor calculation and estimation of $EG_{PJ,y}$ is checked by the validation team and found that the calculation is transparent and conservative. Please refer D.3 and D.4.5 of this validation report. Baseline emission calculated as below: $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ $= 78,885\ MWh/yr \times 0.8492\ tCO_2/MWh$ $= 66,991.11\ tCO_2/yr$ [5] $\fallingdotseq 66.991\ tCO_2/yr$

[5] Calculated with emission factor without round-down.

	Project Emission (PEy) As per applied methodology only emission associated with the fossil fuel combustion, emission from operation of geothermal power plants due to release of non-condensable gases, emission from water reservoir of hydro should be accounted for the project emission. Since the project activity is a solar power project and hence project emission is zero. Hence PEy=0. **Emission Reductions (ERy)** The project activity reduces carbon dioxide emissions through displacement of grid electricity generation with predominantly fossil fuel based power plants. The emission reduction (ERy) due to project activity during a given year y is calculated as the difference between baseline emissions (BEy), project emissions (PEy) and emissions due to, as per the formulae given below: $ER_y = BE_y - PE_y$ Where, • BE_y = Baseline emissions in the year y in tCO_2e • PE_y = Project emissions in the year y Here, PEy = 0 for the project activity as per the methodology. Leakage is also zero according to the ACM 0002 (version 19.0). Therefore, $ER_y = BE_y$
Conclusion	The validation team confirms that the project activity complies with the specified requirements of algorithms and/or formulae used to determine emission reductions and discussed above. The validation team confirms all assumptions and data used by the project participant are listed in the PDD, including their references and sources. All documentation used by project participant as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed project activity. The baseline methodology and corresponding tool(s) have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD. The validation team confirms that the project activity complies with the requirements in applied methodology and VVS.

D.4.8. Monitoring plan

Means of validation	The validation team assessed whether a description of the monitoring plan in the PDD complies with applied methodology including applicable tools and, where applicable, the applied standardized baseline.
Findings	The project activity has applied approved monitoring methodology ACM0002, version 19.0. The project activity is solar energy-based grid connected Greenfield power plant with a total installed capacity of 50MW, applied monitoring methodology requires the monitoring of net generation electricity supplied to grid by the project plant. The net generation electricity supplied to grid shall be cross checked with monthly invoice receipt/billing provided by power purchaser. Further, the monitoring methodology requires calibration of monitoring equipment as per national/local standard applicable and monitored data must be archived in electronic format for two years after the end of the last crediting period. The PDD has described the monitoring plan in a clear and transparent manner, which is in compliance with applied approved monitoring methodology ACM0002, version 19.0. The validation team has validated each parameter required to be monitored as per applied monitoring methodology and in opinion the proposed monitoring plan in PDD is feasible to implement and will result credible emission reductions resulted due to the project activity. **Parameter determined ex-ante** The methodology requires identification of the following for grid-connected power

projects:

- Data needed to calculate the operating margin emission factor, based on the choice of the method to determine the operating margin (OM), consistent with "Tool to calculate the emission factor for an electricity system"
- Data needed to calculate the build margin emission factor (BM) consistent with "Tool to calculate the emission factor for an electricity system"

The parameters determined ex-ante for calculating the emission factors are listed in the PDD and were verified by validation team as follows:

- Weighted average OM emission factor: 0.8336 tCO_2/MWh
- Weighted average BM emission factor: 0.8961 tCO_2/MWh
- Combined Margin (CM) emission factor ($EF_{grid,CM,y}$) : 0.8492 tCO_2/MWh

The determination of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) has already been discussed in the above section D.4.5 and ex-ante method has been selected by the PP.

Parameters monitored ex-post

The project emission and leakage are considered zero, as the project activity is a new solar energy-based power project and does not involve transfer of energy generating equipment, which is in conformity with the applied approved monitoring methodology ACM0002 Version 19.0.

The following parameters will be monitored ex-post:

- Electricity exported to the national grid
- Electricity imported from the national grid
- Net electricity supplied to the national grid

According to the PDD version 1.0, 2 main meters and 2 back-up meters will operate to monitor electricity exported to the grid and electricity imported from the grid. And PP mentioned that accuracy class of those meters will be 0.2S but validation team identified that information was not consistent with the information gathered during on-site assessment. Especially for the main meter, number of meter and location of meter was not clearly verified and QA/QC procedure like calibration plan was not clearly identified. (**Refer to Appendix 4/Table 2/CAR ID 02**) After PP have submitted revised PDD version 3.2, validation team could see that the monitoring plan consists of monitoring of parameters representing electricity metering at 110 kV substation. The electricity exported and imported will be directly measured by main metering equipment. The electricity (export, import) will be measured continuously by digital kilowatt hour (kWh) meters and recorded monthly. The $EG_{BL,y}$ will be calculated as the electricity exported to grid less the electricity imported from the grid. This data will be cross checked against the monthly sales receipt/bills provided by power purchaser.
The metering system includes the main meter of accuracy class 0.2s, which is in compliance with the host country requirement for power meter. The electricity exported and imported will also be monitored by the same meters installed by the PP. PP will also install 2 back-up meters (accuracy class 0.5S) and in case of failure of main meter the readings of 2 back-up meters installed by PP will be considered for emission reduction calculation. Calibration will be carried out once a year for the power meters (1 main meter and 2 back-up meters) as per PPA and it is clearly stated in the PDD. The validation team considers that the monitoring plan has complied with the requirements in the approved methodology.

Data management and QA/QC

The procedure to monitor the net electricity generation supplied by this project activity to the Grid is explained in section B.7 of the PDD and was assessed to be appropriate and correct and acceptable to the validation team. All the monitored data will be archived electronically for a period of 2 years after the crediting period.

Accuracy, calibration and maintenance procedures of monitoring equipment are clearly mentioned in Section B.7.1 of the PDD. The validation team has interviewed plant staffs during on-site assessment and could confirm that it is adequate and will

	lead to the correct measurement of the net electricity exported to the grid. Also, the monthly Joint Energy meter reading reports is used for commercial purpose and is authentic and correct.
Conclusion	The validation team hereby confirms that the project participant is able to implement the monitoring plan as described in the PDD in accordance with the applied monitoring methodology. The monitoring plan includes a data, parameters and related information required by the selected methodology and it will be kept and archived for two years after the end of the crediting period. The monitoring plan includes the internal quality control and assurance process, data control system and regular calibration of the monitoring instruments as appropriate that will ensure reliable monitoring and reporting of the emission reductions. The monitoring arrangements are therefore deemed feasible within the project design. The DOE interviewed the representatives of the project participant and confirms the ability of the PP to implement the monitoring plan. The raised CAR (ID 02) has been completely resolved.

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

Means of validation	The validation team determine whether the project participants specified start date and crediting period type and duration of the proposed CDM project activity in accordance with relevant requirements in the "CDM project standard for project activities".
Findings	The PDD mentions the start date as 01 October 2018 which is the date of signing of the EPC contract between PP and Hanwha Engineering & Construction Corp. The life time of the project activity will be 25 years confirmed from the FSR and technical specification of modules and inverters provided by manufacturer. The PDD proposes a renewable crediting period of 7 years with maximum of 2 renewals has been chosen by the PP for the project activity. The start date as EPC contract for the project activity, which in accordance with the definition of start date in Glossary - CDM terms, which appears to be the first real action and financial commitment by the PP towards implementation of the project activity, the validation team considers the date 01 October 2018 is the start date of the project activity.
Conclusion	The validation team has checked the PDD and confirms that section C of the PDD is completed as per requirements. DOE checked the EPC contract and can therefore confirm that the start date of the project activity has been determined correctly as per PS and Glossary of terms. PPs have chosen renewable crediting period of the project activity and thus the duration is 7 years which can be renewed twice. The same is thus acceptable to the assessment team.

D.6. Environmental impacts

Means of validation	By means of provided evidence and by the assessment of host party regulations regarding the environment, the validation team has checked the compliance of the analysis of the environmental impacts with applicable validation requirements related to the environmental impacts in the VVS.
Findings	According to the national rule, Decree No. 18/2015/ND-CP (Environmental Protection Planning, Strategic Environmental Assessment, Environmental Impact Assessment, and Environmental Protection Plans (2015)), this project activity does not require EIA approval by local government as electricity generated by this project activity is directly supply/connect to 110kV busbar of 110kV KN Cam Lam substation to connect the plant with the national power system. Thus, it only requires "Environmental Protection Plan" to provide mitigation measures for negative impacts, prevention and response to environmental problems identified during preparation, construction works and in the process of going into operation of this project activity. The validation team checked related national rule and confirmed that PP has followed the requirements of the host country (i.e. Decree 18/2015/ND-CP) with regards to addressing environmental impacts. It is also assessed via interview with EVN confirming that this project activity is connecting to 110kV substation directly without passing transmission line.

	To confirm the impact related with this project activity, the validation team checked FSR, environmental protection plan and its approval by "Environmental Protection Department" on 19/08/2018, and found that it has been well explained in section D of the PDD.
Conclusion	The validation team has checked the PDD with relevant national requirements, FSR and environmental protection plan to confirm that PP have conducted required process in accordance with national rule and it also meets the requirements of CDM PS for PA (Version 02.0).

D.7. Local stakeholder consultation

Means of validation	The validation team has determined whether the PPs completed a local stakeholder consultation process and that due steps were taken to engage stakeholders and solicit comments for the proposed CDM project activity.
Findings	The validation team checked that local stakeholder consultation of the project was carried out adequately in October 2017 as per terms of reference made by Decree 18/2015/ND-CP, as a part of preparing environmental protection plan. The PPs submitted evidences of the implementation of LSC such as attendant list of each meeting and meeting minute of it. LSC was carried out by the PPs which includes several sessions with stakeholders. A summary of the comments received and a note on how due account was taken of the concerns raised in the above public consultation are included in section E of the PDD. From the background of the stakeholders, it was reasonably believed that the general attitude of the local residents, who were likely to be affected by the project, was positive towards the project. During the on-site visit, local employees of the project and local residents were interviewed. In general, the interviewees showed adequate understanding of the nature of the project and felt that there would be no adverse impacts on the environment arising from the project activity.
Conclusion	The validation team confirms that the process for conducting the local stakeholders meeting is adequate and credible against the relevant requirements of PS and VVS.

D.8. Sustainable development co-benefits

Means of validation	The validation team checked how the project participants intend to monitor sustainable development co-benefits of the proposed CDM project activity was developed by the project participants separately from the monitoring plan.
Findings	The project participants do not intend to monitor sustainable development co-benefits. The validation team has checked the section A.1 of the PDD and LoA and, confirms that project will contribute to sustainable development. The project is in line with the respective requirements.
Conclusion	The criterion a voluntary initiative. As the LoA clearly mentions that project activity contributes to sustainable development in Viet Nam, no further monitoring of sustainable development co-benefit is thus required.

D.9. Approval

Means of validation	By means of review of the LoA issued by the DNA of the host country, confirming the proposed project activity meets the requirements in VVS.
Findings	At the time of on-site assessment, LoA was not submitted to DOE. **(Refer to Appendix 4/Table 2/CAR ID 03)** LoA received from PPs is issued by the DNA of Viet Nam on 28/10/2019 (Ref: 07/2019/DCC-BCD) and the validation team was able to assess the approval from the DNA in accordance with related applicable validation requirements in the VVS (Version 02.0). Hanwha Energy Corporation and Cam Lam Solar Joint Stock Company are the project participants and Viet Nam the only party involved. Therefore, only one LoA and authorisation is required. The LoA issued on 28/10/2019 has been received

	directly from PPs. The LoA has been signed and stamped by an authorized entity, "Ministry of natural resources and environment of Viet Nam".
Conclusion	The validation team has checked the LoA and confirms that it has been completed as per guidelines. • The Party (Viet Nam) is a party to the Kyoto Protocol and party has ratified the Kyoto Protocol on 25 September 2002: • Participation of PPs in the proposed project activity is voluntary in nature; • The project under validation will assist in sustainable development in Viet Nam; • The project title is in line with the title of the PDD (Version 3.2); • It refers to the precise project proposed CDM project activity title "Cam Lam VN Solar Power Plant" in the PDD being submitted for registration. Further, the participation requirements were validated based on confirmation of following: • The project participant listed in the tabular form in Section A.4 of PDD (version 3.2) and the contact details provided in Annex 1 of the PDD (version 3.2) is consistent and precise. • Participation of the PPs have been approved by the DNA, as confirmed in the LoA. • No entities other than those approved as project participants are included in relevant sections of PDD (version 3.2). • The LoA does not contain any conditional clause as regards to the above elements and it also does not refer to any specific version of the validation report. The raised CAR (ID 03) has been completely resolved.

D.10. Authorization

Means of validation	The validation team determined whether project participants of the proposed project activity has been authorized by at least one Party involved in a LoA.
Findings	At the time of on-site assessment, LoA was not submitted to DOE thus validation team could not able to assess the authorization from the DNA **(Refer to Appendix 4/Table 2/CAR ID 03).** LoA received from PPs is issued by the DNA of Viet Nam on 28/10/2019 (Ref: 07/2019/DCC-BCD) and the validation team was able to assess the approval from the DNA in accordance with related applicable validation requirements in the VVS (Version 02.0).
Conclusion	The LoA dated 28/10/2019 from the DNA of Viet Nam as the only party involved has been submitted. The LoA was provided to the DOE by PPs. The LoA has been duly verified by the validation team. The letter confirms that: • The LoA is addressed to Hanwha Energy Corporation and Cam Lam Solar Joint Stock Company, the authorized PPs of the proposed CDM project activity • The LoA refers to precise title of the project activity • Viet Nam has ratified the Kyoto Protocol on 25 September 2002 • Viet Nam participation in the CDM is voluntary • The project will assist Viet Nam in achieving sustainable development • The LoA is unconditional • The LoA was issued by the authorized authority the DNAs focal point, the general director of "Department of Climate Change" at Ministry of Natural Resources and Environment of Viet Nam. The DOE can confirm that the project participants of the proposed CDM project activity are listed in the PDD and that this information is consistent with the information provided in the section A.4 and appendix 1 of the PDD. The raised CAR (ID 03) has been completely resolved.

D.11. Modalities of communication

Means of validation	The validation team has checked the corporate identity of all PPs, and focal points included in the MoC statement, as well as the personal identities, including

	specimen signatures and employment status, of their authorized signatories and has checked that the MoC statement has been correctly completed and duly authorized.
Findings	At the time of on-site assessment, MoC was not submitted to DOE **(Refer to Appendix 4/Table 2/CAR ID 04).** The signed MoC statement dated 08/10/2019 was provided directly by the PPs. The signatures and details of the signatory in the Moc were validated from the certificate of registration and interview with PP to confirm information in MoC is correct and valid. It is also checked that Hanwha Energy Corporation is sole focal point authority The validation team confirmed that the authorized signatory of PP has signed the MOC form and Annex 1 of MOC form and further found that name of the authorized signatory is included in Annex 1 of PDD (version 3.2). The MOC is found to be appropriate as it clearly defined the responsible party for communicating with EB and UNFCCC regarding the issuance of CER of the proposed CDM project and applies the latest version of the form (CDM-MOCFORM - Modalities of communication statement) (version 3.0).
Conclusion	The validation team confirms the authenticity of the MOC. All sections of the MOC are verified and found to be filled in accordance with the latest and active version of "Guidelines for completing the MoC form" version 3.0. Also the validation team has confirmed that the proposed project activity is in line with the respective requirements. The raised CAR (ID 04) has been completely resolved.

D.12. Global stakeholder consultation

Means of validation	The validation team has determined whether authentic and relevant comments in the global stakeholder consultation were taken into due account in the PDD of the proposed CDM project activity.
Findings	PDD (ver.1.0) was submitted to the validation team by the project participants and the DOE has made the PDD publicly available prior to the start of the validation activities through a dedicated interface on the UNFCCC CDM website as below in accordance with applicable validation requirements related to the global stakeholder consultation in the VVS and PCP. https://cdm.unfccc.int/Projects/Validation/DB/CMAIC8AHZSH5THBQVB4YTTI0VMANJ0/view.html : for the PDD title with "50MW CAM LAM VN Solar Power Project in Viet Nam" was made publicly available on UNFCCC from 08/02/2019 to 09/03/2019 but it was withdrawn by PPs on 15/08/2019. For the details please refer section D.1 of this report. https://cdm.unfccc.int/Projects/Validation/DB/G70YFODPUHGSEVZBXI3QTOFY07IPAC/view.html : for the PDD title with "Cam Lam VN Solar Power Plant" was made publicly available on UNFCCC from 28/08/2019 to 26/09/2019 in order to invite comments from public stakeholders. The validation team has checked for the stakeholder's comments and found no comments during the period for comments.
Conclusion	The validation team has confirmed that there was no comment received during this period.

SECTION E. Internal quality control

According to KFQ's Procedure for deciding whether to proceed request for registration, the final validation report and validation findings underwent a technical review before being submitted to the PP for requesting registration. The technical review was performed by technical review team

composed of a person qualified for this project activity in accordance with KFQ's qualification scheme for CDM project validation and verification.

SECTION F. Validation opinion

Korean Foundation for Quality (KFQ) has performed a validation of the "Cam Lam VN Solar Power Plant". The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and subsequent decision by the CDM Executive Board.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, KFQ cannot be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose. And it has provided KFQ with sufficient evidence to determine the fulfilment of stated criteria. The validation consisted of the following 3 phases: i) a desk review of the project design, the baseline and monitoring plan, ii) follow-up interviews with project stakeholders and iii) the Resolution of outstanding issues and the issuance of the final validation report and opinion.

The host country (Viet Nam) fulfils the participation criteria and has approved the project and authorized the project participant. The DNA of host country confirmed that the project assisted in achieving sustainable development.

The validation did not reveal any information that indicated that the project can be seen as a diversion of official development assistance (ODA) funding towards Viet Nam.

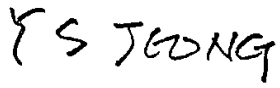
By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions. Additionally, the assessment team reviewed the estimation of the projected emission reductions. It is confirmed that the indicated amount of emission reductions of 468,937 tCO_2e over 7 years period of crediting period, resulting in a calculated annual average of 66,991 tCO_2e, represents a reasonable estimation using the assumptions given by the project documents.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and the project participants are able to implement the monitoring plan.
In our opinion, the "Cam Lam VN Solar Power Plant" as described in the final PDD of 30/10/2019 (version 3.2), meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology, ACM0002 (Version 19.0). Thus, the "Cam Lam VN Solar Power Plant" will hence be recommended by KFQ for requesting for registration as a CDM project to UNFCCC.

Signed on behalf of the Korean Foundation for Quality

Signature:



Name / Position: Yu Shim JEONG, Technical Managing Director

Date: 14/11/2019

Appendix 1. Abbreviations

Abbreviations	Full texts
ACM	Approved Consolidated Methodology
BE	Baseline Emissions
CA	Corrective Action/Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CMP	COP/MOP Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
DNA	Designated National Authority
DOE	Designated Operational Entities
DVR	Draft Validation Report
EB	CDM Executive Board
EF	Emission Factor
EIAs	Environment Impact Analysis
ERs	Emission Reductions
EVN	Electricity of Viet Nam
FAR	Forward Action Request
FSR	Feasibility Study Report
FVR	Final Validation Report
GSC	Global Stakeholder Consultation
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KFQ	Korean Foundation for Quality
LoA	Letter of Approval/Authorization
MoC	Modalities of Communication
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emissions
PP	Project Participant
PS	Clean Development Mechanism Project Standard for Project Activities
QA/QC	Quality Assurance and Quality Control
TA	Technical Area
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard for Project Activities

Appendix 2. Competence of team members and technical reviewers

CERTIFICATE OF COMPETENCE

Name: Mi Jung LEE

Qualification:

	Validation	Verification
-Lead auditor	■	■
-Auditor	☐	☐
-Technical Expert	☐	☐
-Local Expert	☐	☐

Scopes of Expertise:

Technical Area (TA)

1.1	Thermal energy generation
1.2	Renewables
3.1	Energy demand
5.2	Caprolactam, nitric and adipic acid
11.1	Emission of Fluorinated gases
11.2	Refrigerant gas production
13.1	Solid waste and wastewater
13.2	Manure

She is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 14 September 2017.

Sustainability Management Institute
Yu Shim JEONG

CERTIFICATE OF COMPETENCE

Name: Su Hyun PARK

Qualification:

	Validation	Verification
-Lead auditor	☐	☐
-Auditor	■	■
-Technical Expert	☐	☐
-Local Expert	☐	☐

Scopes of Expertise:

Technical Area (TA)

1.2 Renewables

She is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 11 January 2018.

Sustainability Management Institute
Mi Jung LEE

CERTIFICATE OF COMPETENCE

Name: Seon Young MOON

Qualification:

	Validation	Verification
-Lead auditor	☐	☐
-Auditor	■	■
-Technical Expert	☐	☐
-Local Expert	☐	☐

Scopes of Expertise:

Technical Area (TA)

1.2 Renewables

She is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 11 March 2019.

Sustainability Management Institute
Mi Jung LEE

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Project Participants	PDD • Version 1.0 • Version 3.0 • Version 3.2	 07/02/2019 15/07/2019 30/10/2019	 Project participants
2	Project Participants	ER calculation spreadsheet • Version 2.1 • Version 2.2	 07/02/2019 30/10/2019	Project participants
3	DNA of Viet Nam	LoA	28/10/2019	Project participants
4	Project participants	MoC	08/10/2019	Project participants
5	Hanwha Engineering & Construction Corp.	EPC contract	01/10/2018	Project participants
6	Department of Climate Change, Ministry of Natural Resources and Environment	Viet Nam Grid Emission Factor : 2017 Report (330/BDKH-GNPT)	29/03/2019 (Published at website on 19/04/2019) http://www.dcc.gov.vn/van-ban-phap-luat/1053/He-so-phat-thai-luoi-dien-Viet-Nam-2017.html	Project participants
7	EVN	Vietnam Electricity annual report 2017	02/02/2018 https://en.evn.com.vn/c3/gioi-thieu-l/Annual-Report-6-13.aspx	Project participants
8	International Renewable Energy Agency (IRENA)	Renewable Capacity Statistics 2018 & 2019	March 2018 https://www.irena.org/publications/2018/Mar/Renewable-Capacity-Statistics-2018 July 2019 https://www.irena.org/publications/2019/Jul/Renewable-energy-statistics-2019	Project participants
9	QCELLS	Specification of solar module : Q.PEARK DUO L-G5.2 380-395	-	Project participants
10	SUNGROW	Specification of inverter	16/08/2018	Project participants
11	Cam Lam District People's committee	Confirmation on environmental protection plan	17/09/2018	Project participants
12	Viet Nam Applied Technical Company Limited (Vatec)	Feasibility Study Report	January 2018	Project participants
13	Project participants	Grid-connected system: Simulation parameters	19/07/2018	Project participants
14	PP & electricity buyer	Power Purchase Agreement : 12/2018/HD-NMDMT-CAM	December 2018	Project participants

		LAM VN		
15	EVN	Confirmation letter of commercial operation	27/06/2019	Project participants
16	Local government	Approval of environmental protection plan	19/08/2018	Project participants
17	Project participants	Meeting minutes and attendance list for LSC Committee's opinion	October 2017	Project participants
18	Project participants	Notification of prior consideration of CDM of the Project	30/11/2018 https://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html	UNFCCC
19	Project participants	Email notification of prior consideration of CDM of the Project to DNA of Viet Nam	30/11/2018	Project participants
20	Viet Nam DNA	Confirmation of receipt of notification of prior consideration of CDM of the project activity	30/11/2018	Project participants
21	Ministry of Natural Resources and Environment	Regulation on Environmental protect planning, strategic environmental assessment, environmental impact assessment and environmental protection plan	14/02/2015 (Decree 18/2015/NDCP)	Others
22	Ministry of Natural Resources and Environment	Regulation on Strategic environmental assessment, environmental impact assessment and environmental protection plan	29/05/2015 (CIRCULAR 27/2015/TT-BTNMT)	Others
23	CDM Executive Board	ACM0002, Grid connected electricity generation from renewable sources (Version 19.0) Tool 05. Baseline, project and/or leakage emission from electricity consumption and monitoring of electricity generation (version 3.0) Tool 07. Tool to calculate the emission factor for an electricity system (version 07.0) Glossary of CDM terms (version 10.0) Standards, Procedures & Checklists • Standard – CDM validation and verification standard for project activities (Version 02.0) • Standard – CDM project	From 31/08/2018 Published under: https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD From 22/09/2017 Published under: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf From 31/08/2018 Published under: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf From 12/09/2019 From 29/11/2018 From 29/11/2018	Others

		standard for project activities (Version 02.0) • Procedure – CDM project cycle procedure for project activities (Version 02.0) • Checklist – Checklist for requests for registration of project activities (Version 02.0) From 30/08/2017 • Form – Project design document form (Version 11.0) • Form – Validation report form for CDM project activities	From 29/11/2018 From 23/08/2019 From 31/05/2019 From 31/05/2019 All published under: https://cdm.unfccc.int/Reference/index.html	

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

Table 1. CLs from this validation

CL ID	01	**Section no.**	D.3	**Date:** 26/03/2019
Description of CL				
The location of the proposed project activity is at Cam Nghia Ward in Cam Ranh City of Khanh Hoa Province, Viet Nam. The geographical coordinates of the project activity is 11°42`50``N, 108°40`33``E and it was confirmed during site visit. However it's information in the PDD version 1.0 (published version of PDD) is slightly different as what the validation team confirmed during on-site assessment.				
Project participant response				**Date:** 30/10/2019
Revised PDD to provide correct geographical coordinates of the project activity				
Documentation provided by project participant				
PDD (version 3.2)				
DOE assessment				**Date:** 14/11/2019
After the PPs have submitted the revised PDD (version 3.2), validation team checked revised geographical coordinates of the proposed project activity in the PDD (Version 3.2) and confirmed that correct information was provided. It was crosschecked with the geographical coordinates that were checked by the validation team during on-site assessment as well as FSR.				

CL ID	02	**Section no.**	D.3	**Date:** 26/03/2019
Description of CL				
During on-site assessment, it was checked that this proposed project activity will be equipped with 127,904 modules (76,170 modules of Q.PEAK DUO L-G5.2 390 and 51,744 modules of Q.PEAK DUO L-G5.2 385 respectively) and 18 inverters (SG2500HV) of 2,500kW each, which will convert direct current into alternating current electricity. The inverters connected to transformers where the electricity transmit to through 110kVCam Ranh transmission line before feeding to the national grid. It is also checked through FSR, module purchase contract as well as interview technical supervisor at the project site. However, capacity of module and total number of modules in the PDD (Version 1.0) is not consistent with what the validation team identified.				
Project participant response				**Date:** 30/10/2019
Revised PDD to provide correct information modules of this project activity				
Documentation provided by project participant				
PDD (version 3.2)				
DOE assessment				**Date:** 14/11/2019
After the PPs have submitted the PDD (version 3.2), it was checked that actual number and capacity of modules equipped at the project site was provided. The validation team confirmed that information provided in the PDD regarding modules is correct and appropriate.				

CL ID	03	**Section no.**	D.3	**Date:** 26/03/2019
Description of CL				
According to the PDD (Version 1.0), the project will replace anthropogenic emissions of greenhouse gases estimated to be 62,788t CO_2e per year, thereon displacing 78,831 MWh/yr amount of electricity from the power plants connected to the Viet Nam national grid. However, evidence of estimation of electricity would be generated by this project activity and estimated annual emission reduction were not provided.				
Project participant response				**Date:** 30/10/2019
Revised PDD to provide correct estimation of electricity generation by this proposed project activity as well as estimation of emission reduction by this project				
Documentation provided by project participant				
PDD (version 3.2) simulation report of electricity generation ER calculation spreadsheet (version 2.2)				
DOE assessment				**Date:** 14/11/2019

After the PPs have submitted the PDD (version 3.2), validation team checked estimated annual electricity generation by this proposed project activity (78,885 MWh) against FSR including simulation report of electricity generation, PPA and other related evidence and confirmed that correct information was provided. Regarding the estimated annual emission reduction, it is corrected as 66,691 t CO_2e and final value was calculated based on corrected annual electricity generation (78,885 MWh) by this proposed project activity and emission factor. Please refer section D.4.5 for the ex-ante emission factor and section D.4.7 for estimation of emission reduction.

CL ID	04	**Section no.**	D.4.5	**Date:** 26/03/2019
Description of CL				
The PP adopts the ex-ante calculation of emission factors of the grid and the combined margin emission factor for national grid of Viet Nam has been calculated as 0.7695 tCO_2 / MWh. It has been calculated using the source published in March 2017 from the Ministry of Natural Resources and Environment Viet Nam. However, evidence of emission factor applied in estimation of baseline emission was not provided to the validation team.				
Project participant response				**Date:** 30/10/2019
Revised PDD to apply the latest EF of Viet Nam				
Documentation provided by project participant				
PDD (version 3.2) Viet Nam Grid Emission Factor: 2017 Report (330/BDKH-GNPT) ER calculation spreadsheet (version 2.2)				
DOE assessment				**Date:** 14/11/2019
The combined margin emission factor for national grid of Viet Nam in the revised PDD (version 3.2) has been calculated as 0.8492 tCO_2/MWh. It has been calculated based on the data provided by Ministry of Natural Resources and Environment Viet Nam in March 2019. This state body has provided the grid emission factor using the 'Tool to calculate the emission factor for an electricity system, version 07.0'. This data was the latest publicly available data at the time of publishing the PDD for the global stakeholder consultation.				

Table 2. CARs from this validation

CAR ID	01	**Section no.**	D.4.6	**Date:** 26/03/2019
Description of CAR				
As per published PDD version 1.0, total installed grid connected power generation capacity is 42,135 MW and the installed grid connected solar photovoltaic power plants are 11 MW which is approx. 0.026%. However, evidences of it have not been submitted to the validation team.				
Project participant response				**Date:** 30/10/2019
Provide evidences to demonstrate additionality of this project activity and revise PDD to provide its information with the latest data				
Documentation provided by project participant				
PDD (version 3.2) Vietnam Electricity annual report 2017 Renewable Capacity Statistics 2018 & 2019				
DOE assessment				**Date:** 14/11/2019
PP have revised PDD (version 3.2) and submitted to DOE with evidence such as 2017 Annual Report issued by EVN (Electricity of Vietnam) on 02/02/2018. According to this Report, total installed grid connected power generation capacity in the Viet Nam is 42,135MW. The validation team checked public available website to confirm whether this evidence is the latest version at the time of PDD submission, and could conclude that the Report is credible and appropriate source to use as reference. In case of installed grid connected solar photovoltaic power plants, PP adopted it from IRENA (International Renewable Energy Agency) Renewable Energy Statistics 2019 as there was no any officially published references to apply. According to this statistic, capacity of solar photovoltaic in Viet Nam is 106MW and it is sum of grid connected and non-grid connected solar power plants thus share of solar PV is less than 2% to total installed grid connected power generation capacity. It is also assessed via interview with EVN confirming that this project activity comes under positive list in the Viet Nam thus the validation team conclude that the project meets the additionality criteria as specified and is additional.				

CAR ID	02	**Section no.**	D.4.8	**Date:** 26/03/2019
Description of CAR				

According to the PDD version 1.0, 2 main meters and 2 back-up meters will operate to monitor electricity exported to the grid and electricity imported from the grid. And PP mentioned that accuracy class of those meters will be 0.2S but validation team identified that information was not consistent with the information gathered during on-site assessment. Especially for the main meter, number of meter and location of meter was not clearly verified and QA/QC procedure like calibration plan was not clearly identified.
Project participant response **Date:** 30/10/2019
Provide correct and recent information regarding monitoring equipments (1 main meter and 2 back-up meters)
Documentation provided by project participant
PDD (version 3.2) Relay protection and measurement
DOE assessment **Date:** 14/11/2019
After PP have submitted revised PDD version 3.2, validation team could see that the monitoring plan consists of monitoring of parameters representing electricity metering at 110 kV substation. The electricity exported and imported will be directly measured by main metering equipment. The electricity (export, import) will be measured continuously by digital kilowatt hour (kWh) meters and recorded monthly. The $EG_{BL,y}$ will be calculated as the electricity exported to grid less the electricity imported from the grid. This data will be cross checked against the monthly sales receipt/bills provided by power purchaser. The metering system includes the main meter of accuracy class 0.2s, which is in compliance with the host country requirement for power meter. The electricity exported and imported will also be monitored by the same meters installed by the PP. PP will also install 2 back-up meters (accuracy class 0.5S) and in case of failure of main meter the readings of 2 back-up meters installed by PP will be considered for emission reduction calculation. Calibration will be carried out once a year for the power meters (1 main meter and 2 back-up meters) as per PPA and it is clearly stated in the PDD. The validation team considers that the monitoring plan has complied with the requirements in the approved methodology.

CAR ID	03	**Section no.**	D.9, D.10	**Date:** 26/03/2019
Description of CAR				
At the time of on-site assessment, LoA was not submitted to DOE.				
Project participant response				**Date:** 30/10/2019
Submitted LoA of Viet Nam				
Documentation provided by project participant				
LoA of Viet Nam				
DOE assessment				**Date:** 14/11/2019
LoA received from PPs is issued by the DNA of Viet Nam on 28/10/2019 (Ref: 07/2019/DCC-BCD) and the validation team was able to assess the approval from the DNA in accordance with related applicable validation requirements in the VVS (Version 02.0). Hanwha Energy Corporation and Can Lam Solar Joint Stock Company are the project participant and Viet Nam the only party involved. Therefore, only one LoA and authorisation is required. The LoA issued on 28/10/2019 has been received directly from PPs. The LoA has been signed and stamped by an authorized entity, “Ministry of natural resources and environment of Viet Nam”.				

CAR ID	04	**Section no.**	D.11	**Date:** 26/03/2019
Description of CAR				
At the time of on-site assessment, MoC was not submitted to DOE.				
Project participant response				**Date:** 30/10/2019
Submitted MoC				
Documentation provided by project participant				
MoC				
DOE assessment				**Date:** 14/11/2019
The signed MoC statement dated 08/10/2019 was provided directly by the PPs. The signatures and details of the signatory in the Moc were validated from the certificate of registration and interview with PP to confirm information in MoC is correct and valid. It is also checked that Hanwha Energy Corporation is sole focal point authority The validation team confirmed that the authorized signatory of PP has signed the MOC form and Annex 1 of MOC form and further found that name of the authorized signatory is included in Annex 1 of PDD (version 3.2). The MOC is found to be appropriate as it clearly defined the responsible party for communicating with EB and UNFCCC regarding the issuance of CER of the proposed CDM project and applies the latest version of the form (CDM-MOCFORM - Modalities of communication statement) (version 3.0).				

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

- - - - -

Document information

Version	*Date*	*Description*
04.0	31 May 2019	Revision to: • 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