




**Verification and certification report form for
CDM project activities
(Version 03.0)**

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Title: 70MW Solar Power Plant Project in Ba Ria - Vung Tau, Vietnam UNFCCC reference number: 10524
Scale of the project activity	<input checked="" type="checkbox"/> Large-scale <input type="checkbox"/> Small-scale
Version number of the verification and certification report	03
Completion date of the verification and certification report	24/06/2020
Monitoring period number and duration of this monitoring period	01 Monitoring period: 26/11/2019 to 29/02/2020 (Including both dates)
Version number of the monitoring report to which this report applies	Version 3.0, dated 22/06/2020
Crediting period of the project activity corresponding to this monitoring period	Renewable crediting period; 26/11/2019 – 25/11/ 2026 (first and last day included)
Project participants	1. SH Solar Farm Vina Co., Ltd 2. SH Power Co., Ltd
Host Party	Viet Nam
Applied methodologies and standardized baselines	Methodology: ACM0002 ver. 19 - "Grid-connected electricity generation from renewable sources" Standardized baseline: N/A
Mandatory sectoral scopes	Sectoral Scope 1: Energy industries (Renewable - / non-renewable sources)
Conditional sectoral scopes, if applicable	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	25,919 tCO ₂ e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	24,131 tCO ₂ e
Name and UNFCCC reference number of the DOE	4K Earth Science Private. Limited UNFCCC Ref No. CDM-E-0069
Name, position and signature of the approver of the verification and certification report	 S. Jagajothi Director

SECTION A. Executive summary

>>

4K Earth Science Private Limited has been commissioned by “SH Power Co., Ltd” to perform an independent verification of its registered CDM project, “70MW Solar Power Plant Project in Ba Ria - Vung Tau, Vietnam”, UNFCCC ref. no. 10524 for the reported GHG emission reductions for the given 1st monitoring period 26/11/2019 – 29/02/2020 (both dates included). The CDM projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The actual monitoring systems & procedures and monitoring report conforms with the requirements of the registered monitoring plan and the approved monitoring methodology;
- The data is recorded and stored as per the monitoring methodology and registered monitoring plan.

Scope:

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on review of monitoring report, supporting information and

- a) The registered PDD, including the monitoring plan and the corresponding validation opinion(s);
- b) Previous verification reports, deviation requests, requests for revision of monitoring plan (if applicable);
- c) Monitoring report for the monitoring period under verification including CER calculations sheets and all supporting documents;
- d) The applied monitoring methodology;
- e) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;
- f) All information and references relevant to the project activity's resulting in emission reductions
- g) The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

4K EARTH SCIENCE PRIVATE LIMITED has, based on the recommendations in the latest version of CDM Validation and Verification Standard for project activity, employed a rule-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

Description of project

The project is installation of a grid-connected new power plant at the site (a Greenfield project) and is not a capacity addition or retrofit or replacement of any other existing plant.

The project adopted poly-crystalline photovoltaic cells without any backup generators and generates 100% clean energy to be fed into the Vietnamese national grid. And thus, the project activity does not result in waste, GHG emissions nor pollution to the environment during its operation.

Total installed capacity of the project is 69.552 MW (Module Capacity). The estimated amount of electricity generation from the project activity is approximately 116,045 MWh/year and thus replaces anthropogenic GHG emissions into the atmosphere 98,545 tCO₂e annually, 689,815 tCO₂e during the entire first credit period of 7 years.

The baseline scenario of the project is the electricity energy that is being fed into the Vietnamese national grid through other fossil fuelled power plants according to the applied methodology ACM0002 version 19.0.

The Location information of project activity is as follows.

- Host Party : Socialist Republic of Viet Nam Location : Road No. D15, Chau Duc Industrial Park, Nghia Thanh Commune, Chau Duc District, Ba Ria - Vung Tau Province

The coordinates of project boundary points are presented in the following table:

Table 1. Coordinates of the boundary points of the plant

No	Latitude	Longitude
1	10.578124° North	107.191825° East
2	10.580135° North	107.180151° East
3	10.573212° North	107.185474° East
4	10.584318° North	107.181822° East

Methodology:

4K Earth Science Private Limited follows a rule based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of CDM Accreditation Standard. Subsequently, after the contract is signed, the monitoring report of the project activity is made publicly available at UNFCCC website as per CDM procedures. A desk review of the project documentation is undertaken, which is followed by an on-site visit by the members of verification team in accordance with the latest version of CDM AS. The verification protocol is filled by the verification team that is based on standard auditing practices and version 02 of CDM VVS for project activity, to capture the assessment of applicable CDM requirements viz., version 02 of CDM Project Standard for project activity, registered PDD, applied methodology, applied standardized baseline and/or tools and recent decisions. The verification protocol provides transparent means to record the observations and compliances by the verification team members and the nonconformities, if any. The verification protocol is an internal document, and is available on request. Following are the major milestones for the verification under consideration.

Publication of MR	15/04/2020 (By the DOE Korea Testing & Research Institute (KTR)) which is further transferred to 4K Earth Science Private Limited
Remote audit	18/06/2020
Draft Verification Report	19/06/2020
Final Verification Report	24/06/2020

4K Earth Science Private Limited confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 24,131 tCO₂e (round down) emission reductions during period 26/11/2019 to 29/02/2020 (Including both the days).

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader, Technical Expert (TA 1.2)	IR	Sharma	Chetan Swaroop	Central office	✓		✓	✓
2.	Local Expert	EI	Nguyen	Hong Ngoc Trang	Central Office	✓			

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TA 1.2)	IR	Puratchikkanal	Ma Paa	Central Office
3.	Approver	IR	S	Jagajothi	Central Office

SECTION C. Application of materiality**C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	The data monitoring is done through electronic meters and errors can be perceived during the information transfer from the source to the emission reduction sheet.	High	<p>There is one monitoring parameter i.e. $EG_{PJ, y}$. The electricity export and import are measured by the energy meters.</p> <p>$EG_{PJ, y}$ is calculated as follows: $EG_{PJ, y} = EG_{\text{export}, y} - EG_{\text{import}, y}$</p> <p>This monitoring parameter ($EG_{PJ, y}$) is used for the calculation of baseline emissions.</p>	The complete dataset for the monitoring parameter $EG_{PJ, y}$ was checked and it can be confirmed that the values are consistent with their sources.

C.2. Consideration of materiality in conducting the verification

>> The prescribed thresholds for materiality, as per §326 of “CDM validation and verification standard for project activities” Version 02.0 /24/.

Prescribed range of ERs/annum	500,000+	300,000+ to 500,000	300,000	SSC Pas	MSC PAs
Prescribed Threshold	0.5%	1.0%	2.0%	5.0%	10.0%

The identified/selected materiality threshold for the project activity under current monitoring period is 2% as project activity is large scale project activity lower than 300,000 ERs/annum.

	MR Version (Draft)/01/	MR Version (Final)/02/
Emission reductions	24,131 tCO ₂ e	24,131 tCO ₂ e
Identified Threshold	2%	2%

There is no change in the emission reduction during this monitoring period. The complete dataset for the project activity was checked and it can be confirmed that the values are consistent with their sources. The assessment team confirms that the reported emission reductions are free from material errors, omissions or misstatements.

SECTION D. Means of verification

D.1. Desk/document review

>> A desk review is undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of documents reviewed is included in the section 'Appendix 3' of this report.

D.2. On-site inspection

As a result of the COVID-19 pandemic, taking into account the rules of relevant national and local authorities (local to the DOE offices as well as to locality of the site visits), World Health Organization (WHO) recommendations, policies of the DOE and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return from specific countries), A DOE may postpone site visits for onsite inspections required by the “CDM validation and verification standard for project activities (version 02.0) (VVS-PA)”.

If the site visits cannot be postponed, a proper justification should be provided by the DOE why the site visits cannot be postponed, including the demonstration of a significant impact of delaying the site visits on the DOE, or project participants or coordinating/ managing entity (e.g. commitment/ timeline as per the validation or verification contract, CER delivery commitment by project participants) reliance on applicable force majeure provisions in the validation or verification contracts, if needed.

For this project activity, PP has signed a Loan agreement with Woori bank /18/. According to the Loan agreement, loan start date is 25/02/2019. The loan is deferred for 12 months from the loan start date and need to repay every 4 months from 25/04/2020. Hence PP want to issue CERs as soon as possible to support the loan repayment along with the income coming from electricity export to grid. Hence the site visit could not be postponed for this project activity. Also as per the DOE contract timeline, DOE has to deliver the draft report before 30/06/2020. Considering the current COVID-19 world situation, Site visit is not expected to happen in near future. Hence the DOE has skipped the on-site visit. However as per the CDM EB, the DOE may use other standard auditing techniques for validation or verification as referred to in sections 9.1.3 of the VVS for PA /24/.

Verification team has used the following alternative means for its assessment and to justify that they are sufficient for the purpose of verification. Along with desk review, audit team has conducted remote audit interview (Skype interview) as follows:

- A complete desk review of the MR, as well as all applicable country legal requirement and supportive evidences have been checked by the verification team.
- Verification team has performed Skype interview with PP in order to check implementation, project boundary, current situation, evaluation of data management, QA/QC system, monitoring and metering equipment, monitoring procedures, calibration etc.
- Cross checks between information provided by interviewed personnel (i.e. by checking sources) to ensure that no relevant information has been omitted.
- Cross-check evaluation, for information received from interviews, under the scope of all information and references provided in MR and supporting documents.

Details of interviewees, topics covered and additional information presented in the below section “D.3 Interviews”

Duration of on-site inspection:				
No.	Activity performed on-site	Site location	Date	Team member

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Nguyen Minh	Tuan	Foreman of the plant (SH Solar Farm Vina Co., Ltd)	18/06/2020 (Remote audit through skype)	Operational and implementation data, CDM Requirements, Data collection, Calibration Requirements, Monitoring and data recording, Issues in the MR and ER calculation,	Chetan Swaroop Sharma (Team Leader, Technical Expert (1.2))
2.	Tran Quoc	Viet	Operator (SH Solar Farm Vina Co., Ltd)			
3.	Truong Quoc	Khanh	Operator (SH Solar			

			Farm Vina Co., Ltd)		Training practice of the operational personnel	
4.	Seol	Sehwan	Team Leader - Econetwork (Consultant)			
5.	Jung	Soon Chul	General Manager - Econetwork (Consultant)			

D.4. Sampling approach

>> No Sampling Approach is used during verification.

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	00	04	00
Compliance of the project implementation and operation with the registered PDD	00	00	00
Post-registration changes	00	00	00
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	00	00	00
Compliance of monitoring activities with the registered monitoring plan	01	02	00
Compliance with the calibration frequency requirements for measuring instruments	00	0	00
Assessment of data and calculation of emission reductions or net removals	02	01	00
Assessment of reported sustainable development co-benefits	00	00	00
Global stakeholder consultation	00	00	00
Others (please specify)	00	01	00
Total	03	08	00

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	Verification team checked the monitoring report/02/ with “Instructions for filling out the monitoring report form” mentioned as attachment to Monitoring report form (version 07.0)/25/.
Findings	CAR 01, CAR 02, CAR 03 and CAR 04 were raised and closed satisfactorily. Refer to appendix 4 for further details.
Conclusion	In accordance with §352 of CDM VVS for project activity, Version 02.0 /24/, verification team confirms that final monitoring report /02/ is completed using the latest valid version of the applicable monitoring report form /25/.

E.2. Remaining forward action requests from validation and/or previous verifications

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The current verification is for the 1st monitoring period of the project activity. All raised CARs and CLs were successfully closed during validation. There is no pending FAR from validation to be addressed during this monitoring period.

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	<p>The project adopted poly-crystalline photovoltaic cells without any backup generators and generates 100% clean energy to be fed into the Vietnamese national grid under a Power Purchase Agreement (PPA) signed with the Electricity Corporation of Vietnam (EVN) /07/.</p> <p>Total installed capacity of the project is 69.552 MW (Module Capacity). Project has been fully commissioned on 26/06/2019 as verified from Certificate of commercial operation date issued by EVNEPTC (ELECTRICITY POWER TRADING COMPANY) /05/ and during remote auditing.</p> <p>The project is owned by SH Solar Farm Vina Co., Ltd as verified from supportive docs 05/, /07/, /08/, /09/, /10/.</p>
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For the current monitoring period, the generated electricity is sold to EVN as evidenced from electricity bills/protocol/09/ and the electricity sale invoice/10/.

Project is located at Road No. D15, Chau Duc Industrial Park, Nghia Thanh Commune, Chau Duc District, Ba Ria - Vung Tau Province, Vietnam.

The coordinates of project boundary points are presented in the following table:

Coordinates of the boundary points of the plant

No	Latitude	Longitude
1	10.578124° North	107.191825° East
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4	10.584318° North	107.181822° East

The location has been verified during the remote audit and also from the web /26/ and found correct.

Based on remote audit (Skype) interview, photographic evidence/14/ and document review, the verification team confirms that all physical features of the CDM project activity including technology, data collection systems and storage systems have been implemented in accordance with the registered PDD /23/ for the project activity.

The team has conducted remote audit on 18/06/2020 to confirm the implementation and operation of the project activity and found that project activity is fully commissioned and operating as per the registered PDD /23/. The technical specification of the project activity as given below is verified from the remote audit and the supporting documents /12/, /13/ and /14/ and found consistent with the registered PDD /23/ and monitoring report /02/.

Technical information of the main equipment used in the project

Devices	Indicators	Specifications
PV Panel	Manufacturer	Hanwha Q CELLS
	Model	Q.PLUS L-G4.2 345
	Type	Poly crystal
	Rated Max. Power at STC	345W
	Module Efficiency	17.8%
	Class of Module	A
	Dimensions	1,994X1,000X35 mm
	Degradation Gradient	0.6%/year
	Warranty	83% of nominal power up to 25years.
Inverter	Manufacturer	HYOSUNG
	Model	HS-P625GLO
	Input	
	Rated DC Input Power	685kW
	Max. DC Input Voltage	1,000V
	DC Voltage Range	550-1,000V
	MPP Voltage Range	550-850V
	Max. DC Current	1,245A
	Output	

		Rated AC Output Power	625kW
		Max. AC Output Power	625kW
		Rated AC Voltage Range	340V (-12 ~ +10)%
		Rated Grid Voltage	340V
		Rated Output Current	1,061A
		Max Efficiency	>98%
		Dimensions	2,222x2,188x1,013mm
		Ambient Temperature Range	(-20 ~ 50)°C
	Transformer	Manufacturer	HYOSUNG
		Model	N/A
		Rating Power	1,300/(650+650) kVA
		Rated Voltage	HV 22,000V, LV 340V
		Cooling Method	ONAN
	PV Cables	Manufacturer	TAIHAN
		Model	0.6/1kV Cu/XLPE/FR-PVC 1Cx6 mm ²
		Diameter	3.12mm
		Total Length	105 km
	63MVA Transformer	Manufacturer	ABB
		Model	N/A
		Rated Power	48/63 MVA
		Rated Voltage	HV 115kV, MV 23kV, LV 11kV

The power plant consists of 14 groups, each group has 8 inverters with capacity of 625 kW/machine and 2 medium voltage transformers with capacity of 1.250 kVA. Each PV panel capacity is 345 W and total installed PV panels are 201,600. Therefore, total installed capacity is 69.552 MW (Module Capacity). Total installed capacity of the project activity has been verified from an independent third-party report "Jung-In Engineering" dated June 2019 /13/ and found consistent. The total installed capacity of the project activity i.e. 69.552 MW (Mentioned under PDD /23/ and MR /02/) is based on the module capacity which is the maximum capacity corresponding to the electricity generation from project activity. The life time of the project activity PV panels is 25 years as verified from the manufacture specification /12/ which is consistent with the registered PDD /23/.

The details of the equipment to be used for the project is as follows:

Table 2. Configuration of modules and inverters

LINE No.	Group	Inverter	PV Module	Power
		[EA]	[EA]	[kW]
A	1 Group	8	14,400	4,968
	2 Group	8	14,400	4,968
B	3 Group	8	14,400	4,968
	4 Group	8	14,400	4,968
C	5 Group	8	14,400	4,968
	6 Group	8	14,400	4,968
D	7 Group	8	14,400	4,968
	8 Group	8	14,400	4,968

E	9 Group	8	14,400	4,968
	10 Group	8	14,400	4,968
F	11 Group	8	14,400	4,968
	12 Group	8	14,400	4,968
G	13 Group	8	14,400	4,968
	14 Group	8	14,400	4,968
Total		112	201,600	69,552

The verification team, based on the remote audit and document review, was able to conclude that the project activity has been commissioned and the implemented project activity's physical features viz MW capacity, make, model and its operation are as per the registered PDD/23/.

The electricity exported and imported to/from the grid is monitored by the energy meters installed at the project site and national grid connection point at chau duc 110 kV transformer station (0.8 km far from the project plant). These meters are specific only to the project activity. The monitoring is in compliance with the registered PDD /23/.

There is no event or situation occurred during this monitoring period which has impacted the applicability of methodology/21/.

The allocation of the responsibilities is followed as described in the registered PDD /23/. Routines for the archiving of data are defined and documented. Calculations, laid down in the monitoring report are in line with registered PDD /23/. Project is connected thorough SCADA system and the plant monitoring can be done by the operators in the control room through SCADA system as verified from the remote interview. Plant operators have the necessary competence to carry out the relevant tasks with sufficient accuracy which is also confirmed during the remote interview.

Interviews (refer section D.3 of this report) were carried out with the plant personnel during the remote audit to verify the actual monitoring system practiced by PP. It was found that the plant personals are well aware of their roles & responsibilities. The actual monitoring system presently practiced complies with the monitoring plan provided in the registered PDD/23/ and the monitoring methodology/21/.

All the data have been measured as specified in the registered PDD /23/. The monitored data are archived partly in physical (hard copy) and partly in electronic form. The archived data will be kept for the whole crediting period and 2 years after the crediting period.

Findings	No findings have been raised.
Conclusion	<p>The verification team confirms that:</p> <p>a) The project activity is implemented as per the registered PDD/23/.</p> <p>b) The actual operation of the proposed CDM project activity is in line to the registered PDD/23/.</p> <p>It has been reviewed from the registered PDD /23/ including the monitoring plan, the applied monitoring methodology, relevant decisions from the CMP and the CDM EB and found that the Final MR /02/ for this monitoring period is in line with all the above-mentioned documents.</p>

E.4. Post-registration changes**E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents¹**

>> There is no temporary deviation to be submitted with this request for issuance. Therefore, this section is not applicable.

E.4.2. Corrections

>> There is no correction to be submitted with this request for issuance. Therefore, this section is not applicable.

E.4.3. Changes to the start date of the crediting period

>> The start date of the crediting period was modified to 26/11/2019. The project participant emailed the change to the UNFCCC Secretariat on 31/03/2020. The UNFCCC Secretariat informed the CDM website that the change was complete on 08/04/2020.

E.4.4. Inclusion of a monitoring plan

>> There is no inclusion of a monitoring plan to the registered project activity that was not included at registration. Hence, this section is not applicable.

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

>> There is no permanent changes to be submitted with this request for issuance. Therefore, this section is not applicable.

E.4.6. Changes to the project design

>> There is no changes to the project design to be submitted with this request for issuance. Therefore, this section is not applicable.

E.4.7. Changes specific to afforestation and reforestation project activities

>> This section is not applicable.

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	The verification team was able to confirm that the monitoring plan contained in registered PDD/23/ and MR/02/ is in accordance with the approved large scale methodology applied for the project activity i.e. "ACM0002 ver. 19 - Grid-connected electricity generation from renewable sources"/21/ and its applicable tools. All parameters stated in the monitoring plan /23/ and the applied methodology /21/ has been fulfilled in the current monitoring period. The discussion regarding each parameter has been elaborated in the further sections (E.6.1 and E.6.2) of this Verification report.
Findings	No findings have been raised.
Conclusion	As per para 357 and 358 of CDM VVS for project activity version 02.0 /24/, In the opinion of the verification team the monitoring plan of the registered PDD /23/ complies with the monitoring requirement of the applied approved large scale methodology "ACM0002 ver. 19 - Grid-connected electricity generation from

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied (selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

renewable sources"/21/ in the context of the project activity.

E.6. Compliance of monitoring activities with the registered monitoring plan**E.6.1. Data and parameters fixed ex ante or at renewal of crediting period**

Means of verification	Ex-ante Parameter:	EF _{grid,BM,y} , tCO ₂ /MWh (Build margin CO ₂ emission factor of Vietnamese national grid in year y)
	Value(s) applied:	0.8961 tCO ₂ /MWh Source: Registered PDD /23/
	Source and Verification of the source:	It is fixed for the entire crediting period as per the registered PDD/23/. The value of the build margin emission factor has been correctly taken as per the registered PDD /23/ and Hence accepted by the verification team. This ex-ante parameter is used for the calculation of "EF _{CO₂,grid,y} = EF _{grid,CM,y} ".
	Ex-ante Parameter:	EF _{grid,OM,y} , tCO ₂ /MWh (Operating margin CO ₂ emission factor of Vietnamese national grid in year y)
	Value(s) applied:	0.8336 tCO ₂ /MWh Source: Registered PDD /23/
	Source and Verification of the source:	It is fixed for the entire crediting period as per the registered PDD/23/. The value of the operating margin emission factor has been correctly taken as per the registered PDD /23/ and Hence accepted by the verification team. This ex-ante parameter is used for the calculation of "EF _{CO₂,grid,y} = EF _{grid,CM,y} ".
	Ex-ante Parameter:	EF _{CO₂,grid,y} = EF _{grid,CM,y} , tCO ₂ /MWh (Combined margin CO ₂ emission factor of Vietnamese national grid applying for solar power plant in year y)
	Value(s) applied:	0.8492 tCO ₂ /MWh Source: Registered PDD /23/
	Source and Verification of the source:	It is fixed for the entire crediting period as per the registered PDD/23/. The value of the combined margin emission factor has been correctly taken as per the registered PDD /23/ and Hence accepted by the verification team. This ex-ante parameter is used for baseline emission calculation.
	Ex-ante Parameter:	Total installed power plant capacity in Vietnam, MW (Total installed power plant capacity in

		the host country)
	Value(s) applied:	42,135 MW
		Source: Registered PDD /23/
	Source and Verification of the source:	The value of this ex-ante parameter is correctly taken from the registered PDD /23/ and Hence accepted by the verification team. This Ex-ante parameter is not used for the emission reduction calculation. This was used to demonstrate the additionality during the registration of the project activity.
	Ex-ante Parameter:	Total installed capacity of the solar power plant in Vietnam, MW (Total installed capacity of the solar power plant in the host country)
	Value(s) applied:	106 MW
		Source: Registered PDD /23/
	Source and Verification of the source:	The value of this ex-ante parameter is correctly taken from the registered PDD /23/ and Hence accepted by the verification team. This Ex-ante parameter is not used for the emission reduction calculation. This was used to demonstrate the additionality during the registration of the project activity.
Findings	CAR 07 was raised and closed satisfactorily. Refer to appendix 4 for further details.	
Conclusion	As per para 360 to 361 of CDM VVS for project activity version 02.0 /24/, the verification team confirms that the value used for grid emission factor for calculation of emission reduction is consistent with registered PDD /23/ and correctly applied in MR /02/ and emission reduction spread sheet /04/ and justified.	

E.6.2. Data and parameters monitored

Means of verification	<p>Verification team confirms through remote audit verification and from the document review, the actual monitoring system complies with the monitoring plan mentioned in the registered validated PDD/23/. According to the monitoring plan in the registered PDD, there is 1 monitoring parameter required to be monitored.</p> <p>During the verification, monitoring parameter of the registered monitoring plan /23/ has been verified with regard to the appropriateness of the verification method; the correctness of the values applied for ER calculation, the accuracy and applied QA/QC measures. The monitoring parameter has been measured / determined without material misstatements and are in line with all applicable standards and relevant requirements. Complete set of data for the specified monitoring period (26/11/2019 to 29/02/2020) was available. The same is confirmed through verification of electricity export and import data /09/ and /10/.</p> <p>The assessment for monitoring parameter is given below:</p> <p>Monitoring parameter:</p>	
	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	EG_{P,J,y} (Quantity of net electricity generation supplied by the project plant/unit to the grid in year (y) in MWh)
	Value(s) of monitored parameter:	28,416 MWh The calculation of the net electricity supplied to

		the grid has been checked under the ER sheet /04/ and found in compliance with the registered PDD /23/. The value has been verified from the ER sheet /04/ and MR /02/ and found OK.
	Measuring frequency/Time Interval:	<p>The electricity exported to the grid ($EG_{\text{export},y}$) and imported from the grid ($EG_{\text{import},y}$) are measured directly by the electricity meters at the connection point.</p> <p>Electricity exported to the grid ($EG_{\text{export},y}$) is measured by main meter (Main energy meter 173) installed at the national grid connection point at chau duc 110 kV transformer station (0.8 km far from the project plant).</p> <p>Electricity import from the grid ($EG_{\text{import},y}$) is sum of import electricity for consumption for the plant (measured by Main energy meter 173 installed at the national grid connection point at chau duc 110 kV transformer station (0.8 km far from the project plant)) and import electricity for office consumption (One import meter installed at Project plant to measure the imported electricity from 22kV grid). More details is provided in further sections of this report.</p> <p>Electricity exported to the grid ($EG_{\text{export},y}$) and imported from the grid ($EG_{\text{import},y}$) are continuously measured by electricity meters and monthly recorded.</p> <p>The net electricity supplied by the power plant to the grid ($EG_{\text{PJ},y}$) is monthly calculated from $EG_{\text{export},y}$ and $EG_{\text{import},y}$</p> <p>The net electricity supplied by the power plant to the grid is calculated as follows:</p> $EG_{\text{PJ},y} = EG_{\text{export},y} - EG_{\text{import},y}$ <p>The calculation is provided in the emission reduction calculation sheet /04/. The ER sheet is verified and found that the calculation of $EG_{\text{PJ},y}$ is correct.</p> <p>This monitoring procedure has been checked during the remote audit and also from monthly protocols /09/ and invoices /10/ and found in compliance with the registered PDD /23/.</p>
	Reporting frequency:	Monthly recording jointly by EVN staff and a representative of PP in compliance with the registered PDD /23/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Type of monitoring equipment:	The electricity exported to the grid and imported from the grid (consumption for the plant) are measured by a pair of Main energy meter (173) and first back up energy meter (173) at the national grid connection point at chau duc 110 kV transformer station (0.8 km far from the project plant).

		<p>There are also second back up meters (171, 131, 132) installed at project plant (110 kV bus bar) which will only be used in case first back up meter is failed.</p> <p>All the meters (Main meter 173, First backup meter 173, Second backup meter 171, Second backup meter 131, Second backup meter 132) mentioned above are bidirectional meters i.e. measuring export and import electricity.</p> <p>One import meter (At Project plant) is also installed to measure the imported electricity from 22kV grid for the project office. PP has also used this electricity meter which is conservative and accepted to the verification team. This is a unidirectional meter.</p> <p>All these meters are specific only to the project activity.</p> <p>All the above meters have been verified during the remote audit, monthly electricity protocols /09/ and also from the Single line diagram for Electricity measurement system by EVN SOUTHERN REGION LOAD DISPATCH CENTER /17/.</p> <p>The installed meters are in compliance with the registered PDD /23/.</p>
	Is accuracy of the monitoring equipment as stated in the PDD?	The accuracy class of the Main meter is 0.2s. The accuracy class of all other meters is 0.5s. The accuracy class of the energy meters is verified from the remote audit (Skype interview) and also through photographic evidence/14/ which is in compliance with the registered PDD /23/.
	Calibration frequency /interval:	At least once every two year for all the meters. Calibration frequency is in compliance with the registered PDD /23/.
	Is the calibration interval in line with the monitoring plan of the PDD?	Yes
	Company performing the calibration:	The Calibration of all the electricity meters has been done by the government authority (SOUTHERN ELECTRICAL TESTING COMPANY) as verified from the calibration certificates /06/ and hence accepted.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes, the calibration certificates /06/ are verified and found that the error in calibration test is less than respective accuracy class which is accepted to the verification team.
	Is (are) calibration(s) valid for the whole reporting period?	Yes. Refer section E.7 of this report for calibration details.
	If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in the ER sheet /04/ and MR /02/ has been cross-checked from the invoices /10/ and found consistent.
	How were the values in the monitoring report verified?	During this monitoring period, the monitoring period start date i.e. 26/11/2019 is not matching with the billing cycle i.e. 00.00 hour of first date of every month. CL-03 has been raise in this

		<p>regard and successfully closed. Refer CL-03 under Appendix 4 of this report for more details.</p> <p>Daily data of all the Energy meters is recorded by the SCADA system /20/ which can be matched with the monthly Electricity protocols /09/. For the period 26/11/2019 to 30/11/2019, PP has used SCADA reading (for the electricity export and electricity import for the plant) from the Main meter 173 (Billing meter) for the emission reduction calculation which is accepted to the verification team and also in compliance with section B.7.3 of the registered PDD /23/.</p> <p>For the electricity import for the project office purpose, the monthly data (November 2019) is apportioned for 5 days which is also accepted to the verification team.</p> <p>The verification team has verified all the monthly electricity protocols /09/ for this monitoring period, Daily export and import electricity data from Main meter 173 for the month of Nov 2019 /20/ and confirms that the same values are applied in the ER calculation sheet /04/.</p>
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA
Findings	CL-01 and CAR-05 were raised and closed satisfactorily. Refer to appendix 4 of this report for further details.	
Conclusion	As per para 360 to 361 of CDM VVS for project activity version 02.0 /24/, the assessment team concludes that the monitoring of the project activity is being carried out in accordance with the registered PDD monitoring plan /23/ and meets the requirements of the applied monitoring methodology /21/. The adequacy and compliance of the registered monitoring plan /23/ in the MR can be concluded to be conforming. The flow of the information from the point of generation up to reporting has been reviewed and found to be correct and appropriate meeting the requirements of the applied methodology.	

E.6.3. Implementation of sampling plan

Means of verification	No sampling plan applied for the project activity. Therefore, this section is not applicable.
Findings	-
Conclusion	Not applicable.

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Verification team has checked whether the calibration of the measuring equipment that has an impact on the claimed GHG emission reductions is conducted by the PP at a frequency specified in the monitoring plan/23/.						
	There is only one monitoring parameter 1. $EG_{PJ,y}$						
	The electricity exported to the grid ($EG_{export,y}$) and imported from the grid ($EG_{import,y}$) are measured directly by the electricity meters at the connection point. The net electricity supplied by the power plant to the grid ($EG_{PJ,y}$) is calculated from $EG_{export,y}$ and $EG_{import,y}$						
	The electricity exported to the grid and imported from the grid (consumption for the plant) are measured by a pair of Main energy meter (173) and first back up energy meter (173) at the national grid connection point at chau duc 110 kV transformer station (0.8 km far from the project plant).						
	There are also second back up meters (171, 131, 132) installed at project plant (110 kV bus bar) which will only be used in case first back up meter is failed.						
	All the meters (Main meter 173, First backup meter 173, Second backup meter 171, Second backup meter 131, Second backup meter 132) mentioned above are bidirectional meters i.e. measuring export and import electricity.						
	One import meter (At Project plant) is also installed to measure the imported electricity from 22kV grid for the project office. PP has also used this electricity meter which is conservative and accepted to the verification team. This is a unidirectional meter.						
	All these meters are specific only to the project activity.						
	All the above meters have been verified during the remote audit, monthly electricity protocols /09/ and also from the Single line diagram for Electricity measurement system by EVN SOUTHERN REGION LOAD DISPATCH CENTER /17/. The installed meters are in compliance with the registered PDD /23/.						
	The calibration details of the monitoring equipments corresponding to electricity exported to the grid ($EG_{export,y}$) and imported from the grid ($EG_{import,y}$) is given in the below table.						
Monitoring Equipment:	Main meter 173	First backup meter 173	Second backup meter 171	Second backup meter 131	Second backup meter 132	Import meter from 22kV grid for the office	
Function:	Measuring energy export to grid and import from grid (consumption for the plant)					Measuring energy import from 22kV grid for the office	
Location	The national grid connection point at chau duc 110 kV transformer station (0.8 km far from the project plant)			At Project plant (110 kV bus bar)		At Project plant (from 22kV grid for the office)	
Monitored parameter :	$EG_{PJ,y}$ ($EG_{export,y}$)	$EG_{PJ,y}$ ($EG_{export,y}$)	$EG_{PJ,y}$ ($EG_{export,y}$ and $EG_{import,y}$)			$EG_{PJ,y}$ ($EG_{import,y}$)	

	and EG _{import,y}) (For electricity export and import to/from grid)	and EG _{import,y}) (only when main meter fails)	Only used when the first back up meter fails			(only for the import electricity from 22kV grid for the office)
Type:	Elster A1700	Elster A1700	Elster A1700	Elster A1700	Elster A1700	Elster A1700
Serial number:	19030121	17025033	17025030	17025032	17025031	18086121
Accuracy:	0.2s	0.5s	0.5s	0.5s	0.5s	0.5s
Frequency of calibration:	At least once in every two years					
Last calibration date:	14/05/2019					05/03/2019
Name of the certifier	SOUTHERN ELECTRICAL TESTING COMPANY					
<p>Calibration frequency: Once in two year as per registered PDD monitoring plan /06/.</p> <p>The Calibration performance was checked from the calibration reports /06/ and found that the meters were within the respective accuracy level as verified from the calibration results.</p> <p>The calibration validity of the energy meters/06/ during this monitoring period were verified from the corresponding calibration certificates/06/. No delay in calibration was observed.</p> <p>The monitoring equipment's have been installed in the project activity according to registered monitoring plan /23/.</p> <p>Please refer individual monitoring parameter table (Under section E.6.2 of this report) for the calibration details.</p>						
Findings	No findings have been raised.					
Conclusion	As per para 365 to 370 of CDM VVS for project activity version 02.0 /24/, the Verification team confirms that the calibration frequency is in line with the monitoring plan mentioned in the registered PDD /23/.					

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	<p>The calculation, applied formulae and the method for calculation of baseline emissions are in accordance with the registered PDD /23/ and are in line with the requirements of the applied methodology (ACM0002 Version 19.0.0 /21/). The formulae and the methods referred in the MR /02/ and the emission reduction calculation spread sheet/04/ for estimation of emission reduction complies with the corresponding formulae and methods in the registered PDD /23/.</p> <p>The ex-ante and validated fixed value of grid emission factor i.e. The combined margin of the emission factor (0.8492 tCO₂e/MWh, registered PDD /23/) is taken into account for the calculation of baseline emissions.</p> <p>During this monitoring period, the monitoring period start date i.e. 26/11/2019 is not</p>
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matching with the billing cycle i.e. 00.00 hour of first date of every month. CL-03 has been raised in this regard and successfully closed. Refer CL-03 under Appendix 4 of this report for more details.

Daily data of all the Energy meters is recorded by the SCADA system /20/ which can be matched with the monthly Electricity protocols /09/. For the period 26/11/2019 to 30/11/2019, PP has used SCADA reading (for the electricity export and electricity import for the plant) from the Main meter 173 (billing meter) for the emission reduction calculation which is accepted to the verification team and also in compliance with the section B.7.3 of the registered PDD /23/.

For the electricity import for the project office purpose, the monthly data (November 2019) is apportioned for 5 days which is also accepted to the verification team.

The verification team has verified all the monthly electricity protocols /09/ for this monitoring period, Daily export and import electricity data from Main meter 173 for the month of Nov 2019 /20/ and confirms that the same values are applied in the ER calculation sheet /04/.

The verification team has checked all the monthly electricity protocol/09/, Daily export and import electricity data from Main meter 173 for the month of Nov 2019 /20/ and invoices/10/ applicable for the monitoring period and found the monitoring parameter is monitored and recorded as per the monitoring plan in the registered PDD/23/.

As per registered PDD /23/, the baseline emissions of the project is calculated from net electricity supplied to grid ($EG_{PJ,y}$) and combined margin emission factor of grid (EF) as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where

$$EG_{PJ,y} = EG_{export,y} - EG_{import,y}$$

$EG_{export,y}$	=	Electricity exported to the grid
$EG_{import,y}$	=	Electricity imported from the grid

The electricity export and import values are verified from monthly electricity protocol/09/, Daily export and import electricity data from Main meter 173 for the month of Nov 2019 /20/ and found that the value considered for the ER calculation is correct. Also the Electricity exported and imported to grid are cross verified from the monthly invoices /10/.

The calculation is provided in the emission reduction calculation sheet. The ER sheet is verified and found that the calculation of $EG_{PJ,y}$ is correct.

Parameter	Description	Value for this Monitoring period
$EG_{PJ,y}$	Quantity of net electricity generation supplied by the project plant/unit to the grid in year (y) in MWh	28,416 MWh
$EF_{grid,CM,y}$	Combined margin CO ₂ emission factor of Vietnamese national grid applying for solar power plant in year y	0.8492 tCO ₂ /MWh
BE_y	Baseline emissions in year y (tCO _{2e} /y)	24,131 tCO ₂

Hence baseline emission for this monitoring period is 24,131 tCO_{2e} (Rounded down)

Findings

CL-03 and CAR 06 were raised and closed satisfactorily. Refer to appendix 4 of

	this report for further details.
Conclusion	<p>As per para 372 and 373 of CDM VVS for project activity version 02.0 /24/, Verification team concludes that the calculation provided in the monitoring report /02/ and emission reduction spread sheet /04/ are complete and reflect all the requirements of the registered monitoring plan/23/ and:</p> <p>a) All the monitored data pertaining to baseline calculation as required by the registered monitoring plan was available to PP, the same has been verified by the verification team.</p> <p>b) All the formula used for the baseline, was in line to the registered monitored plan /23/.</p> <p>c) The ex-ante emission factors correctly sourced from the registered PDD /18/ and was found to be appropriate and justified.</p>

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	As per registered PDD /23/ and applied methodology /21/, project emission has been considered as zero. Project activity does not use fossil fuel consumption which is confirmed during the remote audit interview. Hence the project emission is zero (PEy =0).
Findings	CL-02 was raised and closed satisfactorily. Refer to appendix 4 of this report for further details.
Conclusion	Hence the project emission is zero (PEy =0).

E.8.3. Calculation of leakage GHG emissions

Means of verification	Not applicable in accordance with applied methodology /21/ and registered PDD/23/.
Findings	Nil.
Conclusion	NA

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	<p>As per registered PDD/23/, the emission reductions E_{Ry} by the project activity during the monitoring period is equal to the baseline emission less project emission and leakage emission.</p> $E_{Ry} = BEy - PEy - LEy$ <p>Since project emission and leakage are zero</p> $E_{Ry} = BEy = 24,131 \text{ tCO}_2$ <p>The calculation provided in the ER sheet and MR was assessed appropriate by the verification team.</p> <p>The verification team confirms that a complete set of data for this monitoring period is available to verify the emission reduction calculation, and the same was found in accordance with the registered PDD/23/.</p> <p>No lack of evidence and missing data were detected during this monitoring period. All values as per the monitoring plan were crosschecked by the verification team against basic monitored data and the calculations were found to be correct.</p> <p>The verification team confirms that the emission reductions are real and measurable.</p> <p>No reporting risks have been identified for the data reported. All the monitored data are archived in electronic and paper form. The data will be kept for the whole crediting period and 2 years after the last crediting period thereby meeting the requirement of the PDD. The verification team has checked and confirms that all the meters are calibrated. Thus conclude no material risks in the claimed emission reduction for the applied period</p>
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Findings	No findings have been raised.
Conclusion	<p>As per para 372 and 373 of CDM VVS for project activity version 02.0/24/, Verification team concludes that the calculation provided in the monitoring report /02/, and emission reduction spread sheet/04/ are complete and reflect all the requirements of the monitoring plan/23/ and:</p> <ul style="list-style-type: none"> a) All the monitored data as required by the registered monitoring plan /23/ was available to PP, the same has been verified by the verification team. b) Formula used for the baseline was in line to the registered monitored plan/23/. <p>The ex-ante emission factors correctly sourced from the registered PDD /23/ and was found to be appropriate and justified.</p>

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	<p>The MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD /23/.</p> <table border="1"> <tr> <td>Estimated Reduction as per Registered PDD:</td><td>25,919 tCO₂e /23/</td></tr> <tr> <td>Actual Reduction for the Monitoring Period</td><td>24,131 tCO₂e/02/</td></tr> </table> <p>In summary, verification team confirms that the actual emission reduction is lower than the estimate of the registered PDD /23/ for the current monitoring period.</p>	Estimated Reduction as per Registered PDD:	25,919 tCO ₂ e /23/	Actual Reduction for the Monitoring Period	24,131 tCO ₂ e/02/
Estimated Reduction as per Registered PDD:	25,919 tCO ₂ e /23/				
Actual Reduction for the Monitoring Period	24,131 tCO ₂ e/02/				
Findings	No findings have been raised.				
Conclusion	In summary, verification team confirms that the actual emission reduction is lower than the estimate of the registered PDD /23/ for the current monitoring period. Verification team confirms that the comparison for the estimated and actual emission reduction for this monitoring period is correctly calculated and reported.				

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	The actual emission reductions are lower than the estimated emission reductions based on the registered PDD /23/.
Findings	No findings have been raised.
Conclusion	The ERs achieved during the monitoring period are 6.90% less than the estimated amount based on the ex-ante estimation in registered PDD /23/.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The complete monitoring period falls after 01 January 2013 and therefore the total ERs during the monitoring period i.e. 26/11/2019 to 29/02/2020 pertains to the 2 nd commitment period. Total 24,131 tCO ₂ e CERs verified during this monitoring period i.e. 26/11/2019 to 29/02/2020 (including both the days).
Findings	No findings have been raised.
Conclusion	Total 24,131 tCO ₂ e CERs verified pertains to the period from 1 January 2013 onwards.

E.9. Assessment of reported sustainable development co-benefits

Means of verification	Not applicable to the proposed project activity.
Findings	Not applicable to the proposed project activity.
Conclusion	Not applicable to the proposed project activity.

E.10. Global stakeholder consultation

Means of verification	<p>This is the 1st periodic verification, no comments received during commenting period as verified from the link.</p> <p>https://cdm.unfccc.int/Projects/DB/Korean%20Standards%20Association1573753561.07/iProcess/KTRCert1586392489.34/view</p>
Findings	Not applicable

Conclusion	Not applicable
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SECTION F. Internal quality control

>> The draft verification report prepared by team leader is reviewed by an independent technical reviewer before requesting for issuance for this verification period for the project activity to confirm the internal procedures established by 4KES are duly followed and the verification report/opinion is reached in an objective manner and complies with the applicable CDM requirements. The technical review is conducted by the technical reviewer qualified as per the 4KES procedures established for the qualification of CDM personnel as per EB guidelines.

The independent technical reviewer may approve or reject the draft verification report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before the request for issuance is submitted to UNFCCC. The final decision is taken by the Head of the DOE. The technical reviewer approves the final version of the report.

The final approval is authorized by the Director, 4KES once the report is approved by the Head/DOE Manager.

SECTION G. Verification opinion

>> The verification team confirms that the evidence is of sufficient quantity, appropriate quality and reliable. The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet and monitoring report. During the course of verification, the data submitted by PP was cross verified with the values mentioned in the emission reduction sheet and monitoring report. The procedure for data monitoring, recording, transfer and compilation was also verified and found in compliance with the monitoring plan as mentioned in the registered PDD/23/.

Evidences (Documents/interview/remote audit) referred for verification of individual monitoring parameter and fixed parameters are defined in section E.6 above. It is confirmed by the assessment team that the reported emission reductions have been conservatively calculated. A list of referred documents for verification is also included in Appendix 3 of this report.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 24,131 tCO₂e emission reductions during period from 26/11/2019 to 29/02/2020 (Including both the days).

SECTION H. Certification statement

>> 4K EARTH SCIENCE PRIVATE LIMITED has been contracted by SH Power Co., Ltd to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from 70MW Solar Power Plant Project in Ba Ria - Vung Tau, Vietnam, UNFCCC Ref. No. 10524 for the monitoring period 26/11/2019 to 29/02/2020 in the Monitoring Report Version 1.1 (first submission) dated 31/03/2020.

The verification is based on the validated and registered PDD and the monitoring report for this project. Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board.

The management of SH Power Co., Ltd is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report, version 3 dated 22/06/2020. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the SH Power Co., Ltd. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 3 dated 22/06/2020.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 26/11/2019 to 29/02/2020 based on the reported emission reductions in the Final Monitoring Report Version 3 dated 22/06/2020 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, 4K EARTH SCIENCE PRIVATE LIMITED planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

4K EARTH SCIENCE PRIVATE LIMITED confirms the following;

Reporting period: From 26/11/2019 to 29/02/2020

Verified and certified emission in the above reporting period:

	Amount	Unit
Baseline emissions (BE)	24,131	tCO ₂ e
Project emissions (PE)	0	tCO ₂ e
Leakage emissions (LE)	0	tCO ₂ e
Total CERs (26/11/2019 to 29/02/2020)	24,131	tCO ₂ e

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CERs	Certified Emission Reductions
CL	Clarification Request
CO ₂ e	Carbon dioxide equivalent
COP	Conference of Parties
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
GHGs	Greenhouse Gas(es)
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
JMR	Joint Meter Reading
KP	Kyoto Protocol
kWh	Kilo Watt Hour
LE	Leakage Emissions
MR	Monitoring Report
MP	Monitoring Plan
MWh	Mega Watt Hour
PE	Project Emissions
PDD	Project Design Document
PLF	Plant Load Factor
PS	Project Standard
PCP	Project Cycle Procedure
PP	Project Participant
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation & Verification Standard
4KES	4K Earth Science Private Limited

Appendix 2. Competence of team members and technical reviewers

<u>Certificate of Competence</u>						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Chetan Swaroop Sharma				
Qualification Procedure	Fulfil the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
<i>Appointed</i>	Yes	Yes	Yes	Yes	Yes	No
<i>Appointed Date</i>	13-06-2020					

Authorized to work as Technical Expert for:			
Authorized Technical Area	Sectoral Scope	TA Code	Technical Area within the scope
	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables
	Energy distribution	2.1	Energy distribution
	Energy demand	3.1	Energy demand
	Waste handling and disposal	13.1	Solid waste and wastewater
Authorized to work as Local Expert for:			
Country/Countries	India		
Compliance check by: Anand S. R.			

<u>Certificate of Competence</u>						
Name	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Nguyen Hong Ngoc Trang				
Qualification Procedure	Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
Appointed	-	-	Yes	Yes	-	-
Appointed Date	13-06-2020					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Sectoral Scope	TA Code	Technical Area within the scope			
	Waste handling and disposal	13.1	Solid waste and wastewater			
Authorized to work as Local Expert for:						
Country/Countries	Vietnam					
Compliance check by: Anand S. R.						

<u>Certificate of Competence</u>						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ma Paa Puratchikkanal				
Qualification Procedure	Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	29-07-2019					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Sectoral Scope	TA Code	Technical Area within the scope			
	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation			
	Energy industries (renewable - /	1.2	Renewables			

	non-renewable sources)		
	Energy demand	3.1	Energy demand
	Construction	6.1	Construction
	Waste handling and disposal	13.1	Solid waste and wastewater
	Agriculture	15.1	Agriculture
Authorized to work as Local Expert for:			
Country/Countries	India		
<u>Compliance check by:</u> Anand S. R.			

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	Project participant	Webhosted monitoring report	Version 1.1, dated 31/03/2020 (published)	Project participant
2.	Project participant	Final Monitoring report	Version 3.0, dated 22/06/2020 (final)	Project participant
3.	Project participant	Draft ER calculation sheet	Corresponding to hosted MR version 1.1	Project participant
4.	Project participant	Final ER calculation sheet	Corresponding to final MR version 3.0	Project participant
5.	Project participant , EVNEPTC	Certificate of commercial operation date issued by EVNEPTC (ELECTRICITY POWER TRADING COMPANY) confirming commercial operation date (COD) of the solar power plant on 26/06/2019.	-	Project participant
6.	SOURTH ERN ELECTRI CAL TESTING COMPAN Y	Calibration Reports of Energy meters corresponding to this monitoring period dated 2019	-	Project participant
7.	Project participant & THE VIETNAM ELECTRI CITY (EVN)	PPA Power Purchase agreement signed between SH SOLAR FARM VINA CO., LTD (The Seller) and THE VIETNAM ELECTRICITY (The Buyer) dated November 2018. Valid for 20 years from commercial operation date.	-	Project participant
8.	MINISTR Y OF INDUSTR Y AND TRADE, ELECTRI CITY REGULAT ORY AUTHORI TY OF VIETNAM	Electricity operation license from MINISTRY OF INDUSTRY AND TRADE, ELECTRICITY REGULATORY AUTHORITY OF VIETNAM date of issuance 25/06/2019 and valid till 25/06/2029.	-	Project participant
9.	EVN - SOUTHE RN POWER CORPOR ATION - ELECTRI CITY	Monthly Electricity Protocol between PP and EVN - SOUTHERN POWER CORPORATION - ELECTRICITY POWER TRADING COMPANY corresponding to this monitoring period 26/11/2019 to 29/02/2020 (Including both the days).	-	Project participant

	POWER TRADING COMPANY			
10.	Project participant and EVN	Monthly electricity invoices corresponding to the monitoring period 26/11/2019 to 29/02/2020 (Including both the days) 1. Export electricity invoices issued by the PP 2. Import Electricity invoices for facility issued by EVN 3. Import Electricity invoices for office issued by EVN	-	Project participant
11.	Project participant	Management review report for the year 2020	-	Project participant
12.	Manufacturer	Technical specification of the main equipments (Solar panel, inverter and transformer) of the project activity along with lifetime supportive for the solar panels	-	Project participant
13.	Jung-In Engineering	Document corresponding to the technical specification of major equipments (Solar panel, inverter and transformer) of the project activity and total installed capacity of the project activity. The report is made by an independent third party "Jung-In Engineering" dated June 2019	-	Project participant
14.	Project participant	Photographic evidence	-	Project participant
15.	Project participant	Training record for the year 2019	-	Project participant
16.	Jung-In Engineering	Project layout by an independent third party "Jung-In Engineering"	-	Project participant
17.	EVN SOUTHERN REGION LOAD DISPATCH CENTER	SINGLE LINE DIAGRAM FOR ELECTRICITY MEASUREMENT SYSTEM by EVN SOUTHERN REGION LOAD DISPATCH CENTER	-	Project participant
18.	Woori bank	Loan agreement with Woori bank for the repayment schedule	-	Project participant
19.	DEPARTMENT OF PLANNING AND INVESTMENT	Company business registration certificate by DEPARTMENT OF PLANNING AND INVESTMENT (The first registration: 16 April 2018).	-	Project participant
20.	Project participant	Daily electricity import-export data (for all the electricity meters) extracted from SCADA system for the month of November 2019	-	Project participant
21.	UNFCCC	Approved monitoring methodology: ACM0002 ver. 19 - Grid-connected electricity generation from renewable sources	-	UNFCCC
22.	UNFCCC	Guidelines for Application of materiality in verifications version 2.0	-	Publicly Available
23.	UNFCCC/PP	Registered Documents (https://cdm.unfccc.int/Projects/DB/Korean%20Standards%20Association1573753561.07/view): 1. Registered PDD- Version 1.7, Dated 17/01/2020 2. Validation Report prepared by Korean Standards Association(KSA) - Revision 2.1, Dated 20/01/2020	-	UNFCCC

24.	UNFCCC	CDM Validation and Verification Standard for project activities, Version 02.0 CDM Project Standard for project activities, Version 02.0 CDM project cycle procedure for project activities, Version 02.0	-	UNFCCC
25.	UNFCCC	CDM-MR-FORM - Monitoring report form for CDM project activity, Version 07.0: https://cdm.unfccc.int/Reference/PDDs_Forms/index.html	-	UNFCCC
26.	web	Websites referred: http://www.itouchmap.com/latlong.html (Latitude-Longitude location finder)	-	web
27.	UNFCCC	Glossary "CDM terms"	Version 10	Publically available
28.	Contracts with suppliers	Supportive document for the Actual Capital cost of the project activity	=	Project participant

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

Table 3. Remaining FAR from validation and/or previous verifications

This is 1st periodic verification of the project activity. There is no remaining FAR from 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

Table 4. CL from this verification

CL ID	01	Section no.	E.6.2	Date: 18/06/2020
Description of CL				
For the monitoring parameter "EGPJ,y" (Under section D.2 of the MR /01/), the description provided under row "Source of data" is not clear.				
Project participant response				Date: 19/06/2020
<i>The source of data has been clarified in the revised MR.</i>				
Documentation provided by project participant				
<i>The revised MR.</i>				
DOE assessment				Date: 19/06/2020
Correction has been done under section D.2 of the revised MR /02/ and found OK. PP has mentioned the sentence "The electricity exported to the grid (EG _{export,y}) and imported from the grid (EG _{import,y}) are measured directly by the electricity meters at the connection point. The net electricity supplied by the power plant to the grid (EG _{PJ,y}) is calculated from EG _{export,y} and EG _{import,y} " which is accepted to the verification team and hence CL 01 is closed.				

CL ID	02	Section no.	E.8.2	Date: 18/06/2020
Description of CL				
Under section E.2 of the MR /01/, PP has mentioned "However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:" and also provided project emission equation however no justification has been provided for the applicability of it to the project activity.				

Project participant response	Date: 19/06/2020
<p>The project activity includes the construction and operation of a solar power plant which does not use fossil fuel. Therefore, the project emissions are considered as zero.</p> <p>The information has been corrected in the revised MR, Section E.2</p>	
Documentation provided by project participant	
Revised MR	
DOE assessment	Date: 19/06/2020
<p>Correction has been done in the revised MR /02/ and found OK. Further the justification provided by the PP is acceptable to the verification team. Project activity does not use fossil fuel consumption which is also confirmed during the remote audit interview. Hence CL 02 is closed.</p>	

CL ID	03	Section no.	E.8.1	Date: 18/06/2020
Description of CL				
<p>From the review of the ER sheet /03/ and Monthly protocols /09/, Verification team has found that the monitoring period start date (i.e. 26/11/2019) is not matching with the monthly monitoring cycle. PP need to clarify how the emission reduction has been calculated for the month of November 2019.</p>				
Project participant response				Date: 19/06/2020
<p>The electricity imported and exported to the grid by the project activity are recorded every half hour by the SCADA system. The data extracted from SCADA system has been used to determine the amount of electricity imported/exported by the project activity from 26/11/2019 to 30/11/2019.</p>				
Documentation provided by project participant				
<p>Electricity import-export data from the SCADA system</p> <p>The revised ER calculation sheet</p>				
DOE assessment				Date: 19/06/2020
<p>The justification provided by the PP seems acceptable. During this monitoring period, the monitoring period start date i.e. 26/11/2019 is not matching with the billing cycle i.e. 00.00 hour of first date of every month.</p> <p>Daily data of all the Energy meters is recorded by the SCADA system /20/ which can be matched with the monthly Electricity protocols /09/. For the period 26/11/2019 to 30/11/2019, PP has used SCADA reading (for the electricity export and electricity import for the plant) from the Main meter 173 (billing meter) for the emission reduction calculation which is accepted to the verification team and also in compliance with the section B.7.3 of the registered PDD /23/.</p> <p>For the electricity import for the project office purpose, the monthly data (November 2019) is apportioned for 5 days which is also accepted to the verification team. Hence CL-03 is closed.</p>				

Table 5. CAR from this verification

CAR ID	01	Section no.	E.1	Date: 18/06/2020
Description of CAR				
<p>Under page 1 of the hosted MR /01/, PP need to mention the "Monitoring report number for this monitoring period" according to the MR filling guideline available under "Monitoring report form for CDM project activity" (Version 07.0) /25/.</p>				
Project participant response				Date: 19/06/2020
<p>The monitoring report number of this monitoring period has been added in the revised MR</p>				
Documentation provided by project participant				
The revised MR				
DOE assessment				Date: 19/06/2020
<p>Correction has been done in the revised MR /02/ and found OK. Hence CAR 01 is closed.</p>				

CAR ID	02	Section no.	E.1	Date: 18/06/2020
Description of CAR				
<p>Verification team has found that futuristic language has been used under the hosted MR /01/. Since the verification is for the monitoring period which is already over, PP need to correct the same.</p>				
Project participant response				Date: 19/06/2020
<p>The information has been updated in the revised MR</p>				
Documentation provided by project participant				
The revised MR				
DOE assessment				Date: 19/06/2020
<p>Correction has been done in the revised MR /02/ and found OK. Hence CAR 02 is closed.</p>				

CAR ID	03	Section no.	E.1	Date: 18/06/2020
Description of CAR				
Section B.2.4 to B.2.6 of the hosted MR /01/ are not filled as per the MR filling guideline available under "Monitoring report form for CDM project activity" (Version 07.0) /25/.				
Project participant response				Date: 19/06/2020
<i>Section B.2.4 to B.2.6 have been corrected in the revised MR</i>				
Documentation provided by project participant				
<i>The revised MR</i>				
DOE assessment				Date: 19/06/2020
Correction has been done in the revised MR /02/ and found OK. Hence CAR 03 is closed.				

CAR ID	04	Section no.	E.1	Date: 18/06/2020
Description of CAR				
Under section C of the MR /01/, PP need to Include line diagrams showing all relevant monitoring points as per the MR filling guideline available under "Monitoring report form for CDM project activity" (Version 07.0) /25/.				
Project participant response				Date: 19/06/2020
<i>The monitoring system diagram has been added in the revised MR</i>				
Documentation provided by project participant				
<i>The revised MR</i>				
DOE assessment				Date: 19/06/2020
Correction has been done in the revised MR /02/ and found OK. The monitoring points mention in the line diagram (section C of the revised MR /02/) have been verified during the remote audit and also from the SINGLE LINE DIAGRAM FOR ELECTRICITY MEASUREMENT SYSTEM by EVN SOUTHERN REGION LOAD DISPATCH CENTER /17/ and found correct. Hence CAR 04 is closed.				

CAR ID	05	Section no.	E.6.2	Date: 18/06/2020
Description of CAR				
Under the row "Monitoring equipment" for the monitoring parameter "EGPJ,y" (Under section D.2 of the MR /01/), PP need to provide information on type, accuracy class, serial number, calibration frequency, date of last calibration and validity for the monitoring equipments as per the MR filling guideline available under "Monitoring report form for CDM project activity" (Version 07.0) /25/.				
Project participant response				Date: 19/06/2020
<i>The requested information has been added in Section D.2 of the revised MR</i>				
Documentation provided by project participant				
<i>The revised MR</i>				
DOE assessment				Date: 19/06/2020
Correction has been done in the revised MR /02/ and found OK. The monitoring equipment (electricity meters) details mentioned in the revised MR /02/ has been verified during the remote audit and found correct. Further the mentioned calibration information has been verified from the calibration certificates /06/ and found correct. Hence CAR 05 is closed.				

CAR ID	06	Section no.	E.8.1	Date: 18/06/2020
Description of CAR				
Under the ER sheet /03/, 1. PP need to mention the date and version of the ER sheet. 2. Final emission reduction is not round down. 3. Electricity import data "Electricity delivered from the SEN Grid to this project" is not matching with the submitted invoices generated by EVN /10/. Also, the mentioned Electricity import data is round which is not conservative. 4. The mentioned electricity supplied to grid is not matching with the monthly protocols /09/.				
Project participant response				Date: 19/06/2020

1. The version and date have been added in the revised ER sheet.
2. The value of final emission reduction has been rounded down in the revised ER sheet.
3. The exact values of electricity import have been corrected in the revised ER sheet.
4. The exact values of electricity export without rounded have been corrected in the revised ER sheet.
Documentation provided by project participant
Revised ER sheet
DOE assessment Date: 19/06/2020
1. Correction has been done in the revised ER sheet /04/ and found OK.
2. Correction has been done in the revised ER sheet /04/ and found OK.
3. Correction has been done in the revised ER sheet /04/ and found OK. The electricity import data is now consistent with the provided invoices /10/. Further the imported data has been rounded up which is conservative and accepted to the verification team.
4. Correction has been done in the revised ER sheet /04/ and found OK. The electricity export data is now consistent with the provided electricity protocols /09/.
Hence this CAR is closed.

CAR ID	07	Section no.	E.6.1	Date: 18/06/2020
Description of CAR				
Verification team as found that two Ex-ante parameters "Total installed power plant capacity in Vietnam" and "Total installed capacity of the solar power plant in Vietnam" are not reported under MR /01/ which are mentioned in the registered PDD /23/.				
Project participant response				Date: 19/06/2020
These ex-ante parameters have been added in the revised MR				
Documentation provided by project participant				
The revised MR				
DOE assessment				Date: 19/06/2020
Correction has been done in the revised MR /02/ and found OK. Hence this CAR is closed.				

CAR ID	08	Section no.	-	Date: 20/06/2020
Description of CAR				
As per para 30 of the applied methodology ACM0002 Version 19, The project proponents that apply simplified procedure to demonstrate additionality shall provide information on actual capital cost of the project activity or the CPA at the time of the first verification however the same is not reported.				
Project participant response				Date: 23/06/2020
The actual investment cost of the project activity has been added in Section A.1 of the revised MR. The actual investment cost are determined based on the signed/ implemented contracts for the project activity, these contracts are attached herewith.				
Documentation provided by project participant				
The revised MR				
DOE assessment				Date: 24/06/2020
Correction has been done under section A.1 of the revised MR /02/ and found OK. Verification team has checked the supportive for the actual capital cost of the project activity /28/ and found OK. Hence this CAR is closed.				

Table 6. FAR from this verification

No FAR raised during this verification.

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>
03.0	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 structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		