Monitoring report form for CDM project activity
(Version 07.0)

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

MONITORING REPORT		
Title of the project activity	70MW Solar Power Plant Project in Ba Ria - Vung Tau, Vietnam	
UNFCCC reference number of the project activity	10524	
Version number of the PDD applicable to this monitoring report	Version 1.7	
Version number of this monitoring report	Version 3.0	
Completion date of this monitoring report	23/11/2020	
Monitoring period number	2nd monitoring period	
Duration of this monitoring period	01/03/2020 - 30/09/2020	
Monitoring report number for this monitoring period	Not applicable	
Project participants	SH Solar Farm Vina Co., Ltd SH Power Co., Ltd	
Host Party	Socialist Republic of Viet Nam	
Applied methodologies and standardized baselines	ACM0002 (Grid-Connected Electricity Generation from Renewable Sources – Version 19.0)	
Sectoral scopes	Sectoral Scope : 01 Energy industries (renewable-/non-renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	-	49,865 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	57,777 tCO_2e	

SECTION A. Description of project activity

A.1. General description of project activity

SH Solar Farm Vina Co., Ltd was founded by South Korean company SH Power Co., Ltd with 100% stake and has installed the Solar Power Plant in Chau Duc Industrial Park, Nghia Thanh, Ba Ria - Vung Tau. SH Solar Farm Vina Co., Ltd also performs as an operation entity of the power plant. SH Power Co., Ltd, private company of the Republic of Korea, participated in the project activity as an investor and a project participant. SH Power Co., Ltd was established by investments from South Korean companies, Soosan Industries Co., Ltd and Halla E&C Co., Ltd.

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. Polycrystalline modules are the most commonly used technology in commercial and industrial solar projects.

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 Location information of project activity is as follows.
- Host Party : Socialist Republic of Viet Nam;
- Exploit the local solar resources effectively;
- Produce clean electricity energy, contributing to environmental protection and reducing the GHG emissions due to fossil fueled electricity production activities;
- Create a motivation to develop similar renewable energy projects in the region;

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.

Total installed capacity of the project is 69.552 MW with the actual total investment cost of 83.85 million USD. The expected 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 tCO_2e annually, 689,815 tCO_2e during the entire first credit period of 7 years.

General contributions to the sustainable development of the country:

- In recent years, Vietnam is facing a serious shortage of electricity due to the inadequate supply of electricity, which has caused negative impacts on the development process for the economy of the whole country as well as the activities of many households on a large scale. This project contributes to balancing the gap between supply and demand.
- The project mitigates dependence on fossil fuel which is running out and reduces the import of fuel for electricity generation.
- The project adopted up-todated technology from Korea, which is highly efficient and thus will encourage and promote the development of renewable energy technology in Vietnam.
- The project provides clean electricity, reducing GHG emissions and also reducing environmental pollution.

Contributions to the sustainable development of the locality:

- The project employed local workers during its construction and also promotes employment of locals for its operation.
- The project contributes to the provincial budget by a significant tax payment.
- The project provides large and stable electricity will contribute to ensure energy security thereby promote industrialization process of the province.

A.2. Location of project activity

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	Lattitude	Longtitude
1	10.578124º North	107.191825º East
2	10.580135º North	107.180151º East
3	10.573212º North	107.185474º East
4	10.584318º North	107.181822º East

The plant location map is shown in the following figure:

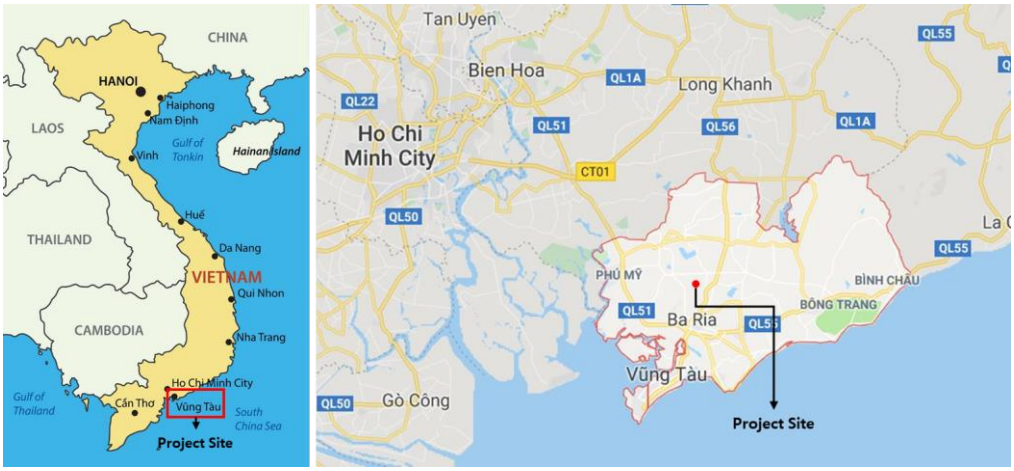

Figure 1. Map of Ba Ria-Vung Tau, Vietnam

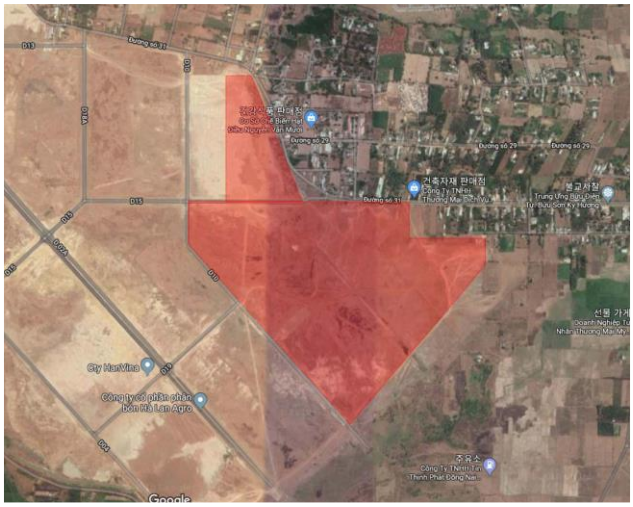

Figure 2. Satellite picture of the project site

A.3. Parties and project participants

Table 2. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Socialist Republic of Viet Nam	Private entity A - SH Solar Farm Vina Co., Ltd	No
Socialist Republic of Viet Nam	Private entity B - SH Power Co., Ltd	No

A.4. References to applied methodologies and standardized baselines

Methodology:

ACM0002 - "Grid-connected electricity production from renewable sources" (version 19.0).

Detailed methodological information are available at:

https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD

Reference tools:

(a) “TOOL01: Tool for the demonstration and assessment of additionality”;

(b) “TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality”;

(c) “TOOL03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion”;

(d) “TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”;

(e) “TOOL07: Tool to calculate the emission factor for an electricity system”;

(f) “TOOL10: Tool to determine the remaining lifetime of equipment”;

(g) “TOOL11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period”.

The tools that accompany the methodology and are referred-to in the methodology, for the purpose of computations and calculations, are as follows.
“Methodological Tool: Tool to calculate the emission factor for an electricity system” (Version 07.0).
Details are available at:
https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

A.5. Crediting period type and duration

Type of crediting period:

Renewable crediting period, First period of crediting

Duration of crediting period:

7 years 0 month

Start date and end date of crediting period:

26/11/2019 (start date) – 25/11/2026 (end date)

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The project uses photovoltaic solar power technology (PV). PV panels generate electricity by converting solar energy, the most abundant renewable energy source, into electricity without consuming fossil fuels and therefore without GHG emissions. Solar PV panels can only generate electricity during the day and electricity output will also vary according to different weather conditions. However, PV panels will produce the maximum amount of electricity in hot days, when demand for electricity increases.

PV panels transform solar radiation into direct current. The panels are connected in series to form a chain to ensure that the voltage is within the inverter's input voltage range. Many parallel strings form a group to match the inverter's capacity. The inverter connected to each group will convert direct current (DC) into alternating current (AC). The post-converted power is supercharged to 110kV using transformers and exported to the Vietnamese national grid via load lines and electricity metering systems.

The lifetime of main device, PV panels, is 25 years according to manufacturer’s information. The PV panels are fixed on the support frame, the angle of tilt for installation of PV panels is about 10 degrees southward, distances between the ranges is 0.9 meters.

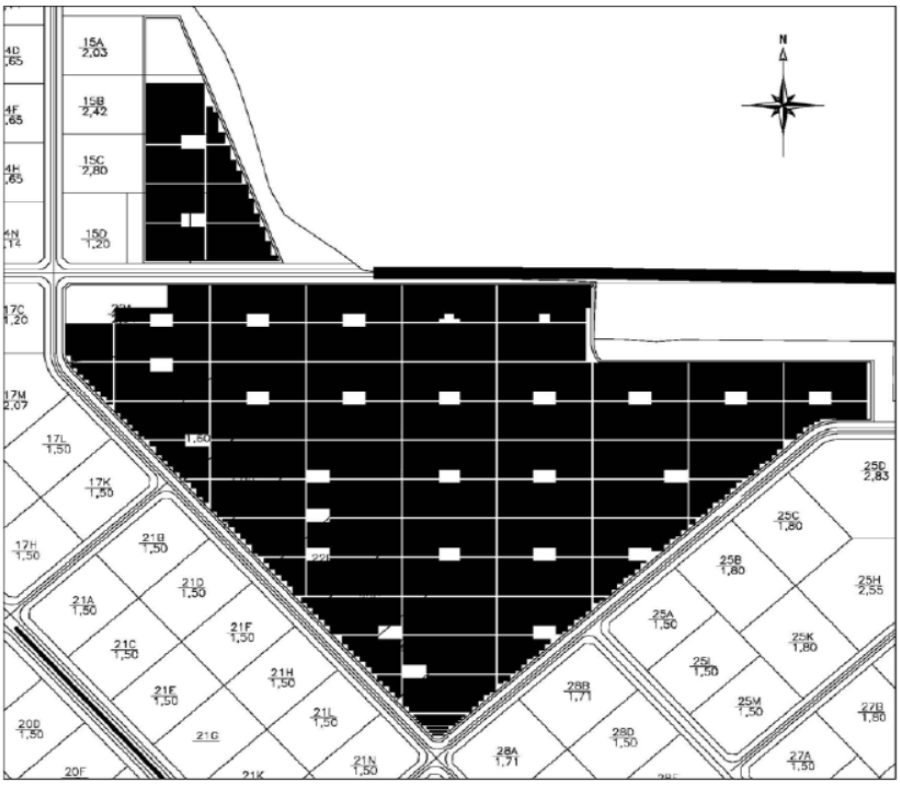

Figure 3. Layout of PV panels

Main Equipment in Power Plant

- PV panels: Used to convert energy from solar radiation to electrical energy; rated power of photovoltaic panels at standard conditions is 345W; conversion efficiency of PV panel is over 17.8 %;
- Inverter equipment: Used to convert DC power to AC power; 3 phases, central type, capacity of 625 kW/machine; Maximum input voltage is 1000 VDC, output voltage is about 340V AC.

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

Table 3. 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 mm2
	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 EA. Therefore, total installed capacity is 69.552 MW.

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

Table 4. 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 history of this project is described in the following table:

Table 5. History of project activity

Date	Milestone	Document
17/04/2018	Feasibility Study Report submission to Vietnam Government	Feasibility Study Report
04/05/2018	Local stakeholder consultation	Environmental Impact Assessment Report
23/05/2018	Consideration of CDM benefit	PP Minutes of Board Meeting
01/06/2018	Environmental Impact Assessment Report submission to Vietnam Government	Environmental Impact Assessment Report
25/07/2018	Approval of Feasibility Study verification result	Announcement of basic design verification results of this project(Vietnam Government)
27/07/2018	Approval of Environmental Impact Assessment Report	Approval document of Environmental Impact Assessment Report(Vietnam Government)
27/09/2018	Signed contract for construction	Contract for Construction
19/10/2018 (Start date of project activity)	Purchase of the Photovoltaic Modules	Photovoltaic Module Master Supply Agreement

28/02/2019	Prior Consideration Form submitted to the host country and UNFCCC	Submission of Prior Consideration Form
28/02/2019	Confirmation from Vietnamese DNA	Email regarding publication of project information for prior consideration of the CDM.
01/03/2019	Confirmation from UNFCCC	Email regarding publication of project information for prior consideration of the CDM.
26/06/2019	Commercial generation date of project activity	
26/11/2019 (Registration date)	Start date of crediting period, first period of crediting	

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

Not applicable

B.2.2. Corrections

Not applicable

B.2.3. 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.

B.2.4. Inclusion of monitoring plan

Not applicable

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

Not applicable

B.2.6. Changes to project design

Not applicable

B.2.7. Changes specific to afforestation or reforestation project activity

Not applicable

SECTION C. Description of monitoring system

The proposed project activity monitoring plan complies with the methodology ACM0002 (version 19.0), whereby it is stated that:
As per methodology ACM0002 (version 19.0) provisions for record handling, all data collected as part of monitoring is archived electronically and kept at least for 2 years after the end of the last crediting period.
All measurements are conducted with calibrated measurement equipment according to relevant industry standards. Indeed, the quantity of net electricity generation supplied by the project plant to the grid is reliably monitored through calibrated electricity meters and cross-checked with sales records as part of quality assurance/quality control measures on top.

The monitoring plan, which is implemented by the project participants describe about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.
The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participants. The following structure is proposed for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:

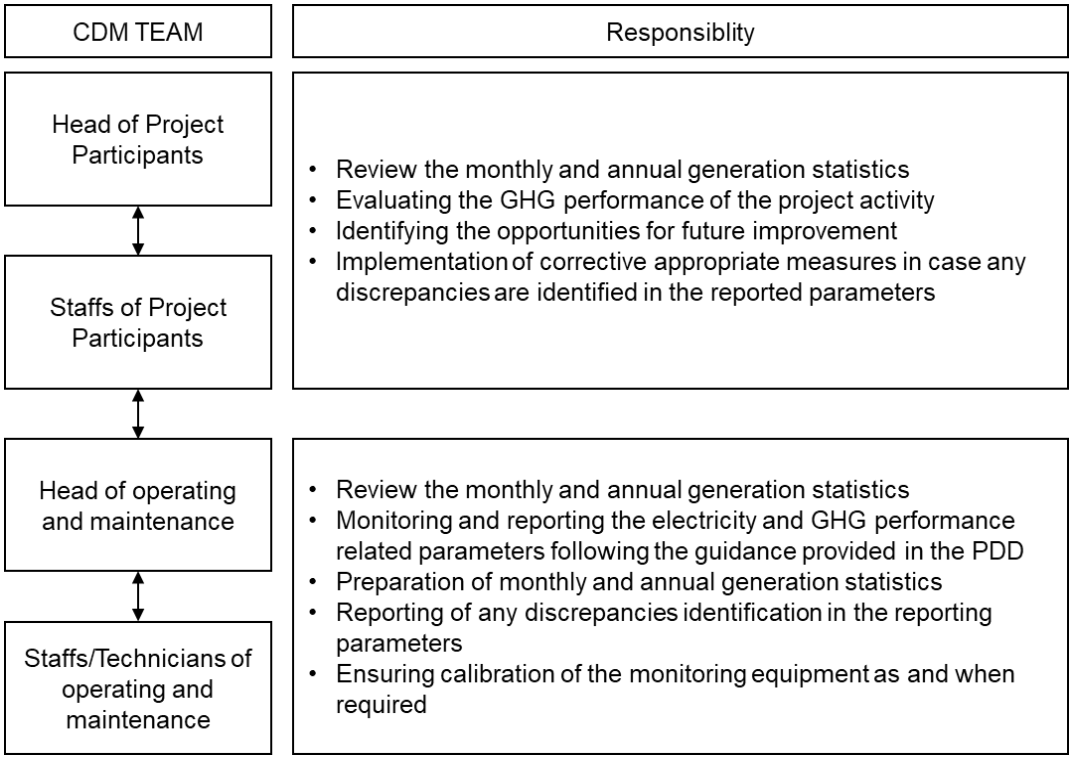

Figure 4. Organizational chart

Data Measurement
The export and import electricity are measured continuously using meters. Based on the article 3. Connection, metering and operation of the power plant of "Power Purchase Agreement" with EVN, readings of meters shall be taken on monthly basis by officer of PP. The metered data can be cross checked with other suitable data source (like daily generation report).

Data collection and archiving
Export and Import data would be recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of CERs for the project activity whichever occurs later.

Emergency preparedness
The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

Personnel training
In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staffs have been trained. The plant helpers have been trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.
In case of mismatch between billing period cycle and monitoring period cycle, the daily generation electricity data will be used to calculate the electricity for specific period.

The metering and data collection system have been installed and used to monitor the parameters including (1) Power output of the project exported to the Vietnamese national grid during the year y ($EG_{export,y}$) and (2) The amount of electricity the plant imported from the Vietnamese national grid in the year y ($EG_{import,y}$). Net electricity of the plant is exported to the Vietnamese national grid during the year y ($EG_{PJ,y}$) using for calculating baseline emissions, calculated according to the following formula:

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

Electricity metering systems including main metering system and backup metering system were installed according to "Technical design agreement of electricity metering system and data collection and measurement system of solar power plant Chau Duc industrial zone", No.3086/EPTC-KT&CNTT-KDBD dated August 21, 2018 between the Electricity Trading Company -Vietnam Electricity Corporation and SH Solar Farm Vina Co., Ltd. and in accordance with the electricity metering regulation.

Ⅰ. Measurement location and the monitoring equipment

- Main measurement location: at the extended 110kV outgoing compartment of 110kV Chau Duc substation connected to solar power plan in Chau Duc industrial zone;
- Backup measurement location: at the extended 110kV outgoing compartment of 110kV Chau Duc substation connected to solar power plant in Chau Duc industrial zone, adjacent to the main measurement location;
- Measurement location serving output separation: at the 22kV outgoing compartments of 110kV substation of SPP in Chau Duc IP connected to solar cell clusters.

The monitoring diagram of the project activity is shown in the below figure:

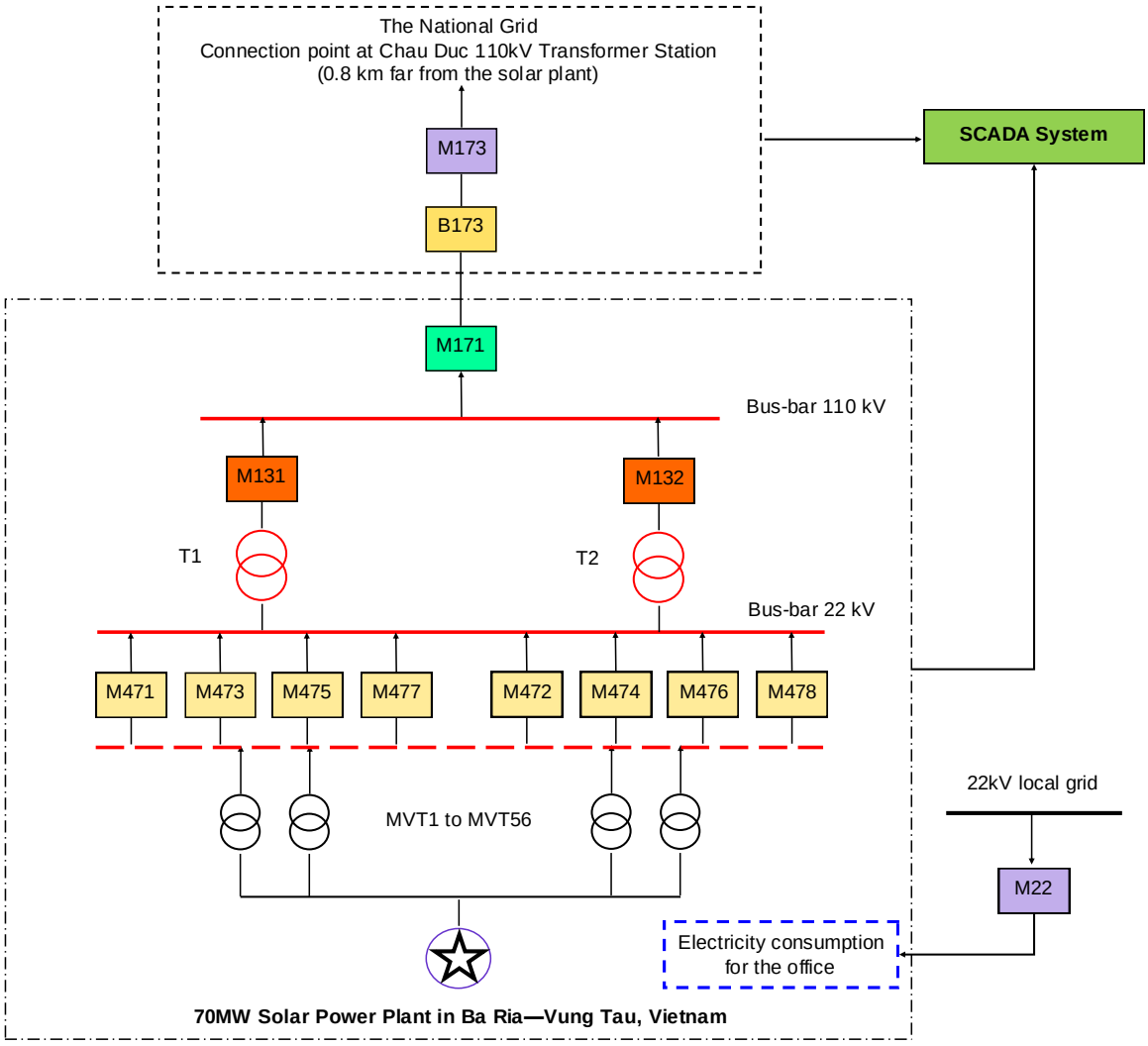

Figure 5. Monitoring System

Where:

- M173: The main electricity meter
- B173: The first backup electricity meter
- M171, M131, M132: The second backup electricity meters
- M471 to M478: The meters to separate electricity generated by each PV group. These meters are used to operate the solar power plant.
- T1, T2: Main transformers
- MVT1 to MVT56: 56 medium voltage transformers (22kV)
- All above meters are collected to Supervisory Control and Data Acquisition (SCADA) system
- M22: The meter to measure electricity consumption for the office of the solar plant.

Ⅱ. Electricity meter and inspection/ calibration requirements

The main metering system uses 3-phase 4-wire electricity meter, Elster-A1700, rated voltage 3x63.5/110V, rated current 3x1 (1,2) A, exactly 0.2s for Active capacity and 2.0 for reactive power.

Measurement system for backup and measuring system for separating output using electricity meter 3 phase 4 wire, Elster-A1700, rated voltage 3x58/100-240/415V, line Rated power 3x1(1,2) A, exactly 0.5s for active power and 2.0 for reactive power.

Auxiliary equipment and features that meet the conditions of remote data acquisition and data transfer system are located at the measurement data management unit.

Electricity meters before installation at the measurement location have been verified and sealed. Periodic inspection of meters is implemented every 2 years according to the law. The inspection and verification of measuring and counting equipment must be approved by the accredited device testing organization and agreed by EVN and the Project participants; must comply with state inspection procedures. The measuring and counting equipment must be sealed and leaded after inspection.

Ⅲ. Method of measuring the export and import of electricity

On the first day of the month, the legal representative of EVN and the Project participants will jointly close the meter readings and make a report certifying the meter readings at 0:00 on the first day of the month and quantity of electricity power export and import of the previous month.

Power output delivered between EVN and project participants is determined based on the main metering system. In case the main metering system is in trouble or inspection results show that the main metering system has a higher error level than the specified level, the power output delivered between the two parties during the measurement system The main count is in trouble or has errors exceeding the regulations determined by the following principles:

- Using the backup measurement system's results to determine the delivery power output.
- In case the backup metering system suffers a problem or the inspection results show that the backup measurement system has errors exceeding the permitted level, the delivered power output will be determined according to a reasonable agreement between EVN and project participants based on historical power delivery data, current status of measuring equipment and collected data. Details are specified in the power sale and purchase contract.

Ⅳ. Etc

All data collected as part of monitoring are archived electronically and are kept at least for 2 years after the end of the last crediting period.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**$EF_{grid,BM,y}$**
Unit	tCO_2/MWh
Description	Build margin CO_2 emission factor of Vietnamese national grid in year y
Source of data	Department of Climate Change, Ministry of Natural Resources and Environment, Official Letter No. 330/CC CC-GNPT on 29 March 2019 subject "Vietnam grid emission factor 2017"
Value(s) applied	0.8961 tCO_2/MWh

Choice of data or measurement methods and procedures	Calculated and published by the Department of Climate Change, applying the "Tool to calculate the emission factor for and electricity system" - version 07.0
Purpose of data/parameter	To calculate combined margin CO_2 emission factor ($EF_{grid,CM,y}$) of Vietnamese national grid
Additional comments	

Data/Parameter	$EF_{grid,OM,y}$
Unit	tCO_2/MWh
Description	Operating margin CO_2 emission factor of Vietnamese national grid in year y
Source of data	Department of Climate Change, Ministry of Natural Resources and Environment, Official Letter No. 330/BDKH-GNPT on 29 March 2019 subject "Vietnam grid emission factor 2017"
Value(s) applied	0.8336 tCO_2/MWh
Choice of data or measurement methods and procedures	Calculated and published by the Department of Climate Change, applying the "Tool to calculate the emission factor for an electricity system" - version 07.0
Purpose of data/parameter	To calculate combined margin CO_2 emission factor ($EF_{grid,CM,y}$) of Vietnamese national grid
Additional comments	

Data/Parameter	$EF_{CO2,grid,y} = EF_{grid,CM,y}$
Unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor of Vietnamese national grid applying for solar power plant in year y
Source of data	Department of Climate Change, applying for solar power plant according to the "Tool to calculate emission factor for an electricity system" - version 07.0
Value(s) applied	0.8492 tCO_2/MWh
Choice of data or measurement methods and procedures	Calculate using $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ published by Department of Climate Change and w_{OM}, w_{BM} with value of 0.75 and 0.25 for solar power plant project
Purpose of data/parameter	To calculate baseline emission
Additional comments	

Data/Parameter	**Total installed power plant capacity in Vietnam**
Unit	MW
Description	Total installed power plant capacity in the host country
Source of data	Vietnam electricity annual report 2017 (published by Vietnam Electricity - EVN)
Value(s) applied	42,135
Choice of data or measurement methods and procedures	EVN publishes annual statistics on electricity of Vietnam. In 2018, total installed electricity capacity statistics of Vietnam are used.
Purpose of data/parameter	To demonstrate additionality
Additional comments	

Data/Parameter	**Total installed capacity of the solar power plant in Vietnam**
Unit	MW
Description	Total installed capacity of the solar power plant in the host country
Source of data	Renewable energy statistics 2019 (published by IRENA – International Renewable Energy Agency)
Value(s) applied	106
Choice of data or measurement methods and procedures	IRENA publishes annual statistics on renewable energy in different countries around the world. In 2018, solar photovoltaic capacity statistics of Vietnam are used
Purpose of data/parameter	To demonstrate additionality
Additional comments	

D.2. Data and parameters monitored

<table>
<tr><td>Data/Parameter</td><td>$EG_{PJ,y}$</td></tr>
<tr><td>Unit</td><td>MWh/year</td></tr>
<tr><td>Description</td><td>Quantity of net electricity generation supplied by the project plant/unit to the grid in year (y) in MWh</td></tr>
<tr><td>Measured/calculated/ default</td><td>Measured and calculated</td></tr>
<tr><td>Source of data</td><td>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 $EG_{import,y}$</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>58,721 MWh</td></tr>
<tr><td>Monitoring equipment</td><td>Electricity generated would be measured and monitored by the electricity meters on a continuous basis and readings will be taken every month for billing to the power purchaser. The data would also be monitored using SCADA system.
The details of main and first backup electricity meters are shown as follows:
<table>
<tr><td>Item</td><td>Main meter 173</td><td>First backup meter 173</td></tr>
<tr><td>Serial No.</td><td>19030121</td><td>17025033</td></tr>
<tr><td>Type</td><td colspan="2">Elster A1700</td></tr>
<tr><td>Accuracy</td><td>0.2s</td><td>0.5s</td></tr>
<tr><td>Date of last calibration</td><td>14/05/2019</td><td>14/05/2019</td></tr>
<tr><td>Calibration standard</td><td colspan="2">DLVN 39:2012</td></tr>
<tr><td>Valid until</td><td>13/05/2021</td><td>13/05/2021</td></tr>
<tr><td>Calibration entity</td><td colspan="2">Southern Electrical Testing Company</td></tr>
<tr><td>Calibration frequency</td><td colspan="2">At least every two years</td></tr>
</table>
The details of second backup electricity meters are shown as follows:
<table>
<tr><td>Item</td><td>Second backup meter 171</td><td>Second backup meter 131</td><td>Second backup meter 132</td></tr>
<tr><td>Serial No.</td><td>17025030</td><td>17025032</td><td>17025031</td></tr>
<tr><td>Type</td><td colspan="3">Elster A1700</td></tr>
<tr><td>Accuracy</td><td>0.5s</td><td>0.5s</td><td>0.5s</td></tr>
<tr><td>Date of last calibration</td><td>14/05/2019</td><td>14/05/2019</td><td>14/05/2019</td></tr>
<tr><td>Calibration standard</td><td colspan="3">DLVN 39:2012</td></tr>
<tr><td>Valid until</td><td>13/05/2021</td><td>13/05/2021</td><td>13/05/2021</td></tr>
<tr><td>Calibration entity</td><td colspan="3">Southern Electrical Testing Company</td></tr>
<tr><td>Calibration frequency</td><td colspan="3">At least every two years</td></tr>
</table>
The details of meter to measure electricity imported for the office:
<table>
<tr><td>Item</td><td>Import meter from 22kV grid for the office</td></tr>
<tr><td>Serial No.</td><td>18086121</td></tr>
<tr><td>Type</td><td>Elster A1700</td></tr>
<tr><td>Accuracy</td><td>0.5s</td></tr>
<tr><td>Date of last calibration</td><td>05/03/2019</td></tr>
<tr><td>Calibration standard</td><td>DLVN 39:2012</td></tr>
<tr><td>Valid until</td><td>04/03/2021</td></tr>
<tr><td>Calibration entity</td><td>Southern Electrical Testing Company</td></tr>
<tr><td>Calibration frequency</td><td>At least every two years</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuously measurement by electricity meters and monthly recording</td></tr>
</table>

Calculation method (if applicable)	The difference of export *($EG_{export,y}$)* and import *($EG_{import,y}$)* of the project activity is used for calculation of net electricity supplied to the grid by the project activity and same value will be considered for $EG_{PJ,y}$ calculations. $EG_{PJ,y} = EG_{export,y} – EG_{import,y}$
QA/QC procedures	Electricity meters will be calibrated periodically per 2 years according to national standards and regulations. The data on electricity output will be cross-checked using the invoices billed to the Electricity Power Trading Company (EVN-EPTC) for payment.
Purpose of data/parameter	Calculation of Certified Emission Reduction (CER) units
Additional comments	

D.3. Implementation of sampling plan

The data would not be collected through sampling. It will be monitored and recorded continuously by the installed electricity meter.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

According to the methodology ACM0002 (version 19.0), for project activities including the installation of a renewable energy plant, baseline emissions only include CO_2 emissions from the amount of electricity provided by the fossil fuel power plants that will be replaced by project activities. This methodology assumes that the production power of all projects in the baseline will be generated by existing grid-connected power plants and the addition of new grid-connected power plants.

Baseline emissions are calculated as follows:

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

In which:

BE_y	=	Baseline emissions in year y (tCO_2/yr)
$EG_{PJ,y}$	=	Quantity of net electricity genenration that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year y (tCO_2/MWh)

Calculation of net electricity by project activity $EG_{PJ,y}$

The process for the calculation of $EG_{PJ,y}$ varies across different types of project activities. If the project activity is the installation of a Greenfield power plant, then:

$$EG_{PJ,y} = EG_{facility,y}$$

In which:

$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project

activity in year y (MWh/yr)

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

Calculation emission factors of the Vietnamese national grid $EF_{grid,CM,y}$

For solar power plants, emission factors are calculated using:

- Most updated national data: Data on Vietnamese national grid emission factors published by Vietnam DNA, Department of Climate Change, Ministry of Natural Resources and Environment with official letter No. 330/BDKH-GNPT on 29 March 2019 on "Vietnam grid emission factor 2017"
- The most updated emission factor calculation tool: Version 07.0 of the "Tool to calculate emission factor for an electricity system"

Emission factor of Vietnamese national grid is calculated and published by Vietnam DNA, Department of Climate Change, Ministry of Natural Resources and Environment (Official Dispatch No. 330/CC-GNPT dated 29 March 2019), including:

Operating margin emission factor: $EF_{grid,OM,y}$ = 0.8336 tCO_2/MWh; and

Build margin emission factor: $EF_{grid,BM,y}$ = 0.8961 tCO_2/MWh

The combined margin emissions factor is calculated as follows:

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

In which:

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor of Vietnamese national grid in year y (tCO_2/MWh)

$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor of Vietnamese national grid in year y (tCO_2/MWh)

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

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor of Vietnamese national grid in year y (tCO_2/MWh)

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

However, the report of the DNA of Vietnam applying the weighting of margin emission factor and build margin emission factor is 0.5, this weighting is not applicable to solar power plants. According to version 07.0 of the "Tool to calculate the emission factor for an electricity system", the following default weights are applied to solar power plants:

$$w_{OM} = 0.75 \text{ and } w_{BM} = 0.25$$

Therefore, the combined margin emissions factor for solar power plants are calculated as follows:

$$\mathbf{EF_{grid,CM,y} = 0.75 \times 0.8336 + 0.25 \times 0.8961 = 0.8492} \ (tCO_2/MWh)$$

From the combination of values for $EG_{PJ,y}$ and $EF_{grid,CM,y}$, the baseline emissions (BE_y) during this monitoring period are calculated as follows:

$$BE_y = 58{,}721 \text{ MWh} \times 0.8492 \text{ tCO}_2\text{/MWh} = 49{,}865 \text{ (tCO}_2\text{)}$$

E.2. Calculation of project emissions or actual net removals

According to the methodology ACM0002 (version 19.0), the proposed project is a solar power plant with photovoltaic technology that does not use fossil fuels. Therefore, project emissions are considered zero.

$$PE_y = 0$$

E.3. Calculation of leakage emissions

No leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected.

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	49,865	0	0	0	49,865	49,865

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
49,865	57,777

E.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the PDD"

This monitoring period covers from 01/03/2020 to 30/09/2020 (first and last days included) – total 214 days.

According to the registered PDD, version 1.7, dated 17/01/2020, amount estimated ex ante for one year – 365 days is 98,545 tCO_2e.

The amount estimated ex ante for this monitoring period in the PDD is calculated as follows:

98,545 / 365 * 214 = 57,777 tCO_2e.

E.6. Remarks on increase in achieved emission reductions

The actual net amount of reductions in this monitoring period (01/03/2020 to 30/09/2020, start date and end date included) is 49,865 tCO_2e, which is 13.7% less than the estimated amount in the registered PDD of 57,777 tCO_2e, no justification is required.

E.7. Remarks on scale of small-scale project activity

Not applicable

Document information

Version	*Date*	*Description*
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

Version	*Date*	*Description*

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: monitoring report