



**Verification and certification report form for  
CDM project activities  
(Version 02.1)**

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

**BASIC INFORMATION**

<b>Title and UNFCCC reference number of the project activity</b>	5 MW Thap Sakae Photovoltaic Solar Cell Power Plant Project, Thailand / Reference Number 10194
<b>Version number of the verification and certification report</b>	02.1
<b>Completion date of the verification and certification report</b>	01/02/2018
<b>Monitoring period number and duration of this monitoring period</b>	1 <sup>st</sup> Monitoring period / Duration 01/08/2016 – 31/03/2017 (first and last days are included)
<b>Version number of the monitoring report to which this report applies</b>	06.0
<b>Crediting period of the project activity corresponding to this monitoring period</b>	Fixed crediting period start date : 01/08/2016 length : 10 years 0 month
<b>Project participants</b>	Electricity Generating Authority of Thailand (EGAT)
<b>Host Party</b>	Thailand
<b>Applied methodologies and standardized baselines</b>	AMS-I.D : Grid connected renewable electricity generation, Version 18
<b>Mandatory sectoral scopes linked to the applied methodologies</b>	Sectoral Scope 01
<b>Conditional sectoral scope(s) linked to the applied methodologies</b>	Not Applicable
<b>Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD</b>	2,412 tCO <sub>2e</sub>
<b>Certified amount of GHG emission reductions or GHG removals for this monitoring period</b>	1,788 tCO <sub>2e</sub>
<b>Name and UNFCCC reference number of the DOE</b>	Bureau Veritas (India) Pvt Ltd/ E-0009.
<b>Name, position and signature of the approver of the verification and certification report</b>	 Rajenda Sharma Global Accreditation Manager

**SECTION A. Executive summary**

>> Bureau Veritas India (refer as “BVI” after this onward) has conducted the periodic verification of 5MW Thap Sakae Photovoltaic Solar Cell Power Plant Project, Thailand, CDM Registration Reference Number 10194 (herein refer as “the Project” after this onward), owned by Electricity Generating Authority of Thailand (EGAT), which is located at Thap Sakae District, Prachauap Khiri Khan Province, Thailand. This project aims to generate electricity by utilizing solar energy and to reduce the greenhouse gas (GHG) emission by displacing equivalent amount of electricity from carbon intensive the national grid. The project is applying the methodology AMS-I.D version 18 (Grid connected renewable electricity generation), and the verification process had been conducted on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions, and consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) onsite inspection and follow-up interviews with project owners; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using BVI internal procedures.

In summary, BVI confirms that the main Solar PVs of the project are implemented since from 24/08/2016 as described in the registered project design documents (PDD) and validation report but there is change in some type of Solar PV installed at the project site as compared to stated in the registered documents. These changes have been addressed by verification team in Post-registration Change Validation report. The Installed equipment being essential for achieving emission reduction, run reliably and are calibrated appropriately. The monitoring system is in place and the project is achieving emission reductions according to the plan. The GHG emission reductions are calculated without material misstatements, and the emission reductions verified totalize 1,788 tons of CO<sub>2</sub>e for this monitoring period of 01/08/2016 to 31/03/2017 first and last day included.

Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the valid and registered project baseline, approved monitoring plan and its associated documents.

Reporting period:	01/08/2016 to 31/03/2017 (first and last day included)
Baseline emissions:	1,788 t CO <sub>2</sub> equivalents.
Project emissions:	0 t CO <sub>2</sub> equivalents.
Leakage emissions:	0 t CO <sub>2</sub> equivalents.
Emission Reductions:	1,788 t CO <sub>2</sub> equivalents.

**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 review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	SRIPRAPARKORN	Chumpol	BV Thailand	x	x	x	x

**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 & Approver	IR	PEDNEKAR	Sapana	Bureau Veritas (India) Pvt Ltd

**SECTION C. Application of materiality**

With reference to Guideline on Application of Materiality in Verification, EB69 annex 6, it's defined by guideline that materiality threshold for project activities achieving a total emission reduction or removal for small-scale project shall be 5 percent (5%).

Given that this project is small-scale project activity, so verification team applied 5% materiality threshold as main criteria for conducting verification during this process.

**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.	Risk of human error in transferring monitoring data from automatic data logged (primary sources) to calculation spreadsheet (secondary sources). This including transferring of data for these parameter <ul style="list-style-type: none"> <li>EG<sub>PJ,facility,y</sub></li> <li>EG<sub>PJ,export,y</sub></li> <li>EG<sub>PJ,import,y</sub></li> </ul>	Medium	Giving that calculation spreadsheet contains numerous of figures from various monitoring parameters, there are possibilities that staff and/or consultant may mistakenly transfer wrong figures to calculation spreadsheet.	Cross-checking data used in calculation spreadsheet against primary sources (e.g., power delivery report, electricity bill from PEA etc.) at the project site.
2.	Human error in providing incorrect calculation formulae in calculation spreadsheet	High	The calculation spreadsheet is complex combined with complicated formulation, there are possibility that staff and/or consultant may developed incorrect formulae and/or inserted mistaken formulation linkage, resulting in error at the end of calculation result	Conducting calculation formulae check at stage of document review prior to onsite inspection covering these calculations <ul style="list-style-type: none"> <li>Baseline Emission</li> <li>Project Emission</li> <li>Total Emission Reduction</li> </ul>
3.	Error due to delay of	Medium	Verification team consider	Conduct cross-checking with

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	
	calibration on monitoring equipment		that there is possibility that some monitoring equipment may have calibration delay that leading to error of monitoring parameters.	latest certification of calibration against calibration plan defined in registered PDD and monitoring plan for these following equipment <ul style="list-style-type: none"> <li>Electricity meter (EG<sub>PJ,export &amp; import, y</sub>)</li> </ul>

## C.2. Consideration of materiality in conducting the verification

>> During onsite inspection 31/08/2017, verification team had cross-checked data provided in ER calculation against primary data sources (e.g. electricity delivery report, internal file on intranet, etc.) and found that there are well agreement of data among two sources of data (i.e., ER calculation sheet and primary sources). In this sense, verification team had considered its level materiality and conducted the sampling as per following.

Parameter	Sampling Plan (at least $\sqrt{n}$ of total data)	Error/Omission/Misrepresentation Found	Consideration of 5% Materiality Threshold (among total ER)	Actual Sampling Plan/ or Adjusted sampling plan
EG <sub>PJ,facility,y</sub>	Random 3 months	NO	n/a	All <b>8 months</b> had been checked found no inconsistency.
EG <sub>PJ,export,y</sub>	Random 3 months	NO	n/a	All <b>8 months</b> had been checked found no inconsistency.
EG <sub>PJ,import,y</sub>	Random 3 months	NO	n/a	All <b>8 months</b> had been checked found no inconsistency.

## SECTION D. Means of verification

### D.1. Desk/document review

>> The assessment of the project documentation provided by the project participant (PP) is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the in the first version 01 of monitoring report published for Global Stakeholder Consultation (GSC) dated on 17/07/2017 /01/ and its later revisions. The final monitoring report (MR) version 06 dated 19/01/2018 /02/ and emission reduction calculation spreadsheet dated 29/06/2017 /03/ had been reviewed and being referred as latest approved versions in this verification report. Qualitative information comprises information on internal management controls, calculation procedures, and procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

The monitoring report version 01 /01/submitted by the project participant was published on the UNFCCC-CDM web site on 17/07/2017 and thus, was available in the public domain.

In addition to the monitoring documentation provided by the project participants, the Bureau Veritas reviewed:

- The registered PDD and the monitoring plan /04/ ;
- The validation report /05/
- The applied monitoring methodology (i.e., AMS-I.D. version 18.0) /06/;

### D.2. On-site inspection

The onsite inspection had been conducted on 31/08/2017 at location of project site. This following table provides detail on activities performed onsite.

Duration of on-site inspection: 31/08/2017				
No.	Activity performed on-site	Site location	Date	Team member
1.	Inspection of Photovoltaic Module <ul style="list-style-type: none"> <li>Crystalline Silicon</li> <li>Amorphous Silicon</li> <li>Copper Indium (Gallium) Di-Selenide</li> <li>Micro Crystalline Amorphous Silicon</li> </ul>	Prachuap Khiri khan	31/08/2017	Chumpol
2.	Inspection of Inverter and Transformer	Prachuap Khiri khan	31/08/2017	Chumpol
3.	Inspection of Main & Backup electricity meter supplied/imported to/from the grid	Prachuap Khiri khan	31/08/2017	Chumpol
4.	Interview with related staffs regarding monitoring activities	Prachuap Khiri khan	31/08/2017	Chumpol

### D.3. Interviews

Following table provides list of in-person interviewee and verification team member who conducted interview session.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kunawanakit	Waraporn	EGAT	31/08/2017	Monitoring Data, Project Implementation	Chumpol
2.	Utthajak	Nutdanai	EGAT	31/08/2017	Monitoring Data	Chumpol
3.	Thongsa-ard	Chaiyanun	EGAT	31/08/2017	Monitoring Data	Chumpol
4.	Fahlert	Jetsada	AEP (consultant)	31/08/2017	Monitoring Data	Chumpol
5.	Surat	Benjawan	AEP (consultant)	31/08/2017	Monitoring Data	Chumpol

### D.4. Sampling approach

>> Giving that registered PDD didn't specify any sampling approach but all monitoring parameters are subject to be verified by verifier during verification process. In this sense, at stage of onsite inspection (31/08/2017), verification team prepared sampling plan to verify accuracy and consistency of data provided in ER calculation spreadsheet against primary data sources (e.g., electricity delivery report, internal file stored in intranet, electricity bill, etc.), as per following detail

Parameters	Sampling approach
EG <sub>PJ,facility,y</sub>	Randomly sampling <u>at least</u> square root of total number = <b>3 months</b>
EG <sub>PJ,export,y</sub>	Randomly sampling <u>at least</u> square root of total number = <b>3 months</b>
EG <sub>PJ,import,y</sub>	Randomly sampling <u>at least</u> square root of total number = <b>3 months</b>

However, because of number of data and time-spending were suitable for verification team to perform better data sampling, verification team had sampled more data than earlier proposed as detail provided in section C.2 above.

### 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	-	1	-
Compliance of the project implementation and operation with the registered PDD	-	2	-
Post-registration changes	2	1	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	1	-
Assessment of data and calculation of emission reductions or net removals	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
<b>Total</b>	<b>2</b>	<b>5</b>	-

## SECTION E. Verification findings

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

<b>Means of verification</b>	<p>Verification team conducted document review on these following document to verify whether monitoring report is compliance with monitoring report form</p> <ul style="list-style-type: none"> <li>Monitoring report (MR) version 01, dated 29/06/2017 (published for GSC) /01/ and its later revision</li> <li>Monitoring report form version 06.0 /07/</li> </ul>
<b>Findings</b>	<p>It's found that monitoring report and its later revision are compliance with the latest available of monitoring report form published on UNFCCC website. In addition, detail provided in this MR is in line with instruction therein.</p> <p>However, as per indication of methodology and tools applied for the project in section A.4 of MR version 01 dated 29/06/2017, it's found that there is no reference to UNFCCC website with referencing to methodologies and tools applied for the project. Verification team decided to raise CAR02 for further correction. See trail of verification process in appendix 4 to this report.</p> <p>In response to this, PPs had provided UNFCCC web-link referring to AMS-I.D in the next revision of MR. This is accepted and this CAR is closed.</p>
<b>Conclusion</b>	It's confirmation from verification team that monitoring report is compliance with relevant form and instruction therein.

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

>> With reference to validation report /05/, there is no remaining FAR from previous validation.

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

Means of verification	Verification team conducted onsite inspection to investigate project implementation on 31/08/2017 at project site location, then compared against detail of project provided in registered PDD /04/ and the first GSC version of MR /01/ on these following area/system; <ul style="list-style-type: none"><li>- Control room</li><li>- Solar PV module (Crystalline Silicon, Amorphous Silicon, Copper Indium Di-Selenide, Micro Crystalline Amorphous Silicon)</li><li>- Inverter</li><li>- Transformer</li><li>- Main &amp; Backup electricity meters</li></ul>		
Findings	As result of onsite inspection, verification team found these findings; <u>Solar PV module</u> During onsite visit, verification team had inspected name plate of each PV module at the site, totally 4 modules, and found these following;		
	PV Module	Electricity (Watt) generated per cell	Finding
	1) Crystalline Silicon : c-Si	250	It's found at name plate at the back of each

2) Amorphous Silicon : a-Si	65	module, which are showing same electricity (Watt) generated per panel as indicated in registered PDD.
3) Copper Indium (Gallium) Di-Selenide CI(G)S	115	
4) Micro Crystalline / Amorphous Silicon	130	

Because it's not possible to count every solar panel, verification team request As-built single line diagram /10/ showing final solar PV installation located at the site and found these quantity of each modules as per following;

- Crystalline Silicon : c-Si = 5,016 cells
- Amorphous Silicon : a-Si = 40,000 cells
- Copper Indium (Gallium) Di-Selenide CI(G)S = 10,880 cells
- Micro Crystalline / Amorphous Silicon = 9,792 cells

It's found that number of cells for Crystalline silicon is changed from 5,040 as stated in registered PDD to 5,016 in this final installation at the site. Verification team had raised CL01 for further clarification. At the end of verification, PPs decided to declare this change in revised MR as "Change to Project Design" and verification team agreed on this. See the next section for detail on how verification team verified this area.

#### **Inverter**

During onsite visit, verification team able to inspect Inverter (SUNGROW), 630 KW for all 5 units. It's confirmed that 5 Inverters having the same specification with registered PDD had been installed and operated in the site.

#### **Transformer**

It's confirmed that verification team had inspected 6 transformers installed and been operating in the site with these following specification;

Transformer Capacity	Quantity	Output/Input	Serial number found at the site
1,250 KVA	5	22 KV/315 V	58129274EE
200 KVA	1	22 KV/400 V	58129264EE

#### **Main & Backup electricity meters**

For electricity Generation (EG), there are two meters installed for the Project.

The main meter was installed at control room to measure the electricity exported to and imported from the grid by the Project (two-directions meter).

There is another backup meter installed at the main entrance of the project boundary. This is back up meter to measure the electricity imported from the grid initially owned by Provincial Electricity Authority (PEA) but now changed and owned by PPs. This is permanent change to the registered monitoring plan and PPs declares this change in section B.2.5. of final version of MR. Please see validation opinion for post-registration change in section below and PRCV report. The electricity data from these two meters is sending to data logger stores at intranet data collection system or DCS system at frequency of 15-minute and 30-minute for main and backup meter, respectively.

It's confirmed that all electricity meters had been appropriately installed and implemented as indication in registered PDD.

During onsite visit, verification team witnessed the installation and operation for these electricity meters

Electricity Meter	Serial Number	Verification Team Finding
Main Export & Import Meter (two-direction meter)	50743276	It's found that this meter had been installed and working properly since the first day of this monitoring period 01/08/2016 until 16/01/2017. It's confirmed that

			this meter was replaced by new meter S/N 50074511 below on date 16/01/2017.
		50074511	This is new meter replacing old meter above, this replacement had been completed on date 16/01/2017. There is no gap of monitoring during the day of meter replacement.
	<i>Backup Export &amp; Import Meter (two-direction meter)</i>	50743277	It's found that this meter had been installed and working properly since the first day of this monitoring period 01/08/2016 until 16/01/2017. It's confirmed that this meter was replaced by new meter S/N 50074512 below on date 16/01/2017.
		50074512	This is new meter replacing old meter above, this replacement had been completed on date 16/01/2017. There is no gap of monitoring during the day of meter replacement.
<p>However, verification team noticed that accuracy class of electricity meter for monitoring of electricity imported is not the same accuracy class with detail provided in registered PDD. Therefore, verification team raised CL02 for PPs clarification. At the end of verification, PPs decides to declare this change in next revision MR and verification team agreed on that. See detail on how verification team verified this change in the next section.</p> <p><b><u>Management and Operation</u></b></p> <p>The PP has operated the Project since from 24/08/2016 /08/ as per the registered PDD. This is in line with power operation license from department of Energy /09/. The monitoring organization has been set up and all monitoring staffs have been trained. Meter reading records of all the meters are based on continuously measurement and monthly recorded by the PP. it's confirmed that the electricity is totally exported from project activity to the Thailand national grid.</p> <p><b><u>Data and variable that is different from stated in registered PDD</u></b></p> <p>Combined result of document review with physical onsite inspection at the site, verification team found some deviation from registered PDD. These observations had been described as post-registration changes in section below. However, it's shown that MR not cause an increase in estimated emission reduction in the future monitoring period</p> <p><b><u>Any increase of actual GHG emission reduction</u></b></p> <p>It was claimed by PP on the MR that less actual value of GHG emission achieved in this current monitoring period which is not being fully functioned, it's confirmed that the project is not fully operated, resulting that PPs generates less amount of ER than earlier expected in registered PDD.</p>			
<b>Conclusion</b>	<p>Corresponding to the paragraph 357 of CDM validation and verification standard for project activities (VVS) version 01.0, Bureau Veritas Certification can confirm that:</p> <ul style="list-style-type: none"><li>- The implementation of the Project is consistent with the registered PDD. However there are some changes to project design and are appropriately described as permanent change in section of post-registration changes in the final version of MR. See more detail in Post-registration Change Validation Report (PRCV)</li><li>- The Project is operated as per the registered PDD by the PP since from 01/08/2016 to 31/03/2017 apart from some changes that are described</li></ul>		



	<p>above.</p> <ul style="list-style-type: none"> <li>- There is some data provided in published MR that is different from that stated in the registered PDD. These changes related to number of cell in some solar PV and change in accuracy class electricity meter. However, these changes will not have any impact on estimated emission reductions in the future monitoring period. See more validation opinion toward these changes in PRCV report.</li> <li>- There is no increase in the actual GHG emission reduction in this current monitoring period as compared to the amount estimated in the registered PDD.</li> </ul>
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#### **E.4. Post-registration changes**

Verification team had performed onsite inspection on 31/08/2017 at Phrachaup Khiri Khan province, Thailand. During site visit verification team found some changes in the project as compared to the registered PDD. Details of verification finding as per described in the next section.

##### **E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline**

>> It's confirmation from verification team based on objective evidences found onsite and fact discovered from document review that there is no deviation from registered monitoring, monitoring methodology or standardized baseline.

##### **E.4.2. Corrections**

>> Combined with details provided in MR /01/ (and its later revision) and evidences found during onsite inspection, it's confirmed there is no correction for this reporting period.

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

>> With reference to detail provided in MR /01/ (and its later revision) and its detail stating the change of crediting on UNFCCC website (<https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view>), this is because PP decided to change crediting period from 07/01/2016 to 01/08/2016, it's has been delayed for about 8 months from earlier proposed date in registered PDD (registration action date is on 07/01/2016). Verification request PPs for evidence notifying UNFCCC secretariat. Combined with email date 04/07/2017 from EGAT (Ms. Waraporn) to UNFCCC /11/, it's confirmed that PPs had notified the UNFCCC by email for the change of crediting period start date. It is evident that the start date of crediting period has not been postponed more than 1 year. Hence it is not required to undergo for prior approval from board. This is in line with para 235 (b) of CDM Project Standard for project activities version 01.0 for Project activity. In addition, it's found on that the change in start date of crediting period had been approved by UNFCCC and detail of changes is shown on UNFCCC website on project view page (<https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view>). It's confirmed that there is change in the start date of crediting period, however this been approved by UNFCCC based on notification sent to secretariat by PP and this is in line with requirement of para 235 of CDM project standard for project activity version 01. .

##### **E.4.4. Inclusion of a monitoring plan to a registered project activity**

>> Not applicable.

##### **E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline**

>> During the course of verification, verification team raised CL02 for clarification on why the accuracy class of electricity meter (i.e., parameter  $EG_{PJ,Import,y}$ ) as stated in published MR is not same as accuracy class indicated in registered PDD. In response to this, PP clarified that there was change in organization handling those import electricity meters. It is changed from Provincial Electricity Authority (PEA) as earlier proposed in registered PDD to be handled by the Project participant themselves. This is the reason that more stringent accuracy class was applied to new electricity meter. In other words, the accuracy class of import electricity meter, which is 0.5S, had been changed to be more stringent accuracy class at 0.2S instead. At the end, PP declared this as permanent change to the registered monitoring plan in section B.2.5 of later version of MR.

In light of the above, verification team conducted onsite visit for physically inspection of those import electricity meter at the site, verification team is able to confirm its serial number are 50074511 (main meter) and 50074512 (backup meter). Combined result of document review of meter technical specification document /12/, with nameplate of accuracy class on these meters, verification team found the same accuracy class as 0.2S as claimed by Project participant..

In addition to the above, verification team had also raised CAR05, as result of finding on the site that the name of data sources for cross-checking data, which referred in registered PDD as electricity sale and usage receipt monthly, are not in line with actual practices by the Project participant. It is found that PP cross-checked quantity of electricity export ( $EG_{PJ,export,y}$ ) from power delivery report, while cross-checking quantity of electricity import ( $EG_{PJ,import,y}$ ) from electricity invoices issued by PEA instead but not “sale and usage receipt” as indicated in registered PDD. It is noted by verification team that calibration of export meter will not be handled by PEA but it will be handled by accredited person or institute or EGAT.

In response to this, Project participant corrected the name of data sources that would be used for cross-checking in line with actual name of sources of data and changes organization that handling calibration of electricity meter. There had been declared this as “permanent change to registered monitoring plan” in section B.2.5 of later version of MR

In line with requirement in para 296 – 299 of CDM validation and verification standard for project activities version 01.0, verification team conducted assessment for these changes as per following detail;

Requirement in AMS.I-D version 18.0	Requirement in “Tool to calculate project or leakage CO2 emission from fossil fuel combustion (version 02.0)”	Requirement in “Tool to calculate the emission factor for an electricity system (version 04.0)”	Is this change leads to reduction on accuracy?	Verification team Opinion
<b>1) Issue : Accuracy class of import electricity meter changed from 0.5S to 0.2S</b>				
<b>No</b> There is no requirement of such accuracy class in this methodology	<b>No.</b> There is no requirement of such accuracy class in this tool	<b>No.</b> There is no requirement of such accuracy class in this tool	<b>No.</b>	This is accepted because this is more precise accuracy class (0.2S) which would lead to enhance accuracy of measurement.
<b>2) Issue : Name of cross-checking data sources changed from “receipt” to “delivery report” and “invoices”</b>				

Requirement in AMS.I-D version 18.0	Requirement in "Tool to calculate project or leakage CO2 emission from fossil fuel combustion (version 02.0)"	Requirement in "Tool to calculate the emission factor for an electricity system (version 04.0)"	Is this change leads to reduction on accuracy?	Verification team Opinion
No There is specific requirement for name of data sources for cross-checking purpose in this methodology as long as those sources are reflecting true monitored data.	No. There is no requirement for the name of cross-checking sources in this tool	No. There is no requirement of the name of cross-checking data sources in this tool	No. The change in the name of data sources for cross-checking purpose doesn't cause any risk to accuracy of monitored data.	The changes of the name of sources whether it is receipt or delivery report or invoices doesn't have any effect to real monitored data. (EG <sub>PJ,import/export,y</sub> ) because those are directly measured by electricity meter which are periodically calibrated. The name of data sources could be changes in response to real operation actions at the site.
<b>3) Issue : Changing of organization who handles calibration of export electricity meter from "PEA" to "accredited person" or "institution" or "EGAT"</b>				
No. There is no specific requirement for organization who handle calibration of meter as long as these meters have been calibrated according to national standard.	No. There is no specific requirement on which organization shall conduct calibration as long as meters have been calibrated according to national standard or manufacturing specification	No. There is no specific requirement on which organization shall conduct calibration as long as meters have been calibrated according to national standard or manufacturing specification	No. There is no reduction in accuracy of data monitored as long as meters have been calibrated according to national standard or manufacturing specification.	This is accepted because PEA is no longer being owner of export electricity meter, but in fact PP is actually owner of these export meters. In this sense, PP managed to have these meters calibrated by accredited persons (Energy Meter Department under EGAT) whose calibration procedures had been approved by Thai Laboratory Accreditation Scheme (NSC-TISI-TIS 17025 Calibration 0025)

With reference to para 298-299 of CDM validation and verification of project activities version 01.0, verification team confirmed that these changes described above do not deviate from applied methodology (AMS-I.D version 18.0) and do not lead to reduction of accuracy on calculation of emission reduction. This project is not referred to any other standards.

To be in line with para 1 (c) of Appendix of CDM project standard for project activities version 01.0, verification team confirmed that the changes above do not need prior approval but can undergo issuance track because the changes above have no material impact on the applicability of the applied methodologies or the accuracy and completeness of the monitoring.

#### E.4.6. Changes to the project design of a registered project activity

>> During course of verification, verification team raised CL01 for clarification from PP to understand the reason for decrease in number of cell for Crystalline Silicon: c-Si from 5,040 to 5,016 cells in category of “correction” and not in “Change to project design”, when this was design change of the project activity. In response to this, PP explained that there are several document submitted to government showing the same installed capacity (i.e., 5 MW), however, verification paid attention to as-built engineering drawing that obviously shown reduced in number of c-Si module from 5,040 to 5,016 that resulting in reduced in Watt generated from this type of solar module from 1,260,000 W to 1,254,000 W. Hence PP determined this change as “change to project design”. This is accepted by verification team.

By mean of onsite visit on 31/08/2017, verification team confirmed that number of c-Si module that had been installed and operated in the site are only 5,016 cells and not 5,040 cells. To be in line with requirement of para 309 of CDM validation and verification for project activities, version 01.0. Verification team describes steps taken to assess these changes as per following.

**Para 309 (a): A description of the proposed or actual changes as compared to the description in the registered PDD:**

Combined result from document review and physical onsite inspection, it's confirmed that there is change in number Crystalline Silicon (c-Si) from registered PDD as per following detail

**Nature of the change to project design**

The number of Crystalline Silicon (c-Si) module installed in the site change from 5,040 to 5,016 that resulting in reduced in electricity generated (Watt) from this type of solar module from 1,260,000 W to 1,254,000 W

**Para 309 (b) An assessment on when the changes occurred, reasons for these changes taking place, whether the changes would have been known prior to the registration of the CDM project activity, and how the changes would impact on the overall operation/ability of the CDM project activity to deliver emission reductions as stated in the PDD;**

Verification team verified “as-built” engineering drawing /10/, it found that publication date of this drawing is at “2017/03” (or March 2017). Combined with interview session with EGAT staff at the site, it's confirmed that the change in number of c-Si solar module occurred after process of project registration – this is not possible to consolidate this changes into PDD at stage of validation. It's confirmed that this change would not have been known prior to the registration of CDM project activity.

Because of the change in number of c-Si module, there is slightly reduced in electricity generated from c-Si panel but it does not adversely affect operation/ability of the Project to deliver emission reduction as stated in the registered PDD. The assessment of verification team is provided in the next section.

**Para 309 (c) An assessment regarding whether the changes would adversely affect the conclusions of the validation report of the registered PDD with regard to:**

**(i) The additionality of the registered CDM project activity;**

Verification team reviewed description of the Project's additionality as provided in registered PDD and found that PP demonstrated its additionality through “Positive List” which is referred by para 2 of Guideline on the demonstration of additionality of small-scale project activities that Solar technology (photovoltaic) for project small scale project is the positive list – the project is automatic additional without any further documentation for the proof of additionality.

Based on reason above, combined with document review and onsite physical inspection, it's confirmation from verification side that this project is electricity generation from "Solar Technology" which is the same technology provided in registered PDD. The reduction in number of cells for c-Si solar panel doesn't cause any change to "Solar Technology (Photovoltaic)" of the project. This is the same small-scale Solar Technology (Photovoltaic) at 5MW that perfectly confined within "Positive List" which is automatically additional.

**(ii) The scale of the registered CDM project activity;**

Verification team verified the change in the reduction of number of cell for c-Si module from 5,040 cells to 5,016 this leading to reduction in electricity power generated from this type of solar PV from 1,260,000 W to 1,254,000 W. This is equivalent to 0.47% reduced from earlier estimated power generation from c-Si module. Verification team re-calculated total power generated from all four types of solar PV (i.e., crystalline silicon, amorphous silicon, copper indium and micro crystalline amorphous silicon) combined with efficiency of inverter as indicated in registered PDD and found that total installed capacity of this project still remain in "small scale" size which is below 15MW installed capacity

It's confirmation from verification team that reduced number of cell for c-Si module doesn't cause any change in the scale of the project and this is still remain below 15MW as small scale project.

**(iii) The applicability and application of (1) the applied methodologies and, where applicable, the applied standardized baselines with which the project activity has been registered; (2) the later valid version of the applied methodologies and/or the applied standardized baselines; or (3) another methodology and/or standardized baseline that the registered CDM project activity has updated/switched to;**

Verification team reviewed requirement in AMS-I.D version 18.0 applied by the Project and found that there is no applicable requirement that affected by the change in number of c-Si module. The version of applied methodology still remains valid version. In addition, this project doesn't applied any standardized baseline that have to be updated or switched to

This is confirmation that the change in number of cell for c-Si doesn't cause any affect to applied methodology or any standardized baseline.

**(iv) The compliance of the monitoring plan with the applied methodologies and, where applicable, the applied standardized baselines;**

Verification team reviewed the change in number of c-Si module compared against description provided in registered monitoring plan and found that the change of c-Si didn't affect any actions in registered monitoring plan. There is no specific detail that related to the reduced number of c-Si installed and operating in the site

This is confirmation that the change in number of cell for c-Si doesn't cause any affect to registered monitoring plan and the Project still comply with applied methodology (i.e., AMS-I.D version 18.0).

**(v) The level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan.**

Verification team reviewed the change in number of c-Si module installed in the site and taken account of any risk that related to level of accuracy provided in registered monitoring plan. It's found that reduced number of cell for c-Si module doesn't cause any effect to level of accuracy as required by registered monitoring plan. This is because monitoring plan requested PPs to monitor total amount of electricity generated from all types of Solar PV and consolidate all of power in term of  $EG_{PJ,export,y}$ . The registered monitoring plan didn't provide any specific requirement to number of cell of each solar PV module.

This is confirmation from verification team that reduced number of cell for c-Si module doesn't reduce level of accuracy of the monitoring as required by registered monitoring plan.

In conclusion, combined with evidences of post-registration change described above - verification team confirmed that the changes are not likely to increase the estimates of emission reductions in the future monitoring periods.

To be in line with para 1 (d) of Appendix of CDM project standard for project activities version 01.0, verification team confirmed that the changes above do not need prior approval but can undergo issuance track because its do no adversely impact any of the following

- (i) The applicability and application of the applied methodologies and, where applicable, the applied standardized baselines with which the project activity has been registered;
- (ii) The additionality of the project activity;
- (iii) The scale of the project activity.

#### E.4.7. Types of changes specific to afforestation and reforestation project activities

>> Not applicable. This project is not afforestation and reforestation project activities.

#### E.5. Compliance of the registered monitoring plan with the methodology including applicable tools and standardized baselines

<b>Means of verification</b>	<p>Verification team conducted document review on these following documents to verify the compliance of monitoring plan indicated in MR version 01 (first GSC) /01/ (and its later revision) dated as per following detail.</p> <ul style="list-style-type: none"> <li>• Registered PDD and its registered monitoring plan /04/</li> <li>• AM0062 Version 02 /08/</li> <li>• MR version 01 (first GSC version) dated 21/07/2017 /01/</li> <li>• MR version 06, dated 19/01/2018 (final version) /02/</li> </ul>
<b>Findings</b>	<p>Based on document review for its first GSC version of MR and its later versions against registered PDD and applied methodology AMS-I.D version 18, verification team found that all monitoring parameters defined in MR, which are shown below, are in compliance with applied methodology</p> <ul style="list-style-type: none"> <li>• <math>EG_{PJ,facility,y}</math></li> <li>• <math>EG_{PJ,export,y}</math></li> <li>• <math>EG_{PJ,import,y}</math></li> </ul> <p>For some parameters, which are <math>FC_{i,y}</math>, <math>NCV_{i,y}</math>, <math>EF_{CO2,i,y}</math>, <math>EG_{y}</math>, <math>FC_{i,m,y}</math>, <math>EG_{m,y}</math>, <math>EF_{grid,y}</math>, <math>EF_{grid,OM,y}</math>, and <math>EF_{grid,BM,y}</math>, these parameter were fixed ex ante and used for calculation of the grid emission factor of Thailand (<math>EF_{grid,y}</math>) following "Tool to calculate the emission factor for an electricity system". Verification team reviewed steps taken to calculate <math>EF_{grid,y}</math> as per indicated in appendix 4 of registered PDD. In addition, verification team also reviewed validation report (/05/) and then agreed with previous validation team that PP had chosen "Simple OM" in step 1 and selected "option (1)" in step 5 (please refer to Tool to calculate the emission factor for an electricity system), therefore PP is <u>not</u> required to monitored and updated this grid emission factor (<math>EF_{grid,y}</math>) every year.</p> <p>Based on document review described above, there is no deviation of monitoring plan described in Monitoring report from registered PDD and methodology AMS-I.D version 18.0</p>

<b>Conclusion</b>	Corresponding to the paragraph 362 of CDM validation and verification standard for project activities (VVS) version 01.0, BVI can confirm that the monitoring plan is in accordance with the approved methodology including applicable tool(s) applied by the Project.
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## 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

<b>Means of verification</b>	<p>Verification team conducted document review on these following documents to ensure compliance of monitoring activities with registered monitoring plan as per following detail.</p> <ul style="list-style-type: none"> <li>Registered PDD and monitoring plan /04/</li> <li>MR version 01 dated 21/07/2017 (first GSC) /01/, later revisions during course of verification, and final MR version 06, dated 19/01/2018 /02/</li> <li>ER Calculation Spreadsheet dated 29/06/2017 /03/</li> </ul>										
<b>Findings</b>	<p>At stage of document review, verification team found that value applied in ER calculation spreadsheet, which are fixed ex ante, had been correctly applied. These are in line with the figures earlier defined in registered PDD.</p> <table border="1"> <thead> <tr> <th>Parameter</th><th>Verification finding</th></tr> </thead> <tbody> <tr> <td>EF<sub>grid,y</sub></td><td>Figure of "0.4786 tCO<sub>2</sub>/MWh" is correctly applied</td></tr> <tr> <td>EF<sub>grid,OM,y</sub></td><td>Figure of "0.5383 tCO<sub>2</sub>/MWh" is correctly applied</td></tr> <tr> <td>EF<sub>grid,BM,y</sub></td><td>Figure of "0.2996 tCO<sub>2</sub>/MWh" is correctly applied</td></tr> <tr> <td>FC<sub>i,y</sub> NCV<sub>i,y</sub> EF<sub>CO<sub>2</sub>,I,y</sub> EG<sub>y</sub> FC<sub>i,m,y</sub> EG<sub>m,y</sub></td><td>With reference to appendix 4 of registered PDD, these parameters were used to calculate grid emission factor for Thailand (EF<sub>grid</sub>). The step taken for calculation of EF<sub>grid,y</sub> had been correctly applied and been validated by validation team which is appropriately addressed in validation report /05/. It's confirmed that PPs had chosen "the simple OM" in step 3 and applied option (1) in step 5 of the "Tool to calculate the emission factor for an electricity system" by using data from most 3 recent year up to the date of submission of data for validation (i.e., 2014, 2013 and 2012), and then the grid emission factor (EF<sub>grid,y</sub>) is calculated once and applied throughout crediting period. Based on requirement in the tool, there is no need to recalculation or monitor of this parameter again.</td></tr> </tbody> </table>	Parameter	Verification finding	EF <sub>grid,y</sub>	Figure of "0.4786 tCO <sub>2</sub> /MWh" is correctly applied	EF <sub>grid,OM,y</sub>	Figure of "0.5383 tCO <sub>2</sub> /MWh" is correctly applied	EF <sub>grid,BM,y</sub>	Figure of "0.2996 tCO <sub>2</sub> /MWh" is correctly applied	FC <sub>i,y</sub> NCV <sub>i,y</sub> EF <sub>CO<sub>2</sub>,I,y</sub> EG <sub>y</sub> FC <sub>i,m,y</sub> EG <sub>m,y</sub>	With reference to appendix 4 of registered PDD, these parameters were used to calculate grid emission factor for Thailand (EF <sub>grid</sub> ). The step taken for calculation of EF <sub>grid,y</sub> had been correctly applied and been validated by validation team which is appropriately addressed in validation report /05/. It's confirmed that PPs had chosen "the simple OM" in step 3 and applied option (1) in step 5 of the "Tool to calculate the emission factor for an electricity system" by using data from most 3 recent year up to the date of submission of data for validation (i.e., 2014, 2013 and 2012), and then the grid emission factor (EF <sub>grid,y</sub> ) is calculated once and applied throughout crediting period. Based on requirement in the tool, there is no need to recalculation or monitor of this parameter again.
Parameter	Verification finding										
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FC <sub>i,y</sub> NCV <sub>i,y</sub> EF <sub>CO<sub>2</sub>,I,y</sub> EG <sub>y</sub> FC <sub>i,m,y</sub> EG <sub>m,y</sub>	With reference to appendix 4 of registered PDD, these parameters were used to calculate grid emission factor for Thailand (EF <sub>grid</sub> ). The step taken for calculation of EF <sub>grid,y</sub> had been correctly applied and been validated by validation team which is appropriately addressed in validation report /05/. It's confirmed that PPs had chosen "the simple OM" in step 3 and applied option (1) in step 5 of the "Tool to calculate the emission factor for an electricity system" by using data from most 3 recent year up to the date of submission of data for validation (i.e., 2014, 2013 and 2012), and then the grid emission factor (EF <sub>grid,y</sub> ) is calculated once and applied throughout crediting period. Based on requirement in the tool, there is no need to recalculation or monitor of this parameter again.										
<b>Conclusion</b>	It's confirmation from verification team that parameter fixed ex ante are correctly applied in ER calculation spreadsheet which are in line with figures earlier defined in registered PDD										

### E.6.2. Data and parameters monitored

<b>Means of verification</b>	<p>Verification team conducted document review on these following documents;</p> <ul style="list-style-type: none"> <li>Registered PDD and its defined monitoring plan /04/</li> <li>Monitoring report version 01 (first GSC) /01/, its later revision during course of verification, and final version 06 /02/</li> <li>ER Calculation Spreadsheet dated 29/06/2017 /03/</li> </ul> <p>In addition, verification team conducted onsite inspection (31/08/2017) at location of project site in order to verify data in ER calculation spreadsheet against primary data sources stored at site and also their management and operation system. The verification finding can be demonstrated as per following detail.</p>				
<b>Findings</b>	<p>Table below provides detail on verification finding in each monitoring parameters.</p> <table border="1"> <thead> <tr> <th>Parameters</th><th>Evidence Checked</th></tr> </thead> <tbody> <tr> <td>EG<sub>PJ,facility,y</sub> EG<sub>PJ,export,y</sub> EG<sub>PJ,import,y</sub></td><td> <p>The internal data log book including delivery report and invoices for these following all 8 months had been checked against figure provided in calculation spreadsheet /03/</p> <p>- August 2016</p> </td></tr> </tbody> </table>	Parameters	Evidence Checked	EG <sub>PJ,facility,y</sub> EG <sub>PJ,export,y</sub> EG <sub>PJ,import,y</sub>	<p>The internal data log book including delivery report and invoices for these following all 8 months had been checked against figure provided in calculation spreadsheet /03/</p> <p>- August 2016</p>
Parameters	Evidence Checked				
EG <sub>PJ,facility,y</sub> EG <sub>PJ,export,y</sub> EG <sub>PJ,import,y</sub>	<p>The internal data log book including delivery report and invoices for these following all 8 months had been checked against figure provided in calculation spreadsheet /03/</p> <p>- August 2016</p>				

	<div data-bbox="635 150 858 461"> <ul style="list-style-type: none"> <li>- September 2016</li> <li>- October 2016</li> <li>- November 2016</li> <li>- December 2016</li> <li>- January 2017</li> <li>- February 2017</li> <li>- March 2017</li> </ul> </div> <div data-bbox="453 477 708 508"> <p><b>Verification Finding</b></p> </div> <div data-bbox="453 526 1415 831"> <p>It's noted by verification team that quantity of electricity exported to the grid (<math>EG_{PJ,export,y}</math>) and imported from the grid (<math>EG_{PJ,import,y}</math>) are stored in "internal data logbook". At the beginning of each month (Day 1, 05:00 am), staff of project will transfer monthly aggregated for quantity of electricity export to the grid to "power delivery report". In the same way, at last day of each month, staff will cross-check monthly aggregated for quantity of electricity imported from the grid from "internal data logbook" against invoices from Provincial Electricity Agency (PEA). The most conservative quantity of electricity imported (<math>EG_{PJ,import,y}</math>) between internal data logbook and invoices from PEA shall be used for ER calculation for the sake of conservativeness.</p> <p>It's found that there are well agreements found between data from internal data logbook and ER calculation /03/ and no any error found. Verification team also double cross-checked data of <math>EG_{PJ,export,y}</math> and <math>EG_{PJ,import,y}</math> with "power delivery report" issued by the Project and "invoices" issued by PEA for all 8 months described above and found no any error. This is accepted.</p> </div> <div data-bbox="440 1034 893 1066"> <p><b><u>Management and operation system</u></b></p> </div> <div data-bbox="440 1081 1450 1234"> <p>With reference to interview session with personnel involved in the project (see name list in section D.3 above), verification team found that operation and management structure had been created extensively for monitoring of relevant parameters. The responsibility of data monitoring, archiving and analysing had been subjected to monitoring team, which is comprising of these following staffs;</p> </div> <div data-bbox="488 1252 1070 1346"> <ul style="list-style-type: none"> <li>• Plant manager</li> <li>• Project consultant or Technical support team</li> <li>• Operation team</li> </ul> </div> <div data-bbox="440 1361 1129 1393"> <p>This structure is in line with their description in current MR</p> </div>
<p><b>Conclusion</b></p>	<p>It's confirmation from verification team that there was no missing data but all monitoring parameters had been monitored and carried out as per description in monitoring plan of registered PDD and 100% of monitoring parameters had been completely monitored covered all this monitoring period during 01/08/2016 – 31/03/2017.</p> <p>This is in line with paragraph 364 (a) – (e ) of CDM validation and verification standard for project activities (VVS) version 01 that</p> <p>(a) The registered monitoring plan has been properly implemented and followed by the project participants;</p> <p>(b) All parameters stated in the registered monitoring plan and relevant Board decisions have been monitored and updated as applicable, including:</p> <ul style="list-style-type: none"> <li>(i) Project emission or net removal parameters;</li> <li>(ii) Baseline emission or net removal parameters;</li> <li>(iii) Leakage parameters;</li> <li>(iv) Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the registered monitoring plan;</li> </ul> <p>(c) The equipment used for monitoring is and is controlled and calibrated in accordance with the registered monitoring plan, the applied methodologies, the applied standardized baselines, Board guidance, local/national standards, or as per the manufacturer's specification;</p>



	(d) Monitoring results are consistently recorded as per the approved frequency; (e) Quality assurance and quality control procedures have been applied in accordance with the registered monitoring plan.
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### E.6.3. Implementation of sampling plan

<b>Means of verification</b>	Verification team conducted document review on registered PDD /04/ in order to verify on how sampling plan had been originally proposed in their registered PDD
<b>Findings</b>	It's found in registered PDD that there is no sampling plan to be conducted but <u>all</u> monitoring parameter are subjected to be verified by verifier during verification process.
<b>Conclusion</b>	Combined with detail provided in registered PDD, it's confirmation from verification team that there is no sampling plan originally proposed by Project Participant in registered PDD, but <u>all</u> monitored data are subjected to be verified during verification process.

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

Means of verification	Verification team conducted document review and found that monitoring instrument such as, electricity meter (main & backup) are subjected to be calibrated as per description in the monitoring plan.  In this sense, verification request certificate of calibration and cross-checked their serial number at real monitoring equipment's during onsite inspection (31/08/2017) at the site.				
Findings	Table below provides detail of verification finding for each monitoring equipment installed and operated at the site. Table 1 : The calibration records of the meters				
	Meter ID	Serial number	Calibration date	Validity in this monitoring period	Verification Team's Opinions
	1) Electricity Meter (Main)	50743276	14/07/2016 /13/	Yes (once in 2 year) This meter has replaced by meter no 50074511 below on 16/01/2017	Verification team reviewed certificate of calibration and checked its serial number at the site and found the same. It's confirmed that this meter had been replaced with the new one (see below).  Based on calibration result, there is no error found. This is accepted.
	2) Electricity Meter (Main)	50074511	16/01/2017 /14/	Yes (once in 2 year)	It's confirmed that there were no gap of calibration. This is new meter replacing the old one above.  Based on calibration result, there is no error found. This is accepted.

	3) Electricity Meter (Back-up)	50743277	14/07/2016 /15/	<b>Yes</b> (once in 2 year) This meter has replaced by meter no 50074512 below on 16/01/2017	Verification team reviewed certificate of calibration and checked its serial number at the site and found the same. It's confirmed that this meter had been replaced with the new one (see below).  Based on calibration result, there is no error found. This is accepted.
	4) Electricity Meter (Back-up)	50074512	16/01/2017 /16/	<b>Yes</b> (once in 2 year)	It's confirmed that there were no gap of calibration. This is new meter replacing the old one above.  Based on calibration result, there is no error found and there is no monitoring gap for the date of meter replacement (16/01/2017) This is accepted.
<b>Conclusion</b>	In line with para 347 of CDM validation and verification of project activities, version 01.0, and verification team confirmed that <u>all</u> monitoring equipment's are well calibrated at the frequencies defined in monitoring plan of registered PDD.				

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

A complete set of data for the specified monitoring period is available for verification. The data obtaining monitoring parameters are maintained in the internal logbook. All the data are in compliance with that stated in the Monitoring Report version 06, dated 19/01/2018 /02/.

As per the methodology AMS-I.D version 18.0 and the registered PDD, the emission reductions for the Project are calculated as the baseline emissions minus the project emissions and leakage. Hence the emission reduction is determined by the following formula:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER<sub>y</sub>: Emission reductions (t CO<sub>2</sub>)

BE<sub>y</sub>: Baseline emissions (t CO<sub>2</sub>)

PE<sub>y</sub>: Project emissions (t CO<sub>2</sub>)

LE<sub>y</sub>: Emissions due to leakage (t CO<sub>2</sub>)

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

Means of verification	<p>Verification team review calculation of baseline emission as per below equation</p> $BE_y = EG_{PJ,y} \times EF_{grid,y}$ <p>Where</p> <p>BE<sub>y</sub> : Baseline emissions in year 'y' (tCO<sub>2</sub>)</p> <p>EG<sub>PJ,y</sub> : Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)</p> <p>EF<sub>grid,y</sub> : Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”</p>																
Findings	<p>Verification team verified each input data as per following detail.</p> <table><tr><th>Parameter</th><th>Figures applied in ER Calculation spreadsheet</th><th>Verification Finding</th><th>Opinion</th></tr><tr><td>1) BE<sub>y</sub></td><td>1,788</td><td>Formulae embedded in ER calculation had been checked and it's found that the calculation is in line with applied methodology.</td><td>OK. Calculation is correct.</td></tr><tr><td>2) EG<sub>PJ,y</sub></td><td>3,736</td><td><p>Value applied in this parameter had been cross-checked against registered PDD. It's found that formulation is defined as per following</p><div><math display="block">EG_{PJ,y} = EG_{PJ, facility,y}</math><math display="block">EG_{PJ, facility} = EG_{PJ, export,y} - EG_{PJ, import,y}</math></div><p>Based on formulae above, verification team re-checked this setting with registered PDD and found the same. It's confirmed that this parameter is result of EG<sub>PJ, export,y</sub> minus with EG<sub>PJ, import,y</sub></p><math display="block">EG_{PJ,y} = EG_{PJ, facility,y}</math><math display="block">EG_{PJ, facility} = EG_{PJ, export,y} - EG_{PJ, import,y}</math><math display="block">3,736 = 3,842 - 106</math><p>Therefore, EG<sub>PJ,y</sub> is equal to 3,736 t CO<sub>2</sub></p></td><td>OK. Calculation is correct</td></tr><tr><td>3) EF<sub>grid,y</sub></td><td>0.4786 t CO<sub>2</sub>/MWh</td><td>Verification team re-checked validation finding in approved validation report /05/ and found that this grid emission factor had been correctly calculated according to “Tool to calculate the</td><td>OK. Calculation is correct and input values are based on</td></tr></table>	Parameter	Figures applied in ER Calculation spreadsheet	Verification Finding	Opinion	1) BE <sub>y</sub>	1,788	Formulae embedded in ER calculation had been checked and it's found that the calculation is in line with applied methodology.	OK. Calculation is correct.	2) EG <sub>PJ,y</sub>	3,736	<p>Value applied in this parameter had been cross-checked against registered PDD. It's found that formulation is defined as per following</p> <div><math display="block">EG_{PJ,y} = EG_{PJ, facility,y}</math><math display="block">EG_{PJ, facility} = EG_{PJ, export,y} - EG_{PJ, import,y}</math></div> <p>Based on formulae above, verification team re-checked this setting with registered PDD and found the same. It's confirmed that this parameter is result of EG<sub>PJ, export,y</sub> minus with EG<sub>PJ, import,y</sub></p> $EG_{PJ,y} = EG_{PJ, facility,y}$ $EG_{PJ, facility} = EG_{PJ, export,y} - EG_{PJ, import,y}$ $3,736 = 3,842 - 106$ <p>Therefore, EG<sub>PJ,y</sub> is equal to 3,736 t CO<sub>2</sub></p>	OK. Calculation is correct	3) EF <sub>grid,y</sub>	0.4786 t CO <sub>2</sub> /MWh	Verification team re-checked validation finding in approved validation report /05/ and found that this grid emission factor had been correctly calculated according to “Tool to calculate the	OK. Calculation is correct and input values are based on
Parameter	Figures applied in ER Calculation spreadsheet	Verification Finding	Opinion														
1) BE <sub>y</sub>	1,788	Formulae embedded in ER calculation had been checked and it's found that the calculation is in line with applied methodology.	OK. Calculation is correct.														
2) EG <sub>PJ,y</sub>	3,736	<p>Value applied in this parameter had been cross-checked against registered PDD. It's found that formulation is defined as per following</p> <div><math display="block">EG_{PJ,y} = EG_{PJ, facility,y}</math><math display="block">EG_{PJ, facility} = EG_{PJ, export,y} - EG_{PJ, import,y}</math></div> <p>Based on formulae above, verification team re-checked this setting with registered PDD and found the same. It's confirmed that this parameter is result of EG<sub>PJ, export,y</sub> minus with EG<sub>PJ, import,y</sub></p> $EG_{PJ,y} = EG_{PJ, facility,y}$ $EG_{PJ, facility} = EG_{PJ, export,y} - EG_{PJ, import,y}$ $3,736 = 3,842 - 106$ <p>Therefore, EG<sub>PJ,y</sub> is equal to 3,736 t CO<sub>2</sub></p>	OK. Calculation is correct														
3) EF <sub>grid,y</sub>	0.4786 t CO <sub>2</sub> /MWh	Verification team re-checked validation finding in approved validation report /05/ and found that this grid emission factor had been correctly calculated according to “Tool to calculate the	OK. Calculation is correct and input values are based on														

		emission factor for an electricity system" version 04.0. This emission factor is fixed ex ante throughout crediting period.	reliable evidences.
<b>Conclusion</b>	It's confirmation from verification team that calculation of baseline is correct and in line with applied methodology. All monitoring parameters used in baseline calculation are reliable which is based on verifiable evidences. This fulfilled requirement in para 377 (c) and 398 (j) of CDM validation and verification standard for project activities (VVS) version 01.0 that appropriate methods and formulae for calculating baseline emission/baseline net removals, project emission/actual net removals, and leakage emission have been correctly followed.		

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

<b>Means of verification</b>	Verification team reviewed requirement provided in AMS-I.D version 18.0, it's stated that most cases of renewable energy project, project emission = 0 t CO <sub>2</sub> unless there are some project activities such as, geothermal power and hydro power plant which have to consider in association with related tools.
<b>Findings</b>	Based on verification finding by both document review and physical inspection at onsite visit (31/08/2017), it's found that this is renewable energy and there is no project emission from power generation generated from solar PV module.
<b>Conclusion</b>	It's confirmation from verification team that calculation of project emission is correct and in line with applied methodology. This is renewable energy project that there is project emission from power generation activity. This is in line with requirement in paragraph 375 of CDM validation and verification standard for project activities (VVS) version 01.0

#### E.8.3. Calculation of leakage GHG emissions

<b>Means of verification</b>	Verification team reviewed registered PDD against applied methodology (AMS-I.D version 18.0)
<b>Findings</b>	There is no leakage applicable for this project. This is in line with registered PDD.
<b>Conclusion</b>	It's confirmation from verification team that leakage emission is not applicable for this project.

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

<b>Means of verification</b>	Verification team reviewed ER calculation spreadsheet against calculation of GHG emission reduction defined by applied methodology (AM0062, version 02)
<b>Findings</b>	<p>The emission reductions during the monitoring period from 01/08/2016 to 31/03/2017 (first and last day included). The total emission reduction (ER) are calculated as:</p> $ER_y = BE_y - PE_y - LE_y$ $ER_y = 1,788 - 0 - 0$ $ER_y = 1,788 \text{ t CO}_2$
<b>Conclusion</b>	It's confirmation from verification team that summary of GHG emission reduction is correct. This is in line with requirement in paragraph 377 (c) and 398 (j) of CDM validation and verification standard for project activities (VVS) version 01.0 that appropriate methods and formulae for calculating baseline emission/baseline net removals, project emission/actual net removals, and leakage emission have been correctly followed

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

<b>Means of verification</b>	Verification team reviewed ER calculation spreadsheet and monitoring report against registered PDD
<b>Findings</b>	As per description in registered PDD, the annual emission reduction is estimated at

	3,618 tCO <sub>2</sub> but Project Participant manages to obtain 1,788 tCO <sub>2</sub> this current monitoring period. This is because electricity generation in this monitoring period is not fully functioned; the Project had just started generating electricity power only 8 months. This is making less emission reduction than registered PDD.
<b>Conclusion</b>	It's confirmation from verification team that <u>lower</u> GHG emission reduction than registered PDD is reasonable and accepted.

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

<b>Means of verification</b>	Verification team reviewed ER calculation spreadsheet and monitoring report against registered PDD
<b>Findings</b>	The amount of emission reduction is not higher than what was estimated in registered PDD, which was estimated at 3,618 tCO <sub>2</sub> /yr
<b>Conclusion</b>	It's confirmed that emission reduction in this monitoring period is not exceed level of ER earlier proposed in registered PDD

**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**

<b>Means of verification</b>	Verification team reviewed ER calculation spreadsheet and monitoring period against registered PDD
<b>Findings</b>	The amount of emission reduction from 1 <sup>st</sup> monitoring period is 1,788 t CO <sub>2</sub>
<b>Conclusion</b>	It's confirmed that emission reduction in this 1 <sup>st</sup> monitoring period is correct.

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

<b>Means of verification</b>	Verification team reviewed registered PDD and latest MR in consideration of monitoring of co-benefit parameters
<b>Findings</b>	It's found that there is no requirement from PPs to monitor co-benefit parameter as described in registered PDD and MR
<b>Conclusion</b>	In line with requirement of paragraph 138 of CDM validation and verification for project activities, version 01.0 that there is no requirement from PPs to monitor sustainable development co-benefit of this project.

**E.10. Global stakeholder consultation**

<b>Means of verification</b>	Bureau Veritas India (BVI) had published first version 01 of monitoring report published for Global Stakeholder Consultation (GSC) dated on 17/07/2017 /01/. This is has been provided on UNFCCC website for period of 14 days
<b>Findings</b>	There is no any comment from Global Stakeholder
<b>Conclusion</b>	In line with paragraph 254 - 265 of CDM validation and verification of project activities version 01.0. It's confirmed there is no any comment from the first publication of version 01 of MR from global stakeholder.

**SECTION F. Internal quality control**

>> The verification report underwent an internal quality control through Internal Technical Review (ITR) before requesting issuance of CERs for this project activity. The ITR is an independent process performed to examine thoroughly that the process of verification has been carried out in conformance with the requirements of the verification scheme as well as internal Bureau Veritas Certification procedures. The Team Leader provides a copy of the verification report to the reviewer, including any necessary verification documentation. The reviewer reviews the submitted documentation for conformance with the verification scheme. This will be a comprehensive review of all documentation generated during the verification process. When performing an Internal Technical Review, the ITR reviewer ensures that:

- The verification activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.

- The review encompasses all aspects related to the project which includes project design, baseline, implementation of monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the verification exercise, review of sample documents.

The reviewer may raise Clarification Requests to the verification team and discusses these matters with Team Leader. After the agreement of the responses on the Clarification Requests from the verification team as well as the PP(s), the finalized verification report is accepted for further processing such as uploading via the UNFCCC interface.

## **SECTION G. Verification opinion**

>> Bureau Veritas India Pvt. Ltd. (BVI) has performed the periodic verification of 5MW Thap Sakae Photovoltaic Solar Cell Power Plant Project, CDM Registration Reference Number 10194, which is located in Thap Sakae district, Prachuap Khiri Khan province, Thailand, and applying the methodology AMS-I.D version 18.0. The verification was performed based on the requirements set by the CDM and relevant guidance provided by CMP and the CDM Executive Board.

The verification consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) onsite inspection and follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of EGAT is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the monitoring plan contained in the registered PDD. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

The BVI has verified the project Monitoring Report version 06 dated 19/01/2018 for the reporting period during 01/08/2016 to 31/03/2017 (first and last day included). BVI confirms that the project is implemented as described in the validated and registered project design documents. Installed equipments being essential for generating emission reductions run reliably and are calibrated appropriately. The monitoring system is in place and the Project is generating. There are some areas that changes from registered PDD but it had been properly declared in monitoring report.

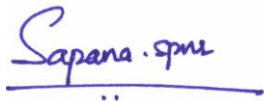
Corresponding to the paragraph 375 of CDM validation and verification standard for project activities (VVS) version 01.0, Bureau Veritas India Pvt. Ltd., can confirm that:

- Data used for the determination of the emission reductions are available and monitored in accordance with the monitoring plan contained in the registered PDD.
- Information and data provided in the monitoring report have been cross-checked with other sources such as internal logbook, power delivery report and invoices.
- Appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed.
- The emission factor that was applied in the calculations had been appropriately justified.

## **SECTION H. Certification statement**

>> Bureau Veritas India Pvt. Ltd., can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the validated and registered project baseline, monitoring plan and its associated documents. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms the following statement:

Reporting period:	01/08/2016 to 31/03/2017 (first and last day included)	
Baseline emissions:	1,788	t CO <sub>2</sub> equivalents
Project emissions:	0	t CO <sub>2</sub> equivalents
Leakage emissions:	0	t CO <sub>2</sub> equivalents
Emission Reductions:	1,788	t CO <sub>2</sub> equivalents



Ms Sapana Pednekar  
Internal Technical Reviewer  
Date 01/02/2018



Dr Chumpol Sripraparkorn  
Team Leader  
Date 01/02/2018

## Appendix 1. Abbreviations

Abbreviations	Full texts
AEP	Advance Energy Plus Co., Ltd. (Project consultant)
BVI	Bureau Veritas India Pvt. Ltd.,
CO2	Carbon Dioxide
EGAT	Electricity Generating Authority of Thailand (Project Owner)
ER	Emission Reduction
GSC	Global Stakeholder Consultation
MR	Monitoring report
PEA	Provincial Electricity Agency
PDD	Project Design Document
PP	Project Participant



## Appendix 2. Competence of team members and technical reviewers

Ms. Sapana Pednekar	Bureau Veritas India Private Limited	<p>Internal Technical Reviewer, Change Lead Verifier</p> <p>She is a Post Graduate in Environmental Science from University of Pune, India and holds a PGDBA in Financial Management from Welingkars School of Management. She has total Industrial work experience of more than 12 years in the field of environmental studies of which more than 9 years' experience is in the field of CDM and VCS. She is working in Bureau Veritas Certification (India) Pvt. Ltd. for last more than 7 years and has undergone training related to Clean Development Mechanism and is currently involved in validation and verification of more than 50 CDM/ VCS project activities. She has undergone and successfully completed ISO 14001:2004 standard, ISO 50001:2011 standard Lead Auditor Courses and ISO 14064:2006 Standard Lead verifier course. She is TA 1.2 qualified verifier.</p>
Dr Chumpol SRIPRAPARKORN	Bureau Veritas Certification, Thailand	<p><u>Current Position</u> : Team Leader, Climate Change Lead Verifier, CDM Technical Area<sup>#</sup>:</p> <ul style="list-style-type: none"> <li>- T.A 1.2 (Energy generation from renewable energy)</li> <li>- T.A. 13.1 (Solid Waste and waste water)</li> <li>- T.A. 13.2 (Manure)</li> </ul> <p><u>Education</u></p> <p>He has PhD education background in Environmental Management (Hazardous Waste Management) Chulalongkorn University, 2009 with core research: Transportation policy, traffic mode, vehicle emission, air quality. His thesis title is Application of The Air Pollution Model (TAPM) for Bangkok air quality management policy with focus on bus route management, traffic management, mass rapid transportation impact, vehicle profile, vehicle emission and its impact on air quality. His master degree in Environmental Science - Chulalongkorn University, 2002 with core research on Urban transportation system, traffic mode, vehicle emission. His thesis title is Application of CALINE4 air quality model for prediction of roadside air quality.</p> <p><u>Related Work Experiences</u></p> <p>He has more than 12-year experiences in environmental business and research area. His work experiences prior to join Bureau Veritas Certification (Thailand) was at Agency for Science, Research and Technology (A*STAR), Singapore also with Environmental Consulting firm (conducting Environmental Impact Study) and CDM Consulting firm. He is now working for Bureau Veritas (Thailand) for 5 years and in charge of CDM service.</p> <p><b>Remark</b> # Obtained by technical training, education and related work experiences</p>

### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/01/	EGAT	Monitoring report version 01 dated 29/06/2017 (first published for Global Stakeholder consultation)	<a href="https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view">https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view</a>	PP
/02/	EGAT	Monitoring report version 06 dated 19/01/2018 (final version)	Completion date 19/01/2017	PP
/03/	EGAT	ER Calculation spreadsheet dated 29/06/2017	File name "ER Thap Sakae (29062017).xlsx"	PP
/04/	EGAT	Registered PDD version 07 dated 29/08/2015	<a href="https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view">https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view</a>	PP
/05/	Bureau Veritas Certification Holding SAS	Validation report requesting for registration version 04 dated 30/09/2015	<a href="https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view">https://cdm.unfccc.int/Projects/DB/BVQI1443850710.86/view</a>	Others
/06/	UNFCCC CDM	AMS-I.D Version 18 "Grid connected renewable electricity generation"	<a href="https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQOQFQQH4SBK">https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQOQFQQH4SBK</a>	Others
/07/	UNFCCC CDM	Monitoring report form version 06.0	<a href="https://cdm.unfccc.int/filestorage/e/x/t/extfile-20150502195215044-iss_form07.pdf/iss_form07.pdf?t=QII8bnZ1MHNmfDAyMtHeTeFX34nroF7QCYy">https://cdm.unfccc.int/filestorage/e/x/t/extfile-20150502195215044-iss_form07.pdf/iss_form07.pdf?t=QII8bnZ1MHNmfDAyMtHeTeFX34nroF7QCYy</a>	Others
/08/	EGAT	First Sync report dated 24/08/2016	First date of power generation fed into the Grid	PP
/09/	Department of Energy	License to operate power generation project	Date 18/08/2016	Others
/10/	EGAT	As-built single line diagram	File name "As built Single line Diagram.pdf"	PP
/11/	EGAT	Email notifying UNFCCC Secretariat dated on 04/07/2017	Email regarding the postponing of crediting period up to one year from earlier date	PP
/12/	Landis + Gyr	Electricity Meter technical specification	Electricity model ZMQ 202C	PP
/13/	EGAT	Certificate of calibration for main electricity meter on 14/07/2016	Serial Number 50743276 (copied given to DOE for further request by UNFCCC)	PP
/14/	EGAT	Certificate of calibration for main electricity meter on 14/01/2017	Serial Number 50074511 (copied given to DOE for further request by UNFCCC)	PP
/15/	EGAT	Certificate of calibration for main electricity meter on 14/07/2016	Serial Number 50743277 (copied given to DOE for further request by UNFCCC)	PP
/16/	EGAT	Certificate of calibration for main electricity meter on 14/01/2017	Serial Number 50074512 (copied given to DOE for further request by UNFCCC)	PP

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

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	xx	Section no.		Date: DD/MM/YYYY
<b>Description of FAR</b>				
n/a				
<b>Project participant response</b>				<b>Date: DD/MM/YYYY</b>
n/a				
<b>Documentation provided by project participant</b>				
n/a				
<b>DOE assessment</b>				<b>Date: DD/MM/YYYY</b>
n/a				

Table 2. CL from this verification

CL ID	01	Section no.	B.2.2.	Date: 19/07/2017
<b>Description of CL</b>				
<p><i>As per indication in table 2 of MR version 01 dated 29/06/2017, please clarify why PP declares the change in number of PV type, which is Crystalline Silicon: c-Si, that had changed from 5,040 to 5,016 cell, and fall into post-registration change in category of "Correction" <u>not</u> "Change to Project Design", given that total watt power of c-Si is equal to 1,254,000 W (5,016x250) which is changed from 1,260,000 W (5,040x250) as indicated in registered PDD.</i></p>				
<b>Project participant response</b>				<b>Date: 04/10/2017</b>
<p><b>1<sup>st</sup> Response (04/10/2017)</b></p> <p><i>The EPC contract mentioned that the net power output of Thap Sakae PV Power Plant shall not less than 5 MW and also specified that the total power output of Crystalline Silicon: c-Si modules shall not less than 1250 kW which the actual installation is meet the contract requirements (1,254,000 W).</i></p> <p><i>Furthermore, as per the Electricity Industrial license, the project agree to sell electricity 5MW to the grid which total electricity output of the actual installation is meet the agreement as well.</i></p> <p><i>Therefore, the decreasing number of c-Si PV cell from registered PDD should be falling into the "Correction" category of post-registration change because it does not affect the output capacity of the project.</i></p>				
<p><b>2<sup>nd</sup> Response (20/10/2017)</b></p> <p><i>The decreasing number of c-Si PV cell has been considered as "Change to project design" due to the installation of units with lower capacity the installation.</i></p> <p><i>The decreasing number of c-Si PV cell does not affect to the registered CDM project activity on the following:</i></p> <ul style="list-style-type: none"> <li><i>(a) The applicability and application of the applied methodologies and, where applicable, the applied standardized baselines, with which the project activity has been registered;</i></li> <li><i>(b) The compliance of the monitoring plan with the applied methodologies and, where applicable, the applied standardized baselines;</i></li> <li><i>(c) The level of accuracy and completeness in the monitoring of the project activity compared with the requirements contained in the registered monitoring plan;</i></li> <li><i>(d) The additionality of the project activity;</i></li> <li><i>(e) The scale of the project activity.</i></li> </ul> <p><i>According to indication in page 9 of MR form version 06, such change is falling under category "(c) Changes that are being submitted with this monitoring report as part of the request for issuance (post-registration changes - issuance track) as applicable from this monitoring period."</i></p> <p><i>The changes of project design have been revised in section B.2.6 of MR version 04 dated 20/10/2017 and Appendix 7 of PDD version 08 dated 28/11/2017.</i></p>				
<b>Documentation provided by project participant</b>				

**1<sup>st</sup> Resposne (04/10/2017)**

Pages from EPC CONTRACT.pdf  
Electricity Industry License.pdf

**2<sup>nd</sup> Response (20/10/2017)**

PDD EGAT Thap Sakae\_v09.doc  
MR Thapsakae\_v04.doc

**DOE assessment****Date:** 11/10/2017**1<sup>st</sup> Comment (11/10/2017)**

Verification team had review submitted evidence, which are (a) Page from EPC contract and (b) Electricity Industry License and found the same 5 MW which is consistent with detail of the project.

However, verifier was able to review the engineer drawing document proposed at the stage of project construction that referring to number of Crystalline Silicon (c-Si) which will be installed at the site for 5,040 cells. During the site visit, verifier found engineer drawing provided at stage of project implementation (as built drawing) that number of Crystalline Silicon had been installed only at 5,016 cells. This fact is also confirmed during physical inspection at the site.

Based on document provided above by PP, verifier consider EPC contract as “minimum” requirement that contractor have to achieve, there is possibility that contractor may provide some technical features that go beyond “minimum” requirement, which is beneficial to project owner but contractor could lost its profit. In this sense, EPC document may not suitable to guarantee whether is there any change from engineering design. In addition, verifier consider the word “5 MW” in Electricity Industry License document as “board” specification of this project with aiming to categorized the size of power plant whether it is small, medium or large size of power plant but not aiming to specify in detail on its engineering specification.

In the sense above, verifier paid attention to document “General Design Plot.pdf” which was designed by engineer at stage of project planning, then compared with Engineering drawing (As built drawing) which were completed after project construction as implementation stage. Verifier can’t deny the information indicated in this document that number of c-Si cells had changed from 5,040 cells to 5,016 cells, this resulting that total electricity power generated from this c-Si panel had decreased from 1,260,000 Watt to 1,254,000 Watt as earlier designed. This given that total electricity power generated from all solar panels are slightly lower than earlier design.

On top of the above, verification team refers to clause 240 (a) of CDM standard for project activity, version 01, which is stated as below

**[CDM project standard for project activity, para 242]**

242. Changes to a registered CDM project activity may include, but are not limited to:

(a) Changes to the effective output capacity due to increased installed capacity or increased number of units, or installation of units with lower capacity or units with a technology which is less advanced than that which is described in the PDD;

In light of the above, verification team consider this change is “Change to project design” which is related to the issue “installation of unit with lower capacity”. This is from decreasing number of c-Si cells from 5,060 cells to 5,016 cells causing total electricity power produced from this c-Si panel reduced to 1,254,000 Watt from originally proposed at 1,260,000 Watt at stage of project design.

Therefore, the PP justification pointing this change to “correction” is not accepted.

This issue is pending.

**2<sup>nd</sup> Comment (27/11/2017)**

Based on revision in section B.2.6 of MR version 04 dated 20/10/2017, it’s accepted by verification team that the reduced number of c-Si cells from 5,060 to 5,016 cells leading to “change to project design”. Verification team has no further question. This is closed

CLOSE OUT

<b>CL ID</b>	02	<b>Section no.</b>	D.2	<b>Date:</b> 19/07/2017
<b>Description of CL</b>				

As per indication of parameter  $EG_{PJ,Import,y}$  in section D.2 of MR version 01 dated 29/06/2017, please clarify why accuracy class of electricity meters, which had been installed and operating to monitor this parameter, are 0.2S not 0.5S as per described in registered PDD.

Please also clarify whether this is “temporary” or “permanent” changes and why not declares this change in appropriate section of “post registration change”

#### Project participant response

Date: 04/10/2017

##### 1<sup>st</sup> response (04/10/2017)

In the actual project implementation, the electricity meters have been monitored both import and export electricity so the accuracy class of electricity meters have been changed from 0.5s to 0.2s.

These changes have fallen under the permanent changes and declared in section B.2.5 of MR version 03 dated 04/10/2017. The accuracy class of electricity meters of parameter  $EG_{PJ,Import,y}$  have been revised in PDD version 08 dated 28/11/2017 and MR version 03 dated 04/10/2017.

##### 2<sup>nd</sup> response (20/10/2017)

The import electricity meters have been operated and maintained by EGAT instead of PEA because a higher accuracy and meter calibration frequency can be controlled by EGAT.

Due to the Project is using higher accuracy electricity meters, therefore the discount factors have not been applied to the calculations of GHG emission reductions, and furthermore these changes do not affect the estimation of GHG emission reductions.

The description of changes have been added to section B.2.5 of MR version 04 dated 20/10/2017 as per indication in page 8 of MR form version 06.

The description of changes have been added to Appendix 7 of PDD version 08 dated 28/11/2017 as per the indications in para 230 and 240 of CDM project standard for project activities version 01.

#### Documentation provided by project participant

##### 1<sup>st</sup> response (04/10/2017)

PDD EGAT Thap Sakae\_v08.doc  
MR Thapsakae\_v03.doc

##### 2<sup>nd</sup> response (20/10/2017)

PDD EGAT Thap Sakae\_v09.doc  
MR Thapsakae\_v04.doc

#### DOE assessment

Date: 27/11/2017

##### 1<sup>st</sup> Comment (11/10/2017)

With reference to detail provided above, it's understood by verifier that these are post-registration changes occurring in monitoring activities and it's different from what was proposed in registered PDD. In addition to this, verification team is able to review description of these changes in revised PDD version 08 and MR version 03 and found these following issues.

- In MR version 03 section B.2.5, there is no description provided in accordance with instruction for complete MR form such as, categories of this changes (prior approval track or issuance track), completion date of revised PDD. This is per indication in page 8 of MR form version 06.
- In revised PDD version 08, there is no description on how PP response to the issue of “conservative assumption or discount factor” to the calculations in the proposed alternative monitoring. This is per indication in para 240 of CDM project standard for project activities version 01.
- In revised PDD version 08, there is no description for the reasons of changes as per indicated in para 230 of CDM project standard for project activities version 01.

This issue is pending

##### 2<sup>nd</sup> Comment (27/11/2017)

Based on new revision in section B.2.5 of MR version 04 dated 20/10/2017, verification team accepted sentence regarding “post-registration change – issuance track),

With reference to the description in appendix 7 of the revised PDD version 08 dated 28/11/2017, it's accepted that import electricity meter was changed because EGAT is able to operate and maintain higher accuracy electricity meter instead of PEA. This point is accepted and this CL is closed.

CLOSE OUT

Table 3. CAR from this verification

CAR ID	01	Section no.	A.2 and excel spreadsheet	Date: 19/07/2017
<b>Description of CAR</b>				
<i>It's appeared in section A.2 of MR version 01 dated 29/06/2017 that location of project (i.e., Thap Sake) is not consistency with other areas of the report. In addition the name of the same project in calculation spreadsheet is not the same with the said MR (i.e., Thap Sakea).</i>				
<b>Project participant response</b>				Date: 04/10/2017
Location of the project under section A.2 of MR version 03 dated 04/10/2017 has been revised from Thap Sake to Thap Sakae.				
<b>Documentation provided by project participant</b>				
MR Thapsakae_v03.doc				
<b>DOE assessment</b>				Date: 11/10/2017
With reference to the latest revision in MMR version 03 dated 04/10/2017, it's found that the spelling for location of project are now consistent through all document. This is accepted and this issue closed.				
CLOSE OUT				

CAR ID	02	Section no.	A.4	Date: 19/07/2017
<b>Description of CAR</b>				
<i>As indication of methodology and tools applied in section A.4 of MR version 01 dated 29/06/2017, it's found that there are no reference to UNFCCC website with referencing to methodologies and tools applied for the project.</i>				
<b>Project participant response</b>				Date: 04/10/2017
The references of methodology and tools that linked to UNFCCC website have been inserted in the footnote under Section A4 of MR version 03 dated 04/10/2017				
<b>Documentation provided by project participant</b>				
MR Thapsakae_v03.doc				
<b>DOE assessment</b>				Date: 11/10/2017
It's found in MR version 03 that reference to the applied methodology is now provided. This is accepted and this issue closed.				
CLOSE OUT				

CAR ID	03	Section no.	B.6.2.	Date: 19/07/2017
<b>Description of CAR</b>				
<i>Combined the parameters provided in section B.6.2 of registered PDD version 07 dated 28/08/2015 with detail in section D.1 of MR version 01 dated 29/06/2017, it's found that <u>not</u> all parameters had been properly listed in the MR and no further elaboration to ease understanding of reader on why are among several parameters fixed ex ante in registered PDD, but only parameter <math>EF_{grid,y}</math> is listed in this section of MR.</i>				
<b>Project participant response</b>				Date: 04/10/2017
<b>1<sup>st</sup> response (04/10/2017)</b>				
The parameter $FC_{i,y}$ , $NCV_{i,y}$ , $EF_{CO2,i,y}$ , $EG_y$ , $FC_{i,m,y}$ , $EG_{m,y}$ , $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ which are listed in section B.6.2 of registered PDD version 07 dated 28/08/2015 have been added in section D.1 of MR version 03 dated 04/10/2017				
<b>2<sup>nd</sup> response (20/10/2017)</b>				
In section D.1 of MR version 04 dated 20/10/2017, the reference of Value(s) applied of the parameter $FC_{i,y}$ , $NCV_{i,y}$ , $EF_{CO2,i,y}$ , $EG_y$ , $FC_{i,m,y}$ , $EG_{m,y}$ , $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ have been revised to "Refer to Appendix 4 of register PDD".				
<b>Documentation provided by project participant</b>				
<b>1<sup>st</sup> response (04/10/2017)</b>				
MR Thapsakae_v03.doc				
<b>2<sup>nd</sup> response (20/10/2017)</b>				
MR Thapsakae_v04.doc				



<b>DOE assessment</b>	<b>Date:</b> 27/11/2017
<b>1<sup>st</sup> Comment (11/10/2017)</b> With reference to latest revision in section B.6.2 of MR version 03 dated 04/10/2017, it's found that all parameter fixed ante, which were indicating in registered PDD, had not been listed in this section. However, there are descriptions in these newly added parameters that referring to "Appendix 1" but verifier is not able to find this referred section in the said MR.  This issue is pending.  <b>2<sup>nd</sup> Comment (27/11/2017)</b> Based on newly added parameters in section B.6.2 of MR version 04 dated 20/10/2017, verification team found that <u>all</u> parameter as provided in registered PDD had been correctly listed. This is accepted and CAR03 is closed.  CLOSE OUT	

<b>CAR ID</b>	04	<b>Section no.</b>	C and D.2	<b>Date:</b> 19/07/2017
<b>Description of CAR</b>				
<i>As per indication in registered PDD version 07 dated 28/08/2015 and MR section C, version 01 dated 29/06/2017 that calibration of electricity meters will be undertaken on regular basis at least once in 3 years. However, it's observed in MR section D.2 that the first calibration test had been conducted on 16/01/2017, resulting the delay of calibration gap was occurred between 01/08/2016 – 15/01/2017 but there is no explanation in both MR and calculation spreadsheet on how PP deals with this gap following conservative manner.</i>				
<b>Project participant response</b>				<b>Date:</b> 04/10/2017
<i>The first meter calibration has been conducted on 14/07/2016, please refer to ESMS-2559-039-50743276(Main) and ESMS-2559-039-50743277(Backup). The second meter calibration has been conducted on 16/01/2017 which terminated the previous energy meters and replaced with the new one. Please refer to Calibration certificate_SN 50074511_ and Calibration certificate_SN 50074511. Therefore, it has no calibration gap in this monitoring period.</i>				
<b>Documentation provided by project participant</b>				
<i>Supporting Documents</i> <i>Meter calibration certificates</i> <i>ESMS-2559-039-50743276(Main).pdf</i> <i>ESMS-2559-039-50743277(Backup).pdf</i> <i>Calibration certificate_SN 50074511_.pdf</i> <i>Calibration certificate_SN 50074512_.pdf</i>				
<b>DOE assessment</b>				<b>Date:</b> 11/10/2017
Combined with evidence found onsite, it's found that there were main & backup electricity meters, which are 50743276 and 50743277, had been replaced by new electricity meter which are 50074511 and 50074512, respectively. Verification team is able verified that the old electricity meters had been properly calibrated on 14/07/2016. It's also found that there was no calibration gap for these monitoring activities, given that the new meters had been put into function and replacing old meters on the continuous basis.  This is accepted and this issue closed.  CLOSE OUT				

<b>CAR ID</b>	05	<b>Section no.</b>	C and D.2	<b>Date:</b> 01/09/2017
<b>Description of CAR</b>				
<i>With reference to objective evidences found onsite, it's observed by verification team that sentences addressing to "PEA" in section C of MR version 01 dated 29/06/2017 are <u>not</u> in line with actual practices in project site, given that electricity meter used for monitoring of parameter EG<sub>PJ,export,y</sub> and EG<sub>PJ,import,y</sub> are operating &amp; maintaining by EGAT not PEA</i>  <i>In addition to the above, it's also found by verification team that description in section D.2 of MR version 01 dated 29/06/2017 in area of "QA/QC procedure : " for parameter EG<sub>PJ,export,y</sub> and EG<sub>PJ,import,y</sub> are not in line with actual monitoring practices, given that data to be cross-checked is done by other means of documents such as, (a) electricity invoices issued by PEA and (b) electricity meter reading report issued by EGAT but <u>not</u> "electricity receipt monthly" as defined by both MR and registered PDD</i>				

<b>Project participant response</b>	<b>Date:</b> 04/10/2017
<p><b><u>1<sup>st</sup> response (04/10/2017)</u></b>  <i>In the actual project implementation, the electricity meters have been monitored both import and export electricity which are operated and maintained by EGAT. The data of parameter <math>EG_{PJ,export,y}</math> and <math>EG_{PJ,import,y}</math> were crosschecked by monthly power delivery reports and electricity invoices.</i></p> <p><i>Please refer to PDD version 08 dated 28/11/2017 section B.7.1 and B.7.3 and MR version03 dated 04/10/2017 section C and section D for the revision as per the actual implementation.</i></p> <p><b><u>2<sup>nd</sup> response (20/10/2017)</u></b>  <i>The description of these changes have been added to section B.2.5 of MR version 04 dated 20/10/2017 as per indication in page 8 of MR form version 06.</i>  <i>The description of changes have been added to Appendix 7 of PDD version 08 dated 28/11/2017 as per the indications in para 230 and 240 of CDM project standard for project activities version 01.</i></p> <p><b><u>3<sup>d</sup> response (28/11/2017)</u></b>  <i>The reason of the changes of QA/QC procedure for parameter <math>EG_{PJ,export,y}</math> and <math>EG_{PJ,import,y}</math> have been added to Appendix 7 of PDD version 08 dated 28/11/2017.</i></p>	
<b>Documentation provided by project participant</b>	
<p><b><u>1<sup>st</sup> response (04/10/2017)</u></b>  PDD EGAT Thap Sakae_v08.doc  MR Thapsakae_v03.doc</p> <p><b><u>2<sup>nd</sup> response (20/10/2017)</u></b>  PDD EGAT Thap Sakae_v09.doc  MR Thapsakae_v04.doc</p> <p><b><u>3<sup>d</sup> response (28/11/2017)</u></b>  PDD EGAT Thap Sakae_v10.doc  MR Thapsakae_v05.doc</p>	
<b>DOE assessment</b>	<b>Date:</b> 27/11/2017
<p><b><u>1<sup>st</sup> Comment (11/10/2017)</u></b>  With reference to detail provided above, it's understood by verifier that these are post-registration changes occurring in monitoring activities and it's different from what was proposed in registered PDD. In addition to this, verification team is able to review description of these changes in revised PDD version 08 and MR version 03 and found these following issues.</p> <ul style="list-style-type: none"> <li>• In MR version 03 section B.2.5, there is no description provided in accordance with instruction for complete MR form such as, categories of this changes (prior approval track or issuance track), completion date of revised PDD. This is per indication in page 8 of MR form version 06.</li> <li>• In revised PDD version 08, there is no description on how PP response to the issue of "conservative assumption or discount factor" to the calculations in the proposed alternative monitoring. This is per indication in para 240 of CDM project standard for project activities version 01.</li> <li>• In revised PDD version 08, there is no description for the reasons of changes as per indicated in para 230 of CDM project standard for project activities version 01.</li> </ul> <p>This issue is pending.</p> <p><b><u>2<sup>nd</sup> Comment (27/11/2017)</u></b>  With reference newly added description in section B.2.5 of MR version 04, this is accepted that this changes had been categorized into issuance track.</p> <p>However, verification team reviewed the change of QA/QC for parameter of <math>EG_{PJ,export,y}</math> and <math>EG_{PJ,import,y}</math> but not able to understand on <u>what is the reason</u> that leads to the changes in these issues. This is not in line with para 230 of CDM project standard for project activities version 01. This is not accepted.</p> <p>This issue is pending.</p> <p><b><u>3<sup>e</sup> Comment (06/12/2017)</u></b>  Verification team reviewed the latest revision in MR version 06 dated 19/01/2018 and found this is in line with para 230 of CDM project standard for project activities version 01. This is accepted and this CAR is closed.</p> <p>CLOSE OUT</p>	



Table 4. FAR from this verification

<b>FAR ID</b>	xx	<b>Section No.</b>		<b>Date:</b> DD/MM/YYYY
<b>Description of FAR</b>				
n/a				
<b>Project participant response</b>				<b>Date:</b> DD/MM/YYYY
n/a				
<b>Documentation provided by project participant</b>				
n/a				
<b>DOE assessment</b>				<b>Date:</b> DD/MM/YYYY
n/a				

## Appendix 5. PROJECT Verification Protocol (Rev 08.2)

**Table 1 CDM validation and verification standard for project activities, version 01.0 (EB 93 Annex 05), CDM project cycle procedure for project activities, version 01.0 (EB 93 Annex 06), CDM project standard for project activities, version 01.0 (EB 93 Annex 04),**

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
<b>Part I Cover Page</b>					
(a) Is the title of the project activity provided?	MR		Yes, The project title is “5MW Thap Sakae Photovoltaic Solar Cell Power Plant Project, Thailand”. This is in line with registered PDD on UNFCCC website.	OK	OK
(b) Is the reference number of the project activity provided?	MR		Yes, The reference Number of the project activity is 10194. This is in line with reference number provided on UN database. .	OK	OK
(c) Is the version number of the monitoring report indicated?	MR		Yes, Version 05	OK	OK
(d) Is the completion date of the monitoring report provided in DD/MM/YYYY format?	MR		Yes, The completion date of the Monitoring Report is 28/11/2017.	OK	OK
(e) Are the monitoring period number and duration of this monitoring period (first and last days included in DD/MM/YYYY format) provided?	MR		Yes, The MR is prepared for the 1 <sup>st</sup> Monitoring period. The monitoring period for this Verification is 01/08/2016 to 31/03/2017 (first and last days included).	OK	OK

(f) Are project participants indicated?	MR		Yes, Electricity Generating Authority of Thailand, this is found in line with the registered PDD.	OK	OK
(g) Is the host party(ies) indicated?	MR		Yes, Thailand	OK	OK
(h) Are the sectoral scope(s) and applied methodology(ies) indicated?	MR		Yes, The sectoral scope identified for this project is Sectoral scope 1 : Energy industries (renewable/ non-renewable sources)  Applied methodology : AMS-I.D version 18 – Grid connected renewable electricity generation	OK	OK
(i) Are the standardized baseline(s) indicated?	MR		Yes, It is indicated as 'n/a'. This is in line with UNFCCC website that there is no standardized baseline applicable for Thailand.	OK	OK
(j) Is the estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD indicated?	MR		Yes,  The estimate amount of GHG emission reductions for this monitoring period is estimated and presented appropriately. The Estimated GHG Reduction for this Monitoring Period as per registered PDD is 2,412 tCO <sub>2</sub> for 8 months periods	OK	OK
(k) Are the GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012 indicated (if applicable)?	MR		Not applicable	-	-
(l) Are the GHG emission reductions or net GHG removals by sinks from 1 January 2013 onwards indicated (if applicable)?	MR		Yes	OK.	OK.

			There is indication of 1,788 tCO <sub>2</sub> e in the report.		
<b>Part II Monitoring Report</b>					
<b>A. Description of project activity</b>					
<b>A.1 Purpose and general description of project activity</b>					
A.1.1	Is the description of the project activity to be presented in this section a brief summary of the detailed description given in the section B.1 Implementation status of the project activity?	MR	Yes, PP has provided clear information regarding project activity and implementation status in Section A.1.	OK	OK
A.1.2 Does this description include:					
A.1.2.1	Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks?	MR	Yes, Description includes the measures taken for GHG emission reductions from producing electricity from solar power projects as they replace grid electricity.	OK	OK
A.1.2.2	Brief description of the installed technology and equipments?	MR	Yes, PP is generating electricity by using solar energy with capacity installation at 5 MW <sub>(ac)</sub> involving 4 types of PV modules as per described in MR	OK	OK
A.1.2.3	Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)?	MR	Yes, Indicated in Table 1	OK	OK
A.1.2.4	Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period?	MR	Yes, It is mentioned and the total emission reductions accounted during this monitoring period is 1,788 tCO <sub>2</sub> .	OK	OK
<b>A.2 Location of project activity</b>					

A.2.1	Is the information on the location of the project activity provided, including Host Party(ies), Region/State/Province, City/Town/Community, Physical/Geographical location etc.?	MR	<p>Yes, This is provided and in line with detail in registered PDD</p> <p><b><u>CAR01</u></b></p> <p>It's appeared in section A.2 of MR version 01 dated 29/06/2017 that location of project (i.e., Thap <u>Sake</u>) is not consistency with other areas of the report. In addition the name of the same project in calculation spreadsheet is not the same with the said MR (i.e., Thap <u>Sakea</u>).</p> <p><i>See closure of CAR01 in appendix 4</i></p>	CAR01	OK
<b>A.3</b>	<b>Parties and project participant(s)</b>				
A.3.1	Is the Party(ies) and project participant(s) involved in the project activity listed in the provided table?	MR	<p>Yes, It is provided in the Monitoring report section A.3. Information is found in accordance with the registered PDD</p>	OK	OK
<b>A.4</b>	<b>Reference of applied methodology</b>				
A.4.1	Is the exact reference (number, title, version) of the methodology(ies) indicated?	MR	<p>Yes, - AMS-I.D "Grid connected renewable electricity generation", version 18. This is in line with registered PDD.</p>	OK	OK
A.4.2	Is the exact reference (number, title, version) of any tools and other methodologies to which the applied methodology(ies) refers indicated?	MR	<p>Yes,</p> <ul style="list-style-type: none"> <li>• "Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion" (Version 02.0)</li> <li>• "Tool to calculate the emission factor for an electricity system" (Version 04.0)</li> </ul> <p>This is in line with registered PDD.</p>	OK	OK

A.4.3	Where applicable, is the exact reference (number, title, version) of applied standardized baseline(s) indicated?	MR		Not applicable. There is no applied standardized baseline(s) referred in registered PDD.	OK	OK
A.4.4	Is the exact UNFCCC CDM website for the exact reference of the applied methodologies, tools and standardized baselines indicated?	MR		No. <b><u>CAR02</u></b> As indication of methodology and tools applied in section A.4 of MR version 01 dated 29/06/2017, it's found that there are no reference to UNFCCC website with referencing to methodologies and tools applied for the project. <i>See closure of CAR02 in appendix 4</i>	CAR02	OK.
<b>A.5 Crediting period of project activity</b>						
A.5.1	Are the type, start date and length of the crediting period corresponding to this monitoring period provided?	MR		Yes, PP has provided this information correctly in the monitoring report and the information is found in accordance with the registered PDD and the Project webpage at UNFCCC website.  The type of crediting period: 10 year fixed Start date of crediting period: 01/08/2014 Length of Crediting Period corresponding to this monitoring period: 8 months from 01/08/2016 - 31/03/2017	OK	OK
<b>A.6 Contact information of responsible persons/entities</b>						
A.6.1	Is contact information of the person(s)/entity(ies) responsible for completing the CDM-MR-FORM provided?	MR		Yes, Mr. Jetsada Falert Ms. Benjawan Surat Advance Energy Plus Co., Ltd.	OK	OK

			Forum Tower Building, floor 28 184/177, Ratchadapisek Rd. Huay Kwang, Bangkok, Thailand. 10310 E-mail: jetsada_f@aep.co.th, benjawan_s@aep.co.th		
A.6.2 Is it indicated whether the person(s)/entity(ies) is(are) also a project participant(s) in Appendix 1	MR		Yes, It is indicated that <i>'The person/entity is not a project participant as indicated in Appendix 1'</i> .	OK	OK
<b>B. Implementation of project activity</b>					
<b>B.1 Description of implemented registered project activity</b>					
B.1.1 Is the description of the installed technology, technical processes and equipments provided, include diagrams where appropriate?	MR PS	257(a)	Yes, It is found satisfactory covering all relevant information related to the project activity. However, there are changes in quantity of Crystalline Silicon: c-Si from 5,040 to 5,016 cells This would be reviewed under PRC validation process	OK	
B.1.2 Is the information on the implementation and actual operation of the project activity, including relevant dates (e.g. construction, commissioning, continued operation periods, etc.) provided?	PS	257(b)	Yes, The information is provided correctly and Information on the implementation and actual operation of the project activity, including relevant dates had been provided in section A.1	OK.	OK.
B.1.3 If applicable, present information on any request for prior approval by the Board of changes to the registered CDM project activity in section B.2.1, B.2.2, B.2.3, B.2.4,	MR		Not applicable	-	-

B.2.5 and/or B.2.6.					
B.1.4 Have the project participants addressed the FARs identified during validation or previous verification(s)?	VVS	323	Verification team reviewed the approved validation report. There was no FAR was raised during validation process.	OK	OK
B.1.5 Have the implementation and operation of the project activity been conducted in accordance with the description contained in the registered PDD?	VVS	357 (a)	No.  Verification team raised CAR05 please see in section below	CAR05 See below	OK.
B.1.6 Have any deviation or the proposed or actual changes in the implementation or operation of the project activity comply with the relevant requirements of the "CDM project standard for project activities".	VVS	357 (b)	Please refer to CL01 and CL02 below.	CL01 CL02	OK
B.1.7 Are all physical features of the project activity in the registered PDD in place?	VVS	358	Yes.  All physical features of the project activities had been in places as per description in registered PDD.	OK.	OK.
B.1.8 Have the project participants operated the project activity as per the registered PDD or any approved revised PDD?	VVS	358	Yes.  It's confirmed that EGAT is still operating as project participant as described in registered PDD.	OK.	OK.
B.1.9 Was an on-site visit conducted?	VVS	358	Yes,  On site visit was conducted on 31/08/2017	OK	OK.
<b>B.2 Post registration changes</b>					
B.2.1 Temporary deviations from registered monitoring plan or applied methodology					
B.2.1.1 Is it indicated whether any temporary deviations have been applied during this	MR		Yes,	OK.	OK.



monitoring period?			<p><i>There is description in MR that during this monitoring period, there are no any temporary deviations from registered monitoring plan or applied methodology.</i></p> <p>It's confirmed by verification team that there is no any temporary deviation</p>		
B.2.1.2 Is a description of the deviation(s) in accordance with applicable provisions in the Project standard provided?	MR		Not Applicable	-	-
B.2.1.3 Are the reasons for the deviation(s), how it deviates from the monitoring plan and/or applied methodology(ies), the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach included in the description?	MR		Not Applicable	-	-
B.2.1.4 For deviation(s) that require prior approval by the Board, are the date of approval and reference number included in the description?	MR		Not Applicable	-	-
<b>B.2.2 Corrections</b>					
B.2.2.1 Is it indicated whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report?	MR		<p>Yes,</p> <p>There are corrections in the number of photovoltaic panel, Crystalline Silicon: c-Si has been changed in the actual project implementation from 5,040 to 5,016 cells.</p> <p>This would be reviewed under PRC validation process</p> <p><b><u>CL01</u></b></p> <p>As per indication in table 2 of MR version 01 dated 29/06/2017, please clarify why PP declares the change in number of PV type, which is Crystalline Silicon: c-Si, that had changed from 5,040 to 5,016 cell, and fall into post-registration change in category of "Correction" <u>not</u> "Change to Project Design", given that total watt power of c-Si is equal to 1,254,000 W (5,016x250) which is</p>	GL01 GL02	OK.

			<p>changed from 1,260,000 W (5,040x250) as indicated in registered PDD.</p> <p>In light of the above, please also submit evidences showing <u>actual</u> number of PV module in each type including inverter and transformer that had been installed and operating in the project site</p> <p><b><u>CL02</u></b> As per indication of parameter <math>EG_{PJ,Import,y}</math> in section D.2 of MR version 01 dated 29/06/2017, please clarify why accuracy class of electricity meters, which had been installed and operating to monitor this parameter, are 0.2S <u>not</u> 0.5S as per described in registered PDD.</p> <p>Please also clarify whether this is “temporary” or “permanent” changes and why not declare this change in appropriate section of “post registration change”</p> <p><i>See closure of CL01 and CL02 in appendix 4</i></p>		
B.2.2.2 In cases where the correction(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided? Otherwise, are the version number and the completion date of the revised PDD provided?	MR		Not Applicable.	-	-
B.2.3 Changes to start date of crediting period					
B.2.3.1 Is it indicated whether any changes to the start date of the crediting period have been approved during this monitoring period?	MR		<p>Yes,</p> <p>With reference to web hosted MR, it is confirmed that there is change of crediting period to the project activity.</p> <p>See list of doc requested issuing for requesting notification evidence to secretariat in PRC validation</p>		

			report.		
B.2.3.2 In cases where the changes and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided?	MR		Not Applicable.	-	-
<b>B.2.4 Inclusion of a monitoring plan to the registered PDD that was not included at registration</b>					
B.2.4.1 Is it indicated whether the inclusion of a monitoring plan into the PDD for which the delayed submission of the monitoring plan was chosen by the project participants at the time of the registration of the project activity, has been approved by the Board prior to the submission of this monitoring report or is being submitted together with this monitoring report?	MR		Yes, <i>During this monitoring period, there is no any inclusion that was not included at registration.</i>	OK	OK.
B.2.4.2 In cases where the inclusion of a monitoring plan into the registered PDD had been approved by the Board prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided?	MR		Not Applicable	OK	OK.
<b>B.2.5 Permanent changes from registered monitoring plan or applied methodology or applied standardized baseline</b>					
B.2.5.1 Is it indicated whether any permanent changes from the registered monitoring plan or applied methodologies have been approved during this monitoring period or submitted with this monitoring	MR		Yes, It is indicated that there are no permanent changes	OK.	OK.

report?			This would be reviewed under PRC validation process		
B.2.5.2 In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided? Otherwise, are the version number and the completion date of the revised PDD provided?	MR		Not Applicable.	-	-
B.2.6 Changes to project design of registered project activity					
B.2.6.1 Is it indicated whether any changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report?	MR		Yes, <i>During this monitoring period, there are no any changes to the project design of registered project activity.</i> However, verification team raise CL01 as per above.	CL01	OK.
B.2.6.2 In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided? Otherwise, are the version number and the completion date of the revised PDD provided?	MR		Not Applicable.	-	-
B.2.7 Types of changes specific to afforestation or reforestation project activity					
B.2.7.1 Is it indicated whether any changes specific to afforestation or reforestation project activities have been applied during this monitoring period based on applicable provisions in the Project standard that do not require prior	MR		Yes, <i>Not Applicable</i> It is confirmed that this is not afforestation and reforestation project activity.	-	-

approval by the Board?					
B.2.7.2 If changes were applied, are the version number and the completion date of the revised PDD provided?	MR		Not Applicable	-	-
<b>C. Description of monitoring system</b>					
<b>C.1 General requirements</b>					
C.1.1 Have project participants described the monitoring system and provided line diagrams (graphical schemes) showing all relevant monitoring points?	MR PS	- 259	Yes,  The monitoring system is described in Monitoring Report Section C. All relevant monitoring points are found identified. The identification of these monitoring points is found in accordance with the process requirements. Data flow diagram was shown in Figure 5-6	OK	OK.
C.1.2 Does this description where appropriate include data collection procedures (information flow including data generation, aggregation, recording, calculations and reporting), organizational structure, roles and responsibilities of personnel, and emergency procedures for the monitoring system?	MR PS	- 259	Yes,  The monitoring report clearly describes this.	OK	OK.
C.1.3 Is the registered monitoring plan of the project activity in accordance with the applied methodology including applicable tool(s)?	VVS	360	Yes,  The monitoring report covers the monitoring requirement as per the approved methodology.	OK	OK.
C.1.4 For monitoring aspects that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency), are there any issues which may enhance the level of accuracy and completeness of the monitoring plan and should bring to the	VVS	361	Not Applicable.  Verification team confirmed that there is no any issue that should bring to UNFCCC concerns in order to raise level of accuracy and completeness.	-	-

attention of the Board?					
C.1.5 Has the registered monitoring plan been properly implemented and followed by the project participants?	VVS	364(a)	Please see CAR05 below	CAR05 See below	OK.
C.1.6 Have all parameters stated in the registered monitoring plan and relevant Board decisions been monitored and updated as applicable, including:	VVS	364(b)			
C.1.6.1 Project emission parameters?	VVS	364(b) (i)	Not Applicable.  There is no project emission parameter to be monitored as per registered PDD.	OK	OK.
C.1.6.2 Baseline emission parameters?	VVS	364(b) (ii)	Baseline emission parameters are as per the Approved Methodology and that is the net electricity exported to the Grid. This is found in accordance with the requirement of registered monitoring plan. PP has provided necessary arrangement to monitor this parameter.	OK	OK.
C.1.6.3 Leakage parameters?	VVS	364(b) (iii)	Not Applicable.  There is no leakage emission parameter to be monitored as per registered PDD.	-	-
C.1.6.4 Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?	VVS	364(b) (iv)	Yes,  There is no change observed in this section.	OK.	OK.
<b>D. Data and parameters</b>					
<b>D.1 Data and parameters fixed ex ante or at renewal of crediting period</b>					
D.1.1 For "Purpose of data", is one of the following options chose: (a) Calculation of baseline	MR		Yes,	OK	OK.

emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks; (c) Calculation of leakage?			It is clearly mentioned in the monitoring report against each monitoring parameter appropriately.		
D.1.2 For “Value(s) applied”, if applicable, is one table used to report multiple values referring to the same data and parameter? If necessary, are reference(s) to electronic spreadsheets used?	MR		Yes,	OK	OK.
D.1.3 Is the source of data provide and/or identified?	PS	261(d)	Yes, Source of data is provided against each monitoring parameter appropriately and it is found in accordance with the registered monitoring plan.	OK	OK.
D.1.4 Is information about appropriate emission factors, IPCC default values and any other reference values that have been used in the calculation of GHG emission reductions or net GHG removals provided?	PS	261(g)	No  Verification team raised CAR03 as per following. <b><u>CAR03</u></b> Combined the parameters provided in section B.6.2 of registered PDD version 07 dated 28/08/2015 with detail in section D.1 of MR version 01 dated 29/06/2017, it's found that <u>not</u> all parameters had been properly listed in the MR and no further elaboration to ease understanding of reader on why are among several parameters fixed ex ante in registered PDD, but only parameter $EF_{grid,y}$ is listed in this section of MR.  <i>See closure of CAR03 in appendix 4</i>	CAR03	OK
<b>D.2 Data and parameters monitored</b>					
D.2.1 For “Purpose of data”, is one of the following options chose: (a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or	MR		Yes, It is clearly mentioned in the monitoring report against	OK	OK.

actual net GHG removals by sinks; (c) Calculation of leakage?			each monitoring parameter appropriately.		
D.2.2 For "Value(s) of monitored parameter", if applicable, is one table used to report multiple values referring to the same data and parameter? If necessary, are reference(s) to electronic spreadsheets used?	MR		Yes, there is spreadsheet provided to verification team.	OK	OK.
D.2.3 Are the values of the monitored parameter for the purpose of calculating GHG emission reductions or net GHG removals provided? Where data are measured continuously, are they presented using an appropriate time interval? For default values (such as an IPCC value), where it is ex post confirmed, is the most recent value applied?	PS	261(a)	Yes,  This information is transparently made available in the Monitoring report and calculation spreadsheet and is planned to be verified during the on-site inspection.	OK	
D.2.4 Is the equipment used to monitor each parameter described, including details on accuracy class, and calibration information (frequency, date of calibration and validity), if applicable as per monitoring plan?	PS	261(b)	For $EG_{PJ, facility, y}$ , $EG_{PJ, import, y}$ and $EG_{PJ, export, y}$ , it is found that monitoring equipments have been properly documented,.	OK.	OK.
D.2.5 Is the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer's specification?	VVS	364(c)	No.  Verification team raised CAR04 as per following. <b>CAR04</b> As per indication in registered PDD version 07 dated 28/08/2015 and MR section C version 01 dated 29/06/2017 that calibration of meters will be undertaken on regular basis at least once in 3 years. However, it's observed in MR section D.2 that the first calibration test had been conducted on 16/01/2017, resulting the delay of calibration gap was occurred between 01/08/2016 – 15/01/2017 but there is no explanation in both MR and calculation spreadsheet on how PP deals with this gap following conservative manner.	CAR04	OK.



			See closure of CAR04 in appendix 4		
D.2.6 Is the calibration of those measuring equipments that have an impact on the claimed emission reductions conducted by the project participants at a frequency specified in the applied monitoring methodology and/or the monitoring plan?	VVS	368 – 374	Yes.  It's confirmed that electricity meter had been calibrated as per monitoring plan.	OK.	OK.
D.2.7 If, during verification of a certain monitoring period, the calibration has been delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), is the following conservative approach adopted in the calculation of emission reductions:	VVS	369			
D.2.7.1 Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error?	VVS	369(a)	Not applicable	-	-
D.2.7.2 Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment?	VVS	369(b)	Not applicable	-	-
D.2.8 Has the error has been applied:	VVS	370			
D.2.8.1 In a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed emission reductions?	VVS	370(a)	Not applicable	-	-

D.2.8.2 For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.	VVS	370(b)	Not applicable	-	-
D.2.9 In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, prior to finalizing verification, were the project participants requested to conduct the required calibration have the project participants calculated the emission reductions conservatively using the approach mentioned in item “ <b>Error! Reference source not found.</b> ” above?	VVS	371	Not applicable	-	-
D.2.10 In cases where it is not possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of PPs, are the requirements for post registration changes, in section 8 of the VVS, followed?	VVS	372	Not applicable	-	-
D.2.11 In cases where neither the monitoring methodology nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, are the equipments calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification? If neither local/national standards nor the manufacturer's specification are available, were international standards used?	VVS	373	Not applicable	-	-
D.2.12 Is it described how the parameters are measured/calculated and the measurement	PS	261(c)	Yes, it's properly described	OK.	OK.

and recording frequency?					
D.2.13 Are monitoring results consistently recorded as per approved frequency?	VVS	364(d)	Yes, it's recorded as per approved frequency	OK.	OK.
D.2.14 Is the source of data (e.g. logbooks, daily records, surveys, etc.) provide and/or identified?	PS	261(d)	Yes, please see below in protocol	-	-
D.2.15 Where relevant is the calculation method of the parameter provided?	PS	261(e)	Yes, The calculation of Emission Reduction is provided.	OK	OK.
D.2.16 Are the QA/QC procedures applied described (if applicable per monitoring plan)?	PS	261(f)	Yes, description of QA/QC procedure is provided.	OK.	OK.
D.2.17 Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or the revised monitoring plan?	VVS	364(e)	<p>No</p> <p>Based on verification finding during onsite visit, it's found that the QA/QC by PEA is not in line with real practices on the site, therefore, verification issues CAR05 as per following</p> <p><b><u>CAR05</u></b></p> <p>With reference to objective evidences found onsite, it's observed by verification team that sentences addressing to "PEA" in section C of MR version 01 dated 29/06/2017 are not in line with actual practices in project site, given that electricity meter used for monitoring of parameter EGPJ,export,y and EGPJ,import,y are operating &amp; maintaining by EGAT not PEA</p> <p>In addition to the above, it's also found by verification team that description in section D.2 of MR version 01 dated 29/06/2017 in area of "QA/QC procedure : " for parameter EGPJ,export,y and EGPJ,import,y are not in line with actual monitoring practices, given that data to be</p>	CAR05	OK

			cross-checked is done by other means of documents such as, (a) electricity invoices issued by PEA and (b) electricity meter reading report issued by EGAT but not “electricity receipt monthly” as defined by both MR and registered PDD <i>See closure of CAR05 in appendix 4.</i>		
D.2.18 Is information about appropriate emission factors, IPCC default values and any other reference values that have been used in the calculation of GHG emission reductions or net GHG removals provided?	PS	261(g)	Yes, Monitoring report contains relevant and appropriate information on usage of emission factor used by PP while calculating Emission reductions.	OK	OK
<b>D.3 Implementation of sampling plan</b>					
D.3.1 Is a description provided on how project participants implemented the sampling efforts and surveys for those data and parameters according to the sampling plan, Include:	MR		Yes, As per the registered monitoring plan and PDD, it is confirmed that sampling plan is not applicable for this project activities.	OK	OK
D.3.1.1 Description of implemented sampling design?	MR		Not Applicable.	-	
D.3.1.2 Collected data (electronic spreadsheets may be attached and referenced)?	MR		Not Applicable.	-	
D.3.1.3 Analysis of the collected data?	MR		Not Applicable.	-	
D.3.1.4 Demonstration on whether the required confidence/precision has been met?	MR		Not Applicable.	-	
<b>E. Calculation of emission reductions or GHG removals by sinks</b>					
<b>E.1 Calculation of baseline emissions or baseline net GHG removals by sinks</b>					
E.1.1 Are the sample calculations for all formulae used and calculation of baseline emissions or baseline net GHG removals by sinks	MR PS	- 253(a)	Yes, Monitoring Report Section E.1 provides detailed		

provided, applying actual values?			information on how PP has calculated the Baseline Emissions during this Monitoring period. The formulae used by PP are found in accordance with the registered PDD.		
E.1.2 Are the electronic spreadsheets to present full calculations in the monitoring report attached?	MR		Yes, Emission reduction calculation spread sheet is provided with all calculations. The ER Spreadsheet is found transparently showing the calculations.	OK.	OK.
<b>E.2 Calculation of project emissions or actual net GHG removals by sinks</b>					
E.2.1 Are the sample calculations for all formulae used and calculation of project emissions or actual net GHG removals by sinks provided, applying actual values?	MR PS	- 265(b)	Yes calculation is provided.	OK.	OK.
E.2.2 Are the electronic spreadsheets to present full calculations in the monitoring report attached?	MR		Yes, Emission reduction spread sheet is provided with all calculations. The ER Spreadsheet is found transparently showing the calculations.	OK	OK.
<b>E.3 Calculation of leakage</b>					
E.3.1 Are the sample calculations for all formulae used and calculation of leakage provided, applying actual values?	MR PS	265(c)	Not applicable. This is not biomass project.	-	-
E.3.2 Are the electronic spreadsheets to present full calculations in the monitoring report attached?	MR		Yes, Emission reduction spread sheet is provided with all calculations. The ER Spreadsheet is found transparently showing the calculations.	OK	OK
<b>E.4 Summary of calculation of emission reductions or net anthropogenic GHG</b>					

removals by sinks					
E.4.1	Are the results of above sections summarized and GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period presented, using the provided table?	MR PS	- 265(d)	Yes,  This information is provided in the tabular form and detailed calculations are provided to support this tabular information.	OK
E.4.2	Is a complete set of data for the specified monitoring period is available?	VVS	376(a)	Yes.  The complete set of data is available.	OK. OK.
E.4.3	Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?	VVS	376(b)	Yes.  The monitored data had been cross-checked with power delivery report and electricity invoices	OK. OK.
E.4.4	Have calculations of baseline emissions, and project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?	VVS	376(c)	Yes,  The calculations provided in the Monitoring report and in the form of Calculation Spreadsheet are in accordance with the registered PDD and approved Monitoring Plan.	OK OK.
E.4.5	Have any assumptions used in emission calculations been justified?	VVS	402(d)	Not Applicable.  There is no assumptions made, all calculation are based on the factual data obtained during day to day operation of Power plant.	- -
E.4.6	Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	VVS	402(e)	Yes.  Emission factor as per registered PDD is found applied correctly.	OK OK.

E.4.7	If the monitoring period starts before 31 December 2012 and ends anytime thereafter, are actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved for the following two periods provided respectively? (a) Up to 31 December 2012 (1st commitment period); (b) From 1 January 2013 onwards.	MR		Yes,  This Monitoring period is starting from 1 <sup>st</sup> August 2016, which is after 1 <sup>st</sup> January 2013.  PP has provided correct information in the Tabular manner in the Monitoring Report Section E.4	OK	OK.
E.4.8	Is it ensured that the achieved GHG emission reductions or net anthropogenic GHG removals by sinks are calculated proportionally for each period? In cases where annual caps were applied in the calculations, is it ensured that the annual caps are pro-rated to each period?	MR		Emission reductions are calculated based on the monthly calculations and hence it is ensured that the correct amounts of emission reductions are accounted. There are no pro-rated calculations required.	OK	OK.
<b>E.5</b>	<b>Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD</b>					
E.5.1	Is a comparison of actual GHG emission reductions or net anthropogenic GHG removal of the project activity achieved during this monitoring period with the estimates in the registered PDD provided?	MR PS	- 268	Yes,  PP has provided Tabular information to compare the Actual GHG emission achieved during this crediting period with the estimates in the registered PDD.	OK	OK.
<b>E.6</b>	<b>Remarks on difference from estimated value in registered PDD</b>					
E.6.1	For any registered CDM project activity, except A/R project activities, have project participants explained the cause of any increase in the actual GHG emission reductions achieved during the current monitoring period (e.g. higher water availability, higher plant load factor, etc.),	MR PS	- 269	There is no increase in the Actual GHG emission reductions during this Monitoring period. The GHG emissions calculated for this monitoring period is found less than that of the estimated quantity provided in the registered PDD because the project was not fully implemented	OK	OK

including all information (i.e. data and/or parameters) that is different from that stated in the registered PDD?					
<b>F. Appendix 1 - Contact information of project participants and responsible persons/entities</b>					
F.1.1 Are Project participant and/or responsible person/entity for completing the CDM-MR-FORM indicated?	MR		Yes, Both Project participant and responsible person/entity for completing the CDM-MR-FORM are indicated.	OK	OK.
F.1.2 Are Organization, Street/P.O. Box, City, Postcode, Country, Telephone, Fax, E-mail and Name of contact person of each Project participant and/or responsible person/entity provided?	MR		Yes. It's provided.	OK.	OK