JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Introduction of Solar PV Systems on Rooftops of Factory and Office Building
Reference number	TH001
Third-party entity (TPE)	Lloyd's Register Quality Assurance Limited (LRQA)
Project participant contracting the TPE	Pacific Consultants Co., Ltd. (PCKK)
Date of completion of this report	08/08/2017

A.2 Conclusion of validation

Overall validation opinion	☒ Positive ☐ Negative

A.3. Overview of final validation conclusion

Only when all of the checkboxes are checked, overall validation opinion is positive.

Item	Validation requirements	No CAR or CL remaining
Project design document form	The TPE determines whether the PDD was completed using the latest version of the PDD forms appropriate to the type of project and drafted in line with the Guidelines for Developing the Joint Crediting Mechanism (JCM) Project Design Document, Monitoring Plan and Monitoring Report.	☒
Project description	The description of the proposed JCM project in the PDD is accurate, complete, and provides comprehension of the proposed JCM project.	☒
Application of approved JCM methodology (ies)	The project is eligible for applying applied methodology and that the applied version is valid at the time of submission of the proposed JCM project for validation.	☒
Emission sources and calculation of emission reductions	All relevant GHG emission sources covered in the methodology are addressed for the purpose of calculating project emissions and reference emissions for the proposed JCM project.	☒
	The values for project specific parameters to be fixed *ex ante* listed in the Monitoring Plan Sheet are appropriate, if applicable.	☒
Environmental impact assessment	The project participants conducted an environmental impact assessment, if required by the Kingdom of Thailand, in line with Thai procedures.	☒
Local stakeholder consultation	The project participants have completed a local stakeholder consultation process and that due steps were taken to engage stakeholders and solicit comments for the proposed	☒

Item	Validation requirements	No CAR or CL remaining
	project.	
Monitoring	The description of the Monitoring Plan (Monitoring Plan Sheet and Monitoring Structure Sheet) is based on the approved methodology and/or Guidelines for Developing the Joint Crediting Mechanism (JCM) Project Design Document, Monitoring Plan, and Monitoring Report. The monitoring points for measurement are appropriate, as well as whether the types of equipment to be installed are appropriate if necessary.	☒
Public inputs	All inputs on the PDD of the proposed JCM project submitted in line with the Project Cycle Procedure are taken into due account by the project participants.	☒
Modalities of communications	The corporate identity of all project participants and a focal point, as well as the personal identities, including specimen signatures and employment status, of their authorized signatories are included in the MoC.	☒
	The MoC has been correctly completed and duly authorized.	☒
Avoidance of double registration	The proposed JCM project is not registered under other international climate mitigation mechanisms.	☒
Start of operation	The start of the operating date of the proposed JCM project does not predate January 1, 2013.	☒

Authorised signatory:	Mr. ☒ Ms. ☐
Last name: Chiba	First name: Michiaki
Title: Climate Change Manager - Asia & Pacific	
Specimen s [redacted]	Date: 08/08/2017

B. Validation team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Michiaki Chiba	LRQA Ltd.	Team leader	☒	Technical competence authorised	☒
Mr. ☒ Ms. ☐	Dhirayut Chenvidhya	External expert	Host country and sector expert	☐	Technical competence authorised	☒
Mr. ☒ Ms. ☐	Xianxin Yan	LRQA China	Internal reviewer	☒	N/A	☐
Mr. ☐ Ms. ☐				☐		☐

Please specify the following for each item.

* *Function: Indicate the role of the personnel in the validation activity such as team leader, team member, technical expert, or internal reviewer.*

* *Scheme competence: Check the boxes if the personnel have sufficient knowledge on the JCM.*

* *Technical competence: Indicate if the personnel have sufficient technical competence related to the project under validation.*

C. Means of validation, findings, and conclusion based on reporting requirements

C.1. Project design document form

<Means of validation>

The PDD was checked and confirmed as complete against the JCM Guidelines for Developing Project Design Document (PDD) and Monitoring Report (MR) No. JCM_TH_GL_PDD_MR_ver01.0. A valid form of the JCM PDD Form No. JCM_TH_F_PDD_ver01.0 is used for the PDD Version 01.0 dated 26/01/2017. The completeness was also checked for the revised PDD Version 02.0 dated 13/07/2017.

The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that the PDD was completed using the valid form of the JCM PDD Form and in accordance with the JCM Guidelines for Developing PDD and MR.

C.2. Project description

<Means of validation>

The project is to introduce total 994.56 kW solar photovoltaic (PV) systems on rooftops of A-14 Factory Building (Site A) and Head Quarters Building (Site B) of Siam Steel International Public Company Limited (SSI) in Samutprakharn, Thailand. The electricity generated by the project PV systems is self-consumed without being fed to the public electricity grid system and reduces GHG emissions from generation of grid electricity that is imported by SSI in the absence of the JCM project. The project solar PV systems employ Panasonic HIT photovoltaic module VBHN240SJ25.

The project is implemented by SSI and Pacific Consultants Co., Ltd. (PCKK) from Japan. The start date of project operation is on 27/06/2016 for Site A and 20/06/2016 for Site B. The expected operational lifetime of the project is for 10 years. The PPs referred to the Statutory useful life for the calculation of depreciation and amortization for machinery and equipment issued by Japan's Ministry of Finance for the basis of the expected operational lifetime of the project solar PV systems indicated as for 10 years (facilities for metal product manufacturing). The project PV systems applying the state-of-art design of the Japanese leading manufacturer will have a longer operational lifetime with sound operation and maintenance activities, but the PPs selected shorter lifetime specified by the applicable regulations. That is conservative and considered acceptable as it fulfils the duration of the crediting period.

The project receives financial support for JCM model projects from the Ministry of the Environment, Japan. The PP from Japan contributes in the project achieving GHG emission reductions by provision of capacity building on operation and monitoring with a Thai-based Japanese company.

The validation team assessed the PDD and the supporting documents, interviewed the PPs to validate the requirements concerning accuracy and completeness of the project description.

The details of the persons interviewed and documents reviewed are provided in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team assessed the project description provided in the PDD with the supporting documents to the requirements on the accuracy and completeness. The validation team confirmed that the proposed JCM project in the PDD is described in accurate and complete manners that is understandable the nature of the proposed project activity.

C.3. Application of approved methodology(ies)

<Means of validation>

The project applied the approved methodology JCM_TH_AM001_ver01.0 "Installation of Solar PV System" Ver 01.0.

LRQA assessed if the selected methodology is applicable to the proposed project. The project applicability was checked against each eligibility criterion in the selected approved methodology. The steps taken to validate each eligibility criterion and the conclusions about its applicability to the proposed project are summarised as below.

Criterion 1: The project installs solar PV system(s).

Justification in the PDD: Two solar PV systems are installed at both Site A and B. The solar PV module employed is Panasonic HIT photovoltaic module VBHN240SJ25. The inverter employed is Huawei String Inverter SUN2000-20KTL.

Steps taken for assessment: Document review was conducted on the project documentation, technical specification, the test and commissioning reports, and the on-site visit and interviews were conducted at the project sites.

Conclusion: Based on the validation processes taken, the validation team confirmed that the project installed solar PV systems at the 2 sites of SSI and the criterion is met.

Criterion 2: The solar PV system is connected to the internal power grid of the project site and/or to the grid for displacing grid electricity and/or captive electricity at the project site.

Justification in the PDD: The solar PV system of each site is connected to the internal power grid of each site and to the grid.

Steps taken for assessment: Document review was conducted on the electricity diagram, and the on-site visit and interviews were conducted at the project sites.

Conclusion: Based on the validation processes taken, the validation team confirmed that the project solar PV systems are connected to the internal electricity supply systems of the factory and the building of SSI. The electricity supply systems of SSI are connected to the public power grid system and no captive electricity exists in the project sites. The project was confirmed to displace consumption of grid electricity. The systems to prevent reverse power flow from the project solar PV systems to the public power grid systems have been installed and the electricity generated by the project solar PV systems is only consumed at the project sites. The criterion is met by the proposed project.

Criterion 3: The PV modules have obtained a certification of design qualifications (IEC 61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).

Justification in the PDD: The installed PV module (Panasonic HIT photovoltaic module

VBHN240SJ25) has obtained a certification of design qualifications (IEC 61215) and safety qualification (IEC 61730-1 and IEC 61730-2).
Steps taken for assessment: Document review was conducted on the technical specification, certificates of design qualifications and safety qualification, the test and commissioning reports, and the on-site visit and interviews were conducted at the project sites.
Conclusion: Based on the validation processes taken, the validation team confirmed that the PV modules of the project solar PV system have obtained the certificates in compliance with the international standards IEC61215, IEC61730-1 and IEC61730-2 as appropriate. The criterion was therefore fulfilled.

Criterion 4: The equipment to monitor output power of the solar PV system and irradiance is installed at the project site.
Justification in the PDD: For each site, two electricity meters are installed to measure output power of the solar PV system. A pyranometer is installed at each site to measure irradiance.
Steps taken for assessment: Document review was conducted on the technical specification, the test and commissioning reports, and the on-site visit and interviews were conducted at the project sites.
Conclusion: Based on the validation processes taken, the validation team confirmed that the monitoring equipment has been installed for output power of the solar PV systems as well as irradiance at each project site. Thus the criterion was confirmed as satisfied by the project.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that the project applied the valid version of the approved methodology and the applicability was demonstrated to the eligibility criteria as appropriate.

C.4. Emission sources and calculation of emission reductions

<Means of validation>

The project supplies electricity generated by solar PV systems installed on the rooftops of the factory and office building for the self-consumption and displaces electricity purchased from the public power grid system. No captive power generation facility exists in the project sites. The source of GHG emissions is consumption of grid electricity and CO2 emissions in the reference scenario are considered to determine the reference emissions (REs), while the project emissions (PEs) is assumed to be zero for the solar PV system in accordance with the applied methodology. The annual electricity generation of the project is estimated ex-ante at 1,540.98

MWh. The estimation is based on the results of simulation conducted by the technology supplier and obtained as sum of A-14 East: 643.76 MWh, A-14 West: 590.18 MWh and Headquarter: 307.04 MWh. The default CO2 emission factor for the grid electricity of 0.319 t-CO2/MWh is chosen. The annual GHG emission reductions (ERs) are calculated using the estimated annual electricity generation of the project: ERs = REs – PEs = 1,540.98 MWh x 0.319 – 0 = 491 t-CO2e. In the first year, Site A was operated from 27/06/2016 and Site B was operated from 20/06/2016. Based on the simulation, the ERs in the first year of operation was estimated at 236 tCO2e.

The validation team assessed the documented evidence and confirmed that all the relevant GHG emission sources covered in the applied methodology are addressed, and the steps taken and the equations applied to calculate REs for the proposed project comply with the requirements of the approved methodology.

Through the processes taken, CL 2 was raised as the resolution detailed below.

The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CL 2

Nature of the issue raised: The PPs were requested to clarify relevance of ex-ante estimation of GHG emission reductions. The level of electricity generation through the actual operation of the project system until the validation on site visit was observed much less than the simulation results by the technology provider at the initial design.

Nature of responses provided by the PPs:

The PPs explained that the level of generation had been lower than the simulation results as it could have not utilised the capacity as designed, but the PPs were studying measures to improve electricity generation that would be taken during the crediting period if confirmed the effectiveness. If an effective measure could not be taken, the PPs would consider applying of a post registration change as relevant following the procedures of JCM.

Assessment of the responses:

The validation team noted that the project sites are applied functions to prevent reverse electricity flow to the connected public power grid systems that have interrupted utilising capacity of the project solar PV systems as designed. Under the current conditions, electricity generation of project solar PV systems is stopped when electricity consumption of specified building areas is low or less than electricity supply from the solar PV systems, and the power demand is met by import of grid electricity. The PPs are under studying measures to improve the conditions after looking at the operational outcomes since commissioning of the project systems. The measures if confirmed as effective might be taken during the crediting period.

Application of a post registration change will be considered if the level of ERs becomes lower than the ex-ante estimation based on the simulation by the supplier in lack of effective measures for improvement over the crediting period. The CL was closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that:

- The methodology was applied correctly to calculate PEs and REs and no other significant emission source was identified that would be affected and reasonably attributed by implementation of the proposed project but not addressed by the applied methodology;
- The choice of whether an emission source or gas is to be included where the applied methodology allows was reasonably justified by the PPs;
- The Monitoring Plan Sheet (MPS) was not altered and the fields were filled in as required so that all estimates of the REs could be replicated using the data and parameter values provided in the PDD;
- The values for the project specific parameters fixed ex ante listed in the MPS were appropriate with all the data sources and assumptions and the calculations were correct to the proposed JCM project;
- All assumptions and data used by the PPs were listed in the PDD, including their references and sources; and
- All values used in the PDD were considered reasonable in the context of the proposed JCM project.

C.5. Environmental impact assessment

<Means of validation>

The proposed project is to install the total 994.56 kW solar PV systems on rooftops of the existing factory and office building in the premise of the existing steel products manufacturing factory located in the industrial area and an environmental impact assessment is not required by laws of the host country. The validation team assessed the applicable legal requirements in the host country using its local sources/expertise and confirmed that an environmental impact assessment is not required to be conducted for implementation of the project.

The details of the persons interviewed and documents reviewed are provided in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed by assessing the relevant documents and using the local sources/expertise that the project does not need an environmental impacts assessment to be conducted to meet the legal requirement of the host country and the PDD satisfies the requirements of the JCM.

C.6. Local stakeholder consultation

<Means of validation>

The PPs identified the employee of SSI working at the project sites as the main local stakeholders and held a consultation meeting that was also attended by staff of the EPC contractor. The managers and engineers of SSI attended the meeting provided comments mainly related to the monitoring activities. No negative issue was raised through the process.

The details of the persons interviewed and documents reviewed are provided in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Please refer to CAR 1 in the below section C.7. as a comment from a local stakeholder related with the testing interval of the energy meters in the Monitoring Plan (MP) and the issue was addressed in the relevant section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that the PPs have invited comments to the proposed project from the relevant local stakeholders, the summary of the comments received is provided in the PDD in a complete manner and the PPs have taken due account of all the comments received from the local stakeholders as the processes described in the PDD.

C.7. Monitoring

<Means of validation>

The MP consisting of the MPS and Monitoring Structure Sheet (MSS) is based on the approved methodology. Total quantity of the electricity generated in the project is the parameter to be monitored ex-post.

The electricity generated by the project solar PV systems is directly and continuously measured by electricity meters. Four electricity meters are installed to measure electricity supply from 1,600 PV panels on A-14 Westward (A14-1), 1,728 PV panels on A-14 Eastward (A14-2), 192 PV panels (HQ-1) and 624 PV panels (HQ-2) on the Headquarter building respectively.

The roles and responsibilities of the persons are described in the MSS in accordance with the requirements of the applied methodology. The reading results of electricity meters are monthly recorded, checked by the Supervisor and approved by the Project Manager.

The validation team confirmed that the MP complied with the requirements in the approved methodology and that the PPs will be able to apply the MP following the monitoring arrangements described in it. CAR 1, CAR 2, and CL 1 were issued that the details of resolution are as described below.

The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CAR 1

Nature of the issue raised:

The Measurement methods and procedures of the MPS did not include description of:

1) QA/QC procedures applied, and

2) Details of the measuring equipment on accuracy level and calibration information (frequency, date of calibration and validity).

PDD E.2. mentioned the testing interval of kWh meters became clear that follow the MPS in reply to the comment of a local stakeholder. However, the MPS did not include the information.

Nature of responses provided by the PPs:

The requested information was added to the revised MPS (input) as below.

- QA/QC is implemented by following the monitoring manual.
- The electricity meter is certified according to IEC62053-22 (Class 0.5s).
- The electricity meters are replaced or tested for accuracy every ten years based on the Metering Code of Singapore. The electricity meter is calibrated or replaced when it fails to pass the test.
- The start date of measuring the electricity generation by the system is set as the base date for counting the ten-year interval for each electricity meter. The date is: 1) 27 June 2016 for A14-1 and A14-2; 2) 24 June 2016 for HQ-1; and 3) 20 June 2016 for HQ-2.

Assessment of the responses:

The revised MPS refers to the Monitoring Manual that specifies detail procedures including the internal data checks as well as maintenance of the measuring equipment.

The electricity meters measure electricity generated and supplied from the project PV systems to the internal consumption at the sites of factory and office buildings, that are not for trade measurement and subject of regulations in the host country or the power companies. The calibration interval is set with reference to the Metering Code of Singapore where the manufacturer of the instrument, EDMI Limited, locates and the instrument is mainly supplied. The electricity meter type Mk6N is certified by KEMA T&D Testing Services to the requirements of IEC62053-22. KEMA T&D Testing Services is a certified laboratory with the

international standard ISO / IEC 17025. The PPs have chosen the shortest interval for low voltage measurement at 10 years as the calibration interval based on the Metering Code of Singapore that is applied since commencement of use, namely 27/06/2016 for 2 meters of Site A, 24/06/2016 and 20/06/2016 for 2 meters of Site B respectively. The accuracy level of the electricity meters was confirmed as Class 0.5s.
The validation team reviewed the revised MPS, Monitoring Manual and the other supporting documents to confirm the relevance.
The CAR was closed.

Grade / Ref: CAR 2
Nature of the issue raised: The PPs were requested to confirm how the PPs ensure that data monitored and required for verification and issuance be kept and archived electronically for two years after the final issuance of credits.
Nature of responses provided by the PPs:
Monitored data is entered into the excel sheet and kept by SSI. The same is shared with PCKK and PCKK also stores the data on its server.
The PPs confirmed that the monitored data is recorded in excel sheet and archived more than 2 years after the final issuance of credits. The confirmation was added to MSS and the Monitoring Manual.
Assessment of the responses:
The validation team reviewed the revised MP and the Monitoring Manual, and confirmed that the PPs will keep the electronical data of the monitoring results for more than 2 years after final issuance of the credits as requested in the JCM Guidelines. The CAR was therefore closed.

Grade / Ref: CL 1
Nature of the issue raised: The PPs were requested to clarify responsibility and procedure for producing MR and managing monitoring points to maintain and control measuring instruments including calibration/regular inspection.
Nature of responses provided by the PPs:
The PPs revised the MP and the Monitoring Manual to clarify responsibility and procedures for producing the MR and maintaining the electricity meters.
Assessment of the responses:
The validation team reviewed the revised MP and the Monitoring Manual, and confirmed that the responsibility and procedure are clarified for producing MR and managing the measuring instruments including the calibration in the specified interval. The CL was closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that the MP was described in compliance with the requirements of the approved methodology and the Guidelines for developing PDD and MR, and the PPs have demonstrated feasibility of the monitoring structure and their ability to implement the MP.

C.8. Modalities of Communication

<Means of validation>

The MoC was submitted to LRQA in the form JCM_TH_F_MoC_ver01.0. The MoC nominates Pacific Consultants Co., Ltd. as the focal point and was signed by the authorized representatives of all the PPs with the contact details. The form used is the latest one as of the time of validation.

The validation team assessed the personal identities including specimen signatures and employment status of the authorized signatories through reviewing the written confirmation from the PP with whom LRQA contracted the validation, namely Pacific Consultants Co., Ltd. The written confirmation was issued by a Director of the company whose authorization was confirmed by the power of attorney, and it confirms that all corporate and personal details including specimen signatures are valid and accurate as requested in the JCM Guidelines for Validation and Verification. The validation team also confirmed through reviewing the corporate information of the PPs and by meeting the persons representing the PPs that the information provided in the MoC is correct.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that the MoC was completed using the latest form after assessment conducted on relevance of the MoC in compliance with the requirements of the JCM Guidelines.

C.9. Avoidance of double registration

<Means of validation>

The validation team assessed and confirmed relevance of the written confirmation in the MoC from the PPs that the proposed JCM project was not registered under the other international climate mitigation mechanisms.

The team in addition to the interviews with the PPs checked publicly accessible information of Clean Development Mechanism (CDM), Joint Implementation (JI), Verified Carbon Standard (VCS) and Gold Standard (GS) and found no identical project as the proposed JCM project in terms of the name of entities, applied technology, scale and the location. The result of

researches confirmed that the proposed project was not registered under the other international climate mitigation mechanisms than JCM and it will not result in a double counting of GHG emission reductions.
The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that the proposed JCM project was not registered under the other international climate mitigation mechanisms.

C.10. Start of operation

<Means of validation>

The start date for the operation of the proposed JCM project is indicated in the PDD as 27/06/2016 and 20/06/2016 for the Site A and Site B respectively.
The validation team confirmed correctness/relevance of the information by reviewing the supporting evidence, including but not limited to assessing of the contracts and commissioning report, and that the date is not before 01/01/2013 as required to be eligible as a JCM project.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team confirmed that the start date of operation of the proposed JCM project is 20/06/2016 (Site B) and not before 01/01/2013 as required to be eligible as a JCM project.

C.11. Other issues

<Means of validation>

No issue was identified as relevant element not covered above.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Not applicable

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Not applicable

D. Information on public inputs

D.1. Summary of public inputs

In line with the JCM Project Cycle Procedure, the PDD is to be made publicly available for 30 days to invite public comments. The PDD was made publicly available in line with the requirements of the procedure for the period of 06/07/2017 to 04/08/2017 as per https://www.jcm.go.jp/th-jp/projects/28.

D.2. Summary of how inputs received have been taken into account by the project participants

No comment was received during the above period to receive public inputs.
Thus no action was required to be taken by the PPs to satisfy the JCM requirement.

E. List of interviewees and documents received

E.1. List of interviewees

Pacific Consultants Co., Ltd.
Hirofumi Ishizaka, Senior Researcher, PC-Institute for Global Environment Research, International Division
Shigezane Kidoura, Researcher, PC-Institute for Global Environment Research, International Division

Siam Steel International Public Company Limited
Thanyapong Sinsoongsud, Senior Manager
Weera Wilaipornpanit, Project Manager
Nattakit Pacherat, Manager
Kittisak Cheevarparmong, Engineer

Panasonic Eco Solutions Sales (Thailand) Co., Ltd.
Norihiko (Jack) Mizushima, Assistant General Manager, Technical Section, Environmental Systems Department
Arch Riyachan, Executive, Technical Section, Environmental Systems Department

E.2. List of documents received

Category A documents (documents prepared by the PP)

- PDD Version 01.0 dated 26/01/2017 with the Monitoring Spreadsheet
- Revised PDD Version 02.0 dated 13/07/2017 with the Monitoring Spreadsheet
- Technical specification of project solar PV system
- Annual Report 2015 of Siam Steel International Public Company Limited
- Proposal for the project
- MoC dated 30/06/2017
- Project implementation plan
- Photovoltaic Power Generation System Test & Commissioning Report
- Annexes 1 and 2 to the Act of Japan's Ministry of Finance concerning Statutory useful life for the calculation of depreciation and amortization
- Monitoring Manual
- Purchase order
- Certificate of Completion for Solar System at Factory A-14 and Head Office
- Single Line Diagram
- Certificate of design qualifications and quality qualification
- Grid-Connected System: Simulation parameters
- Metering Code, Energy Market Authority of Singapore, January 2014
- Certificate for Type Test of Energy Meters
- Certificate of Accreditation to the laboratory
- Supply information of EDMI energy meters
- Inspection reports of energy meters, Provincial Electricity Authority
- Thailand Board of Investment Guide on Environmental Regulations, 19/12/2014
- Records of local stakeholders consultation meeting
- Letter of confirmation for registration of rooftop solar system for own use, Energy Regulation Commission (ERC)
- Electricity expense in years 2015 and 2016, SSI
- Electricity bills from Metropolitan Electricity Authority of Thailand (MEA)
- Power Meter data sheets
- PV Production data records
- Monthly meter reading records
- Historical performance data analysis
- Explanatory of Power limit function

Category B documents (other documents referenced)

- JCM_TH_AM001_ver01.0 Installation of Solar PV Systems
- Additional Information to the Proposed Methodology “Installation of Solar PV System”
- JCM Project Cycle Procedure JCM_TH_PCP_ver01.0
- JCM Guidelines for Validation and Verification JCM_TH_GL_VV_ver01.0
- JCM Guidelines for Developing PDD and MR JCM_TH_GL_PDD_MR_ver01.0
- JCM Glossary of Terms JCM_TH_Glossary_ver01.0
- JCM PDD Form JCM_TH_F_PDD_ver01.0
- JCM MoC Statement Form JCM_TH_F_MoC_ver01.0
- JCM Validation Report Form JCM_BD_F_Val_Rep_ver01.0
- Proposed and registered projects under CDM, VCS, Gold Standard, and the other international schemes
- IEC 62053-22:2003, Electricity metering equipment (ac) - Particular requirements. Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)
- APLMF Economy Report Thailand, Central Bureau of Weights and Measures
- Weights and Measures Act B.E. 2542 (1999)
- Certificate of Accreditation for EDMI Limited, Singapore Accreditation Council

Annex Certificates or curricula vitae of TPE's validation team members, technical experts and internal technical reviewers

Please attach certificates or curricula vitae of TPE's validation team members, technical experts and internal technical reviewers.

Certificate of Appointment is attached to this report.

Lloyd's Register
LRQA

Joint Crediting Mechanism Certificate of Appointment

Title of Project: Validation of Introduction of Solar PV Systems on Rooftops of Factory and Office Building

We hereby certify that the following personnel have engaged in the validation process that has fully satisfied the competence requirements of the validation of the JCM project.

Name of Person	Assigned Roles
Michiaki Chiba	Team Leader
Dhirayut Chenvidhya	Host Country Expert
Xianxin Yan	Technical Reviewer

Signed by

[redacted]

Michiaki Chiba
Climate Change Manager – Asia & Pacific
06/07/2017