JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Introduction of 30MW Rooftop Solar Power System to Large Supermarkets
Reference number	TH009
Third-party entity (TPE)	Japan Quality Assurance Organization (JQA) (TPE-TH-003)
Project participant contracting the TPE	Sharp Energy Solutions Corporation
Date of completion of this report	04/02/2020

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	The project participants have completed a local stakeholder consultation process and that due steps were taken to engage	☒

Item	Validation requirements	No CAR or CL remaining
consultation	stakeholders and solicit comments for the proposed 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: Asada	First name: Sumio
Title: Senior Executive	
Specimen signature:	Date: 04/02/2020
[redacted]	

B. Validation team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Tadashi Yoshida	JQA	Team Leader	☒	Authorized	☐
Mr. ☐ Ms. ☒	Sachiko Hashizume	JQA	Internal Reviewer	☒	Authorized	☐

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 form was checked and confirmed as complete in accordance with the JCM Guidelines for Developing Project Design Document and Monitoring Report (JCM_TH_GL_PDD_MR_ver02.0). The latest version of the JCM PDD form (JCM_TH_F_PDD_ver02.0) is used for the PDD of the proposed project (Version 01.0 dated 28/02/2019 for First edition and Version 02.0 dated 21/01/2020 for Second edition). The validation was conducted on the first edition of the PDD.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the PDD is completed using the valid version of the PDD form and drafted in line with the JCM Guidelines for Developing Project Design Document and Monitoring Report.

C.2. Project description

<Means of validation>

The purpose of the proposed project is to reduce CO_2 emissions from the consumption of grid electricity at the large supermarket by installing rooftop solar power system. The

capacity of individual solar power system installed at 37 sites of the supermarkets is distributed in a range of 432.00 – 997.92 kW and its total capacity is 30 MW. The supermarkets under "Big C" are located across the country in Thailand. The solar power system consists of PV module, inverters, AC collection board, pyranometer, electricity meter and PC server. The proposed project has installed the crystalline silicon photovoltaic (PV) modules (ND-AH315, ND-AF320 and ND-AF330H) made by Sharp Energy Solution Corporation, Japan, which are well known for high durability and is more stringent than Japan Industrial Standard or International Electrotechnical Commission (IEC) Standards. The power generated by the solar PV system is supplied to the internal grid of the supermarket which is connected to the national grid and could displace the consumption of grid electricity mostly derived from fossil-fuel fired plant. As a result, the proposed project would reduce the emissions of 13,293 tCO_2e per year and 165,088 tCO_2e in total during the monitoring period of 2018 - 2030.

The proposed project is implemented by Impact Electrons Siam Co., Ltd. and Impact Solar Limited from Kingdom of Thailand and Sharp Energy Solutions Corporation from Japan. The first installation of the solar PV system was completed at the site of Pathum Thani (Site No. 1) on 20/07/2018 through the inspection by Provincial Electricity Authority (PEA) and the grid connection for the solar PV system. The subsequent installation of the solar PV systems were also completed at 36 sites of supermarket across the country in Thailand by the end of 2019. The starting date of project operation was set to be 01/08/2018. This date is validated by the Letter "Notice for Commercial Operation Date for Big C Pathum Thani Branch" from Impact Solar Limited (ISL) who is an owner of the solar PV system, which states that the Commercial Operation Date for Big C Pathum Thani shall commence on 1st August 2018 under Power Purchase Agreement (PPA), dated 25th April 2017, between ISL and Big C. The expected operational lifetime of the project is 17 years, which is based on the legal durable years for the manufacturing facilities of electronic parts, device and/or circuit issued by Ministry of Finance, Japan.

The proposed project was partially supported by the Ministry of Environment (MOE), Japan, through the Financing Programme for JCM model projects, which provides financial support of less than half of the initial investment for the projects in order to acquire JCM credits. As for the technology transfer, Sharp Energy Solutions Corporation and ISL have conducted OJT training on the operation and monitoring of the project facilities for the staffs of Big C main office and each supermarket. Maintenance support is provided by ISL when necessary.

The validation team has assessed the PDD and the supporting documents through the desk review and the interview with the PPs, without on-site visit, to validate the requirements about accuracy and completeness of the project description. No on-site visit is justified as follows:

The validation of the accuracy and completeness of the project description has been conducted by the document review and interviews. The sufficient evidences and information

relevant to the project description have been obtained without site-visit. The team reviews those documents to determine whether the information in the PDD is accurate and complete, and interviews with the PPs, when necessary the related stakeholders, for understanding the proposed JCM project.

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

Regarding the date description and the purpose of the proposed project, the validation team raised CAR 01 and CL 01, and these issues were resolved as explained in "Findings".

<Findings>

< *CAR 01* >

The date in A.5 of the PDD is to be provided in the form of DD/MM/YYYY.

< Comments from the PPs >

The date in A.5 of the PDD has been revised as 01/08/2018.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the starting date of project operation in A.5 is appropriately described in accordance with the JCM Guidelines for Developing Project Design Document and Monitoring Report. Thus, CAR 01 is closed.

< *CL 01* >

The main purpose of the JCM project is to reduce GHG emissions. The purpose of the proposed project and means of the GHG emission reduction are not clearly described.

< Comments from the PPs >

The description has been revised as follows: “The purpose of the project is to reduce the GHG emission from the consumption of grid electricity at the supermarket. To realize the purpose, the project involves installation of rooftop solar power systems with the total generating capacity of 30MW at 37 supermarkets under “Big C” chain in Thailand.”

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the purpose of the proposed project and means of the GHG emission reduction are clearly described. Thus, CL 01 is closed.

<Conclusion based on reporting requirements>

The validation team concludes that the description of the proposed project in the revised PDD complies with the supporting documents and information obtained through the desk

review and the interview with the PPs, and the description is accurate and complete.

C.3. Application of approved methodology(ies)

<Means of validation>

The approved methodology JCM_TH_AM001_ver01.0 "Installation of Solar PV System" is applied to the proposed project. The methodology was approved by the JC on 23/08/2016 and valid at the time of the validation.

The validation team has assessed whether the selected methodology is applicable to the proposed project. The project applicability was checked against four eligibility criteria contained in the approved methodology. The project information for each eligibility criterion and the assessment/conclusion about its applicability to the proposed project are summarized in the following tables.

Eligibility criteria	Descriptions specified in the methodology	Project information	Assessment and conclusion
Criterion 1	The project installs solar PV system(s).	The solar PV systems are installed on to the rooftops of 37 supermarkets.	It is confirmed through the review of the relevant documents and the interview with the PPs that the solar PV systems with a power capacity of 432.00 – 997.92 kW are installed at 37 sites of the supermarket across the country by the end of 2019. Hence, the Criterion 1 is satisfied.
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.	The solar PV systems are connected to the internal power grids of the project sites (each supermarket) for displacing grid electricity at the project sites.	It is confirmed through the review of PPA between ISL and Big C and Notification from ISL to Big C that the connection of the solar PV system to the internal grid of each supermarket is inspected by Provincial Electricity Authority (PEA), which displaces grid electricity at the project sites. Hence, the Criterion 2 is satisfied.

Criterion 3	The PV modules have obtained a certification of design qualifications (IEC61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).	The PV modules installed in the project have been certified for IEC 61215, IEC 61730-1 and IEC 61730-2.	It is confirmed through the review of Certificate issued by VDE Testing and Certification Institute that Sharp Energy Solutions Corporation is authorized to use design qualification IEC 61215 and safety qualification 61730-1 and IEC 61730-2 for the product of crystalline silicon terrestrial PV modules on 28/03/2017 (valid until 30/04/2019). Hence, the Criterion 3 is satisfied.
Criterion 4	The equipment to monitor output power of the solar PV system and irradiance is installed at the project site.	Electricity meters and pyranometers have been installed at the project sites to monitor output power and irradiance, respectively.	It is confirmed through the review of relevant documents including monitored data and the interview with the PPs that electricity meter and pyrano-meter are installed at 37 project sites of supermarket and have been operated to monitor output power and irradiance. Hence, the Criterion 4 is satisfied.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the proposed project is eligible for applying the valid version of the approved methodologies TH_AM001_ver01.0 and all eligibility criteria have been met by the proposed project.

C.4. Emission sources and calculation of emission reductions

<Means of validation>

The proposed project aims to reduce CO_2 emission from the consumption of grid electricity at the supermarket by newly installing the solar PV system at 37 project sites of the supermarket located across the country.

Reference emissions are sourced from the consumption of grid electricity and project emissions are sourced from the generation of electricity from the solar PV system.

Reference emissions are calculated on the basis of the AC output of the solar PV system

multiplied by the conservative emission factor of grid electricity, which is expressed by Equation (1), in accordance with the methodology TH_AM001:

$$RE_p = \sum EG_{i,p} \times EF_{RE} \quad \text{----------} \quad (1)$$

Where:

RE_p : Reference emissions during the period *p* (tCO_2/p)

$EG_{i,p}$: Quantity of the electricity generated by the project solar PV system *i* during the period *p* (MWh/p)

EF_{RE} : Reference CO_2 emission factor of grid electricity and/or captive electricity (tCO_2/MWh)

The value of $\sum EG_{i,p}$ is the sum of electricity generated by the solar PV system at 37 sites of the supermarket. The quantity of electricity generated at each site is estimated *ex-ante* by using Meteonorm program based on the solar irradiance data.

As the proposed project consumes grid electricity at the supermarket, the CO_2 emission factor of the Thai grid is used in the calculation of reference emissions. In order to calculate reference emissions conservatively, the applied methodology TH_AM001 requires to use the emission factor of the most efficient natural gas-fired power plant in Thailand (generation efficiency: 61.2%), *i.e.,* 0.319 tCO_2/MWh given by the applied methodology.

It is confirmed through the review of relevant documents and the interview with the PPs that the project-specific parameter to be fixed *ex-ante* such as EF_{RE} is correctly applied in the calculation of reference emissions.

Project emissions are the emissions from the solar PV system, which are assumed to be zero as per the methodology. Hence, the project emissions are expressed by Equation (2),

$$PE_p = 0 \quad \text{----------} \quad (2)$$

Where:

PE_p : Project emissions during the period *p* [tCO_2/p]

Thus, the GHG emission reductions during the period *p* are calculated by Equation (3), in line with the approved methodology:

$$ERp = REp - PEp = Rep \quad \text{----------} \quad (3)$$

Where:

ERp : Emission reductions during the period p (tCO_2/p)

REp : Reference emissions during the period *p* (tCO_2/p)

PEp : Project emissions during the period *p* (tCO_2/p)

As a result , the annual emission reductions are calculated as follows:

$ERp = REp – PEp$

$= \sum EG_{i,p} \times EF_{RE}$

$= 41,671.37 \text{ MWh} \times 0.319 \text{ tCO}_2\text{/MWh}$

$= 13,293 \text{ tCO}_2$

The GHG annual emission reductions are estimated to be 13,293 tCO_2 and the sum of the emission reductions for the period of 2018 – 2030 is estimated to be 165,088 tCO_2.

It is confirmed through the review of relevant documents and the interview with the PPs that all GHG emission sources specified by the applied methodology are identified, and the reference emissions (RE_p), project emissions (PE_p) and emission reductions (ER_p) in the revised PDD (ver02.0) and Monitoring Plan Sheet are correctly calculated, in accordance with the methodology TH_AM001_ver01.0.

Regarding the value of emission reductions for 2018 and CO_2 emission source in the PDD, the validation team raised CAR 02 and CL 02 and these issues were resolved as explained in "Findings".

<Findings>

< *CAR 02* >

The values of Estimated reference emissions and Estimated emission reductions for 2018 in C.3 of the PDD are to be checked.

< Comments from the PPs >

The values of Estimated Reference emissions and Estimated Emission Reductions have been calculated on a per diem basis.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that Estimated Reference emissions and Estimated Emission Reductions for 2018 in C.3 of the PDD are correctly calculated and revised to 5,572.2 tCO_2 and 5,572 tCO_2, respectively. Accordingly, the total amount of emission reductions during the period of 2018 – 2030 is also appropriately revised to 165,088 tCO_2. Thus, CAR 02 is closed.

< *CL 02* >

CO_2 emission source from the consumption of grid electricity at the supermarket building is not appropriately described in C.2 of the PDD.

< Comments from the PPs >

The figure in C.2 of the revised PDD has been revised to show the CO_2 emission source

from the consumption of grid electricity appropriately.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that CO_2 emission source from the consumption of grid electricity at the supermarket building is appropriately described in C.2 of the PDD. Thus, CL 02 is closed.

<Conclusion based on reporting requirements>

The validation team confirms that all emission sources and GHG types specified in the approved methodology are appropriately identified. The validation team concludes that the value of parameter to be monitored *ex-post* in the MPS ($\sum EG_{i,p}$) is correctly estimated based on the total quantity of electricity generated by the proposed project and the value for the project-specific parameter to be fixed *ex-ante* listed in the MPS (EF_{RE}) is also correctly determined as per the methodology. In addition, the equations to calculate reference emissions, project emissions and emission reductions for the proposed project are appropriately derived and the annual emission reductions are correctly calculated using parameters and data in the MPS.

C.5. Environmental impact assessment

<Means of validation>

The purpose of the proposed project is to reduce CO_2 emissions from the consumption of grid electricity at the supermarket by newly installing the solar PV system. The PDD states that an Environmental Impact Assessment (EIA) is not required for the small scale power generation projects with a plant size of less than 1 MW as the proposed project does not conduct a physical development with an impact to the society as well as the environment around the project sites. Hence, there is no stipulation which requires EIA assessment to such kind of the technology implementation.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the proposed project does not require the EIA. The implementation of the proposed project is in line with the regulations in the Kingdom of Thailand and the requirements of the JCM.

C.6. Local stakeholder consultation

<Means of validation>

The PPs conducted a local stakeholder consultation under the EIA at Big C Supercenter Public Company Limited on 30/11/2018. Prior to the meeting, the invitation letter by email was delivered to the stakeholders on 26/11/2018.

The list of the participants for Local Stakeholders' Consultation Meeting is as follows:

- Thailand JCM Secretariat (TGO)
- Impact Electrons Siam Co., Ltd.
- Impact Solar Limited
- Big C Supercenter Public Company Limited

The local stakeholders provided positive comments for the proposed project. No negative issues that require actions to be taken by the PPs were raised through the consultation. It is confirmed through the review of the relevant documents and the interview with the PPs that the stakeholder consultation process was appropriately conducted to collect stakeholders' opinions on the project. The summary of the comments received in the consultation and due account of all comments taken by the PPs are fully described in the PDD.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the PPs have completed a local stakeholder consultation process under the EIA and invited comments on the proposed project from the 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 and described this process in the PDD.

C.7. Monitoring

<Means of validation>

The Monitoring Plan consists of the Monitoring Plan Sheet and Monitoring Structure Sheet which comply with the approved methodologies JCM_TH_AM001_ver01.0. One monitoring parameter, i.e., total quantity of the electricity generated in the project during the period *p* ($\Sigma EG_{i,p}$), is measured by electricity main meter. The monitoring point for electricity generation (#1) is located at the right position after the inverters. The measured data is automatically transmitted via the cloud system to the PC server at Impact Solar Limited for recording. The quantity of electricity generation is continuously monitored and recorded

every 15 minutes and then monthly aggregated. The aggregated data is double-checked by a responsible staff on a monthly basis. The accuracy of the electricity meter is Class 0.2S (± 0.2%) and the electricity meter is calibrated according to the procedures of WI-LAB-04 every two years based on "Official Announcement from Energy Regulatory Commission (ERC) on Electricity services standard 2018". In case of main meter malfunction, the back-up meter (built-in meter at inverter) will be used for the calculation of emission reductions.

All monitored data which are required for verification and issuance will be kept and archived electronically for two years after the final issuance of the credits.

The roles and responsibilities of the personnel are described in Monitoring Structure Sheet. The monitoring structure consists of Project Manager (Sharp Energy Solutions Corp.), Deputy Project Manager (ISL), QA/QC Manager (ISL) and Operator (ISL). Project Manager is responsible for project implementation and the preparation of monitoring report, Deputy Project Manager is for the confirmation of recorded data and archived data, QA/QC Manager is for the calibration of monitoring equipment and Operator is for recording of the monitored data.

It is confirmed through the review of the relevant documents and the interview with the PPs that the monitoring plan complies with the requirements of the approved methodology and the PPs are able to implement the monitoring activity appropriately according to the monitoring plan.

Regarding the meter reading, stream line of chilled water, the archiving procedure of data and calibration frequency of electricity meter, the validation team raised CL 03 – CL 07 and these issues were resolved as explained in "Findings".

<Findings>

< *CL 03* >

The PDD and Table 1 of MPS show that main meter and back-up meter to measure the quantity of electricity generated by the solar PV system are installed in the project facilities. It is not clearly described which meter's data is used for the calculation of emission reductions.

< Comments from the PPs >

The description in Table 1 of MPS has been revised to show that the reading data from the main meter is used for the calculation of emission reductions.

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that the AC output data is recorded electronically by main meter installed after inverters as a monitoring point. Back up meters (built-in meters at inverters) will be used for the calculation of emission reductions only in the

case of the main meter malfunction. Thus, CL 03 is closed.

< *CL 04* >

The PPs are requested to clarify the procedures of main meter calibration and the roles of back-up meter in "(h) Measurement methods and procedures" in Table 1 of MPS.

< Comments from the PPs >

The measurement method and procedures in Table 1 of MPS has been explicitly revised.

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that electricity main meter is calibrated according to the procedures of WI-LAB-04 every two years based on "Official Announcement from Energy Regulatory Commission (ERC) on Electricity services standard 2018" and built-in meters at inverters is used as a back-up meter only in case of the main meter malfunction. Thus, CL 04 is closed.

< *CL 05* >

The PPs are requested to revise the description in "(i) Monitoring frequency" in Table 1 of MPS correctly.

< Comments from the PPs >

The description in "(i) Monitoring frequency" has been revised to "Continuously monitored and monthly recorded".

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that the description in "(i) Monitoring frequency" is correctly revised to "Continuously monitored and monthly recorded". Thus, CL 05 is closed.

< *CL 06* >

The PPs are requested to move the description on the archiving of the monitored data in MSS to "(h) Measurement methods and procedures" in Table 1 of MPS.

< Comments from the PPs >

The description on the archiving of the monitored data in MSS has been shifted to Table 1 of MPS.

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that the description on the archiving of the monitored data in MSS is appropriately moved to "(h) Measurement methods and

procedures" in Table 1 of MPS. Thus, CL 06 is closed.

< *CL 07* >

The PPs are requested to describe the roles of responsible personnel in MSS more explicitly.

< Comments from the PPs >

Project Manager is responsible for making monitoring report and such responsibility is clearly described in the revised MSS.

< Assessment by the TPE >

It is confirmed through the review of the revised MSS that the roles of responsible personnel are explicitly described and Monitoring Report is prepared by Project Manager.
Thus, CL 07 is closed.

<Conclusion based on reporting requirements>

The validation team concludes that the description of Monitoring Plan is based on the approved methodology and JCM Guidelines for Developing Project Design Document and Monitoring Report, and the monitoring point as well as monitoring equipment for measurement are also appropriate. Thus, the PPs have demonstrated feasibility of the monitoring structure and their abilities to implement the monitoring activity appropriately.

C.8. Modalities of Communication

<Means of validation>

The MoC was provided to JQA for review on 15/11/2019, in the valid form (JCM_TH_F_MoC_ver01.0) at the time of validation, in which Sharp Energy Solutions Corporation is nominated as the focal point. The MoC was signed by the authorized representatives of Impact Electrons Siam Co., Ltd on 01/11/2019, Impact Solar Limited 0n 01/11/2019 and by the authorized representatives of Sharp Energy Solutions Corporation on 01/11/2019, along with the contact details.

The validation team has checked the personal identities and employment status of the authorized signatories through their business cards. Primary authorized signatory of Sharp Energy Solutions Corporation is Senior Executive Director and General Manager of Project Business and alternate authorized signatory is Supervisor of Global New Business Promotion Division, Project Business Unit.

It is confirmed through the check of business cards and the interview with the PPs that all corporate and personal details including specimen signatures and the information in the MoC are valid and accurate as requested in the JCM Guidelines for Validation and Verification.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the MoC is completed using the valid version of the form, and the information and the specimen signature of the PPs provided in the MoC are correct and sufficient, in compliance with the requirements of the JCM Guidelines. It is demonstrated that the MoC is correctly completed and dully authorized.

C.9. Avoidance of double registration

<Means of validation>

The representative of focal point entity in the MoC, Senior Executive Director and General Manager of Project Business of Sharp Energy Solutions Corporation, declares that the proposed project is not registered under any other international climate mitigation mechanism other than the JCM. It is confirmed through the check of publicly available information (e.g. CDM/JI website, etc.) that the proposed project is not registered under any other international climate mitigation mechanisms in terms of the name of entity, applied technology, scale and location. Thus, it can be concluded that the proposed project will not result in double counting of GHG emission reductions.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the proposed project is not registered under any other international climate mitigation mechanisms and hence will not result in double counting of GHG emission reductions.

C.10. Start of operation

<Means of validation>

For the proposed project, the first installation of the solar PV system and the grid connection were completed at the site of Pathum Thani (Site No. 1) on 20/07/2018, which was inspected by Provincial Electricity Authority (PEA). And under the Power Purchase Agreement (PPA) between ISL and Big C, ISL notified Big C of the commencement of the commercial operation on 01/08/2018. It is confirmed through the review of relevant documents and the interview with the PPs that the monitoring activity of the proposed project was actually commenced at

the site of Pathum Thani on 01/08/2018.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the starting date of project operation is set as 01/08/2018 and does not predate 01/01/2013 as required by the Guideline of the JCM project.

C.11. Other issues

<Means of validation>

No more issues are raised in the validation of the proposed project.

<Findings>

Not applicable.

<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 was made publicly available for 30 days from 14/11/2019 to 13/12/2019 to invite public comments on the following JCM website: https://www.jcm.go.jp/th-jp/projects/68

No public comments were received.

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

Not applicable.

E. List of interviewees and documents received

E.1. List of interviewees

- Hiroya Ota, Supervisor of Global New Business Promotion Division, Project Business Unit,

Sharp Energy Solutions Corporation - Natthawadi Limsaguan, Business Development and Investment, Impact Solar Limited

E.2. List of documents received

1. PDD, ver01.0, 28/02/2019 and ver02.0, 21/01/2020 2. Monitoring Spreadsheet JCM_TH_AM001_ver01.0_rev2.xlsx and JCM_TH_AM001_ ver01.0_rev3.xlsx 3. JCM Modalities of Communication Statement Form (MoC) submitted for JC, dated 01/11/2019 4. Business cards of Primary authorised signatory, Alternate authorised signatory from Japanese and Thailand sides along with Contact person 5. JCM Approved Methodology (JCM_TH_AM001_ver01.0) 6. Monitoring Spreadsheet (JCM_TH_AM001_ver01.0) 7. JCM Modalities of Communication Statement Form (JCM_TH_F_MoC_ver01.0) 8. JCM Glossary of Terms (JCM_TH_Glossary_ver01.0) 9. JCM Project Cycle Procedure (JCM_TH_PCP_ver02.0) 10. JCM Project Design Document Form (JCM_TH_F_PDD_ver02.0) 11. JCM Guidelines for Developing Project Design Document and Monitoring Report (JCM_TH_GL_PDD_MR_ver02.0) 12. JCM Validation Report Form (JCM_TH_F_Val_Rep_ver01.0) 13. JCM Guidelines for Validation and Verification (JCM_TH_GL_VV_ver01.0) 14. Outline of the proposed project 15. Company profiles of Impact Electrons Siam Co., Ltd. and the subsidiary Impact Solar Limited 16. Company profile of Sharp Energy Solutions Corporation 17. Catalogue and specification of PV modules (ND-AH315, ND-AF320) 18. Map showing the location of 37 sites of the supermarket 19-1. Notice for commercial operation date for Big C Pathum Thani branch to demonstrate the starting date of project operation (01/08/2018) 19-2. Grid connection approval between ISL and Big C Supercenter Public Company Limited at site of Pathum Thani, dated 18/06/2018 20. Legal durable year list issued by Ministry of Finance, Japan, to demonstrate the expected operational lifetime (17years) of the solar PV module Operation manual of chiller (ETI series) issued by Mitsubishi Heavy Industries, Ltd. 21. Contract of the proposed project between Sharp Energy Solutions Corporation and Global Environment Centre Foundation (GEC) dated 31/01/2017

22-1. Records and texts of the staff training for installation, operation and maintenance of the solar PV system
22-2. Date of O&M training conducted at each site of the supermarket
22-3. Photos of staff training
24. Single line diagram including the location of monitoring point at the project site
25. Certificates of design qualification (IEC 61215) and safety qualification (IEC 61730-1, 61730-2) of ND-AF320
26. Catalogue and specification of electricity meter Mk6E (Class 0.2S) made by EDMI
27. Catalogue and specification of pyranometer CMP6 made by Kipp & Zonen
28. Catalogue and specification of integrated monitoring system
29. Legal requirement and procedures of environmental impact assessment (EIA) in Thailand
30-1. Minutes of the LSC meeting held on 30/11/2018
30-2. Attendee's list of the LSC
31. Invitation letter sent to the stakeholders dated on 26/11/2018
32. Presentation materials used at the LSC meeting
33. Copy of WI-LAB-04 and documents on Frontend 2.52EEMCal software
34. Official Announcement from Energy Regulatory Commission (ERC) on Electricity services standard 2018 for calibration frequency (every 2 years) of electricity main meter
35. Calibration certificate of electricity main meter installed at 37 project sites
36. Grid emission factor determined by the methodology TH_AM001_ver01.0
37. *Ex-ante* calculation of 1,338.40 kWh generated by the solar PV system at the project site No.2 (Ayutthaya)
38. Diagram of monitoring structure and reporting system
39. PPA between Big C Supercenter Public Company Limited and Impact Solar Limited
40. Source of irradiance data
41. ISL monitoring data of each project site in 2018-2019

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.

Statement of competence

Name: Dr. Tadashi Yoshida

Qualified and authorized by Japan Quality Assurance Organization.

Function

	Date of qualification
Validator	2014/12/22
Verifier	2014/12/22
Team leader	2014/12/22

Technical area within sectoral scopes

	Date of qualification
TA 1.1. Thermal energy generation	2014/12/22
TA 1.2. Renewables	2014/12/22
TA 3.1. Energy demand	2014/12/22
TA 4.1. Cement and lime production	2015/11/12
TA 5.1. Chemical industry	2014/12/22
TA 10.1. Fugitive emissions from oil and gas	2014/12/22
TA 13.1. Solid waste and wastewater	2014/12/22
TA 14.1. Afforestation and reforestation	-

Statement of competence

Name: Ms. Sachiko Hashizume

Qualified and authorized by Japan Quality Assurance Organization.

Function

	Date of qualification
Validator	2015/11/20
Verifier	2015/11/20
Team leader	2018/6/22

Technical area within sectoral scopes

	Date of qualification
TA 1.1. Thermal energy generation	2015/11/20
TA 1.2. Renewables	2015/11/20
TA 3.1. Energy demand	2015/11/20
TA 4.1. Cement and lime production	-
TA 5.1. Chemical industry	-
TA 10.1. Fugitive emissions from oil and gas	-
TA 13.1. Solid waste and wastewater	2015/11/20
TA 14.1. Afforestation and reforestation	-