JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Introduction of 5MW Floating Solar Power System on Industrial Water Reservoir in Thailand
Reference number	TH014
Third-party entity (TPE)	Japan Quality Assurance Organization (JQA) (TPE-TH-003)
Project participant contracting the TPE	TSB Co., Ltd.
Date of completion of this report	26/03/2020

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: 26/03/2020

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 15/01/2019 for First edition, Version 02.0 dated 11/03/2020 for Second edition and Version 03.0 dated 13/03/2020 for Third 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 factory by newly installing 5 MW floating solar power system at the

industrial reservoir pond of Kabinburi Industrial Zone. The solar power system consists of PV module, optimizer, inverters, pyranometer, electricity meter and PC server. The type of crystalline silicon photovotalic (PV) module installed is EN 156p-72-320 with a maximum power output of 320 W, made by Econess Energy Co., Ltd., and 16,000 units of PV module are installed with floating over the industrial reservoir pond. All PV modules are equipped with the power optimizer (made by GNE New Energy Technology Co., Ltd.) which works with maximum power point tracking. This optimizer has also functions of maximum conversion efficiency, module level monitoring, data acquisition, wireless communication and safety management. Water floating solar power system has some advantages such as effective use of unused land, less dust and shadow influence, lower PV surface temperature which gives 10-15% higher generation output, etc. All power generated by the solar PV system is supplied to a factory in Kabinburi Industrial Zone, in accordance with the Power Sales Agreement, where national grid electricity has been consumed. Hence, the implementation of the proposed project contributes to the reduction in the consumption of national grid electricity mostly derived from fossil-fuel fired power plant at the factory. As a result, the proposed project would reduce the emissions of 2,552 tCO_2e per year and 27,939 tCO_2e in total during the monitoring period of 2020 - 2030.

The proposed project is implemented by TSB Bangkok Co., Ltd. from the Kingdom of Thailand and TSB Co., Ltd. from Japan. The starting date of project operation was set to be 20/01/2020, which is supported by Report of Construction Completion issued by Smart En Consultants Co., Ltd. dated 17/01/2020. 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, TSB Co., Ltd. has conducted OJT training on the floating assembly, wiring and maintenance of the project facilities for the staffs of TSB Bangkok Co., Ltd.

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 on-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 coordinates of the project site in A.3 and the ambiguous description in A.2 of the PDD, the validation team raised CL 01 and CL 02 and these issues were resolved as explained in "Findings".

<Findings>

< *CL 01* >

The PPs are requested to provide more precise coordinates of the project site in A.3 of the PDD.

< Comments from the PPs >

More precise coordinates of the project site, *i.e.*, N14.059759 E101.84849, are provided in A.3 of the revised PDD.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the coordinates of the project site are correctly provided in A.3 of the revised PDD. Thus, CL 01 is closed.

< *CL 02* >

The meanings of the following paragraphs such as "under high temperature", "protect environmnet" and "PV module's variation" and "displacing grid electricity generation" are not explicitly explained in A.2 of the PDD.

< Comments from the PPs >

The description in A.2 of the revised PDD has been revised as follows:

PV system on the water will give higher power generation efficiency compared to the solar system on the ground under high atmosphere temperature due to the lower surface temperature of PV module. The optimizer has a power shutdown function for each PV modules. It can prevent an electric shock for Firefighters in case of fire. And monitoring function of the optimizer can detect leakage accident of PV module. The use of optimizer also minimizes the power generation loss of PV module string by PV module’s specification variation.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the technology of the proposed project and means of the GHG emission reduction are clearly described in A.2. Thus, CL 02 is closed.

<Conclusion based on reporting requirements>

The validation team concludes that the description of the proposed project in the 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 system is installed at industrial Reservoir pond in Kabinburi industrial zone.	It is confirmed through the review of the Report of Construction Completion issued by Smart En Consultants Co., Ltd. that the solar PV system with a capacity of 5 MW was installed with floating over the industrial reservoir pond in Kabinburi industrial zone on 17/01/2020. 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 (factory) for displacing grid electricity at the project sites.	It is confirmed through the review of Power Sale Agreement between TSB Bangkok Co., Ltd. and Fujikura Electronics Thailand Ltd. that the connection of the solar PV system to the internal power grid of the factory in Kabinburi industrial zone is approved by Provincial Electricity Authority (PEA) on 19/12/2019, which displaces grid electricity consumed at the factory. 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, IEC 61730-2.	It is confirmed through the review of Certificate issued by TUV NORD CERT GmbH on 24/05/2019 that Econess Energy Co., Ltd. is authorized to provide the PV modules (EN156P-72-320) tested according to the design qualification IEC 61215 and safety qualification 61730-1 and 61730-2 on 24/05/2019 (valid until 06/11/2023). 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 meter and pyranometer have been installed at the project site 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 the project site and have been operated to monitor output power and irradiance. Hence, the Criterion 4 is satisfied.

Regarding the missing of Criterion 2 in B.2 of the PDD, the validation team raised CAR 01 and this issue was resolved as explained in "Findings".

<Findings>

< *CAR 01* >

The PPs are requested to provide Criterion 2 in the methodology and its project information in B.2 of the PDD.

< Comments from the PPs >

Criterion 2 of Eligibility criteria and its project information are appropriately provided in B.2 of the revised PDD.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that Criterion 2 of Eligibility criteria and its project information are appropriately provided in B.2 of the PDD. Thus, CAR 01 is closed.

<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 factory by newly installing the PV solar system at the industrial reservoir pond of Kabinburi Industrial Zone.

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. The quantity of electricity generated by the solar PV system is estimated *ex-ante* based on the solar irradiance data published by NASA Atmospheric Science Data Center.

As the grid electricity is consumed at the factory, 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:

$$ERp = REp - PEp = \sum EG_{i,p} \times EF_{RE} = 8{,}000.75 \text{ MWh} \times 0.319 \ tCO_2/MWh = 2{,}552 \ tCO_2$$

The GHG annual emission reductions are estimated to be 2,552 tCO_2 and the sum of the emission reductions for the period of 2020 – 2030 is estimated to be 27,939 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 (ver03.0) and Monitoring Plan Sheet are correctly calculated, in accordance with the methodology TH_AM001_ver01.0.

Regarding the CO_2 emission source and correctness of RE and ER values in 2020, the validation team raised CAR 02 and CL 03 and these issues were resolved as explained in "Findings".

<Findings>

< *CAR 02* >

CO_2 emission source from the consumption of grid electricity at a Factory in Kabinburi Industrial Zone is not appropriately illustrated in C.2 of the PDD

< Comments from the PPs >

The CO2 emission from the factory due to the consumption of national grid electricity is added to the figure in C.2 of the revised PDD.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that CO_2 emission from the consumption of national grid electricity at the factory is appropriately added in C.2 of the PDD. Thus, CAR 02 is closed.

< *CL 03* >

The PPs are requested to check the values of RE and ER in 2020 in C.3 of the PDD

< Comments from the PPs >

The values of RE and ER in 2020 have been corrected and provided in C.3 of the revised PDD.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the values of RE and ER in 2020 have been correctly recalculated and provided in C.3 of the PDD. Thus, CL 03 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 factory by newly installing the PV solar system at the industrial reservoir pond of Kabinburi Industrial Zone. The PDD states that an Environmental Impact Assessment (EIA) is not required because the proposed project is exempt from the law, namely, it is not included in the list of 35 projects or activities which requires an EIA Report. Hence, there is no stipulation which requires EIA to this 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 TSB Bangkok Co., Ltd. on 17/12/2019.

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

- Thailand Greenhouse Gas Management Organization (TGO)
- TSB Co., Ltd.
- TSB Bangkok Co., Ltd.

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.

Regarding the necessity of further action to the comments and total efficiency of 89.7%, the validation team raised CL 04 and CL 05 and these issues were resolved as explained in "Findings".

<Findings>

< *CL 04* >

It is not clearly described whether further action is required or not against each comment received (E.2 of the PDD).

< Comments from the PPs >

Further action is not requested to each comment provided by the stakeholders. Hence, the description "No further action is not needed" is added to each comment in E.2 of the revised PDD.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the description "No further action is needed" has been added to each comment in E.2 of the PDD. Thus, CL 04 is closed.

< *CL 05* >

The PPs are requested to explain the total efficiency of 89.7% for the generation of the proposed project in more detail (E.2 of the PDD).

< Comments from the PPs >

The total efficiency of 89.7% is derived from the following equation:

89.7% = Temperature compensation coefficient (98%) x Power conditioner efficiency (98.4%) x Cable loss coefficient (93%)

< Assessment by the TPE >

It is confirmed through the review of the revised PDD and supporting documents that the total efficiency of electricity generation for the proposed project is appropriately explained in E.2 of the PDD. Thus, CL 05 is closed.

<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 meter. The monitoring point for electricity generation (#1) is located within the area of the factory for transaction, and the quantity of electricity generated by the solar PV system is recorded by the customer and the PP on a monthly basis according to the Power Sale Agreement. Electricity data monitored by the optimizer is automatically transmitted to the cloud server and therefore the PPs are able to download the monitored data for recording from the server at any time. The quantity of electricity generation is continuously monitored and monthly recorded. The data is checked by a responsible personnel (Deputy Project Manager) on a monthly basis. The accuracy of the electricity meter is Class 0.2S ($\pm$0.2%) and the electricity meter is calibrated according to the instruction from the PEA.

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 (TSB Co., Ltd.), Deputy Project Manager (TSB Bangkok Co., Ltd.), Technical and Engineering Manager (TSB Bangkok Co., Ltd.) and Project Engineer (TSB Bangkok Co., Ltd.). Project Manager is responsible for project implementation and the preparation of monitoring report, Deputy Project Manager is for the confirmation of monitored data and archived data, Technical and Engineering Manager is for the collection and archiving of the monitored data, and Project Engineer is for the QA/QC of the monitoring including the calibration of measuring equipment.

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 archiving of data, monitoring frequency and QA/QC of monitoring, the validation team raised CL 06 – CL 08 and these issues were resolved as explained in "Findings".

<Findings>

< *CL 06* >

The description on the archiving of the monitored data is not provided in "(h) Measurement methods and procedures" in Table 1 of the MPS.

< Comments from the PPs >

The description “The data monitored and required for verification and issuance be kept and archived electronically for two years after the final issuance of credits” is provided in "(h) Measurement methods and procedures".

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that the description on the archiving of data is appropriately provided in "(h) Measurement methods and procedures" in Table 1 of the MPS, according to the requirement of para. 26 of JCM Guidelines for Developing PDD and MR, ver02.0. Thus, CL 06 is closed.

< *CL 07* >

The PPs are requested to provide the description on monitoring frequency in “(i) Monitoring frequency” in Table 1 of the MPS.

< Comments from the PPs >

“Monthly recording” is revised to “Continuously monitored and monthly recorded” in (i) Monitoring frequency.

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that "Monthly recording" is revised to "Continuously monitored and monthly recorded" in (i) Monitoring frequency in Table 1 of the MPS. Thus, CL 07 is closed.

< *CL 08* >

It is not clearly described who is responsible for QA/QC of the monitoring including the calibration of measuring equipment.

< Comments from the PPs >

Project Engineer (TSB Bangkok Co., Ltd.) who is in charge of QA/QC of the monitoring including the calibration of measuring equipment is newly added in Monitoring Structure System.

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that Project Engineer (TSB Bangkok Co., Ltd.) is newly added in Monitoring Structure System for the QA/QC of monitoring and for the calibration of measuring equipment. It is also confirmed that the electricity meter is calibrated or replaced according to the instruction of PEA in the proposed project. Thus, CL 08 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 12/02/2020, in the valid form (JCM_TH_F_MoC_ver01.0) at the time of validation, in which TSB Co., Ltd. is nominated as the focal point. The MoC was signed by the authorized representatives of TSB Bangkok Co., Ltd. on 03/02/2020 and by the authorized representatives of TSB Co., Ltd. on 03/02/2020, along with the contact details.

The validation team has checked the personal identities and employment status of the authorized signatories with their business cards and signatures. Primary authorized signatory

of TSB Co., Ltd. is Chief Executive Officer (CEO) and Alternate authorised signatory is General Manager of Development Department.

It is confirmed through the check of business cards/signatures 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, Chief Executive Officer (CEO) of TSB Co., Ltd, 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>

The installation of 5 MW floating solar power system and the wiring connection were

completed at the project site on 17/01/2020, which is supported by Report of Construction Completion issued by Smart En Consultants Co., Ltd. The supply of electricity generated by the solar PV system to the factory was commenced on 20/01/2020 under the Power Sale Agreement between TSB Bangkok Co., Ltd. and Fujikura Electronics Thailand Ltd. It is confirmed through the review of relevant documents and the interview with the PPs that the start of project operation was actually commenced at the project site of industrial reservoir pond in Kabinburi Industrial Zone on 20/01/20120.

<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 20/01/2020 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 20/02/2020 to 20/03/2020 to invite public comments on the following JCM website: https://www.jcm.go.jp/th-jp/projects/78

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

- Katsuyuki Ishikawa, General Manager, Development Dept., TSB Co., Ltd.
- Nacha Kaewmaneewong Manager, Sales & Purchasing, TSB Bangkok Co., Ltd.

E.2. List of documents received

1. PDD, ver01.0, 15/01/2019, ver02.0, 11/03/2020 and ver03.0, 13/03/2020
2. Monitoring Spreadsheet 200207_JCM_TSB_TH_AM001.xlsx and 200312_JCM_TSB_TH_AM001.xlsx
3. JCM Modalities of Communication Statement Form (MoC) submitted for JC, dated 12/02/2020
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. Location map and layout of 5 MW floating solar power farm
16. Specification of solar PV module (EN156P-72-320) installed by the proposed project
17. Function of optimizer equipped with PV module
18. Power sale agreement between TSB Bangkok Co., Ltd. and Fujikura Electronics (Thailand) Ltd., dated 11/02/2019
19. Company profiles of TSB Co., Ltd.
20. Company profile of TSB Bangkok Co., Ltd.

21-1. The Report of Construction Completion issued by Smart En Consultants Co., Ltd, dated 17/01/2020

21-2. KIZ Power Generation License

21-3. PEA approval - Grid connection approval between ISL and, dated 18/06/2018
21-4. Selling license issued by Energy Regulatory Commission on 26/11/2019
21-5. Building construction, Modification or Demolition Permit dated 10/04/2019
21-6. Electricity distribution license issued by Energy Regulatory Commission on 26/11/2019
22. Legal durable year list issued by Ministry of Finance, Japan, to demonstrate the expected operational lifetime (17years) of the solar PV module
23-1. Contract of the proposed project between TSB Co., Ltd. and Global Environment Centre Foundation (GEC) dated 10/03/2017
23-2. Modified contract of the proposed project between TSB Co., Ltd. and Global Environment Centre Foundation (GEC) dated 15/01/2018
24. Records of the staff training for installation, operation and maintenance of the solar PV system, conducted on 5-8/08/2019
25. Operation and Maintenance for Manual Floating Solar 5.12 MWp, issued Smart En Consultant Co., Ltd.
26. Floating Kits Installation Manual, issued Smart En Consultant Co., Ltd.
27. Single line diagram of floating solar 5.12 MW at the project site, issued Smart En Consultant Co., Ltd.
28. Certificates of design qualification (IEC 61215) and safety qualification (IEC 61730-2) of EN156P-72-320, issued by TUV NORD CERT GmbH on 24/05/2019
29. Specification of electricity meter Mk6E (Class 0.2S) made by EDMI
30. Specification of pyranometer VSN800-14, made by ABB
31. Specification of inverter CL-60E, made by Schneider Electric
32-1. Assessing Environmental Impact Assessment (EIA) in Thailand: Implementation Challenges and Opportunities for Sustainable Development Planning (Working Paper), reported by Asian Environmental Compliance and Enforcement Network (AECEN), March 2015
32-2. Code of Practice Report for Floating Solar Power Plant Project - Generation Capacity 5.12 MW - of TSB Bangkok Co., Ltd. made by Smart Solar Engineering Co., Ltd on 30/01/2020
33-1. Minutes of the LSC meeting held on 17/12/2019
33-2. Presentation materials used at the LSC meeting
33-3. List of attendee at the LSC meeting
34. Calibration certificate of electricity meter, tested by PEA on 20/06/2019
35. Grid emission factor determined by the methodology TH_AM001_ver01.0
36. *Ex-ante* calculation of 8,000.75 MWh generated by the solar PV system at the project site
37. Diagram of monitoring structure and reporting system

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	-