JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Introduction of Heat Recovery Heat Pumps to a Chicken Slaughtering Plant in Thailand
Reference number	TH008
Third-party entity (TPE)	Japan Quality Assurance Organization (JQA) TPE-TH-003
Project participant contracting the TPE	CPF Japan Co., Ltd.
Date of completion of this report	05/03/2020

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: 05/03/2020

[redacted]

B. Team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Hiroshi MOTOKAWA	JQA	Team Leader	☒	Authorized	☐
Mr. ☒ Ms. ☐	Tsuyoshi NAKAMURA	JQA	Team Member	☐	--	☐
Mr. ☒ Ms. ☐	Chakra CHAEMFA	JQA	Team Member	☐	Authorized	☐
Mr. ☒ Ms. ☐	Tadashi YOSHIDA	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 1.0 dated 11/06/2019 for First edition). The validation was conducted on the first edition of the PDD (hereinafter, "the PDD").

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team (hereinafter, "the 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 (hereinafter, "the Guidelines for PDD").

C.2. Project description

<Means of validation>

This proposed JCM project (hereinafter, "the project") aims to improve energy efficiency at a chicken slaughtering plant of Charoen Pokphand Foods PCL. (hereinafter, CPF) in Nakhonratchasima province, Thailand by introducing a high-efficiency heat recovery heat pump (HP) system. CO2 heat pump is highly efficient and recovers heat from water body to generate hot water and chilled water simultaneously by using the subcritical system of the natural refrigerant CO2. The project can reduce the consumption of electricity and fuel by introducing this high-efficiency HP system in this food manufacturing process.

The installation of a high-efficiency heat recovery heat pump system (HP) by the project would reduce the emission reductions of 942 tCO_2 per year and 9,420 tCO_2 in total during the period of 2018 – 2027.

The starting date of the monitoring activity was set to be 01/01/2018, which is confirmed by reviewing the supporting documents and monitoring data records. The expected operational lifetime of the project is 10 years, which is based on the legal lifetime issued by National Tax Agency, Japan.

The project was partially financed by Ministry of the Environment, 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.

By reviewing the supporting documents and interviewing with the PPs, without on-site visit (OV), the team has assessed the PDD and the supporting documents based on the requirements about accuracy and completeness of the project description.

The validation without OV 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 OV. 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 project

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

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

By reviewing the supporting documents and interviewing with the PPs, the team confirms that the project description in the PDD is accurate and complete.

C.3. Application of approved methodology(ies)

<Means of validation>

The approved methodology JCM_TH_AM008_ver01.0, "Introducing heat recovery heat pumps with natural refrigerants for the food manufacturing industries" (hereinafter, “the methodology”) is applied to the project. By reviewing the relevant documents, conducting an on-site visit and interviewing with the PPs, it is confirmed that the methodology is applicable to the project. The project information for each eligibility criterion and the assessment and conclusion about its applicability to the project are summarized in the following table.

Criterion	**Descriptions in the methodology**	**Project information**	**Assessment and conclusion**
1	A project newly introduces (a) high efficiency HP(s) using natural refrigerants to a food manufacturing plant and it does not replace (an) existing HP(s). In case of HPs supplying chilled water, the water is fed into a refrigeration system of the plant which uses either screw or reciprocating compressors.	This project newly installs high efficiency HP called ECO-CUTE “UNIMO WW” using the natural refrigerant (CO2) to the food manufacturing plant at CPF Korat. The newly installed HP supplies water to a refrigeration system of the plant which uses screw compressors.	By reviewing relevant documents and interviewing with the PPs and stakeholders, the team confirms that - A project newly introduces 8 high efficiency HPs using CO2 refrigerants, called ECO-CUTE “UNIMO WW”, at the plant, which it has ever have no HPs; - The HPs supply chilled water, which is fed into a refrigeration system of the plant using screw compressors. Hence, Criterion 1 is satisfied.
2	The cooling capacity of a HP unit is more than or equal to 50kW and less than 1600kW.	The project installs eight (8) units of HP. The cooling capacity of individual HP units generating 20 degree Celsius chilled water (4 units) is 62.5 kW, while the cooling capacity of individual HP units generating 25 degree Celsius chilled water (4 units) is 60.8 kW.	By reviewing relevant documents and interviewing with the PPs and stakeholders, the team confirms that the cooling capacity of each HP unit is 60.8 kW or 62.5 kW depending on the conditions mentioned in the PDD. Hence, Criterion 2 is satisfied.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The team concludes that the project is eligible for applying the methodology and all eligibility criteria have been met by the project.

C.4. Emission sources and calculation of emission reductions

<Means of validation>

This methodology only applies to a food manufacturing plant which uses hot and chilled water for the industrial process. The team validates the emission reductions by taking the steps mentioned below, following the methodology.

Reference emissions, REs, are calculated by multiplying electricity consumption of the project by the ratio of efficiency between a reference equipment and project HPs, and emission factors of electricity and fossil fuel consumed, and the methodology shows the equation given below:

$$\mathbf{RE_p} = \sum_i \frac{\boldsymbol{EC_{PJ,i,p}} \times \mathbf{3.6}}{\boldsymbol{ECR_i}} \times \frac{\boldsymbol{H_i}}{\boldsymbol{\eta_{REh}}} \times \boldsymbol{EF_{REh}} + \sum_i \frac{\boldsymbol{EC_{PJ,i,p}}}{\boldsymbol{ECR_i}} \times \frac{\boldsymbol{CH_i}}{\boldsymbol{COP_{RE}}} \times \boldsymbol{EF_{elec}}$$

RE_p	:	Reference emissions during the period p [tCO_2/p]
$EC_{PJ,i,p}$	:	Electricity consumed by the project HP *i* during the period *p* [MWh/p]
ECR_i	:	Rated electricity consumption of the project HP *i* [kW]
H_i	:	Rated heating capacity of the project HP *i* [kW]
η_{REh}	:	Efficiency of the reference boiler for heating energy generation [-]
EF_{REh}	:	CO_2 emission factor for the fuel consumed by the reference boiler for heating energy generation [tCO_2/GJ]
CH_i	:	Rated cooling capacity of the project HP *i* [kW]
COP_{RE}	:	Efficiency of the reference compressor for cooling energy generation [-]
EF_{elec}	:	CO_2 emission factor for consumed electricity [tCO_2/MWh]
i	:	Identification number of the project HP

The reference equipment is identified as a boiler for the hot water generation and a compressor for the chilled water generation because their loads are partially replaced by the project HPs. The methodology ensures a net emission reduction by conservatively setting default efficiency values for both reference boiler and compressor, η_{REh}: 0.89 and COP_{RE}: 4.01, respectively.

Regarding the grid electricity consumed by the reference compressor, the CO_2 emission factor of the national grid (EF_{elec}), 0.5664 tCO_2/MWh, is applied to the calculation of reference emissions. This is the most recent value sourced from "Thailand Grid Emission Factor for GHG Reduction Project" issued on 28/09/2017 by the Analysis/Evaluation Bureau of Thailand Greenhouse Gas Management Organization (TGO), in line with the methodology.

Regarding the fuel consumed by the reference boiler, through the review of the relevant documents, the team confirms the type of fuel consumed by the existing boilers is Residual/Heavy Fuel Oil and the CO_2 emission factor of that fuel (EF_{REh}), 0.0755 tCO_2/GJ, is applied to the calculation of reference emissions. This is the lower value sourced from “IPCC default values provided in table 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories”, in line with the methodology.

Project emissions, PEs, are calculated based on the monitored electricity consumption by both the project HPs and the auxiliaries, and the CO_2 emission factor of the grid electricity consumed by the project. The methodology shows the equation given below:

$$\mathbf{PE_p} = \left(\sum_{i} \mathbf{EC_{PJ,i,p}} + \sum_{j} \mathbf{EC_{PJ\_AUX,j,p}} \right) \times \mathbf{EF_{elec}}$$

$EC_{PJ,i,p}$	:	Electricity consumed by the project HP *i* during the period *p* [MWh/p]
$EC_{PJ\_AUX,j,p}$	:	Electricity consumed by the auxiliary electric equipment *j* for the project HP(s) during the period *p* [MWh/p]
EF_{elec}	:	CO_2 emission factor for consumed electricity [tCO_2/MWh]
j	:	Identification number of the auxiliary electric equipment for the project HP(s)

Thus, the GHG emission reductions during the period *p* are calculated by the equation:

$ER_p = RE_p – PE_p$

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)

Thus, the annual emission reductions are calculated as follows:

$ER_p = RE_p – PE_p$

$= 1{,}702.10 – 759.78$

$= 942.32\ tCO_2/p$

The GHG annual emission reductions are estimated to be 942 CO_2 and the sum of the emission reductions for the period of 2018 – 2027 is estimated to be 9,420 tCO_2.

By interviewing with the PPs and reviewing the documents relevant to the parameters and calculations of the emission reductions in the Monitoring Plan Sheet (MPS), the team assesses that all the GHG emission sources specified by the methodology are identified, and that the emission reductions are correctly calculated in accordance with the methodology.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

By taking the steps mentioned above, the team concludes the following:

- All the emission sources and GHG types specified in the methodology are appropriately identified;
- Values of parameters to be monitored *ex-post* in the MPS are correctly estimated;
- Values for the project-specific parameters to be fixed *ex-ante* listed in the MPS are correctly determined;
- Equations to calculate REs, PEs and ERs are appropriately derived;
- Annual emission reductions are correctly calculated using parameters and data in the MPS.

C.5. Environmental impact assessment

<Means of validation>

The PPs states that the project is not subject to an Environmental Impacts Assessment (EIA) according to national or local regulations. The team interviewed with the PPs and confirmed the PPs have not conducted an environmental impact assessment.

By using the local expertise of local personnel, the team assesses the applicable legal requirements in Thailand. According to the Notification of the Ministry of Natural Resources and Environment (MoNRE) on Projects, Undertakings, or Operations Required to Provide an Environmental Impact Assessment Report and Rules, Procedure, and Conditions in Providing an Environmental Impact Assessment Report, the project come under none of 35 type and size of projects and activities listed in Annex 4 of the Notification. The project, therefore, is not required to conduct the EIA.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The team concludes that it is in accordance with the Thai regulations that the PPs have not conducted an EIA.

C.6. Local stakeholder consultation

<Means of validation>

The PPs have held a local stakeholders' meeting at the conference room of CPF Korat Plant on 31/10/2017. Prior to the meeting, the PPs invited the stakeholders and the participants including the officials from Ministry of Energy and TGO, CPF engineers and local staffs, etc.

By reviewing the relevant documents and interviewing with the PPs, it is confirmed 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 team concludes that the PPs have appropriately completed a local stakeholder consultation process and invited comments from the local stakeholders relevant to the project. 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 and described this process in the PDD.

C.7. Monitoring

<Means of validation>

The monitoring plan consists of the Monitoring Plan Sheet (MPS) and Monitoring Structure Sheet (MSS) provided by the methodology. Two monitoring parameter, *i.e.*, $EC_{PJ.i.p}$ and $EC_{PJ\_AUX,i,p}$, electricity consumptions by the project HPs and auxiliary equipment are measured by the electricity meters mounted at the monitoring points shown in Figure 2 in the PDD.

The roles and responsibilities of the personnel are described in the MSS showing that Operators, Managing Director and JCM Project Manager compile the measured data to prepare a monitoring report.

By applying the stepwise process, the team confirms the compliance of monitoring plan with the methodology and the Guidelines for PDD. Also, by reviewing the relevant documents and interviewing with the PPs, the team, confirms whether the monitoring structure in the MSS are feasible within the project design, and whether the means of implementation of the monitoring plan, including the data management and QA/QC procedures, are sufficient for ex post reporting and verification.

Regarding the calibration procedure and monitoring structure, the team raised CL1 and CL2, they were resolved as explained in "Findings".

<Findings>

< *CL1* >

The description of the calibration is not provided for the parameters with Monitoring Point No. of (1), (2) and (4) in the column of "Measurement methods and procedures" of the MPS, although the methodology mentions "- Calibration: The measuring equipment ….. by the time of installation" in the MPS.

< Comments from the PPs >

The text on calibration in the Monitoring Plan Sheet (Input Sheet) is added using the description mentioned in the approved methodology.

< Assessment by the TPE >

By reviewing the revised MPS, it is confirmed the calibration descriptions added in line with the methodology. Thus, the CL is closed.

< *CL2* >

It is not clearly described in the Monitoring Structure Sheet who prepares and manages the monitoring report, although Managing Director authorizes the issuance of a final monitoring repot.

< Comments from the PPs >

JCM Project Manager is in charge of preparing a monitoring report. The Monitoring Structure Sheet has been updated accordingly.

< Assessment by the TPE >

By reviewing the revised MSS, the team confirms that the role to prepare the monitoring report is added to JCM Project Manager. Thus, the CL is closed.

<Conclusion based on reporting requirements>

The team concludes that the monitoring plan described in the MPS and MSS complies with the methodology and the Guidelines for PDD, and is feasible for the PPs to implement the monitoring plan.

C.8. Modalities of Communication

<Means of validation>

The MoC was provided to JQA on 18/09/2019, in the valid form, JCM_TH_F_MoC_ver01.0, at the time of validation, in which CPF Japan Co. Ltd. is nominated as the focal point.

By directly checking the evidences, i.e. personal business cards, specimen signatures including the signatures on the participant list of local stakeholder meeting and the CPF Japan

website (http://www.su-cpi.co.jp/company/index.html#message), it is confirmed that the latest version of the form, JCM_TH_F_MoC_ver01.0, is used, that the information is correctly completed and duly authorized, and that all corporate and personal details described in the MOC are valid and accurate.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The team concludes the following:

- The latest version of the form, JCM_TH_F_MoC_ver01.0, is used;
- All corporate and personal details described in the MOC are valid and accurate;
- Information is correctly completed and duly authorized.

C.9. Avoidance of double registration

<Means of validation>

By reviewing the written confirmation in the Section 7 of the MoC, it is confirmed that the project is not registered under other international climate mitigation mechanisms.

In addition, the team assessed the publicly available information (e.g. CDM/JI website, etc.) to confirm that no identical project as the project in terms of the name of entities, applied technology, scale and the location.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The team confirms that the 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 start date for the operation of the proposed JCM project is described in the PDD as 01/01/2018.

By reviewing the relevant documents and operation records, the team confirms that the starting date of project operation is 01/01/2018 as described in the PDD.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The team concludes that the starting date is 01/01/2018, which does not predate 01/01/2013

C.11. Other issues

<Means of validation>

No more issues are raised in the validation of the 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 19/09/2019 to 18/10/2019 to invite public comments on the following JCM website: https://www.jcm.go.jp/th-jp/projects/65

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

- Shuhei Kato Chief Sales Division, CPF Japan Co., Ltd.
- Yukimi Shimura Senior Consultant, Environmental Strategy Advisory Division,

- Jun Oshima	Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. Assistant Manager, Planning Section, Secretary Corporate Communication Division, Mayekawa MFG. Co., Ltd.

E.2. List of documents received

1. Project Design Document, ver01.0 for publication, 11/06/2019 and ver02.0, 03/03/2020
2. Monitoring Plan Sheet and Monitoring Structure Sheet, ver01 for publication and ver02.
3. Modalities of Communications Statement Form for publication, submitted on 18/09/2019
4. JCM Project Design Document Form (JCM_TH_F_PDD_ver02.0)
5. JCM Validation Report Form (JCM_TH_F_Val_Rep_ver01.0)Monitoring Plan Sheet and Monitoring Structure Sheet (JCM_TH_AM008_ver01.0.xlsx)
6. Modalities of Communication Statement Form (JCM_TH_F_MoC_ver01.0)
7. JCM Approved Methodology (TH_AM008 Ver01.0)
8. Monitoring Plan Sheet and Monitoring Structure Sheet (JCM_TH_AM008_ver01.0.xlsx)
9. JCM Glossary of Terms (JCM_TH_Glossary_ver01.0.pdf)
10. JCM Project Cycle Procedure (JCM_TH_PCP_ver02.0.pdf)
11. JCM Guidelines for Developing Project Design Document and Monitoring Report (JCM_TH_GL_PDD_MR_ver02.0.pdf)
12. JCM Guidelines for Validation and Verification (JCM_TH_GL_VV_ver01.0)
13. Charoen Pokphand Foods PCL. (CPF)
    https://www.cpfworldwide.com/en/about
14. CPF Japan Co., Ltd
    http://www.su-cpi.co.jp/company/index.html#data
15. Project Schedule as a part of documents submitted to JCM scheme
16. List of the legal lifetime of depreciable assets issued by National Tax Agency, Japan
    https://www.keisan.nta.go.jp/h30yokuaru/aoiroshinkoku/hitsuyokeihi/genkashokyakuhi/taiyonensukikai.html
17. Technical specifications of the project HPs, ECO-CUTE "UNIMO WW"
18. Flow sheets/photos before and after HP installation
19. Entire system flow sheet after HP installation
20. List and catalog of the compressors equipped by the project plant
21. Piping layout before and after the project equipment installation
22. Photos of the nameplate and the technical specification of the existing 3 boilers at the plant
23. Specification of the oil burner used by No. 2 boiler indicating the fuel type, i.e. Heavy Fuel Oil
24. Specifications of the meters

25. Photo of the meters
26. Mitsubishi Electronic Watthour Meter Test report
27. Project equipment layout with the photos of HPs, meters and control panel
28. Presentation material, "Environmental Impact Assessment (EIA)" prepared by Environmental Impact Evaluation Bureau (EIEB)
28. LSC invitation letter
29. LSC presentation materials prepared by Mayekawa and MUMSS
30. Electricity consumption data after the project operation start
31. Single-line diagram of the plant
32. Thailand Grid Emission Factor for GHG Reduction Project" prepared by the Analysis/Evaluation Bureau of Thailand Greenhouse Gas Management Organization.
33. Copies of business cards and signatories of the several personnel

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

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

Statement of competence

Name: Mr. Hiroshi Motokawa

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	2014/12/22
TA 5.1. Chemical industry	-
TA 10.1. Fugitive emissions from oil and gas	-
TA 13.1. Solid waste and wastewater	2014/12/22
TA 14.1. Afforestation and reforestation	-

Statement of competence

Name: Dr. Chakra Chaemfa

Qualified and authorized by Japan Quality Assurance Organization.

Function	Date of qualification
Validator	-
Verifier	2014/12/22
Team leader	2016/7/26

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	-
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: 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	-