JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Introducing double-bundle modular electric heat pumps at AXIA SOUTH CIKARANG Tower 2
Reference number	ID008
Third-party entity (TPE)	TPE-ID-003 Japan Quality Assurance Organization (JQA)
Project participant contracting the TPE	Toyota Tsusho Corporation
Date of completion of this report	09/09/2016

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 Republic of Indonesia, in line with Indonesia's procedures.	☒
Local	The project participants have completed a local stakeholder	☒

Item	Validation requirements	No CAR or CL remaining
stakeholder consultation	consultation process and that due steps were taken to engage stakeholders and solicit comments for the proposed project unless a local stakeholder consultation has been conducted under an environmental impact assessment.	
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: Yano	First name: Tadayuki
Title: Senior Executive	
Specimen signature: [redacted]	Date: 09/09/2016

B. Validation team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Koichiro Tanabe	JQA	Team leader	☒	Authorized	☒
Mr. ☐ Ms. ☒	Sachiko Hashizume	JQA	Team member	☒	Authorized	☐
Mr. ☒ Ms. ☐	Hiroshi Motokawa	JQA	Internal reviewer	☒	Authorized	☐
Mr. ☐ Ms. ☐	N/A	N/A	N/A	☐	N/A	☐

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>

Through a review of the draft PDD, it was checked and confirmed that the PDD was completed using the latest version of the PDD form (JCM_ID_F_PDD_ver01.0) appropriate to the type of project and drafted in line with JCM Guidelines for Developing PDD and MR (JCM_ID_GL_PDD_MR_ver02.0).

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concluded that the PDD was completed using the valid form in line with the JCM Guidelines for Developing PDD and MR.

C.2. Project description

<Means of validation>

The proposed JCM project aims to reduce CO_2 emissions in Indonesia by introducing a high efficient technology for hot water supply and air conditioning system in commercial buildings. The proposed project introduces a water-to-water double-bundle modular electric heat pumps (modular HP) system to a new residential hotel "AXIA SOUTH CIKARANG Tower 2" in Bekasi, which is located on the eastern border of Jakarta. The project will provide hot water and air conditioning to the common area and the back yard of the project hotel, reducing the consumption of fossil fuel which would have been used for the conventional boilers for hot water supply. In addition, the energy efficiency for the air conditioning would be also improved, leading to the additional energy saving. The key technology of the proposed JCM project has been defined in the approved methodology “Introducing double-bundle modular electric heat pumps to a new building, version 1.0” (ID_AM010).

The emission reductions that would be achieved by the proposed project are estimated to be 175 ton annually. This estimate may vary depending on the hot water demand and the cooling demand at the hotel during the monitoring period. The estimated emission reductions of the period from 2016 through 2020 are calculated in the PDD.

The validation team conducted document review, and then conducted a one-day on-site inspection on 24/08/2016, including a follow-up interview. The location of the proposed JCM project, including coordinates, was checked during the on-site visit. The project description was also cross-checked through the physical inspection and interview with a representative of each of the entities below, who have been involved in the proposed JCM project:

- PT. TTL Residences (hereinafter called “the project participant”)
- PT Takenaka Indonesia (hereinafter called “the engineering service provider”)
- Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. (JCM consultant)

It was confirmed through interview with the interviewees that the starting date of project operation was on 01/04/2016, which was the official opening date of AXIA SOUTH CIKARANG Tower 2. It was also confirmed that the expected operational lifetime of the proposed JCM project is eight years, which was defined by a statutory useful life of the proposed technology under the regulation of Indonesia (Regulation of the Finance Minister, No.96/PMK. 03/2009, Category 2).

For the purpose of knowledge transfer of the advanced technology, the engineering service provider has provided the facility management team of PT. TTL Residences with

opportunities for practice through the trial and commercial operation of the project equipment, and it is also conducting a training session to the team. This finding was confirmed through review of supporting documents and the on-site inspection, with a satisfactory result.

As a result, the team determined that the description of the proposed JCM project in the PDD was accurate, complete, and provided an understanding of the proposed JCM project.

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concluded that the accuracy and completeness of the project description were valid.

C.3. Application of approved methodology(ies)

<Means of validation>

Selection of methodology(ies)

Through a review of the draft PDD and Monitoring Plan (Monitoring Plan Sheet and Monitoring Structure Sheet), it was confirmed that the following latest version of methodology was correctly quoted and applied in the proposed JCM project.

- JCM_ID_AM010_ver01.0

The assessment results of the eligibility criteria in the approved methodology are summarized as below:

Criterion 1:

A project introduces (a) modular HP(s) to a new building. The total cooling capacity of the modular HP(s) is altogether less than 176 kW or 600,000 BTU/hr.

Through reviewing supporting documents (the specifications of the installed modular HPs) and interviewing during the physical inspection, the project information of Criterion 1 described in the PDD, was checked and confirmed as below with a satisfactory result:

- AXIA SOUTH CIKARANG Tower 2 is a new building, which began the construction work in October 2014 and was completed in March 2016.

- The total cooling capacity of the installed modular HPs (6 units) is 171.6kW (28.6kW/unit × 6 units), which is less than 176kW.

Criterion 2:
The modular HP(s) introduced under the project has its technical capability to produce outgoing hot water higher than or equal to 70 degrees Celsius. The value can be checked against specifications from an equipment supplier.

Through interview with the project participant, the project information of Criterion 2 described in the PDD was checked as below:

- During and after the on-site inspection, model code of the installed modular HPs was confirmed through the nameplate of the equipment and product guarantee letter issued by the equipment supplier.
- It was explained by the project participant that the technical capability of outgoing hot water produced by the installed modular HPs is higher than 70 degrees Celsius, while its practical capability under normal operating condition is 65 degrees Celsius. However it was not confirmed through supporting documents (the specification and performance characteristic table of the installed modular HPs).

Therefore, clarification request (CL01) was raised.

Criterion 3:
In addition to the modular HP(s) installed for project, oil-fired hot water generating equipment(s) and/or electric-run chilled water generating equipment(s) may be installed and operated to supply hot and/or chilled water to the project building. In such cases, the capacity of these additional equipment to generate hot and/or chilled water is less than or equal to half of the heating capacity and/or the cooling capacity of the modular HP(s), respectively.

Through reviewing supporting documents (the specifications of an electric-run chilled water generating equipment) and interviewing during the physical inspection, the project information of Criterion 3 described in the PDD was checked and confirmed as below with a satisfactory result:

- An electric-run chilled water generating system has been already installed, while there is no plan to install oil-fired hot water generating equipment in the proposed JCM project.
- Two units of electric-run chiller have been installed and the nominal cooling capacity of 60kW each.
- These two chiller units have been designed for alternate-switching operation based

on the cooling demand of the hotel, and thus they are not operated simultaneously under normal operating condition. Moreover, according to performance results of these equipments after the commercial operations, cooling demand of the hotel has been met with this chiller operation with the room occupancy ratio above 90%. The maximum operating cooling capacity of the additional equipment is, therefore, 60kW, which is less than half of the cooling capacity of the modular HPs.

Criterion 4:
A plan for not releasing refrigerant used for the modular HP(s) is prepared, if the refrigerant contains CFCs, HFCs, or HCFCs.

Through reviewing supporting documents (management plan document for Freon leakage) and interviewing during the physical inspection, the project information of Criterion 4 described in the PDD was checked and confirmed as below with a satisfactory result:

- "Management plan for Freon leakage" has been established and it covers modular HPs only (an electric-run chilled water generating system is not included). The specification of modular HPs states that HFC-134a is the only refrigerant that is used for the modular HPs.
- Operating instructions for troubleshooting have been also established. The pressure of compressed air for each of modular HPs is closely monitored individually under normal operating condition, and in case of a refrigerant leak, it is alerted to internal facility engineers for emergency measures immediately. Initial response procedures in emergency are available, and organization for heat pump maintenance by service engineers of the equipment supplier has been built.
- On the other hand, it was not confirmed whether any regular maintenance is necessary for a refrigerant leak caused by refill of refrigerant during the expected operational lifetime of the project.

Therefore, clarification request (CL02) was raised.

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

(Issue raised as CL01)
As for Criterion 2, it is requested to clarify the technical capability of outgoing hot water produced by the installed modular HPs through any supporting documents.

(Summary of the response on CL01)
Supporting documents were submitted.

(Assessment result of the responses on CL01)
It was confirmed through the supporting documents provided by the project participant that the technical capability of the installed modular HPs was confirmed appropriately. Therefore, CL01 was closed.

(Issue raised as CL02)
As for Criterion 2, it is requested to clarify whether any regular maintenance, which includes a refrigerant leak caused by refill of refrigerant, is required during the expected operational lifetime of the project.

(Summary of the response on CL02)
Additional supporting documents were submitted, and clarification was provided by equipment supplier.

(Assessment result of the responses on CL02)
It was confirmed through the supporting documents and clarification that any regular maintenance, which causes a refrigerant leak, is not planned. Therefore, CL02 was closed.

<Conclusion based on reporting requirements>
Please state conclusion based on reporting requirements.
The validation team reached the conclusion that the relevant information contained in the PDD is in compliance with the eligibility criterion listed in the approved methodology applied. The issues raised by the team were fully clarified.

C.4. Emission sources and calculation of emission reductions

<Means of validation>
It is confirmed through desk review that the emission sources and GHGs, which are described in the draft PDD, are described based on evidential documents properly. It is also confirmed through an on-site inspection that they are corroborated as below:

- As illustrated in the PDD, the proposed JCM project includes modular HPs, electric-run chillers, and the other electric-run auxiliary equipment.
- It was observed that an in-house power generator (diesel fuel) had been installed in

the building, for emergency use. The project participant excludes it from the project boundary, and the validation team considered it reasonable.

Since the applied methodology does not allow the PPs to choose any source or gas to be included, all emission sources and their associated GHGs relevant to the proposed JCM project meet the applied methodology. As for Monitoring Spreadsheet, the appropriate form, which is defined in the applied methodology and not altered, is used. It is cross-checked and concluded that the required fields of the spreadsheet are filled in appropriately.

Parameters to be fixed ex ante

Through cross-check of the project-specific parameters fixed *ex ante*, it was not confirmed through the supporting documents whether EF_{elec} (CO_2 emission factor for the electricity consumed by the project and the reference equipment), which was identified in the Monitoring Spreadsheet, is appropriate or not. Therefore, a clarification request (CL03) was raised.

<Findings>

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

(Issue raised as CL03)

It is requested to provide the validation team with the latest supporting document to determine EF_{elec}.

(Summary of the response on CL03)

Supporting document and the revised PDD were submitted.

(Assessment result of the responses on CL03)

The validation team determined that EF_{elec} (CO_2 emission factor for the electricity consumed by the project and the reference equipment) is to be corrected to 0.840 tCO_2/MWh from 0.843 tCO_2/MWh, according to the latest data sourced from “GHG emission factors of electricity interconnection systems 2014”, which issued by Indonesian national directorate general of electricity. The PDD was revised correctly, and thus CL03 was closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team reached the conclusion through the validation that the selected emission sources and GHG types were justified for the JCM project. The validation team assessed values for project-specific parameters to be fixed ex ante in the Monitoring Plan Sheet and intermediate processes to derive the values. As a result, those were considered reasonable in the context of the proposed JCM project. The issue raised by the team was fully clarified, which resulted in a revision of the PDD and the Monitoring Plan Sheet.

C.5. Environmental impact assessment

<Means of validation>

It is confirmed through review of AMDAL (Environmental Impact Assessment in Indonesia) that the proposed JCM project is not required to conduct AMDAL, since it is not applicable for the project type (Housing and Human Settlement Sector) of AMDAL.

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concluded that the project design of the proposed JCM project was in accordance with the EIA regulation in the Republic of Indonesia.

C.6. Local stakeholder consultation

<Means of validation>

Through document review and interviews with local stakeholders, the following information was confirmed with a satisfactory result:

(a) Comments been invited from local stakeholders that are relevant for the proposed project.

The relevant local stakeholders have been identified by the project participants, and a LSC meeting was held on 04/02/2016, with inviting the following local stakeholders respectively:

- Indonesia JCM Secretariat
- Bureau of Industry, Trade, Cooperative, and Micro Small Medium Business of

Bekasi Regency
- International Cooperation Division, Regional Autonomy and Cooperation Bureau, Government of West Java Province
- Social Service Bureau, Government of West Java Province
- PT TTL Residences
- PT Takenaka Indonesia
- PT Toyota Tsusho Indonesia
- Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.

(b) The summary of the comments received as provided in the PDD is complete.
- The summary of the comments received has been described in the PDD. Through interview with one of local stakeholders (PT Takenaka Indonesia), it is confirmed that those comments have been described in the PDD appropriately.

(c) The project participants have taken due account of all comments received and have described this process in the PDD.

JQA determines that the relevant local stakeholders have been identified appropriate and the information on the LSC meeting has been described in the PDD appropriately. As a result, it is concluded that no additional actions are required for the comments received.

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concluded that the local stakeholder consultation of the proposed JCM project was adequate.

C.7. Monitoring

<Means of validation>

Through document review and interviews with the project participants, the following information was confirmed:

(a) Assessment of compliance of the monitoring plan with the approved methodology

and/or PDD and Monitoring Guidelines

The parameters, which are required in the applied methodology, have been defined in Monitoring Plan Spreadsheet (MPS). As for the means of monitoring, JQA conducted interview with the engineering service provider to confirm the following information:

- In order to monitor $Q_{PJh,j}$ (Quantity of heating energy utilized by the project building during the period *p*) and $Q_{PJc,j}$ (Quantity of cooling energy utilized by the project building during the period *p*), two approaches ((1) calorimeter or (2) calculation results using a set of different monitored data) are defined and described in "measurement methods and procedures" of the MPS, while the project participant does not have any plan to install calorimeter for monitoring.

Therefore, clarification request (CL04) was raised.

- $Q_{PJh,j}$ and $Q_{PJc,j}$ are determined by calculation results using a set of data monitored by a flow meter or a temperature measuring meter. Data monitoring, calculation, recording and reporting are controlled by BMS (building management system), and the calculation results of $Q_{PJh,j}$ and $Q_{PJc,j}$ are reported directly.
- According to the equipment supplier of monitoring meters, a flow meter is calibrated prior to factory shipment, based on JCSS (Japan Calibration Service System), which complies with ISO/IEC17025. On the other hand, no information concerning calibration of a temperature measuring meter was provided through the on-site inspection.

Therefore, clarification request (CL05) was raised.

- Meanwhile, according to the supplier of electricity measuring meters, an electricity measuring meter is calibrated prior to factory shipment, based on IEC 62053-22 (Electricity metering equipment - Particular Requirements - Part 22: Static meters for active energy).

(b) Assessment of the implementation of the plan

Through interview with the project participant, it is confirmed that facility management team for modular HPs has been organized in the organization of the project participant, in line with Monitoring Structure Sheet (MSS) of the proposed JCM project. The team has both executive assistant manager (as Monitoring manager of MSS) and chief engineer (As Facility Manager of MSS) to manage assistant engineers.

<Findings>

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

(Issue raised as CL04)

It is requested to clarify whether approach 1 is used for monitoring or not.

(Summary of the response on CL04)

The revised MPS was submitted.

(Assessment result of the responses on CL04)

The validation team confirmed that the description of approach 1 was deleted from the revised MPS. As a result, CL04 was closed.

(Issue raised as CL05)

It is requested to provide information concerning calibration of a temperature measuring meter.

(Summary of the response on CL05)

Supporting documents were submitted.

(Assessment result of the responses on CL05)

It was confirmed through the submitted supporting documents that a temperature measuring meter is also checked based on inspection specification, including allowable error range, and such inspection is conducted for all temperature measuring meters prior to factory shipment. As a result, CL05 was closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concluded that Monitoring Plan of the proposed JCM project complied with the requirements of the methodology and/or PDD and Monitoring Guidelines, and the project participants had ability to implement the described Monitoring Plan, including Monitoring Structure Sheet.

C.8. Modalities of Communication

<Means of validation>

Through document review, it is confirmed that the Modalities of Communication (MoC) have applied the latest version of MoC form. The date of submission indicated in the MoC is 03/08/2016, and it is considered to be valid. JQA also conducted interviews with

the signatories of the Modalities of Communication (MoC), and then identified the personnel and their employment status, including the specimen signatures. Therefore, JQA determine that the information of all project participants, including the focal point provided in the MoC and its correctness of authority, is appropriate.

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concluded that the MoC complied with all relevant forms and requirements.

C.9. Avoidance of double registration

<Means of validation>

It was confirmed through review of the relevant website (e.g. UNFCCC website, Markit Environmental Registry, etc.) that the proposed JCM project has not been registered under other international climate mitigation mechanisms. Also, the written confirmation of the avoidance of double registration was provided through the signed MoC, and was cross-checked through interview with the project participant, with a satisfactory result.

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concluded that the proposed JCM project was not registered under the other international climate mitigation mechanisms at the stage of validation.

C.10. Start of operation

<Means of validation>

Through interview with the project participant, it was confirmed that the starting date of project operation was identified as the opening date of AXIA SOUTH CIKARANG Tower 2, dated 01/04/2016, which is not before 01/01/2013.

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The validation team concludes that the start of the operating date of the proposed JCM project has been defined appropriately.

C.11. Other issues

<Means of validation>

No other issue was identified.

<Findings>

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

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Not applicable.

D. Information on public inputs

D.1. Summary of public inputs

The PDD of the proposed JCM project, which was submitted in line with the Project Cycle Procedure, was made publicly available through the JCM website for public inputs. This call for public comments is open from 06/08/2016 to 04/09/2016 (24:00 GMT). The specific JCM website is as below:

- https://www.jcm.go.jp/id-jp/information/173

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

No comment was received during the period of the public comments; therefore, no action was required to be taken into due account by the project participants.

E. List of interviewees and documents received

E.1. List of interviewees

- Shintaro Morita, Project Manager, Toyota Tsusho Corporation
- Takuma Sato, President Director, PT TTL Residences
- Ohshu Hayashi, Director, PT TTL Residences
- Muahtaruddin Sitorus, Executive assistant manager, PT TTL Residences
- Maman Sudirman, Chief Engineering, PT TTL Residences
- Koichi Tada, Senior Manager, PT Takenaka Indonesia
- Chisato Nakade, Consultant, Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.
- Ricky Tagar Risnauli, Senior Consultant, Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.

E.2. List of documents received

- Project Design Document (draft version) (JCM_ID_F_PDD_ver01.0_AXIA2_HP.docx)
- Project Design Document (final version) (JCM_ID_F_PDD_ver01.0_ID008_final.docx)
- Monitoring Plan Sheet and Monitoring Structure Sheet (draft version) (JCM_ID_AM010_ver01.0_AXIA2_HP.xlsx)
- Monitoring Plan Sheet and Monitoring Structure Sheet (final version) (JCM_ID_AM010_ver01.0_ID008_final.xlsx)
- Modalities of communications statement (submitted with the draft PDD for publication)
- Modalities of communications statement (a validated version for submission of request for registration)
- JCM Approved Methodology ID_AM010 (JCM_ID_AM010_ver01.0.pdf)
- Monitoring Plan Sheet and Monitoring Structure Sheet ID_AM010 (JCM_ID_AM010_ver01.0.xlsx)
- JCM Glossary of Terms (JCM_ID_Glossary_ver02.0)
- JCM Guidelines for Developing Project Design Document and Monitoring Report (JCM_ID_GL_PDD_MR_ver02.0)
- JCM Project Cycle Procedure (JCM_ID_PCP_ver04.0)
- JCM Guidelines for Validation and Verification (JCM_ID_GL_VV_ver01.0)

- JCM Modalities of Communication Statement Form (JCM_ID_F_MoC_ver01.0.pdf)
- JCM Project Design Document Form (JCM_ID_F_PDD_ver01.0.docx)
- JCM Validation Report Form (JCM_ID_F_Val_Rep_ver01.0.docx)
- Brochure of Axia South Cikarang
- Regulation of the Finance Minister, No.96/PMK. 03/2009, Category 2 (Statutory useful life of modular HP)
- Specification of modular HP system
- Performance characteristic table of modular HPs (COP)
- Specification of an electric-run chilled water generating equipment
- Management plan document for Freon leakage
- Project system boundary (utility piping system schematic diagram)
- Meeting minutes of the local stakeholder consultation
- Clarification letter for specification of measuring equipment (inlet/outlet temperature measuring meters and flow meters)
- Specification or calibration certificate of measuring equipment (water flow meter)
- Specification or calibration certificate of electricity measuring meters for modular HPs and auxiliary electric equipment for the modular HP
- Model of the installed modular HPs
- Table 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories
- “Emission Factors of Electricity Interconnection Systems”, National Committee on Clean Development Mechanism (Indonesian DNA for CDM), based on data obtained by Directorate General of Electricity, Ministry of Energy and Mineral Resources, Indonesia
- Presentation materials for local stakeholder consultation
- Legal requirement of environmental impact assessment in Indonesia
- Equipment list for heat pump source
- Specimen signature of the representative of Toyota Tsusho Corporation
- Clarification letter for modular HPs on the past record of Freon leakage
- Maintenance agreement between the equipment supplier and the local distributer for modular HPs

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: Mr. Koichiro Tanabe

Qualified and authorized by Japan Quality Assurance Organization.

Function

	Date of qualification
Validator	-
Verifier	2014/12/22
Team leader	2015/3/24

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 4.6. Other manufacturing industries	2014/12/22
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

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	-

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 13.1. Solid waste and wastewater	2015/11/20

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 4.6. Other manufacturing industries	2014/12/22
TA 13.1. Solid waste and wastewater	2014/12/22