JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Installation of gas engine cogeneration system to supply electricity and heat to the vehicle manufacturing factory of PT. Toyota Motor Manufacturing Indonesia
Reference number	ID 019
Third-party entity (TPE)	Japan Quality Assurance Organization (JQA) (TPE-ID-003)
Project participant contracting the TPE	Toyota Tsusho Corporation
Date of completion of this report	08/03/2019

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	The project participants conducted an environmental impact assessment, if required by the Republic of Indonesia, in line	☒

Item	Validation requirements	No CAR or CL remaining
assessment	with Indonesia's procedures.	
Local stakeholder consultation	The project participants have completed a local stakeholder consultation process and that due steps were taken to engage stakeholders and solicit comments for the proposed 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: Asada	First name: Sumio
Title: Senior Executive	
Specimen signature:	Date: 08/03/2019

[redacted]

B. Validation team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Tadashi Yoshida	JQA	Team leader	☒	Authorized	☒
Mr. ☒ Ms. ☐	Irhan Febijanto	External individual	Team member	☒	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_ID_GL_PDD_MR_ver03.0). The latest version of the JCM PDD form (JCM_ID_F_PDD_ver02.0) is used for the PDD of the proposed project (Version 1.0 dated 09/10/2018 for First edition and Version 2.0 dated 25/02/2019 for Second edition). The validation was conducted on the first edition of the PDD.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

JQA 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 GHG emissions from the consumption of electricity and fossil fuels at the vehicle manufacturing factory by newly introducing a gas engine cogeneration system (CGS) to supply electricity and heat to the facilities. The project is implemented at PT. Toyota Motor Manufacturing Indonesia, located in Karawang, Indonesia. The project CGS consists of a gas engine for power/ heat generation, heat recovery boiler for steam production which utilizes waste heat of exhaust gas from gas engine and heat recovery exchanger for hot water production which utilizes waste heat of lubricant oil for the gas engine. The gas engine introduced by the proposed project is high efficiency model "KG-18-V" which is manufactured by Kawasaki Heavy Industries, Ltd. The result of a preliminary study shows that the emission reductions at PT. Toyota Motor Manufacturing Indonesia would be reduced by about 53% through the introduction of CGS.

The technical specification of the CGS (KG-18-V) shows that the consumption rate of natural gas as fuel source is 1,592 Nm^3/h which is equivalent to 16,116 kW of heat supply at 100% load, and the CGS produces 7,800 kW of electricity (48.4%), 2,520 kW of steam (15.6%) through heat recovery steam generator and 2,370 kW of hot water (14.7%) through heat recovery exchanger. Based on the heat balance, approximately 42,163 MWh/p of electricity generation, 60,846 GJ/p of heat energy recovered as steam and hot water and 8,904,075 Nm^3/p of natural gas consumption would be estimated by the implementation of the proposed project. This result could replace 40-45% of all electricity imported from the grid at PT. Toyota Motor Manufacturing Indonesia. Thus, electricity consumption at the factory and fuel consumption by the reference boiler for producing steam and hot water can be saved by the introduction of the CGS and the annual emission reductions of 21,793 tCO_2/y would be achieved by the proposed project.

The proposed project is implemented by PT. Toyota Motor Manufacturing Indonesia from the Republic of Indonesia and Toyota Tsusho Corporation from Japan. The commissioning of the project facilities was satisfactorily completed on 31/03/2017, which is supported by the Certificate of Completion of the Work signed by PT. Toyota Motor Manufacturing Indonesia and PT. Jaya Obayashi. The starting date of the monitoring activity was set to be 01/12/2017, which is confirmed by the monitoring data collected from this date. The expected operational lifetime of the project is 9 years, which is based on the legal durable year list issued by Ministry of Finance, Japan.

The proposed 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.

As for technology transfer, Toyota Tsusho Corporation has conducted technical lectures on 10/05/2017, 28/05/2017-10/06/2017, 03/09/2018-14/09/2018 and OJT on the operation and maintenance of the CGS for the engineering staffs of PT. Toyota Motor Manufacturing

Indonesia.

JQA has assessed the PDD and the supporting documents through the desk review and on-site assessment conducted on 20/12/2018 to validate the requirements about accuracy and completeness of the project description. The details of 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>

JQA concludes that the description of the proposed project in the revised PDD complies with the supporting documents and information obtained through the desk review, on-site visit 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_ID_AM016_ver01.0 "Installation of gas engine cogeneration system to supply electricity and heat to facility, Version 01.0" is applied to the proposed project. The methodology is approved by the JC on 10/07/2018 (JC8, Annex 5) and valid at the time of the validation.

JQA has assessed whether the selected methodology is applicable to the proposed project. The project applicability was checked against two 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 table.

Eligibility criteria	Descriptions specified in the methodology	Project information	Assessment and conclusion
Criterion 1	Gas engine CGS(s) is installed and supplies electricity and heat to facility(ies)	A gas engine CGS manufactured by Kawasaki Heavy Industries, Ltd. (model number is "KG-18-V") is installed and supplies electricity and heat to the vehicle manufacturing factory of PT. Toyota Motor Manufacturing Indonesia where electricity and heat are consumed.	It is confirmed through the review of the relevant documents, the on-site assessment and the interview with the PPs that gas engine (Model: KG-18-V) has been installed and operated to supply electricity and steam/ hot water which are consumed at PT. Toyota Motor Manufacturing Indonesia. Hence,

<table>
<tr><td></td><td></td><td></td><td>Criterion 1 is satisfied.</td></tr>
<tr><td>Criterion 2</td><td>The power generation efficiency of the CGS(s) stated in catalogs or other information prepared by its manufacturer is equal to or greater than the threshold value in the following table corresponding to the electrical output of CGS(s) installed.
<table><tr><th>Electrical output</th><th>Efficiency threshold</th></tr><tr><td>x < 2 (MW)</td><td>40 %</td></tr><tr><td>2 (MW) < x</td><td>47 %</td></tr></table></td><td>Electrical output of the project CGS is 7.8 MW and its power generation efficiency is provided as 49.0% on a manufacturer's catalog and 48.6% is ensured by the trial result report implemented by the manufacturer.</td><td>It is confirmed through the review of the relevant documents, the on-site assessment and the interview with the PPs that electrical output of gas engine (KG-18-V) is 7.8 MW at 100% load and the generation efficiency obtained by the on-site test was 48.6%. Hence, Criterion 2 is satisfied.</td></tr>
</table>

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

JQA concludes that the proposed project is eligible for applying the valid version of the approved methodology ID_AM016_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 emissions from electricity and fossil fuel consumption by introducing a gas engine cogeneration system (CGS) at the vehicle manufacturing factory. As the CGS generates both electricity and heat by using natural gas as fuel source, it can replace a part of electricity imported from the grid and produce steam and hot water by using waste heat recovered from the exhaust gas and cooling water of gas engine, which were produced by the reference steam boiler and hot water boiler prior to the implementation of the proposed project. Reference emissions are sourced from both the consumption of electricity imported from the grid and the consumption of fossil fuel by the reference boilers to generate steam and hot water, and project emissions are sourced from the consumption of gas fuel by the gas engine.

Reference emissions are calculated by the sum of reference emission from electricity consumption by the facilities which is generated by the CGS and reference emission from heat consumption by the facilities which is generated by the CGS, as expressed by Equation (1), in

accordance with the methodology ID_AM016:

$$RE_p = \sum\sum RE_{elec,i,j,p} + \sum\sum RE_{heat,i,j,p}$$
$$= \sum\sum (EG_{i,j,p} \times EF_{elec,RE,j}) + \sum (\sum HG_{i,j,p} \times 100/\eta_{RE} \times EF_{fuel,RE,j}) \quad \text{----} \quad (1)$$

Where:

RE_p : Reference emissions during the period *p* [tCO_2/p]

$RE_{elec,I,j,p}$: Reference emissions for electricity consumption by the facility *j* which is generated by the CGS *i* during the period *p* [tCO_2/p]

$RE_{heat,i,j,p}$: Reference emissions for heat consumption by the facility *j* which is generated by the CGS *i* during the period *p* [tCO_2/p]

$EG_{i,j,p}$: Amount of electricity consumption by the facility *j* which is generated by the CGS *i* during the period *p* [MWh/p]

$EF_{elec,RE,j}$: CO_2 emission factor for consumed electricity in the facility *j* [tCO_2/MWh]

$HG_{i,j,p}$: Amount of heat consumption by the facility *j* which is generated by the CGS *i* during the period *p* [GJ/p]

η_{RE} : Reference boiler efficiency [%]

$EF_{fuel,RE,j}$: CO_2 emission factor for fossil fuel consumed by the reference boiler in the facility *j* [tCO_2/GJ]

i : Identification number for the CGS

j : Identification number for the facility to which electricity and heat generated by the CGS *i* is supplied.

Here, the parameter $HG_{i,j,p}$ for the proposed project is estimated by using Option I in the applied methodology, *i.e.*, by monitoring the amount of heat consumption by the facility *j* which is generated by the CGS *i* during the period *p*. The amount of heat consumption is calculated by the following formula described in the MPS, based on the monitored data:

For steam: $HG_{i,j,p} = \Sigma_t (VST_{,i,j,t,} \times h \times v^{-1} - VFW_{i,j,t} \times T_{IN,I,j,t} \times C_p \times \rho) \times 10^{-3}$ -----(2)

For hot water: $HG_{i,j,p} = \Sigma_t (VHW_{,i,j,t,} \times (T_{out,i,j,t} - T_{in,i,j,t}) \times C_p \times \rho \times 10^{-3}$ ---------- (3)

Where:

$VST_{,i,j,t}$: Volume of steam consumption between time *t-1* and *t* [m^3]

$VFW_{i,j,t}$: Volume of feed water between time *t-1* and *t* [m^3]

$VHW_{i,j,t}$: Volume of hot water consumption between time *t-1* and *t* [m^3]

$T_{out,i,j,t}$: Outlet temperature of hot water at time *t* [K]

$T_{in,i,j,t}$: Inlet temperature of hot water at time *t* [K]

h : Specific enthalpy of steam [MJ/tonne]

v : Specific volume of steam [m^3/tonne]

C_p : Specific heat capacity of water [MJ/tonne・K]
ρ : Density of water [tonne/m^3]
t : Number of time period during the period *p* [-]

As PT. Toyota Motor Manufacturing Indonesia consumes only grid electricity, the value of $EF_{elec,RE,j}$, project-specific parameter to be fixed *ex-ante*, used in the calculation of reference emissions for electricity consumption is 0.877 tCO_2/MWh for JAMALI grid (*ex-post* value) which is sourced from "Emission Factor of Electricity Interconnection Systems (2016)", 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. The value of $EF_{fuel,RE,j}$ for fossil fuel (natural gas) and reference boiler efficiency (η_{RE}) used in the calculation of reference emissions for heat consumption are 0.0543 tCO_2/GJ and 89%, respectively. The value of $EF_{fuel,RE,j}$ is sourced from the lower default value in Table 1.4 of Chap.1 Vol.2 of 2006 IPCC Guideline and the default value of η_{RE} is determined by the methodology ID_AM016.

It is confirmed through the review of relevant documents that the project-specific parameters to be fixed *ex-ante* such as $EF_{elec,RE,j}$, $EF_{fuel,RE,j}$ and η_{RE} are correctly applied in the calculation of reference emissions.

Project emissions are calculated from the gas fuel consumption of the CGS by using Equation (4):

$$PE_p = \Sigma PE_{i,p}$$
$$= \Sigma (FC_{i,p} \times NCV_i \times 10^{-3} \times EF_{fuel,PJ,I}) \quad \text{----------} \quad (4)$$

Where:

PE_p : Project emissions during the period *p* [tCO_2/p]
$PE_{i,p}$: Project emissions for the CGS *i* during the period *p* [tCO_2/p]
$FC_{i,p}$: Amount of gas fuel consumption by the CGS *i* during the period *p* [Nm^3/p]
NCV_i : Net calorific value of gas fuel consumed by the CGS *i* [MJ/Nm^3]
$EF_{fuel,PJ,i}$: CO_2 emission factor for gas fuel consumed by the CGS *i* [tCO_2/GJ]
i : Identification number for the CGS

The values of NCV and $EF_{fuel,PJ,i}$ for gas fuel (natural gas) used in the calculation of project emissions are 36.4 MJ/Nm^3 and 0.0583 tCO2/GJ, respectively, which are sourced from the upper default value in Table 1.2 and Table 1.4 of Chap.1 Vol.2 of 2006 IPCC Guideline.

It is confirmed through the review of relevant documents that the project-specific parameters to be fixed *ex-ante* such as NCV and $EF_{fuel,PJ,i}$ are correctly applied in the calculation

of project emissions.

Thus, the GHG emission reductions during the period *p* are calculated by Equation (5), in line with the approved methodology:

$$ER_p = RE_p - PE_p \quad \text{----------} \quad (5)$$

The *ex-ante* values of the monitoring parameters ($EG_{i,j,p}$, $HG_{i,j,p}$ and $FC_{i,p}$) in the MRS which were used in the calculation of emission reductions are calculated based on the data of heat output capacities for electricity and steam/hot water, and operation hours and gas consumption rate of the gas engine, which meets the demand of steam and hot water produced by the reference boilers before the start of the proposed project. As a result, approximately 42,163 MWh/p of electricity generation, 60,846 GJ/p of heat recovery as steam and hot water and 8,904,075 Nm^3/p of natural gas consumption are estimated for the proposed project.

Thus, the annual emission reductions are calculated as follows:

$$\begin{aligned} ER_p &= RE_p - PE_p \\ &= \sum\sum(EG_{i,j,p} \times EF_{elec,RE,j}) + \sum(\sum HG_{i,j,p} \times 100/\eta_{RE} \times EF_{fuel,RE,j}) - \\ &\qquad \Sigma\,(FC_{i,p} \times NCV_i \times 10^{-3} \times EF_{fuel,PJ,I}) \\ &= (42{,}163 \times 0.877 + 60{,}846 \times 100/89 \times 0.0543) - (8{,}904{,}075 \times 36.4 \times 0.0583 \times 10^{-3}) \\ &= 21{,}793\ tCO_2 \end{aligned}$$

The annual GHG emission reductions are estimated to be 21,793 tCO_2 and the sum of the emission reductions for the period of 2017 – 2026 is estimated to be 196,137 tCO_2.

It is confirmed through the review of relevant documents and on-site assessment 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 PDD (ver.2.0) and Monitoring Plan Sheet are correctly calculated, in accordance with the methodology ID_AM016_ver01.0.

Regarding the *ex-ante* values of $EG_{i,j,p}$, $HG_{i,j,p}$ and $FC_{i,p}$ in Tables 4, 5 and 7 of the MPS, JQA raised CL 03 and this issue was resolved as explained in "Findings".

<Findings>

< CL 03 >

The PPs are requested to provide the calculation process for the estimates of $EG_{i,j,p}$, $HG_{i,j,p}$

and $FC_{i,p}$ for transparency.

< Resolution by the PPs >

The supporting documents on the *ex-ante* calculation of $EG_{i,j,p}$, $HG_{i,j,p}$ and $FC_{i,p}$ are provided by the PPs.

< Assessment by the TPE >

According to the supporting documents, the technical specification of the CGS (KG-18-V) shows that natural gas consumption rate is 1,592 Nm^3/h which is equivalent to heat capacity of 16,116 kW at 100% load, and the CGS produces 7,800 kW of electricity (48.4%), 2,520 kW of steam (15.6%) through heat recovery steam generator and 2,370 kW of hot water (14.7%) through heat recovery exchanger. Based on this heat balance, approximately 42,163 MWh/p of electricity generation, 60,846 GJ/p of heat energy recovered as steam and hot water and 8,904,075 Nm^3/p of natural gas consumption can be estimated by multiplying the effective operation hours of the CGS during the year. It is confirmed through the review of relevant documents and the interview with the PPs that the *ex-ante* values of $EG_{i,j,p}$, $HG_{i,j,p}$ and $FC_{i,p}$ are correctly calculated. Thus, CL 03 is closed.

<Conclusion based on reporting requirements>

JQA confirms that all emission sources and GHG types specified in the approved methodology are appropriately identified. JQA concludes that the values of parameters to be monitored *ex-post* in the MPS are correctly estimated based on the heat output capacities for electricity and steam/hot water, effective operation hours and gas consumption rate of the gas engine, and the values for the project-specific parameters to be fixed *ex-ante* listed in the MPS are also correctly determined. 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 proposed project is to reduce CO_2 emissions from electricity and fossil fuel consumption by introducing a gas engine cogeneration system (CGS) to the vehicle manufacturing factory. The PDD states that an Environmental Impact Assessment (EIA) is not required, because the proposed project does not conduct a physical development with an impact to the society as well as the environment around the project site. According to the Ministry of Environment

decree no 05 year 2012, there is no stipulation which requires EIA assessment to such kind of the technology implementation. Therefore, JQA confirms that EIA is not required.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

JQA concludes that the proposed project does not require the EIA. The implementation of the project is in line with the regulations in the Republic of Indonesia 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 PT. Toyota Motor Manufacturing Indonesia in Karawang City on 06/03/2018. Prior to the meeting, the invitation letter was delivered to the stakeholders on 23/02/2018.

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

- Ministry of Energy and Mineral Resources
- Coordinating Ministry for Economic Affairs
- PT. Astra Daihatsu Motor
- PT. Sugity
- Environmental Management District Board Karawang
- Karawang International Industrial City
- PT. Toyota Motor Manufacturing Indonesia

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

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

JQA 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 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 Methodology JCM_ID_AM016_ver01.0. Three monitoring parameters, *i.e.*, amount of electricity consumption by the facility *j* ($EG_{i,j,p}$), amount of heat consumption by the facility *j* ($HG_{i,j,p}$) and amount of gas fuel consumption by the CGS *i* ($FC_{i,p}$) during the period *p* are measured by electricity meter and flow meters, respectively. The monitoring points for electricity consumption (#1) and gas fuel consumption (#4) are properly located at the right positions of the gas engine, respectively. The monitoring points for the flow rate of steam, flow rate and temperature of feed water to the heat recovery steam generator and flow rate and inlet/outlet temperatures of hot water to/from the heat recovery exchanger are also located at right positions, respectively, as illustrated by the figure in Section C.2 of the PDD, to determine the amount of heat consumption (#2) for the production of steam and hot water. The measured data is automatically transmitted to the server in the control room for recording.

Three monitoring parameters such as $EG_{i,j,p}$, $HG_{i,j,p}$ and $FC_{i,p}$ are continuously monitored and monthly aggregated. The aggregated data is double-checked by a responsible staff on a monthly basis to prevent the missing of data. The electricity meter and flow meters are replaced or calibrated according to the national regulation or manufacturer's recommendation.

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 General Manager (Japan), Project Manager (Japan), General Manager (Indonesia) and Supervisor (Indonesia). In Japan, General Manager authorizes the monitoring report and Project Manager approves archived data. In Indonesia, General Manager is in charge of data collection and storage including calibration of monitoring equipment and staff training and Supervisor checks the archived data.

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

Regarding the monitoring frequency of data and the calibration frequency of measuring equipment, JQA raised CL 01 and CL 02 and these issues were resolved as explained in "Findings".

<Findings>

< CL 01 >

The description of "Monthly" in "Monitoring frequency" is to be revised to "Continuously monitored and monthly aggregated" for consistency with the actual monitoring activity.

< Resolution by the PPs >

The PDD was appropriately revised to “Continuously monitored and monthly aggregated”.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD and the interview with the PPs that the parameters of $EG_{i,j,p,}$ $HG_{i,j,p}$ and $FC_{i,p}$ are continuously monitored and monthly aggregated based on the actual monitoring procedures. Thus, CL 01 is closed.

< CL 02 >

The PPs are requested to provide information on the calibration frequency of electricity meter and flow meters used in the project activity.

< Resolution by the PPs >

The certificates of performance test conducted by the manufacturers at the time of shipping of electricity meter and flow meters were provided by the PPs. Based on these results, the description for (h) Measurement methods and procedures in the MPS was revised.

< Assessment by the TPE >

The technical specification and the certificates of performance test for electricity meter, natural gas flow meter, steam flow meter and hot water flow meter provided by Daiichi Electronics Co., Ltd, OVAL Corporation, SAM IL Industry Co., Ltd, and Azbil North America, Inc., respectively, at the time of their shipping are reviewed. As a result, it is confirmed that the accuracy of these measuring equipment stays within±2.5% for electricity meter, ±1.0% for natural gas flow meter and ±2.0% for steam /hot water flow meters.

It is confirmed through the review of the revised MPS and the relevant documents that the calibration or replacement of these measuring equipment is not required during the monitoring period, in accordance with the manufacturer’s recommendation. However, the natural gas

flow meter is to be calibrated or replaced in accordance with the national regulation for the future monitoring period. Thus, CL 02 is closed.

<Conclusion based on reporting requirements>

JQA concludes that the description of the MPS is based on the methodology ID_AM016 and JCM Guidelines for Developing Project Design Document and Monitoring Report, and the monitoring points as well as measuring equipment 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 12/12/2018, in the valid form (JCM_ID_F_MoC_ver01.0) at the time of validation, in which Toyota Tsusho Corporation is nominated as the focal point. The MoC was signed by the authorized representatives of PT. Toyota Motor Manufacturing Indonesia on 09/10/2018 and by the authorized representatives of Toyota Tsusho Corporation on 21/09/2018, along with the contact details.

JQA has checked the personal identities including specimen signatures and employment status of the authorized signatories directly through the interview with the PPs during on-site assessment. Primary authorized signatory of Toyota Tsusho Corporation is General Manager of Industrial Machinery Department, and alternate authorized signatory is Manager of Global Engineering Group. Primary authorized signatory of PT. Toyota Motor Manufacturing Indonesia is Director of the Corporation, and alternate authorized signatory is General Manager of Plant Engineering, Safety Health & Environment Division.

It is confirmed 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>

JQA 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, General Manager of Industrial Machinery Department of Toyota Tsusho Corporation, declares that the proposed project is not registered under any other international climate mitigation mechanism other than the JCM. It is confirmed through the check of publicly available information (e.g. CDM/JI website, etc.) that the proposed project is not registered under any other international climate mitigation mechanisms in terms of the name of entity, applied technology, scale and location. Thus, it can be concluded that the proposed project will not result in double counting of GHG emission reductions.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

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

C.10. Start of operation

<Means of validation>

For the proposed project, the commissioning of the project facilities was satisfactorily completed on 31/03/2017 and then the test run was conducted. The starting date of monitoring activity was set as 01/12/2017. It is confirmed through the review of relevant documents, on-site assessment and the interview with the PPs that the monitoring activity of the proposed project was actually commenced on 01/12/2017.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

JQA concludes that the starting date of the project operation, 01/12/2017, is correct and does not predate 01/01/2013 as required by the Guideline of the JCM project.

C.11. Other issues

<Means of validation>

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

<Findings>

Not applicable.

<Conclusion based on reporting requirements>

Not applicable.

D. Information on public inputs

D.1. Summary of public inputs

In line with the JCM Project Cycle Procedure, the PDD was made publicly available for 30 days from 14/12/2018 to 12/01/2019 to invite public comments on the following JCM website: https://www.jcm.go.jp/id-jp/projects/57

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

- Nandi Julyanto	Director, Vehicle Manufacturing Directorate, PT. Toyota Motor Manufacturing Indonesia
- Yoshiro Okamoto	Senior Managing Executive Coordinator, PT. Toyota Motor Manufacturing Indonesia
- Enjang Ripandi	Department Head, Plant Engineering, Safety Health & Environment Div., PT. Toyota Motor Manufacturing Indonesia
- F. Sales Sudaryono	Division Head, Plant Engineering, Safety Health & Environment Div.,

	PT. Toyota Motor Manufacturing Indonesia
- Hanura A. Basyit	Division Head, Plant Engineering & Environment Div., PT. Toyota Motor Manufacturing Indonesia
- Bayu Hery D	Section Head, Plant Engineering, Safety Health & Environment Div., PT. Toyota Motor Manufacturing Indonesia
- Ivan Kharisnan A	Section Head, Plant Engineering, Safety Health & Environment Div., PT. Toyota Motor Manufacturing Indonesia
- Gatot Widodo	Manager, Production Engineering Department, PT. Toyota Motor Manufacturing Indonesia
- Hiroyuki Aritaki	Project Manager, Global Engineering Group, Industrial Machinery Department, Toyota Tsusho Corporation
- Kei Sato	Consultant, Mitsubishi UFJ Research and Consulting Co., Ltd.

E.2. List of documents received

1. PDD, ver. 1.0, 09/10/2018, ver. 2.0, 25/02/2019
2. Monitoring Plan Sheet and Monitoring Structure Sheet, ver. 1.0, 09/10/2018, ver. 2.0, 12/02/2018
3. JCM Modalities of Communication Statement Form (MoC) dated 21/09/2018
4. JCM Approved Methodology ID_AM016_ver01.0, 10/07/2018 (JC8, Annex 5)
5. JCM Glossary of Terms (JCM_ID_Glossary_ver02.0)
6. JCM Project Cycle Procedure (JCM_ID_PCP_ver05.0)
7. JCM Modalities of Communication Statement Form (JCM_ID_F_MoC_ver01.0)
8. JCM Guidelines for Developing Project Design Document and Monitoring Report (JCM_ID_GL_PDD_MR_ver03.0)
9. JCM Project Design Document Form (JCM_ID_F_PDD_ver02.0)
10. JCM Guidelines for Validation and Verification (JCM_ID_GL_VV_ver01.0)
11. JCM Validation Report Form (JCM_ID_F_Val_Rep_ver01.0)
12. Conceptual design of gas engine cogeneration system (CGS) implemented at PT. Toyota Motor Manufacturing Indonesia (TMMIN)

13-1. Catalogue of gas engine (Model: KG-18-V) manufactured by Kawasaki Heavy Industries, Ltd.

13-2. KG-18V Heat balance and schematic diagram of the CGS system

14. Delivery specification of exhaust gas steam boiler (Model: ECS-G880-13E) dated 12/08/2016, manufactured by Miura Co., Ltd.

15-1. Preliminary study of the proposed project implemented by the PPs

15-2. IRR calculation of the proposed project

16. Company overview of TAMMIN
17. Company overview of Toyota Tsusho Corporation
18-1. Certificate of Completion of the Work for the proposed project dated 01/04/2017, issued by PT. Jaya Obayashi
18-2. Shipping slip of gas engine cogeneration system dated 06/06/2017, issued by Asahi Synchrotech Indonesia
19. Legal durable years list issued by Ministry of Finance, Japan, for operational lifetime of the project
20. Instruction manual of Web server for gas engine cogeneration system prepared by Kawasaki Heavy Industries Ltd.
21. On-site test result of generation efficiency (48.6%) of gas engine (Model: KG-18V) at 100% load, dated 02/05/2017
22. Standard of Procedure for making daily report using SCADA data
23. Invitation letter to local stakeholder consultation meeting, dated 23/02/2018
24. Attendee list of local stakeholder consultation meeting held on 06/03/2018
25. Note for the local stakeholder consultation meeting for the JCM project by PT. Toyota Motor Manufacturing Indonesia and Toyota Tsusho Corporation held 06/03/2018
26. Texts presented at the local stakeholder consultation meeting “Implementation of Emission Reduction using Co-Generation in Car Manufacturing”
27-1. Specification of electricity meter (Model: SQLC-110L) made by Daiichi Electronics Co., Ltd.
27-2. Inspection record of electricity meter issued by Daiichi Electronics Co., Ltd., 05/10/2016
28-1. Specification of natural gas flow meter made by OVALCorporation
28-2. Inspection record of natural gas flow meter issued by OVALCorporation, 22/08/2016
29. Specification of steam flow meter made by SAM IL Industry Co., Ltd.
30-1. Specification of hot water flow meter (Model: AX2200) made by Azbil North America, Inc.
30-2. Inspection record of hot water flow meter (Model: AX2200) issued by Azbil North America, Inc., 01/11/2017
31-1. 2016 CO_2 emission factor of the grid in Indonesia
31-2. IGES List of grid emission factors,
32. Ex-ante calculation sheet of electricity generation, heat consumption for steam and hot water supply and natural gas consumption by use of gas engine cogeneration system for the proposed project
33. Monthly data of electricity imported from the grid and generated by the CGS at PT. Toyota Motor Manufacturing Indonesia

34. Ministry of Environment decree 05-2012
35. Daily data report on cogeneration during the monitoring period

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 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
TA 14.1. Afforestation and reforestation	-

Statement of competence

Name: Dr. Irhan Febijanto

Qualified and authorized by Japan Quality Assurance Organization.

Function	Date of qualification
Validator (JCM project only)	2017/8/21
Verifier (JCM project only)	2017/8/21
Team leader	-

Technical area within sectoral scopes	Date of qualification
TA 1.1. Thermal energy generation	2014/12/22
TA 1.2. Renewables	-
TA 3.1. Energy demand	2014/12/22
TA 4.1. Cement and lime production	-
TA 4.6. Other manufacturing industries	-
TA 5.1. Chemical industry	-
TA 10.1. Fugitive emissions from oil and gas	-
TA 13.1. Solid waste and wastewater	-
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 4.6. Other manufacturing industries	-
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	-