

JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Introduction of High Efficiency LED Lighting Utilizing Wireless Network
Reference number	KH002
Third-party entity (TPE)	Japan Quality Assurance Organization (JQA) TPE-KH-003
Project participant contracting the TPE	MinebeaMitsumi Inc.
Date of completion of this report	03/02/2020

A.2 Conclusion of validation

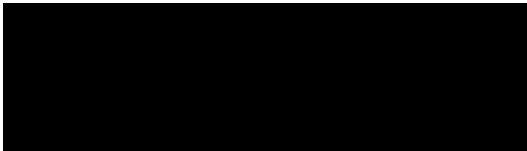
Overall validation opinion	<input checked="" type="checkbox"/> Positive <input type="checkbox"/> Negative
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A.3. Overview of final validation conclusion

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.	<input checked="" type="checkbox"/>
Project description	The description of the proposed JCM project in the PDD is accurate, complete, and provides comprehension of the proposed JCM project.	<input checked="" type="checkbox"/>
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.	<input checked="" type="checkbox"/>
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.	<input checked="" type="checkbox"/>
	The values for project specific parameters to be fixed <i>ex ante</i> listed in the Monitoring Plan Sheet are appropriate, if applicable.	<input checked="" type="checkbox"/>
Environmental impact assessment	The project participants conducted an environmental impact assessment, if required by the Kingdom of Cambodia, in line with Cambodian procedures.	<input checked="" type="checkbox"/>
Local stakeholder	The project participants have completed a local stakeholder consultation process and that due steps were taken to engage	<input checked="" type="checkbox"/>

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 TPE validates the start of the operating date of the proposed JCM project.	☒

Authorised signatory:	Mr. <input checked="" type="checkbox"/> Ms. <input type="checkbox"/>
Last name: Asada	First name: Sumio
Title: Senior Executive	
Specimen signature:	Date: 03/02/2020
	

B. Validation team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. <input checked="" type="checkbox"/> Ms. <input type="checkbox"/>	Tadashi Yoshida	JQA	Team Leader	<input checked="" type="checkbox"/>	Authorized	<input type="checkbox"/>
Mr. <input type="checkbox"/> Ms. <input checked="" type="checkbox"/>	Sachiko Hashizume	JQA	Internal Reviewer	<input checked="" type="checkbox"/>	Authorized	<input type="checkbox"/>

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_KH_GL_PDD_MR_ver03.0). The latest version of the JCM PDD form (JCM_KH_F_PDD_ver03.0) is used for the PDD of the proposed project (Version 1.0 dated 02/10/2019 for First edition and Version 1.1 dated 20/12/2019 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>

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

C.2. Project description

<Means of validation>

The purpose of the proposed project is to reduce GHG emissions from grid electricity consumption of the street lighting system by installing less energy-consuming light-emitting

diode (LED) street lights equipped with wireless network control compared to the conventional type of street lights (High-intensity discharge: HID). About 60 ~ 70% of electricity consumption could be saved by introducing LED lights with wireless network control. The project facilities consist of LED light, node, gateway and database server. The project has installed 5,672 units of high efficiency LED lighting equipment in the vicinity of the capital city of Phnom Penh and Siem Reap Province in Cambodia, which are connected to the national electricity grid. The project sites and the number of light units in Phnom Penh are Diamond Island (766 units) and Chroy Chong Var area (1,288 units), and those in Siem Reap are APSARA area (1,670 units) and Siem Reap Province Hall area (1,948 units). The applied technology enables the dimming control of street lighting system based on the pre-determined time schedule, and further measures the operation hours and electricity consumption of individual light in the project street lighting system every half hour. This technology also detects potential error or malfunction of the street lights individually through wireless network and cloud system at the central control room located in Cambodia and Japan.

Four types of the LED light, which are specified by the different rated light flux and power consumption, are installed for the proposed project. Compared to the conventional type (HID) of street lights, less energy-consuming LED street lighting system installed by the proposed project would reduce the emission reductions of 559 tCO₂ per year and 5,589 tCO₂ in total during the monitoring period of 2018 – 2028.

The proposed project is implemented by 1) Overseas Cambodian Investment Corporation (OCIC), 2) Authority for the Protection of the Site and the Management of the Region of Angkor (APSARA Authority), 3) Siem Reap Provincial Hall from the Kingdom of Cambodia and MinebeaMitsumi Inc. from Japan. The installation of the project LED lights was satisfactorily completed in December 2017 at the sites of Chroy Chong Var, Diamond Island and most of APSARA, and in January 2019 at the site of Siem Reap Province Hall, which are confirmed by their Confirmation Letters. The starting date of project operation was set to be 01/01/2018. This date is validated by “Confirmation Letter” which shows that the installation of 1,288 units of the LED street lights was satisfactorily completed at the site of Chroy Chong Var in December 2017. The expected operational lifetime of the project is 10 years, which is based on the legal durable year list issued by Ministry of Finance, Japan. According to the Guidance by Global Environment Centre Foundation (GEC), the monitoring duration of the proposed project implemented under the Financing Programme for Joint Crediting Mechanism (JCM) Model Projects shall be the legal durable year of 10 years for each site of the project facilities installed by the project. Due to the different starting dates of the project per project site, the expected operational lifetime of project is 11 years for the total duration of entire project, *i.e.*, 2018 -2028, while it is 10 years for the duration of each site.

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, MinebeaMitsumi Inc. has conducted education and training on the installation, operation and maintenance of the LED lighting system with wireless network control for the engineering staffs of the PPs and Minebea (Cambodia) Co., Ltd.

The validation team has assessed the PDD and the supporting documents through the desk review and the interview with the PPs, without on-site visit, to validate the requirements about accuracy and completeness of the project description. No on-site visit is justified as follows: The validation of the accuracy and completeness of the project description has been conducted by the document review and interviews. The sufficient evidences and information relevant to the project description have been obtained without site-visit. The team reviews those documents to determine whether the information in the PDD is accurate and complete, and interviews with the PPs, when necessary the related stakeholders, for understanding the proposed JCM project.

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

Regarding the coordinates of the project sites in A.3 and revision history of the PDD, the validation team raised CAR 01 and this issue was resolved as explained in "Findings".

<Findings>

< CAR 01 >

1) *The "North" of the latitude and "East" of the longitude for the location of the project are missing in A.3 of the PDD.*

2) *The version and date of the PDD completion are to be provided in "Revision history of PDD".*

< Comments from the PPs >

1) "N" for North and "E" for East are added to the section A3.

2) The version and dates of the PDD are added to the "Revision history of PDD".

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the coordinates of the project sites in A.3 and the revision history of the PDD are appropriately described. Thus, CAR 01 is closed.

<Conclusion based on reporting requirements>

The validation team concludes that the description of the proposed project in the revised PDD complies with the supporting documents and information obtained through the desk review, the observation of the LED lighting system with wireless network control via remote

monitoring system 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_KH_AM001_ver01.0 "Installation of LED street lighting system with wireless network control, Version 01.0" is applied to the proposed project. The methodology is approved by the JC on 26/04/2016 (JC2, Annex 7) and valid at the time of the validation.

The validation team has assessed whether the selected methodology is applicable to the proposed project. The project applicability was checked against three 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	The project installs LED street lighting system utilizing wireless network control, which is connected to an electricity grid system.	The LED street lighting systems utilizing wireless network control installed by the project are connected to electricity grid system of the project area.	It is confirmed through the review of the relevant documents, the inspection of street lighting system through remote monitoring system and the interview with the PPs that 5,672 units of LED street lights with wireless network control have been installed at four project sites, which are connected to National electricity grid. Hence, Criterion 1 is satisfied.
Criterion 2	All lighting equipment in one lighting system has the same specifications.	All lighting equipment in one lighting system has the same specifications.	It is confirmed through the review of the relevant documents and the interview with the PPs that four types of LED light are installed at four project sites, but the same specification of light equipment are used in the multiple-light type lighting pole. Hence, Criterion 2 is satisfied.

Criterion 3	Wireless network technology enables controlling of the volume of lighting.	Wireless network technology installed by the project is capable of controlled dimming of the street lighting systems.	It is confirmed through the review of the relevant documents, the inspection of street lighting system through remote monitoring system and the interview with the PPs that the LED lighting system with wireless network control enables the dimming of the street lighting system and further monitors operating hours and electricity consumption of lighting system. This technology also detects potential error or malfunction of individual light in the street lighting system. Hence, Criterion 3 is satisfied.
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<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the proposed project is eligible for applying the valid version of the approved methodology KH_AM001_ver01.0 and all eligibility criteria have been met by the proposed project.

C.4. Emission sources and calculation of emission reductions

<Means of validation>

The proposed project aims to reduce CO₂ emissions from grid electricity consumption of the street lighting system by installing less energy-consuming LED lights equipped with wireless network control compared to the conventional type of HID lights.

Reference emissions are sourced from grid electricity consumption by the HID street lighting system and project emissions are sourced from grid electricity consumption by the LED street lighting system with wireless network control.

Reference emissions are calculated as the emissions from consumption of grid electricity by lighting system utilizing HID lamps for providing the same service level as in the project, which is expressed by Equation (1), in accordance with the methodology KH_AM001:

$$RE_p = \sum_i P_i \times (\eta_{PJ,i} / \eta_{RE}) \times PO_{i,p} \times EF_{grid} \times 10^{-6} \quad \text{-----} \quad (1)$$

Where:

RE_p : Reference emissions during the period *p* (tCO₂/p)

P_i : Rated power consumption of a lighting equipment used in the project lighting

system i (W)

$\eta_{PJ,i}$: Luminaire efficiency of a lighting equipment used in the project lighting system i (lm/W)

η_{RE} : Luminaire efficiency of the reference lighting system (lm/W)

$PO_{i,p}$: Total operating hours of project lighting system i during the period p (hrs/p)

EF_{grid} : Grid emission factor of Cambodian grid (tCO₂/MWh)

i : Identification number of the lighting system

As the grid electricity is consumed for the LED lighting systems installed at four project sites, the CO₂ emission factor of the Cambodian national grid (EF_{grid}), 0.384 tCO₂/MWh, is used in the calculation of reference emissions. The value is sourced from the latest report issued by Ministry of Environment of Cambodia on 01/03/2016 and confirmed by the review of “IGES List of Grid Emission Factor” which summarizes the most recently available data up to October 2019 published by host country governments.

Four types of the LED light are installed at four project sites, and their specification and project specific parameters to be fixed *ex-ante* used in the calculation of reference emissions are summarized in Table 1.

Table 1 Specification and project specific parameters of LED light

LED type	Rated power consumption (P_i , W)	Light flux (lm)	Luminaire efficiency of LED ($\eta_{PJ,i}$, lm/W)	Luminaire efficiency of HID (η_{RE} , lm/W)
1	78	8,400	108	62 (Default value as per the methodology)
2	110	11,900	108	
3	56.8	8,400	148	
4	49.9	4,490	90	

It is confirmed through the review of relevant documents and the interview with the PPs that the project-specific parameters to be fixed *ex-ante* such as EF_{grid} , P_i , $\eta_{PJ,i}$ and η_{RE} are correctly applied in the calculation of reference emissions.

Project emissions are calculated as the emissions from consumption of grid electricity by LED street lighting system with wireless network control installed under the project, which is expressed by Equation (2), in accordance with the methodology KH_AM001:

$$PE_p = \sum_i PEC_{i,p} \times EF_{grid} \times 10^{-6} \quad \text{-----} \quad (2)$$

Where:

PE_p : Project emissions during the period p (tCO₂/p)

$PEC_{i,p}$: Total amount of electricity consumed in the project lighting system i during the period p (Wh/p)

EF_{grid} : Grid emission factor of Cambodian grid (tCO₂/MWh)

i : Identification number of the lighting system

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

$$ER_p = RE_p - PE_p \quad \text{-----} \quad (3)$$

Where:

ER_p : Emission reductions during the period p (tCO₂/p)

RE_p : Reference emissions during the period p (tCO₂/p)

PE_p : Project emissions during the period p (tCO₂/p)

As a result, the annual emission reductions for 2018 are calculated as follows:

$$\begin{aligned} ER_p &= RE_p - PE_p \\ &= \sum_i P_i \times (\eta_{PJ,i} / \eta_{RE}) \times PO_{i,p} \times EF_{grid} \times 10^{-6} - \sum_i PEC_{i,p} \times EF_{grid} \times 10^{-6} \\ &= ((78 \times 108/62 \times 3,735,841 \times 0.384 \times 10^{-6}) + (156 \times 108/62 \times 731,584 \times 0.384 \times 10^{-6}) + \\ &\quad (234 \times 108/62 \times 125,538 \times 0.384 \times 10^{-6})) - ((291,395,575 + 114,127,120 + 29,375,915) \\ &\quad \times 0.384 \times 10^{-6}) \\ &= 123 \text{ tCO}_2 \end{aligned}$$

The GHG emission reductions for 2018 are estimated to be 123 tCO₂ and the sum of the emission reductions for the period of 2018 – 2028 is estimated to be 5,589 tCO₂.

It is confirmed through the review of relevant documents, the inspection through remote monitoring system and the interview with the PPs that all GHG emission sources specified by the applied methodology are identified, and the reference emissions (RE_p), project emissions (PE_p) and emission reductions (ER_p) in the revised PDD (ver1.1) and Monitoring Plan Sheet are correctly calculated, in accordance with the methodology KH_AM001_ver01.0.

Regarding the specification of LED lighting type "SR RoadS", GHG emission source and the estimation of operating hours and electricity consumption in 2018, the validation team raised CAR 02, CL 01 and CL 05 and these issues were resolved as explained in "Findings".

<Findings>

< CAR 02 >

The values of P_i and $\eta_{PJ,i}$ for lighting type "SR RoadS", GHG emission source and the estimation of are not consistent with those in its specification.

<Comments from the PPs >

The values of P_i and $\eta_{PJ,i}$ for lighting type "SR RoadS" have been changed in accordance with its specification and the resulting changes have been made to the C.3.of the PDD and

monitoring plan sheet.

< Assessment by the TPE >

It is confirmed through the review of the specification of "SR RoadS" and the revised PDD and MPS that the values of P_i and $\eta_{PJ,i}$ in Table 1 of the MPS are correctly revised and hence the estimated emission reductions in Table 3 of the MPS and in C.3 of the revised PDD are correctly calculated. Thus, CAR 02 is closed.

< CL 01 >

The sources of GHG emissions are not clearly illustrated in Figure 2 of the PDD.

<Comments from the PPs >

The source of GHG emissions and grid electricity have been added to Figure 2 of the PDD.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the GHG emissions are sourced from the consumption of grid electricity by the LED lighting system installed at the project sites. Thus, CL 01 is closed.

< CL 05 >

The PPs are requested to clarify why DI type under the control of Overseas Cambodian Investment Corp. and 1,470 LED lights (Phase 1) under APSARA of which the installation were already completed in December 2017 were not included in the estimated values of $PO_{i,p}$ and $PEC_{i,p}$ in Table 1 of MPS for 2018.

< Comments from the PPs >

For Diamond Island (DI), some lighting equipment did not get fully operational until 2018. Therefore, the PP decided to set the start date of the project from 2019. For APSARA, the PP decided to set the start date of project after the installation of the entire area was completed to simplify management for monitoring.

< Assessment by the TPE >

It is confirmed through the review of the relevant documents and the interview with the PPs that the LED street lighting system in Diamond Island was not ready for the monitoring activity until 2018 and the installation of the LED lighting system at the site of APSARA was partly delayed until 2018 and hence the PPs decided to start the monitoring activity of these sites on 01/01/2019 to simplify the monitoring management. As a result, the monitoring data for these sites were not included in the estimated values of $PO_{i,p}$ and $PEC_{i,p}$ in 2018. Thus, CL 05 is closed.

<Conclusion based on reporting requirements>

The validation team confirms that all emission sources and GHG types specified in the approved methodology are appropriately identified. The validation team concludes that the values of parameters to be monitored *ex-post* in the MPS are correctly estimated based on the total operating hours and total amount of electricity consumption of the project lighting system 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 purpose of the proposed project is to reduce CO₂ emissions from grid electricity consumption of street lighting system by installing less energy-consuming LED lights compared to the conventional type of street light. 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 Sub-Decree on Environmental Impact Assessment Process dated 11/08/1999, there is no stipulation which requires EIA assessment to this kind of the technology implementation. Therefore, the validation team confirms that EIA is not required.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the proposed project does not require the EIA. The implementation of the project is in line with the regulations in Kingdom of Cambodia 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 CEO Meeting, Koh Pich City Hall, Diamond Island in Phnom Penh on 12/02/2019 and at Meeting Room 1, Siem Reap Provincial Hall in Siem Reap on 13/02/2019. Prior to the meeting, the invitation letter was delivered to the stakeholders on 24/01/2019.

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

- Ministry of Environment, Cambodia
- Ministry of Industry and Handicraft, Cambodia
- Overseas Cambodia Investment Corporation
- APSARA Authority
- Siem Reap Province Hall
- MinebeaMitsumi Inc.
- Minebea (Cambodia) Co., Ltd.
- Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.

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

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the PPs have completed a local stakeholder consultation process under the EIA and invited comments on the proposed project from the local stakeholders. The summary of the comments received is provided in the PDD in a complete manner and the PPs have taken due account of all the comments 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_KH_AM001_ver01.0. Two monitoring parameters, *i.e.*, total operating hours of project lighting system i ($PO_{i,p}$) and total amount of electricity consumed in the project lighting system i ($PEC_{i,p}$) during the period p , are measured by the nodes installed together with the street lighting system. The monitoring points for operating hours (#1) and electricity consumption (#2) of the LED lighting system are located on all lighting poles. The measured data is automatically transmitted through the gateway to the PC server for recording every half hour. The central control rooms are located in Minebea

(Cambodia) Co., Ltd. in Cambodia and MinebeaMitsumi Inc. in Tokyo. These two parameters 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 accuracy of the node ($\pm 5\%$) to measure electricity consumption and operating hours is warranted for 10 years by the manufacturer. 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 MinebeaMitsumi Manager (Japan), Minebea (Cambodia) Operator, Local Partner Organization Manager. MinebeaMitsumi Manager approves the monthly and annual monitoring report, Minebea (Cambodia) Operator monitors data and prepares monthly and annual report and further detects the failure/trouble of the equipment, and Local partner organization manager takes actions on the failure/trouble of equipment.

It is confirmed through the review of the relevant documents, the inspection of street lighting system through remote monitoring system 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 point, monitoring frequency and archiving of monitored data, the validation team raised CL 02, CL 03 and CL 04 and these issues were resolved as explained in "Findings".

<Findings>

< CL 02 >

The exact location of monitoring points for the measurement of operating hours and electricity consumption are not clearly illustrated in Figure 2 of the PDD.

< Comments from the PPs >

The exact location of monitoring points have been clarified as "node" in Figure 2 of the revised PDD.

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the node as monitoring point for the measurement of operating hours and electricity consumption of LED lighting system is clearly illustrated in Figure 2 of the revised PDD. Thus, CL 02 is closed.

< CL 03 >

The monitoring frequency and recording frequency are to be clearly described in the cell "(i) Monitoring frequency" in Table 1 of MPS.

< Comments from the PPs >

Monitoring frequency has been revised as "continuously monitored and monthly recorded".

< Assessment by the TPE >

It is confirmed through the review of the revised PDD that the description in "(i) Monitoring frequency" is appropriately revised to "Continuously monitored and monthly recorded". Thus, CL 03 is closed.

< CL 04 >

The description on the archiving of monitored data in the MSS is to be provided in the cell "(h) Measurement methods and procedures" in Table 1 of MPS.

< Comments from the PPs >

The description of archiving monitored data has been moved from MSS to "(h) Measurement methods and procedures" in Table 1 of MPS.

< Assessment by the TPE >

It is confirmed through the review of the revised MPS that the description on the archiving of monitored data is appropriately inputted into "(h) Measurement methods and procedures" in Table 1 of MPS.

<Conclusion based on reporting requirements>

The validation team concludes that the description of the MPS is based on the methodology KH_AM001 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. Thus, CL04 is closed.

C.8. Modalities of Communication

<Means of validation>

The MoC was provided to JQA for review on 03/09/2019, in the valid form (JCM_KH_F_MoC_ver01.0) at the time of validation, in which MinebeaMitsumi Inc. is nominated as the focal point. The MoC was signed by the authorized representatives of Overseas Cambodian Investment Corporation (OCIC) on 06/04/2019, Authority for the Protection of the Site and the Management of the Region of Angkor (APSARA) on 09/04/2019, Siem Reap Provincial Hall on 10/05/2019 and by the authorized representatives of MinebeaMitsumi Inc. on 03/04/2019, along with the contact details.

The validation team has checked the personal identities and employment status of the

authorized signatories through their business cards. Primary authorized signatory of MinebeaMitsumi Inc. is Head of Smart Production Business Unit and alternate authorized signatory is General Manager of the same unit.

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

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

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

C.9. Avoidance of double registration

<Means of validation>

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

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

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

C.10. Start of operation

<Means of validation>

For the proposed project, the installation of the project facilities was satisfactorily

completed in December 2017 at the sites of Chroy Chong Var, Diamond Island and most of APSARA Authority, and in January 2019 at the site of Siem Reap Province Hall. It is confirmed through the review of the relevant document and the interview with the PPs that the monitoring activity of the proposed project was actually commenced at the site of Chroy Chong Var on 01/01/2018.

<Findings>

No issue was raised to the requirement.

<Conclusion based on reporting requirements>

The validation team concludes that the starting date of the project operation, 01/01/2018, is correct.

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 08/10/2019 to 06/11/2019 to invite public comments on the following JCM website:

<https://www.jcm.go.jp/kh-jp/projects/66>

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

- Takashi Mitsui	Assistant Manager, Administration Div., Engineering HQ, MinebeaMitsumi Inc.
- Ashok Bajracharya	Assistant Supervisor, Administration Div., Engineering HQ, MinebeaMitsumi Inc.
- Fumiko Sakamoto	Administration Div., Engineering HQ, MinebeaMitsumi Inc.
- Naoko Nemoto	Assistant Supervisor, Sales HQ Marketing Dept., Market Strategies Office, MinebeaMitsumi
- Kikuko Shinchi	Senior Consultant, Environmental Strategy Advisory Div., Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.

E.2. List of documents received

1. Project Design Document, ver1.0, 02/10/2019 and ver1.1, 20/12/2019
2. Monitoring Spreadsheet JCM_KH_AM001_ver01.0 for the years of 2018, 2019-2027 and 2028, 02/10/2019
3. Revised Monitoring Spreadsheet JCM_KH_AM001_ver01.0 for the years of 2018, 2019-2027 and 2028, 20/12/2019
4. JCM Modalities of Communication Statement Form, submitted by MinebeaMitsumi Inc.
5. Business cards of Primary authorised signatory, Alternate authorised signatory from Japanese and Cambodia sides along with Contact person
6. JCM Modalities of Communication Statement Form (JCM_KH_F_MoC_ver01.0)
7. JCM Approved Methodology (JCM_KH_AM001_ver01.0)
8. Monitoring Spreadsheet (JCM_KH_AM001_ver01.0)
9. JCM Glossary of Terms (JCM_KH_Glossary_ver02.0)
10. JCM Project Cycle Procedure (JCM_KH_PCP_ver03.0)
11. JCM Project Design Document Form (JCM_KH_F_PDD_ver03.0)
12. JCM Guidelines for Developing Project Design Document and Monitoring Report (JCM_KH_GL_PDD_MR_ver03.0)
13. JCM Guidelines for Validation and Verification (JCM_KH_GL_VV_ver01.0)
14. JCM Validation Report Form (JCM_KH_F_Val_Rep_ver01.0)
15. Feasibility study report of the proposed project, March 2015
16. Design and specification of each type LED street light
17. List of type and number of LED street lights installed at four project sites
18. Company profiles of 1) Overseas Cambodian Investment Corporation (OCIC), 2) Authority for the Protection of the Site and the Management of the Region of Angkor (APSARA

- Authority), 3) Siem Reap Provincial Hall
19. Company profile of MinebeaMitsumi Inc.
 20. Confirmation Letter to demonstrate the starting date of project operation (01/01/2018), including completion date of the installation at four project sites
 21. Legal durable year list issued by Ministry of Finance, Japan, to demonstrate the expected operational lifetime (10 years) of the LED light
 22. Contract of the proposed project between Minebea Co., Ltd. and Global Environment Centre Foundation (GEC) dated 30/09/2015
 23. Records and texts of the staff training for installation, operation and maintenance of the LED Lighting system conducted in 2016-2019, including photos
 24. Design, function and specification of wireless network technology
 25. Design and specification of the node installed by the proposed project
 26. Design and specification of the gateway installed by the proposed project
 27. Installation Manual including troubleshooting, version 1.8, prepared by Paradox Engineering
 28. CMS User Manual on the operation and reporting of monitored data, prepared by Paradox Engineering
 29. Lighting Management Node Product Specification, prepared by Paradox Engineering
 30. Sub-Decree #72 ANRK.BK on environmental impact assessment process (PDF)_990811, Kingdom of Cambodia, issued on 11/08/1999
 31. Minutes of the local stakeholder consultation meeting, including the attendees' list
 32. Invitation letter sent to the stakeholders, dated 24/01/2019
 33. Presentation materials used for the local stakeholder consultation meeting
 34. Night length on 15th of each month in PNH and REP
 35. Data source and calculation of total operating hours and total amount of electricity consumed by the project street lighting system
 36. Comparison data of luminaire efficiency of mercury lamp, high pressure sodium lamp and LED and determination of reference luminaire efficiency (62 lm/W)
 37. Grid emission factor in Cambodia, published by the Ministry of Environment Cambodia, 1 March 2016, which shows that the weighted average CM is 0.384 tCO₂/MWh.
 38. Schematic diagram of monitoring structure including monitoring data flow
 39. Sample of monitoring data report for the proposed project
 40. IGES List of Grid Emission Factors which summarizes the most recently available data up to October 2019

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

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

Statement of competence



Name: Dr. Tadashi Yoshida

Qualified and authorized by Japan Quality Assurance Organization.

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

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

Statement of competence



Name: Ms. Sachiko Hashizume

Qualified and authorized by Japan Quality Assurance Organization.

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

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