# JCM Validation Report Form

## A. Summary of validation

A.1. General Information

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| Title of the project | Energy Saving by Inverters for Distribution Pumps in Water Treatment Plant |
| Reference number | KH004 |
| Third-party entity (TPE) | Japan Management Association (JMA) |
| Project participant contracting the TPE | METAWATER Co., Ltd. |
| Date of completion of this report | 17 March 2021 |

A.2 Conclusion of validation

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| Overall validation opinion | ☒ Positive<br>☐ Negative |

A.3. Overview of final validation conclusion

*Only when all of the checkboxes are checked, overall validation opinion is positive.*

| Item | Validation requirements | No CAR or CL remaining |
|---|---|---|
| Project design document form | The TPE determines whether the PDD was completed using the latest version of the PDD forms appropriate to the type of project and drafted in line with the Guidelines for Developing the Joint Crediting Mechanism (JCM) Project Design Document, Monitoring Plan and Monitoring Report. | ☒ |
| Project description | The description of the proposed JCM project in the PDD is accurate, complete, and provides comprehension of the proposed JCM project. | ☒ |
| Application of approved JCM methodology (ies) | The project is eligible for applying applied methodology and that the applied version is valid at the time of submission of the proposed JCM project for validation. | ☒ |
| Emission sources and calculation of emission reductions | All relevant GHG emission sources covered in the methodology are addressed for the purpose of calculating project emissions and reference emissions for the proposed JCM project. | ☒ |
| | The values for project specific parameters to be fixed *ex ante* listed in the Monitoring Plan Sheet are appropriate, if applicable. | ☒ |
| Environmental impact assessment | The project participants conducted an environmental impact assessment, if required by the Kingdom of Cambodia, in line with Cambodian 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. | ☒ |
| Monitoring | The description of the Monitoring Plan (Monitoring Plan | ☒ |

| Item | Validation requirements | No CAR or CL remaining |
|---|---|---|
| | 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.<br>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. | ☒ |

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| Authorised signatory: | Mr. ☒ Ms. ☐ |
| Last name: Wako | First name: Nemoto |
| Title: Senior Executive of GHG Certification Center, JMA | |
| Specimen signature: [redacted] | Date: 17/03/2021 |

## B. Validation team and other experts

| | Name | Company | Function* | Scheme competence* | Technical competence* | On-site visit |
|---|---|---|---|---|---|---|
| Mr. ☒ Ms. ☐ | Kenji Suzuki | JMA | Team Leader | ☒ | Technical competence qualified | ☐ |
| Mr. ☒ Ms. ☐ | Satoshi Kodakari | JMA | Team Member | ☒ | - | ☐ |
| Mr. ☒ Ms. ☐ | Masao Tomizawa | JMA | Team Member | ☒ | - | ☐ |
| Mr. ☒ Ms. ☐ | Motoyuki Matsumoto | JMA | Internal Reviewer | ☒ | Technical competence qualified | ☐ |

*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>**

PDD (Ref.1) was checked using the "Joint Crediting Mechanism Guidelines for Developing Project Design Document and Monitoring Report (JCM_KH_GL_PDD_MR_ver03.0) (Ref.14)".

Review history of the PDD is as follows.

- PDD version 1: PDD was submitted to JMA on 30 Nov.2020. And the PDD was informed by JCM homepage for public inputs.
- PDD version 2: PDD was revised on 1 Mar.2021 to resolve the remaining issues. PDD version 2 (Ref.1) is final version.

The latest version of the PDD form (JCM_KH_F_PDD_ver03.0) was checked at the website of New Mechanisms Information Platform for Cambodia. Validation team confirmed that the latest version of the PDD form was used for all version of PDD (Ref.1). Also, validation team confirmed that form of Monitoring Spreadsheet (JCM_KH_AM005_ver01.0) which was approved as a methodology (Ref.2) by Joint Committee was used for the proposed project.

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the PDD was completed using the latest version of the PDD form and in accordance with the "JCM Guidelines for Developing PDD and MR (Ref.14)".

C.2. Project description

**<Means of validation>**

The proposed project is to install inverters to two existing pumps (520kW and 272kW) in Water Treatment Plant which are owned by Phnom Penh Water Supply Authority (PPWSA).

Validation team conducted the assessment with the step below by following "Joint Crediting Mechanism Guidelines for Validation and Verification (JCM_KH_GL_VV_ver01.0) (Ref.13)".

- Document review was conducted using the checklist based on the "JCM Guidelines for Validation and Verification (Ref.13)".
- Interviews with all project participants (PPs) through the internet were conducted. The validation was conducted without on-site visit by the following reasons.
- Due to the COVID-19 pandemic.
- The information required for validation, which would normally be verified during on-site assessment, was verified by alternative methods such as document and photo reviews, interviews via internet, and e-mail.

Each section in the PDD was checked as follows during document review and interviews to confirm the project description.

A.1, 2:

The proposed project is to reduce CO2 emissions by introducing inverters to two existing pumps. The two existing water distribution pumps can be operated efficiently by inverter control to reduce power consumption. Validation team confirmed that explanation of how the proposed project reduces greenhouse gas emissions was described in the PDD (Ref.1).

A.3:

Location was confirmed by interviews with PPs and by Google Map based on GPS information. Also, validation team confirmed the project location by the document (Ref.3-2).

A.4:

PPs of both countries were confirmed by interviews and checking the Modalities of communications (MoC) (Ref.8-1).

A.5:

"Expected operational lifetime of project (18 years)" was confirmed to be consistent with Japanese legal durable years (Ref.3-4-1).

"Starting date of project operation" was checked in the section C.10.

A.6:

Financial support by the Ministry of the Environment, Japan was confirmed by checking "Financing programme for JCM model projects (Ref.3-4-2)".

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team assessed the project description provided in the PDD.

Validation team confirmed that the description of the proposed project in the PDD was accurate and complete, and was understandable for the proposed project activity.

C.3. Application of approved methodology(ies)

**<Means of validation>**

Approved methodology "Installation of inverters to distribution pumps in water treatment plant, Version 01.0" was applied to the proposed project. The methodology was approved by the Joint Committee on 21 Feb. 2020, and valid as of the time of the validation.

Validation team assessed if the project is eligible for applying selected methodology.

Validation team conducted the assessment for each criterion with the step below by following "JCM Guidelines for Validation and Verification (Ref.13)".

- Document review was conducted using the checklist based on the "JCM Guidelines for Validation and Verification (Ref.13)".
- Interviews to PPs via internet were conducted on 23 Dec.2020 and 15 Jan.2021.

Each criterion in the PDD was checked as follows during document review and interviews.

Criterion 1:

-Description specified in the methodology: "Inverter(s) is installed to the existing constant-speed pump(s) for water distribution in water treatment plant."

-Assessment for Criterion 1:

Specification of inverters described in the PDD was checked with "Photos of equipment (Ref.3-1)", "Specification of inverters (Ref.3-5-1)" and "Piping diagram for Distribution pump and Transmission pump (Ref.3-5-2)". Also, these two inverters were installed to the existing constant-speed pumps (520kW and 272kW) for water distribution.

Validation team confirmed that inverters described in the PDD was consistent with the actual equipment installed at the water treatment plant.

Criterion 2:

-Description specified in the methodology: “The value of ECR of project pump is always smaller than that of reference pump at the same operational load except when the operational load is equal to one (1), which is demonstrated by equations fixed ex ante or may be demonstrated by equations ex post at the time of the first verification.”

-Assessment for Criterion 2:

Validation team confirmed that ECRPJ,i,p of project pump was decided as follows.

・Operational load and electricity consumption data of project pumps were measured;

All (constant-speed) pumps other than the project pumps that are piped in parallel were stopped, and only the two project pumps (520 kW and 272 kW) for water distribution were operated to measure the actual operational load (flow rate) and electricity consumption.

・Based on the results of measuring, the value of ECRPJ,i,p of project pump was calculated according to "F.2 Calculation of reference emissions Step 1" of the methodology, and the data was decided as parameters to be fixed ex ante. Coefficient of determination (R2) of the equation exceeds 0.95.

The validation team confirmed that the ECR of each project pumps was always smaller than the ECR of the reference pump (Ref.3-6).

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the proposed project was eligible for applying selected methodology "Installation of inverters to distribution pumps in water treatment plant, Version 01.0", and that the applied methodology was valid at the time of submission of the proposed project for the validation.

C.4. Emission sources and calculation of emission reductions

**<Means of validation>**

The inverters for distribution pumps can reduce the electricity consumption derived from the Cambodia grid. Reference emissions are calculated by the operation of existing pumps without inverters. Emission sources of the reference emissions are electricity consumption by reference pumps. Also, project emissions are calculated by the operation of pumps with inverters. Emission sources of the project emissions are electricity consumption by project pumps.

Validation team confirmed that relevant GHG emission sources and parameters to be fixed ex ante in the applied methodology were addressed in the PDD. Also, validation team checked the calculation of emission reductions with reference. Validation team conducted the assessment

for GHG emission sources with the step below by following JCM Guidelines for Validation and Verification (Ref.13).

- Document review was conducted using the checklist based on the “JCM Guidelines for Validation and Verification (Ref.13)”.
- Interviews with Cambodia PP and Japan PP were conducted on 15 January 2021

The description of the PDD including Monitoring spreadsheet was checked during document review and interviews to confirm the emission sources and calculation of emission reductions.

The emission sources were confirmed by checking “Specification of inverters and System diagram (Ref.3-5-1)”, interviews with PPs, and photos of the installation situation of corresponding inverters and pumps (Ref.3-1).

Validation team confirmed that the value of "Reference CO2 emission factor for consumed electricity" (0.384 tCO2/MWh) was used appropriately by checking “Grid Emission Factors in Cambodia (Ref. 11)”. In addition, validation team confirmed that the value is the latest value by the e-mail from Ministry of Environment.

The estimated emissions reductions were checked by validation team as follows.

Validation team checked the values used for the calculation of the estimated emissions reductions. The following values were used by the “Reference regarding the estimated emissions reductions (Ref.3-8)”.

・Operational load(x): Median between actual operational load from 0.75 to 0.95 was used. Also, the actual measured data of operation load (Ref.3-6) was very closed to 0.86.

・ECRRE,i,p : The value of applied methodology was used.

・ECRPJ,i,p ： The value was calculated by measured data by “Reference regarding the value of electricity consumption (Ref.3-6)”（Refer to C3, Criterion 2.）

・Rated power(KW), Motor efficiency ： The data of “Motor data sheet (Ref.3-8)” was used.

・Total running hour(h) ： The data of “Monitoring data (Ref.3-3)” was used.

Validation team confirmed that ECRPJ,i,p was calculated appropriately according to the item F2 of applied methodology. Also, the measured value (measured in Sep.2019) used for the calculation was confirmed by “Record of No.4, 7 Distribution Pump (Ref.3-8)”.

Validation team confirmed that project emissions, reference emissions and emission reductions for the proposed project were calculated properly.

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that:

-All relevant GHG emission sources covered in the approved methodology were addressed for the purpose of calculating project emissions and reference emissions for the proposed project ;
-The values for project specific parameters to be fixed ex ante listed in the Monitoring Plan Sheet were appropriate;
- The Monitoring Spreadsheet was not altered and its required fields were appropriately filled in;
-The emission sources and GHG types were confirmed through the interviews with PPs and document review;
- Significant emission sources which were not addressed by the applied approved methodology and would be affected by implementation of the proposed project were not identified;
-The approved methodology was applied correctly to calculate project emissions and reference emissions.

C.5. Environmental impact assessment

**<Means of validation>**

PDD stated that an Environmental Impact Assessment (EIA) was not required by Cambodia laws and regulations. Validation team had the interview with local side of PP to confirm the requirements of EIA. This project is installing new inverter panels to the existing two motors. Hence, EIA is not required because this project is only installing inverter panels to existing project site. Also, according to the requirements of EIA, which is indicated in "Sub -Decree #72 ANRK.BK on environmental impact assessment process"(Ref.4), there is no description which requires the EIA to inverter panels installation for this project. Validation team confirmed that EIA was not required for the proposed project through the interview and the reference.

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the proposed project did not need EIA against the legal requirement of Republic of Cambodia.

C.6. Local stakeholder consultation

**<Means of validation>**

PPs conducted a stakeholder consultation meeting of this project activity to collect opinions from local stakeholders on 18 December 2018. PPs identified the relevant government agencies and people who working at the project site as local stakeholders for the project activity. The stakeholder consultation meeting was informed to relative stakeholders by sending invitation

letter. Validation team checked "Local stakeholder consultation Meeting memo (Ref.5)". Comments at the local stakeholder consultation meeting were all supportive and no negative comment received.

Also, interview with Cambodian PP and Japan PP was conducted on 15 January 2021. Validation team interviewed two people of PPWSA and one person of METAWATER Co., Ltd at local. Two out of three people were attended to the local stakeholder consultation. Validation team confirmed the comment was supportive, and satisfied with the project activity which have an opportunity to reduce the usage of electricity.

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the PPs invited comments to the proposed project from the relevant local stakeholders, and the summary of the comments received was described in the PDD appropriately.

C.7. Monitoring

**<Means of validation>**

The description of the PDD including monitoring plan was checked as follows during document review and interviews with PPs to confirm the Monitoring.

The description of Monitoring Plan Sheet was checked with the applied methodology.

The proposed project has one monitoring point for each inverter. The description of chapter (h) in the table 1 of Monitoring Plan Sheet was checked as follows.

There is no national law or regulation for the measurement of electrical power in the proposed project. It was confirmed by interviews with local PPs. However, the description of monitoring plan of PDD equals the description from the methodology. CL1 was raised to check the description of the Monitoring Plan for this proposed project. Also, CAR 1 was raised because the figure of monitoring points which was described in item C2 of the PDD was different from the description of the monitoring plan.

PP submitted "Specification of electricity consumption meter of inverters (Ref.3-5-3)" which was made by inverter manufacturer. Also, PP revised the description of chapter (h) in the table 1 of Monitoring Plan Sheet to describe the contents for the project activity. Validation team confirmed the description of chapter (h) by manufacture's specification (Ref.3-5-3). In addition, validation team confirmed that the International Consortium Agreement (Ref.9) which indicates PPWSA maintains the inverters during project operation period.

Also, QA/QC procedure was checked with the description of the Monitoring Structure sheet

and “Monitoring procedure (Ref.12)”.
Monitoring structure was confirmed by interviews with the following people described in the Monitoring Structure sheet.
- Project manager, Monitoring staff
Validation team confirmed the role and responsibility for monitoring were assigned to the personnel in accordance with the Monitoring Structure sheet.
This project activity started monitoring from 30 Jun.2018. Validation team checked the“Records of measured data of electrical power consumption (Ref.3-3)”, and found that measuring result was recorded appropriately. Validation team confirmed that PPs have the ability to implement the monitoring plan described in the Monitoring Plan Sheet and Monitoring Structure Sheet.

**<Findings>**

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

The following CL1 and CAR1 were raised to check the Monitoring Plan.

CL1:

The description of monitoring plan of PDD equals the description from the methodology. CL1 was raised to check the description of the Monitoring Plan for this proposed project.

⇒Summary of Response and Validation team Conclusion：

PP revised the description of chapter (h) in the table 1 of Monitoring Plan Sheet to describe the contents for the project activity.

CL1 was closed.

CAR1:

The figure of monitoring points which was described in item C2 of the PDD was different from the description of the monitoring plan.

PP needs to confirm and revise the documents by following the actual situation.

⇒Summary of Response and Validation team Conclusion：

PP revised the figure of monitoring points which was described in item C2 of the PDD.

CAR1 was closed.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the Monitoring Plan was described in compliance with the approved methodology and “JCM Guidelines for developing PDD and MR (Ref.14)”.
Also, PPs have demonstrated the ability to implement the described monitoring plan including feasibility of monitoring structure.

C.8. Modalities of Communication

**<Means of validation>**

Modalities of communications (MoC) was developed using the form of "JCM_KH_F_MoC_ver01.0". Validation team confirmed that the latest form was used for MoC.

Validation team ensured that the “MoC (Ref.8-1)” was received from METAWATER Co., Ltd. (METAWATER) with whom JMA has a contractual relationship. Also, Validation team assessed the corporate identity of all project participants and a focal point, as well as the personal identities including specimen signatures and employment status of the authorised signatories through reviewing the “Written confirmation from METAWATER (Ref.8-2)”.

In addition, validation team confirmed the corporate information of PPs by interviews with all PPs.

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the “MoC (Ref.8-1)” was completed using the latest form. Also, validation team confirmed the “MoC (Ref.8-1)” had been completed correctly in compliance with the requirements of the “JCM Guidelines (Ref.13, 15)”.

C.9. Avoidance of double registration

**<Means of validation>**

“Modalities of communications (MoC) (Ref.8-1,8-2)” indicates that the proposed project is not registered under other international climate mitigation mechanisms. In addition, the following websites of CDM, JI and VCS were checked whether the projects with similar technology and location had been registered.

1) Website of UNFCCC (Project Search for CDM, JI Projects)

2) Website of IGES (IGES CDM Project Database, IGES JI Project Database)

3) Website of Verified Carbon Standard

Validation team confirmed that there was no registered project with similar technology and location.

**<Findings>**

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

No CAR, CL, or FAR were raised for this section.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the proposed JCM project was not registered under other

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|---|
| international climate mitigation mechanisms. |

C.10. Start of operation

**<Means of validation>**

"Start of operation date" described in the PDD was checked by raising CL2. Validation team confirmed that inverters for this proposed project had completed the commissioning at site on 15 Jun.2018 by checking “Project Completion Letter, Date of issue: 15 Jun.2018 (Ref.3-3)”. Also, the monitoring data of electricity consumption on 30 Jun.2018 was submitted as the response of CL2.

Validation team confirmed the "Start of operation date" by interviews and checking references (Ref.3-3).

**<Findings>**

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

The following CL2 was raised to check the “Starting date of project operation”.

CL2

It is necessary to confirm the “Start of operation date” for this proposed project.

Please submit the documents or records as the evidence of “Starting date of project operation”.

⇒Summary of Response and Validation team Conclusion：

The “monitoring data of electricity consumption on 30 Jun.2018 (Ref.3-3)” was submitted by PP. “Start of operation date” of the PDD was revised according to the references.

Validation team confirmed that the operation of inverters for this proposed project had started after the date of commissioning completion. In addition, there is a monitoring data of electricity consumption from 30 Jun.2018.

CL2 was closed.

**<Conclusion based on reporting requirements>**

*Please state conclusion based on reporting requirements.*

Validation team confirmed that the "Start of operation date" of the proposed project was 30 Jun.2018 as described in the PDD. Validation team confirmed that the proposed project satisfied the requirement of the “JCM Guidelines (Ref.15)”.

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.*

Not applicable

**<Conclusion based on reporting requirements>**

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| *Please state conclusion based on reporting requirements.*<br>Not applicable |

## D. Information on public inputs

D.1. Summary of public inputs

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| In line with the Joint Crediting Mechanism Project Cycle Procedure (JCM_KH_PCP_ver03.0) (Ref.15), the PDD is to be made publicly available for 30 days to invite public comments. The PDD was made publicly available for the period of 24 Dec. 2020 to 22 Jan.2021 on the following URL. https://www.jcm.go.jp/kh-jp/information/394. |

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

| |
|---|
| No comment was received during the period to receive public inputs.<br>Hence, no action was required to be taken by the PPs to satisfy the requirement of JCM Project Cycle Procedure (Ref.15). |

## E. List of interviewees and documents received

E.1. List of interviewees

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|---|
| Phnom Penh Water Supply Authority (PPWSA)<br>Mr. Kem Kanvicheth<br>Mr. Yun Limkea<br>METAWATER Co., Ltd.<br>Mr. Imaji Hayashi<br>Mr. Eba Yutaka<br>Mr. IN Thearith<br>Pacific Consultants Co., Ltd.<br>Mr. Shigezane Kidoura |

E.2. List of documents received

Ref.1: Project Design Document for JCM project "Energy Saving by Inverters for Distribution Pumps in Water Treatment Plant"
Ref.2: Approved Methodology "Installation of inverters to distribution pumps in water treatment plant, Version 01.0"
Ref.3-1：Photos of equipment
・Photos of the installation situation of corresponding Inverters and pumps (inverters to two existing distribution pumps (No.4 pump(520kW) and No.7 pump(272kW))
Ref.3-2： Reference of Location of project (Location of distribution pumps No.4 and No.7)
Ref.3-3：Reference of "Starting date of project operation"
・Project Completion Letter, Date of issue: 15 Jun.2018
・Monitoring data of electricity consumption on 30 Jun.2018
Ref.3-4-1：Reference of "Expected operational lifetime of project" (Japanese legal durable years )：
Ref.3-4-2: Financing programme for JCM model projects by the Ministry of the Environment, Japan
・Grant decisions for carbon dioxide emission control measures business subsidies 2016-2018 fiscal year, Issued by Global Environmental Centre Foundation, 22 Mar. 2017
Ref.3-5-1: Specification of inverters (Equipment specification, System diagram)
Ref.3-5-2: Piping diagram for Distribution pump and Transmission pump
Ref.3-5-3: Specification of electricity consumption meter of inverters
Ref.3-6：Reference regarding the value of electricity consumption
Ref.3-8：Reference regarding the estimated emissions reductions
・Calculation sheet
・Motor data sheet
・Record of No.4, 7 Distribution Pump (20190927)
Ref.4: Sub -Decree #72 ANRK.BK on environmental impact assessment process(PDF)_990811, Kingdom of Cambodia, issued on 11/08/1999
http://www.cambodiainvestment.gov.kh/ja/sub-decree-72-anrk-bk-on-environment-impact-assessment-process-pdf_990811.html
Ref.5: Local stakeholder consultation (24 September 2020) Meeting memo
Ref.8-1: JCM Modalities of Communications Statement Form (Submitted on 27 Sep.2018)
Ref.8-2: Written confirmation from METAWATER Co., Ltd. (Declaration from Mr. Hiroyuki Sougawa on 5 Jan.2021)
Ref.9: International Consortium Agreement between METAWATER Co., Ltd. and Phnom Penh Water Supply Authority (Dated 2.Feb.2017)
Ref. 11: "Reference CO2 emission factor for consumed electricity" (0.384 tCO2/MWh)
・Grid Emission Factors in Cambodia (IGES, 1 Mar.2016)

・e-mail from Ministry of Environment in Cambodia on 14 Dec.2020 to confirm the latest value

Ref.12：Monitoring procedure (manual for calculation sheet)

Ref.13: Joint Crediting Mechanism Guidelines for Validation and Verification (JCM_KH_GL_VV_ver01.0)

Ref.14: Joint Crediting Mechanism Guidelines for Developing Project Design Document and Monitoring Report (JCM_KH_GL_PDD_MR_ver03.0)

Ref.15: Joint Crediting Mechanism Project Cycle Procedure (JCM_KH_PCP_ver03.0)

Ref.16: Joint Crediting Mechanism Glossary of Terms (JCM_KH_Glossary_ver02.0)

## 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.*

# Certificate of Competence
# for Validation/Verification team

GHG Certification Center
Japan Management Association

Scheme:

**The Joint Crediting Mechanism (JCM)**

Project Title:

**Energy Saving by Inverters for Distribution Pumps in Water Treatment Plant**

Validation or Verification:

**Validation**

| Name | Qualification *1 | Leader/Member/ Technical expert/ Technical Reviewer(TR) | Qualification of Technical area *2 | JCM scheme competence |
|---|---|---|---|---|
| Mr. Kenji Suzuki | Lead Validator/ Verifier | Leader | ☑ | ☑ |
| Mr. Satoshi Kodakari | Lead Validator/ Verifier | Member | ☐ | ☑ |
| Mr. Masao Tomizawa | Validator/ Verifier | Member | ☐ | ☑ |
| **Competence of Validation Team** | - | - | ☑ | ☑ |

*1 Qualification in accordance with "JMACC's Procedures for Contract and Evaluation of Validators/Verifiers and Technical Experts (GA-110)"

*2 Competence Requirement in accordance with Competence for Technical area sheet (GA-110-08)

Date 16. Nov. 2020

[redacted]

Kenji Suzuki
Director of Validation & Verification Dept.
GHG Certification Center
Japan Management Association

# Certificate of Competence for Technical Review team

GHG Certification Center
Japan Management Association

Scheme:
**The Joint Crediting Mechanism (JCM)**
Project Title:
**Energy Saving by Inverters for Distribution Pumps in Water Treatment Plant**
Validation or Verification:
**Validation**

| Name | Qualification *1 | Leader/Member/ Technical expert/ Technical Reviewer(TR) | Qualification of Technical area *2 | JCM scheme competence |
|---|---|---|---|---|
| Mr. Motoyuki Matsumoto | Lead Validator/ Verifier | Technical Reviewer | ☑ | ☑ |
| **Competence of Technical Review Team** | - | - | ☑ | ☑ |

*1 Qualification in accordance with "JMACC's Procedures for Contract and Evaluation of Validators/Verifiers and Technical Experts (GA-110)"

*2 Competence Requirement in accordance with Competence for Technical area sheet (GA-110-08)

Date 16. Nov. 2020

[redacted]

Kenji Suzuki
Director of Validation & Verification Dept.
GHG Certification Center
Japan Management Association