

Joint Crediting Mechanism Project Design Document Form

A. Project description

A.1. Title of the JCM project

Energy Saving at Phnom Penh Water Supply Authority (Cambodia) by Improving Efficiency of Water Treatment Plants

A.2. General description of project and applied technologies and/or measures

The Phum Prek Water Treatment Plant (WTP) and the Chamkar Mon WTP of the Phnom Penh Water Supply Authority (PPWSA), Cambodia's largest water supplier, were constructed in the 1990s. Pump facilities are aging and the specifications of the pumps and the plants' power receiving and transforming remain as they were at the time the facilities were built. The efficiency of their equipment is low compared with equipment available in Japan. Electricity charges in the Phnom Penh Special Ward are as high as US\$0.18/kWh, which is equivalent to those in Japan. There is a great demand for reducing these charges. This project is intended to improve efficiency at these water treatment plants and reduce greenhouse gas (GHG) emissions by introducing energy-saving equipment from Japan. Practically, the technologies to be introduced are as follows:

1. Inverter-control systems for pumps
2. Technology to reduce electricity transmission loss between water treatment plants and water intake plants
3. High-efficiency electric transformers

A.3. Location of project, including coordinates

Country	The Kingdom of Cambodia (Cambodia)
Region/State/Province etc.:	Phnom Penh
City/Town/Community etc.:	—
Latitude, longitude	N11°34.28', E104°54.55' (Phum Prek WTP) N11°32.17', E104°55.34' (Chamkar Mon WTP)

A.4. Name of project participants

Cambodia	Phnom Penh Water Supply Authority (PPWSA)
Japan	METAWATER Co., Ltd.

A.5. Duration

Starting date of project operation	April 2017 (Planned)
Expected operational lifetime of project	20 Years

A.6. Contribution from developed countries

Japan will contribute in the following aspects:

- ① Promote dissemination of energy-saving equipment made in Japan
- ② Promote concept of reducing total cost based on the use of long-life equipment
- ③ Supply 'soft' components for efficient operation

B. Application of an approved methodology(ies)

B.1. Selection of methodologies

Selected approved methodology No.	KH_AM00X
Version number	1.0
Selected approved methodology No.	KH_AM00Y
Version number	1.0
Selected approved methodology No.	KH_AM00Z
Version number	1.0

B.2. Explanation of how the project meets eligibility criteria for approved methodology

Eligibility criteria	Descriptions specified in the methodology	Project information
[Methodology No. KH_AM00X]		
Criterion 1	A project which introduces an inverter-control system to pumps without an inverter-control system.	This project is intended to introduce inverter-control systems to distribution pumps without one: two systems in Phum Prek WTP and one in Chamkar Mon WTP.
Criterion 2	The capacity of project pump motors is more than 100 kW.	The capacity of project motors is 272kW and 520kW in Phum Prek WTP and 110kW in Chamkar Mon WTP, respectively.
Criterion 3	The rated electricity conversion efficiency is more than 97% and rated power factor is more than 95% of a high-voltage inverter.	Confirmed with the inverter manufacturer.
Criterion 4	Periodical check is planned to be performed more than 2 times annually.	Confirmed with the inverter manufacturer that periodical checks are performed more than twice a year.

[Methodology No. KH_AM00Y]		
Criterion 1	A project which changes the electricity receiving system where electricity is transmitted from water treatment plants to water intake plants via private transmission cable to individual electricity receiving system.	Currently, the water intake plant (WIP) at Phum Prek WTP and the WIP at Chamkar Mon WTP receive electricity via independent underground lines from their respective WTPs. Due to concern about the possibility of disconnection, the current method should be changed to direct receiving system from the grid.
[Methodology No. KH_AM00Z]		
Criterion 1	Capacity of project transformers is between 500kVA and 1,000kVA.	The capacity of the transformer used to replace the one at the Phum Prek WTP is 750kVA.
Criterion 2	The rated efficiency of project transformers is at least 98.5%.	The rated efficiency of the Japan-made top-runner transformer is at least 98.5% within a range of 500kVA to 1000kVA.

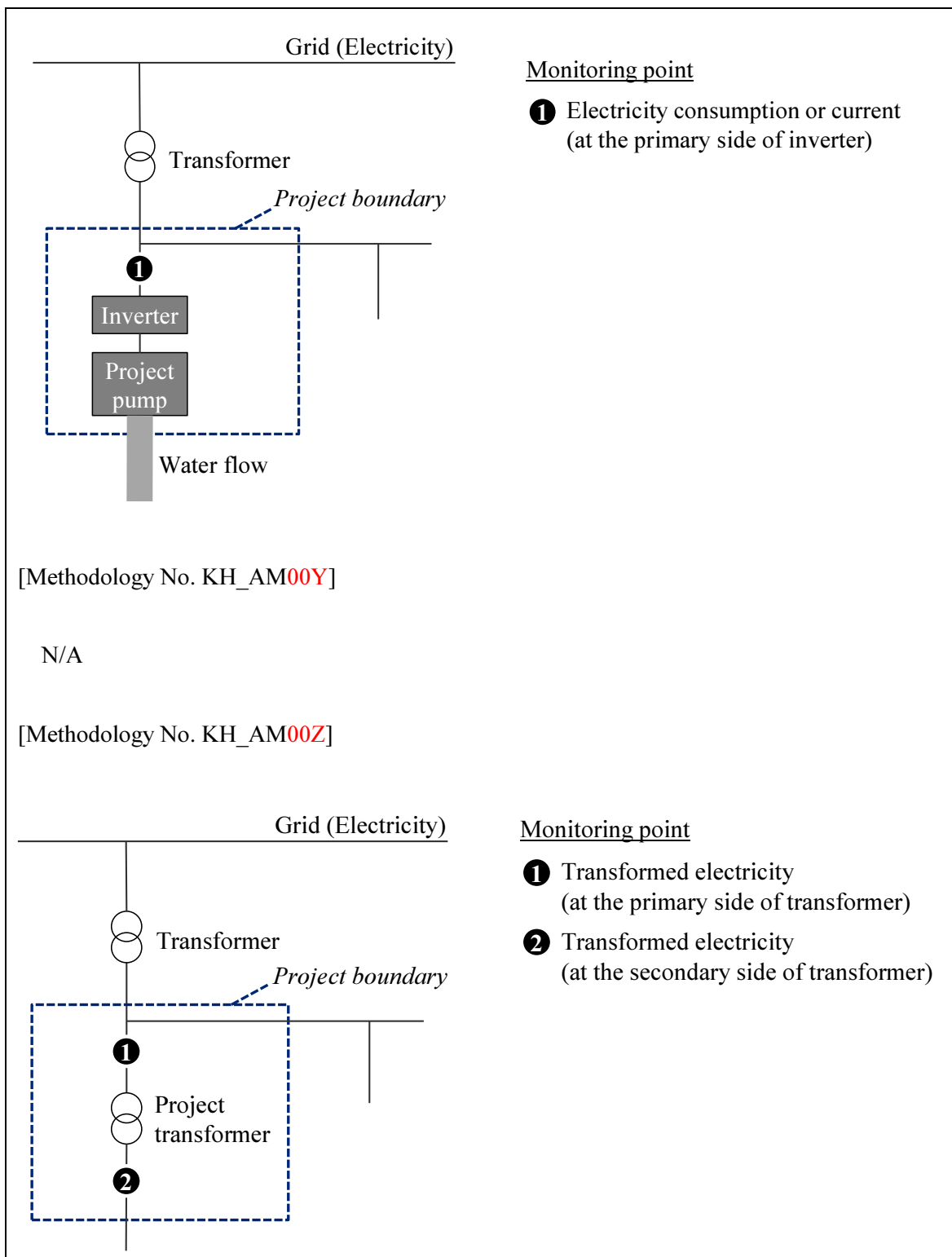
C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
[Methodology No. KH_AM00X]	
Electricity consumption of reference pumps	CO ₂
[Methodology No. KH_AM00Y]	
Electricity transmission loss of reference electricity receiving system	CO ₂
[Methodology No. KH_AM00Z]	
Electricity transformation loss from reference transformers	CO ₂
Project emissions	
Emission sources	GHG type
[Methodology No. KH_AM00X]	
Electricity consumption of the project pumps	CO ₂
[Methodology No. KH_AM00Y]	
Electricity transmission loss of project electricity receiving system	CO ₂
[Methodology No. KH_AM00Z]	
Electricity transformation loss from project transformers	CO ₂

C.2. Figure showing all emission sources and monitoring points relevant to the JCM project

[Methodology No. KH_AM00X]



C.3. Estimated emissions reductions in each year*

Year	Estimated Reference emissions (tCO _{2e})	Estimated Project Emissions (tCO _{2e})	Estimated Emission Reductions (tCO _{2e})
2014	0	0	0
2015	0	0	0
2016	2,225	1,724	501
2017	2,225	1,724	501
2018	2,225	1,724	501
2019	2,225	1,724	501
2020	2,225	1,724	501
2021	2,225	1,724	501
Total (tCO _{2e})	13,350	10,344	3,006

* Estimated based on the data of pumps at Niroth WTP as reference pump

(Recalculation is scheduled once the reference pump is determined)

D. Environmental impact assessment

Legal requirement of environmental impact assessment for the proposed project

For the water supply project in Cambodia, a water supply development project covering 10,000 people or more a day is required to perform an environmental impact assessment. This does not apply to the current project, which is intended to upgrade equipment and improve the facilities. The project will be implemented in such a way as to minimize any negative impact by ensuring that planned construction management will result in minimizing generation of waste.

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

For this project, a committee was organized and meetings were held, in which the project members outlined the project and explained it. This included explanations of the progress and results of the project study being conducted. Cambodia's Ministry of Environment (MOE), Ministry of Industry and Handicraft (MIH), and PPWSA expressed their interests in the GHG emission reduction project and raised questions about benefit of the project to Cambodia and the concepts of reference emission of MRV methodology. Opinions and comments were actively exchanged.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
Ministry of Environment, Cambodia (MOE)	We understand that successful completion of JCM projects could lead to lower electricity consumption and related costs, and reduced CO ₂ emissions. From the viewpoint of reducing CO ₂ , it is expected that the PPWSA will participate in this project.	Cambodia is making energetic efforts to reduce GHG emissions,
Ministry of Industry and Handicraft, Cambodia (MIH)	It is understood that this project offers return effects on investment and also GHG emission reduction effects. As GHG emission reduction is in line with the policy of Cambodia, we would like to support the realization of the project.	The MIH emphasizes not only improving Cambodian water supply systems, but also reducing GHG emissions. It was learned that the Cambodian Government is in favor of completing the project.
Phnom Penh Water Supply Authority (PPWSA)	The fact that this will lead to lower electricity charges and reduced GHG emissions is extremely important. We appreciate the efforts to reduce GHG emissions in Cambodia. The contents of the proposal are promising from the viewpoint of project profitability.	The PPWSA is very enthusiastic not only about the economic aspect of reducing electricity charges, but also about the social contribution achieved by reducing GHG emissions.

F. References

Reference lists to support descriptions in the PDD, if any.

Annex

Revision history of PDD		
Version	Date	Contents revised