JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Introduction of Absorption Chiller to Chemical Factory

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

The proposed JCM project aims to contribute to Indonesia's sustainable development through improvement in energy efficiency and reduction in greenhouse gases (GHG) by introducing a steam-driven absorption chiller at an existing chemical factory in Indonesia. The newly installed absorption chiller which replaces with the existing chiller, will generate the chilled water using waste steam, and by doing so, the factory's electricity consumption is significantly reduced as compared with using the existing or reference one.

The project is located at the factory of PT Timuraya Tunggal in Karawang Regency, West Java Province (Figure 1 below shows the project location). Under the proposed project, the absorption chiller produces chilled water from waste steam within the factory and reduces power consumption of the chiller.

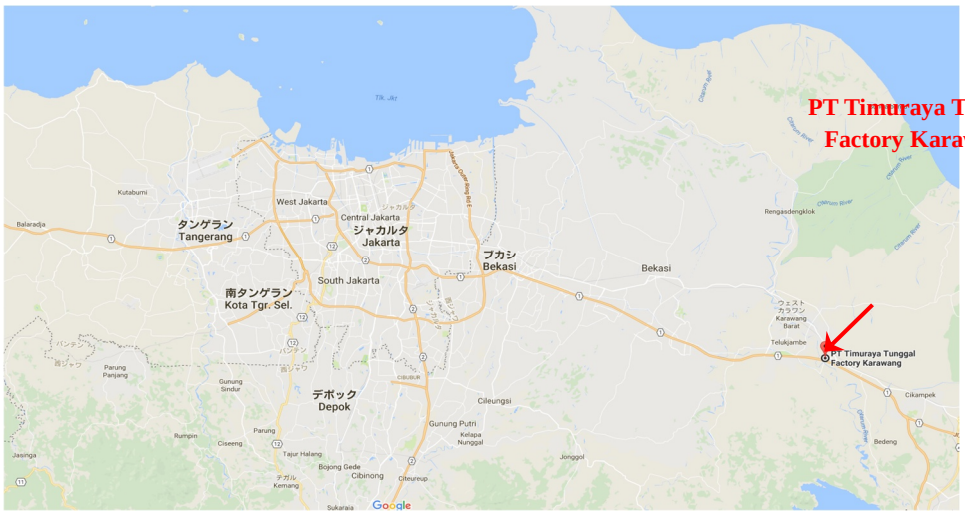


Figure 1: Project location

A.3. Location of project, including coordinates

Country	The Republic of Indonesia
Region/State/Province etc.:	Karawang Regency, West Java Province
City/Town/Community etc:	Jalan Anggadita Raya No. 205, Desa Anggadita, Klari

	Sub-District, Karawang Regency 41371
Latitude, longitude	Latitude: S 6°21′10″ Longitude: E 107°19′59″

A.4. Name of project participants

The Republic of Indonesia	PT. Timuraya Tunggal
Japan	Tokyo Century Corporation

A.5. Duration

Starting date of project operation	05/03/2019
Expected operational lifetime of project	8 years

A.6. Contribution from Japan

The proposed project was partially supported by the Ministry of the Environment, Japan (MOEJ) through the financing programme for JCM model projects, which provided financial support of less than half of the initial investment for the projects in order to acquire JCM credits. Further, implementation of the proposed project promotes diffusion of low carbon technology within Indonesia.

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	JCM-ID-AM022
Version number	Ver.01.0

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

Eligibility criteria	Descriptions specified in the methodology	Project information
Criterion 1	Project chiller is an absorption chiller with a capacity which is less than or equals to 1,300 USRt. * 1 USRt = 3.52 kW	The proposed project installs a new steam absorption chiller from Kawasaki Thermal Engineering Co., Ltd. (KTE) Type NES-630 with a capacity of 630 USRt
Criterion 2	Periodical check is planned more than four (4) times annually.	The Indonesian project owner plans to conduct periodical check more than four (4) times a year.
Criterion 3	In the case of replacing the existing chiller with the project chiller, a plan for	Project chiller uses water as refrigerant. As for the existing

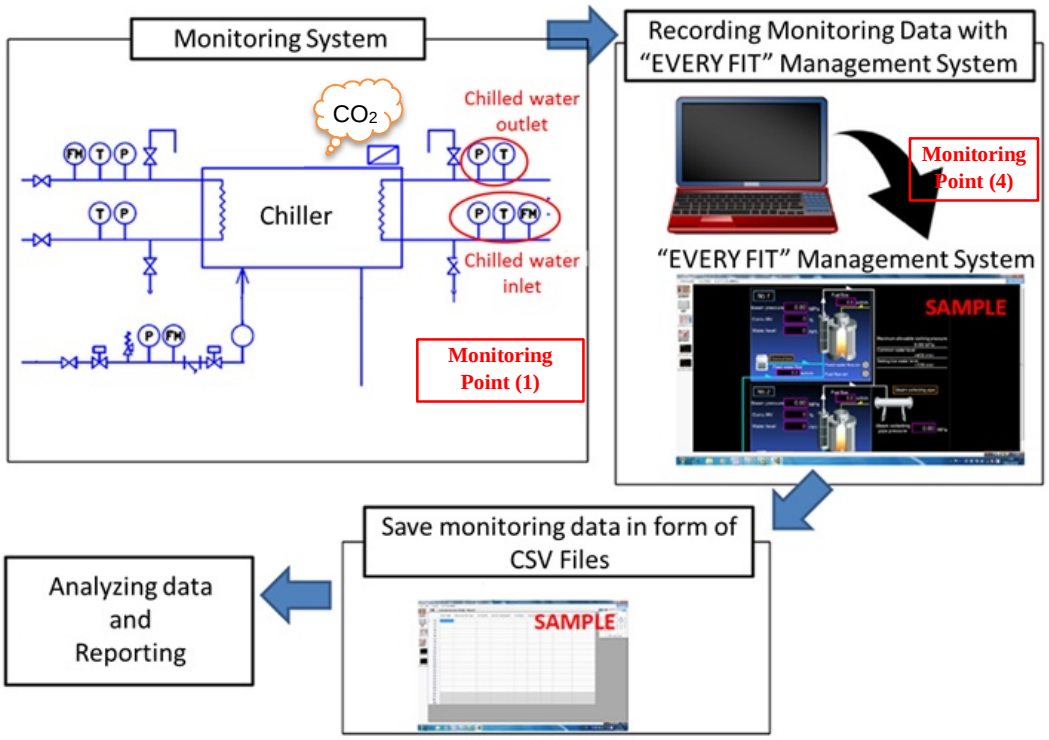
	prevention of releasing refrigerant used in the existing chiller to the air (e.g. re-use of the equipment) is prepared. Execution of this plan is checked at the time of verification, in order to confirm that refrigerant used for the existing one replaced by the project is prevented from being released to the air. In the case that the existing chiller is NOT replaced with the project chiller, this criterion is not applied.	chillers, the Indonesian project owner prepared a plan for prevention of refrigerant release to the air from the existing chiller, which has been shared with the Japanese project participant.
Criterion 4	In the case that project absorption chiller uses fossil fuel for its heat source, such fossil fuel is gas fuel.	The project absorption chiller is not expected to use fossil fuel for its heat source.

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
Power Consumption by reference chiller	CO_2
Project emissions	
Emission sources	GHG type
Power Consumption by project chiller	CO_2

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



Monitoring Point (1): Cooling output of the project chiller	The cooling energy is calculated based on the measured data of water flow rate, inlet/outlet temperature of chilled water and operating hours of the project chiller
Monitoring Point (4): Operating hours of the project chiller	Measured by counter in the "EVERY FIT" management system when the project chiller is turned on

Note: Electricity consumption by the project absorption chiller ($EC_{PJ,I,p}$) is calculated based on Method II stipulated in MPS, where the value is calculated by the catalogue value of the electric power of the absorption chiller multiplying by operation hours of the project chiller (Monitoring Point (4)).

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_2e)	Estimated Project Emissions (tCO_2e)	Estimated Emission Reductions (tCO_2e)
2019	390.6	23.8	366
2020	636.7	28.6	608
2021	710.9	28.6	682

2022	740.7	28.6	712
2023	740.7	28.6	712
2024	740.7	28.6	712
2025	740.7	28.6	712
2026	740.7	28.6	712
2027	123.5	4.8	118
Total (tCO_2e)			5,334

Note: The estimated emission reductions in each year are rounded down after the decimal point.

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	No

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

As part of JCM process, the project participants held a local stakeholder consultation meeting in order to take due steps to engage stakeholders and solicit comments for the proposed project. Details of the local stakeholders consultation meeting is summarized as follows:

Date and Time: Wednesday, 14 November 2018, 09.00 – 13.00 (Western Indonesian Time)
Venue: Swiss-Belinn Karawang (Hotel)
Address: Jl. Jendral Ahmad Yani no 29, Tanjungpura, Karawang Barat, Kabupaten Karawang, Jawa Barat 41315, INDONESIA

The following public and private entities have been identified as stakeholders, and they were invited either through letter or e-mail followed up by telephone calls:

- Indonesia JCM Secretariat
- Coordinating Ministry of Economic Affairs (CMEA)
- Indonesia Joint Committee Members
- Environmental and Sanitation Agency (DLHK), Karawang Regency
- Industrial and Trade Agency (Disperindag), Karawang Regency
- Environmental Agency (DLH), West Java Province
- Cooperation Division, Governance and Cooperation Bureau, West Java Province
- Production and Industry Bureau, West Java Province
- Energy and Mineral Resources Agency (DESDM), West Java Province
- Industry and Trade Agency (Disperindag), West Java Province
- American Society of Heating, Refrigerating, and Air-Conditioning Engineers

(ASHRAE), Indonesia Chapter
- Indonesia Inorganic Basic Chemicals Association (AKIDA)
- PT Century Tokyo Leasing Indonesia
- PT Gikoko Kogyo Indonesia
- Nippon Koei Co., Ltd.
- Takasago Thermal Engineering Co., Ltd.
- Azbil Corporation
- CIMB Niaga
- Mitsubishi Corporation
- PT Monokem Surya
- PT DIC Graphic
- PT Pupuk Kujang
- Other companies
- Jakarta Globe
- NNA Japan Co., Ltd.

Meeting Agenda:
- Opening remarks and Introduction by project participants
- Opening speech by Coordinating Ministry of Economic Affairs
- Progress of JCM in Indonesia by Indonesia JCM Secretariat
- Project Outline by Tokyo Century Corporation
- Project Technology by PT Gikoko Kogyo Indonesia
- MRV (Monitoring, Reporting, and Verification) of the project by Mitsubishi UFJ Morgan Stanley Securities, Co., Ltd. (MUMSS)
- Company Profile and Project Outline by PT Timuraya Tunggal
- Question and Answer Session
- Closing Remarks by PT Century Tokyo Leasing Indonesia

Meeting Summary:
There was a total of 54 stakeholders attended the meeting. No negative comments were expressed toward the proposed project by the attendees during the meeting. For those who were invited and yet were unable to attend the meeting, the project participants sent them the presentation materials used at the meeting and requested them to provide their comments, if any. No additional comments were received from the absentees. The comments relevant to the project received during the local stakeholders meeting, along with the responses/action to the comments, are listed in the following section.

E.2. Summary of comments relevant to the project and their consideration

Stakeholders	Comments received	Consideration of comments received
PT DIC Graphic	For a factory that does not have availability of waste steam, will it be beneficial to use absorption chiller if the steam is intentionally produced?	There is a certain balance point where steam absorption chiller can be beneficial which needs to be analyzed through comprehensive feasibility study, as it depends on the situation of each factory/facility. (No further action is needed)
KIIC Industrial Estate	With the installation of steam absorption chiller, will the PLN supply capacity also decrease?	Currently the project owner is experiencing a shortage of electricity, so the introduction of absorption chiller is good to have more available electricity capacity as there is also another plan to add more equipment. (No further action is needed)
Pupuk Kujang Cikampek (PKC)	Is there any limitation for amount of investment to be eligible for JCM implementation?	There is no limitation of the amount of investment to be eligible for JCM. Only thing is that the project which can generate higher emission reduction amount compared to its investment is more desirable. (No further action is needed)
	What is the benefit that Timuraya gives back to Japanese government in JCM scheme?	The purpose of JCM is to disseminate the information on the project which reduces emission, and it is hoped that this project can be replicated by others. (No further action is needed)
	How to determine the baseline for JCM project?	In JCM, the baseline used to determine emission reduction is called Reference Emission, which is set below business-as-usual (BAU) to be conservative. The calculation is elaborated in the methodology for the project. (No further action is needed).
	What is the temperature and pressure of steam which can be utilized for absorption chiller in this project?	Steam in Timuraya has pressure of 5 bar under old piping. Steam pressure from boiler is 7 bar (saturated, not superheated). With improvement in piping, it is observed that the loss is only 0.5 bar, thus steam arriving at the chiller has pressure of approximately 6.5 bar with new piping. The absorption chiller capacity selected for this project is 630 USRt with optimal operating pressure of 8 bar. Therefore, with lower steam pressure of

		approximately 6.5 bar supplied, the effective cooling capacity is about 500 USRt. (No further action is needed)
	Is steam cheaper than electricity in this project, as in the case of Pupuk Kujang factory, steam is generated from gas, in which the costs are more expensive than electricity?	Steam from gas costs higher than electricity to produce the same cooling capacity. For this project, savings can be realized as there is excess waste steam from the existing boiler that can be used to feed into the steam absorption chiller. (No further action is needed)
PT Pupuk Kujang	Where can the public access all existing JCM methodology?	All the methodology can be accessed in Indonesia JCM website at https://www.jcm.go.jp/id-jp. (No further action is needed)
	Is it still feasible to utilize absorption chiller if the available steam is 3.5 bar?	For steam of 3.5 bar, the utilization is already very limited. The lower limit for the steam utilization is about 4 bar, and lower than that, the efficiency will become very low. (No further action is needed)
	Why the calculation of emission reduction is indirect in the draft methodology, as it looks very complicated?	The calculation is designed as in draft methodology because the reference needs to use the type of chiller which is better than baseline. As such, indirect method is used to ensure that the calculation is conservative and precise. (No further action is needed)
	What are the consequences if the equipment is not continuously used throughout the crediting period?	The equipment under the JCM model projects must be used continuously throughout the operational lifetime (8 years for Timuraya). If not, the project participants will be responsible to return an appropriate amount of the financial support they received back to Japanese government. (No further action is needed)

F. References

N/A

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

Annex

N/A

Revision history of PDD		
Version	Date	Contents revised
01.0	09/01/2020	First Edition
01.1	18/02/2020 30/03/2020	Second Edition Initial registration by the Joint Committee through electronic decision