JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Energy Saving by Introduction of High Efficiency Chilled Water Supply System in Milk Factory

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

The proposed JCM project aims to improve energy efficiency of water supply system by introducing high efficiency chillers in milk factory in Thailand. The milk factory needs cool water for production process, and the water supply system consumes significant amount of energy at the milk factory. The proposed project covers production process, such as sterilization and storage, in the factory of CP-Meiji Co., Ltd. in Nongkae district, Saraburi Province of Thailand. The milk factory introduced high efficiency brine screw chiller with replacing reciprocating chiller, and increased the energy efficiency in stable water supply. For this, reciprocating chiller with ice bank system was replaced with high efficient brine screw chilling unit.

A.3. Location of project, including coordinates

Country	Kingdom of Thailand
Region/State/Province etc.:	Saraburi
City/Town/Community etc:	Nongnak, Nongkae
Latitude, longitude	N 14°44’31”N E 100°89’80”E

A.4. Name of project participants

The Kingdom of Thailand	CP-Meiji Co., Ltd.
Japan	TEPIA Corporation Japan Co., Ltd.

A.5. Duration

Starting date of project operation	08/09/2017
Expected operational lifetime of project	10 years

A.6. Contribution from Japan

The proposed project was partially supported by the Ministry of the Environment, Japan (MOEJ) through the Financing Programmer 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. As for the transfer of technology, the manufacturers provided instruction and manuals for

operation and maintenance during the initial installation.

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	TH_AM013
Version number	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	The project installs brine screw chiller(s) for freezing and refrigeration. Cooling capacity of a screw chiller per one module is less than or equals to 1,000 kW.	The project chilling unit, "HEM660B II", is a brine screw chilling unit composed of four modules of chillers, "HEM 165 II". Cooling capacity of HEM165 under the standardizing temperature conditions is 580.2 kW.
Criterion 2	COP for project screw chiller(s) calculated under the standardizing temperature conditions ($COP_{PJ,tc,i}$) is more than COP of the reference screw chiller, with the cooling capacity range same as the project screw chiller. [equation to calculate $COP_{PJ,tc,i}$] $\mathbf{COP_{PJ,tc,i} = COP_{PJ,i} \times [(TC_{cooling-out,i} - TC_{chilled-out,i} + TD_{chilled} + TD_{cooling}) \div (37 - 7 + TD_{chilled} + TD_{cooling})]}$ $COP_{PJ,tc,i}$: COP of project screw chiller *i* calculated under the standardizing temperature	COP of all the project chiller module is 5.28 under the standardizing temperature conditions.

	conditions* [-] $COP_{PJC,i}$: COP of project screw chiller *i* under the catalog conditions of the project screw chiller [-] $TC_{cooling-out,i}$: Output cooling water temperature of project screw chiller *i* set under the catalog conditions of the project screw chiller [degree Celsius] $TC_{chilled-out,i}$: Output chilled water temperature of project screw chiller *i* set under the catalog conditions of the project screw chiller [degree Celsius] $TD_{cooling}$: Temperature difference between condensing temperature of refrigerant and output cooling water temperature, 1.5 degree Celsius set as a default value [degree Celsius]	

	$TD_{chilled}$: Temperature difference between evaporating temperature of refrigerant and output chilled water temperature, 1.5 degree Celsius set as a default value [degree Celsius] The standardizing temperature conditions at which COP for project screw chiller(s) calculated in this methodology are shown below: Chilled water: Output 7 degree Celsius Input 12 degree Celsius Cooling water: Output 37 degree Celsius Input 32 degree Celsius	
Criterion 3	Ozone Depletion Potential (ODP) of the refrigerant used for screw chiller(s) is zero.	ODP of HFC 407 E, the refrigerant used in the project chiller is zero.
Criterion 4	A plan for prevention of releasing refrigerant used for project screw chiller is prepared. In the case of replacing the existing chiller with the project screw chiller(s), a plan for 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	At the moment, there is no plan to remove reciprocating chiller since it is still utilized for backup. However, CP-Meiji Co., Ltd. agreed not to release any refrigerant of existing equipment and project chillers when it is removed in the future.

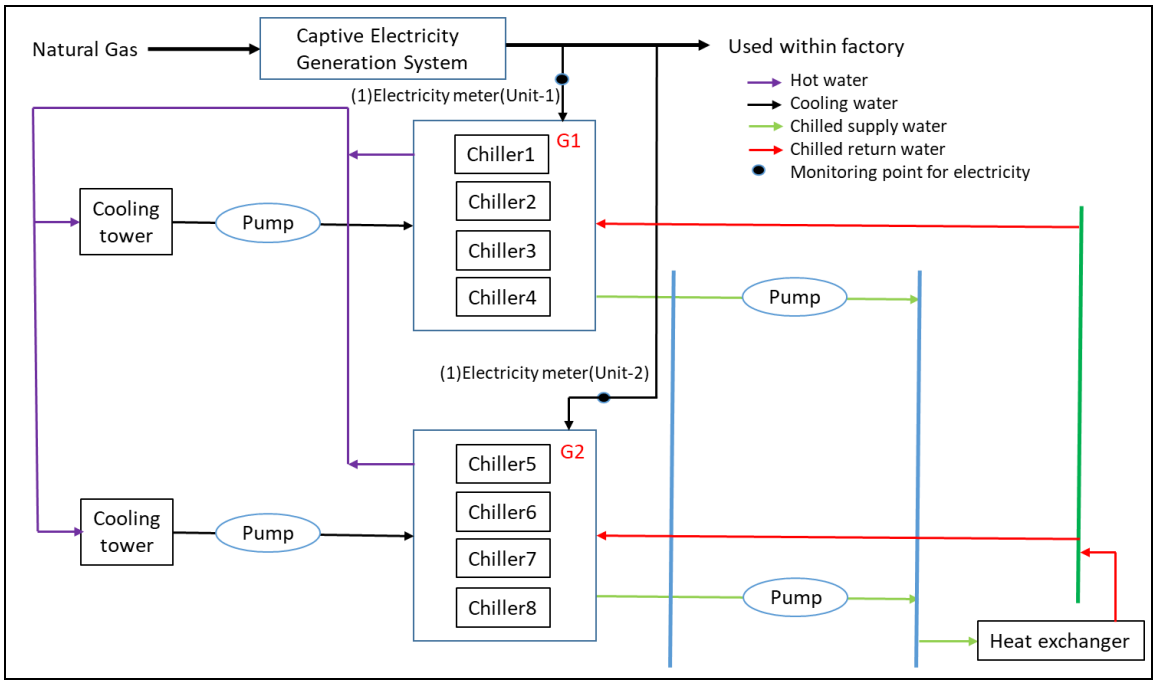
	verification, in order to confirm that refrigerant used for the existing one replaced by the project is prevented from being released to the air.	
Criterion 5	Periodical check at least once a year is planned.	CP-Meiji Co., Ltd. or his representative will conduct periodical check once a year.

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 water chilling unit	CO_2
Project emissions	
Emission sources	GHG type
Power consumption by project water chilling unit(s)	CO_2

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



C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_2e)	Estimated Project Emissions (tCO_2e)	Estimated Emission Reductions (tCO_2e)
2013	-	-	-
2014	-	-	-
2015	-	-	-
2016	-	-	-
2017	719.2	684.0	35
2018	2,422.0	2,303.0	119
2019	2,422.0	2,303.0	119
2020	2,422.0	2,303.0	119
2021	2,422.0	2,303.0	119
2022	2,422.0	2,303.0	119
2023	2,422.0	2,303.0	119
2024	2,422.0	2,303.0	119
2025	2,422.0	2,303.0	119
2026	2,422.0	2,303.0	119
2027	1,702.8	1,619.0	84
2028	-	-	-
2029	-	-	-
2030	-	-	-
Total (tCO_2e)			1,190

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

In order to cover a diverse group of stakeholders, a local stakeholder consultation meeting was

held at the meeting room of CP-Meiji Co., Ltd. on 7th September, 2018.

Participants;
Thailand Greenhouse Gas Management Organization (TGO)
Panasonic Eco Solutions Sales (Thailand) Co., Ltd.
CP-Meiji Co., Ltd
Tepia Corporation Japan Co., Ltd.

Absentee;
The regional office No.7 of Ministry of Natural Resources and Environment
(Sent handouts in the meeting to absentee after the meeting.)

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
Thai Greenhouse Gas Management Organization (TGO)	Want to know how to control 8 units of Chiller, and how much those chillers can control the loading of chilling water.	Showed the actual chiller systems and explained that the chillers are correspond with the loading at production line, and the system can absorb the changing of loading in the range of 30 to 100%. (No further action needed.)
	The electricity in the factory is provided from both power grid and Co-generation System. How to know the actual Chiller System's electricity consumption volume from each grid, to calculate CO2 emission reduction amount?	In usual situation, the electricity from those two sources is mixed at upstream. Tepia Corporation Japan, as a representative entity of the project will calculate the amount of CO2 emission reduction by using lower emission factor in those two sources, as it is designated in JCM Methodology. (No further action 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
1.0	11/26/2021	First edition