JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Batang, Central Java (Phase 2)

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

The proposed JCM project aims to improve energy saving for air-conditioning and process cooling by introducing high-efficiency centrifugal chiller in a textile factory in Indonesia. The factory needs considerable energy, and chillers consume significant amount of energy compared with the other machines in the factory. The proposed project covers a textile factory of PT. Primatexco Indonesia in Batang, Central Java province in Indonesia. The factory replaced a chiller from conventional type to high-efficiency centrifugal chiller and increases energy efficiency in air conditioning. For this, existing 470 USRt absorption chiller is replaced with 500 USRt high-efficiency centrifugal chiller. The chiller was installed in March 2015 and started its operation in 1st April 2015.

A.3. Location of project, including coordinates

Country	Republic of Indonesia
Region/State/Province etc.:	Central Java Province
City/Town/Community etc:	Batang
Latitude, longitude	S 6°55' 0", E 109°44'53"

A.4. Name of project participants

The Republic of Indonesia	PT. Primatexco Indonesia
Japan	Nippon Koei Co., Ltd. (Focal Point) Ebara Refrigeration Equipment & Systems Co., Ltd.

A.5. Duration

Starting date of project operation	01/04/2015
Expected operational lifetime of project	7 years

A.6. Contribution from developed countries

The proposed project was financially supported by the Ministry of the Environment, Japan through the financing programme for JCM model projects which seeks to acquire JCM credits.

As for technology transfer, Ebara Refrigeration Equipment & Systems Co., Ltd. (ERS) has provided the following supports to PT. Primatexco:

- Direct instruction on proper operation, and
- Efficient monitoring through remote monitoring system

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	ID_AM002
Version number	2.0

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 a centrifugal chiller with a capacity of less than 1,250 USRt. ** 1 USRt = 3.52 kW*	Project chiller (Ebara high efficiency centrifugal chiller : RTBF 050) is a centrifugal chiller with a capacity of 499 USRt. [Calculation] 1758 [kW] / 3.52 = 499.4 ≒ 499 [USRt]
Criterion 2	COP for project chiller *i* calculated under the standardizing temperature conditions* ($COP_{PJ,tc,i}$) is more than 6.0. $COP_{PJ,tc,i}$ is a recalculation of COP of project chiller i ($COP_{PJ,i}$) adjusting temperature conditions from the project specific condition to the standardizing conditions. $COP_{PJ,i}$ is derived in specifications prepared for the quotation or factory acceptance test data at the time of shipment by manufacturer. [Equation to calculate $COP_{PJ,tc,i}$] $\mathbf{COP_{PJ,tc,i} = COP_{PJ,i} \times [(T_{cooling-out,i} - T_{chilled-out,i} + TD_{chilled} + TD_{cooling}) \div (37 - 7 + TD_{chilled} + TD_{cooling})]}$ $COP_{PJ,tc,i}$ *: COP of project chiller i calculated under the standardizing temperature*	The COP for project chiller ($COP_{PJ,tc,i}$) which is introduced to the proposed project is 6.13. [Calculation result] 7.81 x (36.9 – 14 + 1.5 + 1.5) / (37.0 – 7 + 1.5 + 1.5) = 6.1296 ≒ 6.13

	conditions [-]* $COP_{PJ,i}$ *: COP of project chiller i under the project specific conditions [-]* $T_{cooling-out,i}$ *: Output cooling water temperature of project chiller i set under the project specific condition [degree Celsius]* $T_{chilled-out,i}$ *: Output chilled water temperature of project chiller i set under the project specific condition [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 to calculate* $COP_{PJ,tc,i}$ *Chilled water:* *output 7 degree Celsius* *input 12 degree Celsius* *Cooling water:* *output 37 degree Celsius* *input 32 degree Celsius*	
Criterion 3	Periodical check is planned more than four (4) times annually.	ERS and PT Ebara Indonesia (PTEI, subsidiary of the ERS which is a chiller manufacturer) agreed to conduct at least one direct periodical check per year by PTEI and remote periodical checks every month by the remote monitoring system by ERS. This remote monitoring system automatically detects the potential error every hour and reports any abnormal condition of chiller to ERS immediately. This periodical check procedure both by direct and remote method is more frequent, effective and better than five times of periodical checks stipulated in the methodology (ID_AM002).
Criterion 4	Ozone Depletion Potential (ODP) of the refrigerant used for project chiller is zero.	Refrigerant for the project chiller is HFC 245fa, whose ODP is zero.

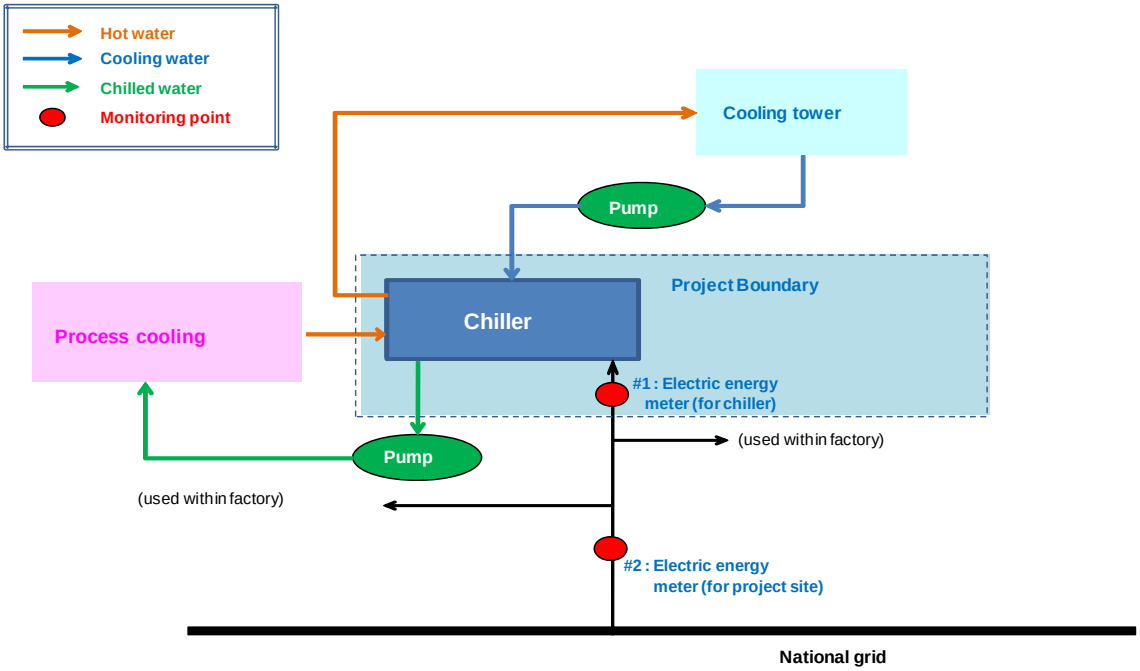
Criterion 5	Plan for not releasing refrigerant used for project chiller is prepared. In the case of replacing the existing chiller with the project chiller, refrigerant used for the existing chiller is not released to the air.	Letter of consent on not releasing refrigerant used for project chiller was prepared by PT Primatexco. Existing chiller is absorption chiller and it uses water as the refrigerant, thus any special handlings of refrigerant in the existing chiller are not required.

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



#1 : Electric energy meter for power consumption of project chiller #2 : Electric energy meter for electricity imported from the grid to the project site

Note : There is no captive electricity generator in this site, so "h_{gen}" is not applicable in this PDD.

C.3. Estimated emissions reductions in each year

Year	Estimated Reference Emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Annual Emission Reductions (tCO_{2e})*
2015	1,253.72	1,142.86	110.00
2016	1,671.63	1,523.81	147.00
2017	1,671.63	1,523.81	147.00
2018	1,671.63	1,523.81	147.00
2019	1,671.63	1,523.81	147.00
2020	1,671.63	1,523.81	147.00
2021	1,671.63	1,523.81	147.00
Total (tCO_{2e})	11,283.51	10,285.70	992.00

* Rouded down

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

Since the project activity is limited to installation of a new environmental friendly chiller in the existing textile factory with a limited level of potential social and environmental impact, the PP identified direct stakeholders as the factory staff related to chiller operations, namely the plant manager and supervisor.

As a JCM project, indirect stakeholders are identified to be staff of local governments, chamber of commerce and textile association since they enjoy the benefit of the project (GHG reduction, energy saving, and capacity development) within their administrative boundary. Thus, the PP identified related provincial and district governments specifically.

The PP conducted a face-to-face interview and consultation meeting with identified stakeholders. The consultations were conducted two times (see table below).

#	Date	Venue	Method
1	Mar. 9-10, 2015	Meeting room and factory of PT. Primatexco	Face-to-face interview and factory visit
2	Aug. 14, 2015	Meeting room in the office of Bappeda of Central Java Province	Local Stakeholder Consultation

E.2. Summary of comments received and their consideration (as of 1st Application, need update)

Stakeholders	Comments received	Consideration of comments received
Plant manager	It is helpful that high-efficiency chiller can contribute to not only energy saving but also cost reduction. And, it is appreciated that Ebara chiller has high reliability equipment based on the existing chiller performance and periodical check/maintenance service.	No action is needed.
Supervisor	New chiller is helpful for daily operation/monitoring work with micro-computer control panel and remote monitoring system which can be checked with PC.	No action is needed.
Local governments (Provincial Government of Central Java Province and Regency (Kabupaten) Government of Batang)	Provincial government (especially Bappeda and Environmental Agency of Central Java Province) are satisfied with this support through JCM and will support this project if needed. We would like to recommend the same type of energy efficient projects to similar type of factories. The project should be successful and should be continued for a long period. We would like to be informed about future update of the Project.	No action is needed.

F. References

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

Annex

Revision history of PDD		
Version	Date	Contents revised
1.0	27/11/2015	First edition