JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Introduction of Energy Efficient Refrigeration System in Logistics Center

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

The proposed JCM project is energy saving using an energy efficient refrigeration system in the logistics center in the Thilawa Special Economic Zone in Yangon. While demands of logistic center for frozen and chilled foods is increasing in Myanmar, it is not easy to add facilities there due to their chronic electricity shortages. By installing a high energy efficient refrigerator, this project can contribute to reduce electricity consumption. In addition, the project refrigerator uses NH3 as a primary and CO2 as a secondary refrigerant, which have a smaller global warming potential compared to CFC substitute.

A.3. Location of project, including coordinates

Country	Republic of the Union of Myanmar
Region/State/Province etc.:	Yangon
City/Town/Community etc:	Lot No. B9, Zone A, Thilawa Special Economic Zone
Latitude, longitude	16°40'18"N 96°16'20"E

A.4. Name of project participants

The Republic of the Union of Myanmar	Ryobi Myanmar Distribution Service Co., Ltd.
Japan	Ryobi Holdings Co., Ltd.

A.5. Duration

Starting date of project operation	01/06/2018
Expected operational lifetime of project	12 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 can contribute development of cold food supply chain in Myanmar with low-carbon technology which has been developed by the Japanese project

participant, Ryobi Holdings. The Japanese project participant transfers the operational know-how to the Myanmar project participants, Ryobi Myanmar Distribution Service Co., Ltd.

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	JCM_MM_AM002
Version number	ver01.0

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

<table>
<tr><th>Eligibility criteria</th><th>Descriptions specified in the methodology</th><th>Project information</th></tr>
<tr><td>Criterion 1</td><td>Refrigerator(s) with a secondary loop cooling system using CO_2 as a refrigerant and equipped with inverter is installed at food industry cold storage.</td><td>A refrigerator with secondary loop cooling system using CO2 as a refrigerant and equipped with inverter is installed at the project site of food industry cold storage.</td></tr>
<tr><td>Criterion 2</td><td>COP for the project refrigerator(s) installed in the project cooling system is more than the threshold COP values set in the tables below. (“x” in the table represents cooling capacity per unit.)
<table>
<tr><th>Room temperature condition</th><th>Cooling capacity (kW)</th><th>Threshold COP value</th></tr>
<tr><td>- 25 deg. C</td><td>42.4 ≦ x ≦ 340.0</td><td>1.71</td></tr>
<tr><td>0 deg. C</td><td>73.6 ≦ x ≦ 516.4</td><td>2.79</td></tr>
<tr><td>5 deg. C</td><td>86.2 ≦ x ≦ 612.6</td><td>3.20</td></tr>
</table>
COP for the project refrigerator(s) are calculated with the following</td><td>The room temperature of the project cold storage is -25 deg C.
The cooling capacity of each of two project refrigerators is 189.4 kW.
Following the condition of the criterion 2, the calculated COP value of the project refrigerator is 2.10, which is more than the threshold COP value.</td></tr>
</table>

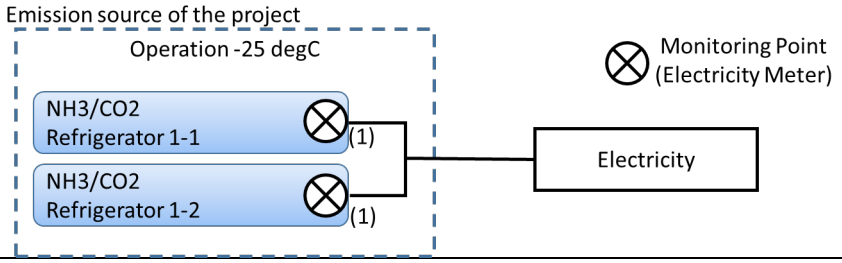
	conditions: • *Room temperature condition: - 25 deg. C or 0 deg. C or 5 deg. C* *Cooling water fed to condenser: inlet 32 deg. C*	
Criterion 3	Periodical check is planned at least one (1) time annually.	Periodical check is planned once a year.
Criterion 4	In the case of replacing the existing refrigerator with the project refrigerator, a plan for prevention of releasing refrigerant used in the existing refrigerator 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.	Not applicable: newly built.

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 the reference refrigerator	CO_2
Project emissions	
Emission sources	GHG type
Power consumption by the project refrigerator	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})

2015	-	-	-
2016	-	-	-
2017	-	-	-
2018	371.8	302.7	69
2019	637.4	519.0	118
2020	637.4	519.0	118
2021	637.4	519.0	118
2022	637.4	519.0	118
2023	637.4	519.0	118
2024	637.4	519.0	118
2025	637.4	519.0	118
2026	637.4	519.0	118
2027	637.4	519.0	118
2028	637.4	519.0	118
2029	637.4	519.0	118
2030	265.5	216.2	49
Total (tCO_2e)			1,416

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

Public consultation was held at Thilawa SEZ on 29th November 2018 at the Ryobi Myanmar Distribution Service Co., Ltd. Ryobi Holdings explained overall figure of the Project and had discussion with stakeholders including workers in the Ryobi Myanmar Distribution Service Co., Ltd., Thilawa Special Economic Zone staffs in charge of environmental issues and so on.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
worker	How many years is the duration of this JCM Project?	It is 12 years for this JCM Project.
worker	Can any other local Myanmar	Yes they can. To use this financing

	companies use this JCM financing programme?	programme, Myanmar companies have to find at least one Japanese company as their partner, like the Ryobi Holdings and the Ryobi Myanmar Distribution Service.
worker	Will this JCM Project be able to renew after 12 years of the duration?	No, it is not. This JCM Project will be completed after 12 years' monitoring. If the project owner will further invest to energy efficient equipment, it might be a new JCM project.
worker	Is the introduced equipment the best technologies in terms of CO2 emissions reductions?	Comparing to several popular cooling equipment prevailing in Myanmar, the JCM Project equipment is almost 20% more energy efficient.
Thilawa staff	Are there any other JCM Project in Myanmar?	Six projects have been preparing for JCM registration in Myanmar at present, including two in the Thilawa SEZ.

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	DD/MM/2020	First edition