JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Introduction of 0.8MW Solar Power System and High Efficiency Refrigerator to Food Factory

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

Thai Delmar Co., Ltd, the Thai corporation of Delmar Co., Ltd. which is a company of marine products and food, also being one of the group company of Nippon Suisan Kaisha, Ltd. built a new factory in the Asia Industrial Estate. In this new factory, solar power system and high efficiency refrigerators were installed to avoid reducing grid power consumption.

For solar power system, it was constructed by Tosplant Engineering (Thailand) Co., Ltd. (an affiliate of Toshiba Plant System Co., Ltd., hereinafter referred to as Toshiba Thailand), which power generation scale is 899kW. The solar power generation is contributed by internal grid.

As for high efficiency refrigerator, it is manufactured by Mayekawa (Thailand) Co., Ltd. (an affiliated company of Maekawa Manufacturing Co., Ltd., hereinafter referred to as Maekawa Thailand), and each refrigerating capacity is 189.4 kW.

In this project, 2 refrigerators has been installed, so, total capacity of this project is 378.8 kW. The refrigerator introduced in this project is a high-efficiency non-CFC refrigerator that uses a natural refrigerant (NH3 and CO2) which was developed as a measure against global warming (global warming coefficient is 1 or less). Therefore, its impact on the environment is small.

The refrigerator uses CO₂ as the refrigerant for the secondary refrigeration cycle which is controlled by an inverter.

A.3. Location of project, including coordinates

Country	The Kingdom of Thailand	
Region/State/Province etc.: Samut Prakarn Province		
City/Town/Community etc.:	Bang Bo District	
Latitude, longitude	N 13° 40' 2.32" and E 100° 54' 24.27"	

A.4. Name of project participants

The Kingdom of Thailand	Thai Delmar Co., Ltd.
Japan	Kanematsu KGK Corp

A.5. Duration

Starting date of project operation	30/6/2020 (Solar Power System: 20/2/2021) (High Efficiency Refrigerator: 30/6/2020)
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 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. Throughout various stages of project implementation including project design, construction, scheduling, installation, Toshiba Thailand and Mayekawa Thailand have provided local operators with required training and know-how transfer and is also expected to do so continuously for operation and maintenance phases.

B. Application of an approved methodology(ies)

B.1. Selection of methodologies

Selected approved methodology No.	TH_AM001
Version number	Ver2.0
Selected approved methodology No.	TH_AM011
Version number	Ver1.0

B.2. Explanation of how the project meets eligibility criteria of the approved methodology Regarding solar power system (Based on the methodology of "JCM_TH_AM001_ver02.0")

Eligibility	Descriptions specified in the methodology	Project information
criteria		
Criterion 1	The project installs solar PV system(s).	Solar power system is installed in
		the new factory in Asia Industrial
		Estate with power generation scale
		of 899kW.
Criterion 2	The solar PV system is connected to the internal	Solar power system is connected to
	power grid of the project site and/or to the grid	the internal power grid of the
	for displacing grid electricity and/or captive	factory to replace the grid power.
	electricity at the project site.	
Criterion 3	The PV modules have obtained a certification of	The PV modules of this project are

	design qualifications (IEC 61215, IEC 61646 or	qualified for design (crystal type:
	IEC 62108) and safety qualification (IEC 61730-	IEC61215) and safety (IEC61730-
	1 and IEC 61730-2).	1, IEC61730-2).
Criterion 4	The equipment to monitor output power of the	Monitoring equipment is
	solar PV system and irradiance is installed at the	introduced to measure the amount
	project site.	of power generation and solar
		radiation intensity of the solar
		power system.

Regarding high efficiency refrigerator

(Based on the methodology of "JCM_TH_AM011_ver01.0")

Eligibility	Descriptions sp	ecified in the metho	odology	Project information
criteria				
Criterion 1	Refrigerator(s) with a secondary loop cooling			The refrigerator uses CO ₂ as the
	system using C	O ₂ as a refrigerant	and equipped	refrigerant for the secondary
	with inverter is	installed at cold sto	orage.	refrigeration cycle which is
				controlled by an inverter.
Criterion 2	COP of projec	t refrigerator(s) ins	stalled in the	Room temperature condition is -25
	project cooling	system is more than	the threshold	deg. C. Cooling capacity is
	COP values set	in the tables below	w. ("x" in the	between 42.4 kW and 340.0kW.
	table represents	cooling capacity p	er unit.)	And threshold COP value is 1.71.
	Room	Cooling	Threshold	
	Temperature	capacity	COP	The refrigerator installed in this
	condition	(kW)	value	project has a refrigeration capacity
	-25 deg. C	$42.4 \le x \le 340.0$	1.71	of 340kW or less. It has been
	0 deg. C	$73.6 \le x \le 516.4$	2.79	clarified that the COP of the
	5 deg. C	$86.2 \le x \le 612.6$	3.20	reference refrigerator in Thailand is
				1.71, which can cool down to -
	COP for the pro	ject refrigerator(s)	are calculated	25°C. While by adopting the
	with the follow	ing conditions:		NH ₃ /CO ₂ cooling system, the COP
	• Room temp	perature condition:	- 25 deg. C or	of this project refrigerator
	0 deg. C or 5 deg. C			increased to 2.1 and the energy
	• Cooling water fed to condenser: inlet 32			efficiency being improved by 20%
	deg. C			approximately.
Criterion 3	Periodical chec	k is planned at leas	t one (1) time	Periodical check is conducted at
	annually.			least once a year.

Criterion 4	In the case of replacing the existing refrigerator	Since this project is a new
	with the project refrigerator, a plan for	installation, it does not release the
	prevention of releasing refrigerant used in the	refrigerant from the existing
	existing refrigerator to the air (e.g. re-use of the	refrigerator.
	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.	

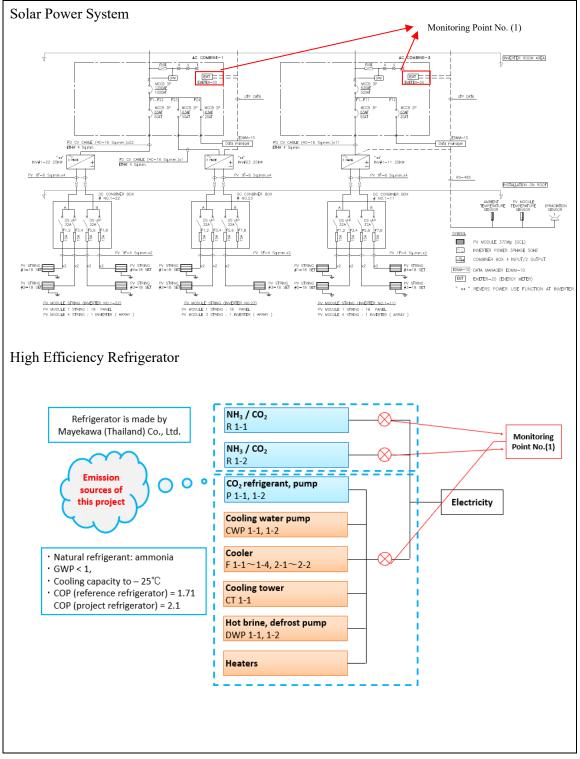
C. Calculation of emission reductions

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

Reference emissions		
Emission sources GHG type		
Consumption of grid and/or captive electricity	CO ₂	
Project emissions		
Emission sources GHG type		
Generation of electricity from solar PV system(s)	N/A	

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 Solar Power System



C.3. Estimated emissions reductions in each year

Year	Estimated Reference	Estimated Project	Estimated Emission
	emissions (tCO ₂ e)	Emissions (tCO ₂ e)	Reductions (tCO ₂ e)
2020	N/A	N/A	66
2021	N/A	N/A	448
2022	N/A	N/A	500
2023	N/A	N/A	500
2024	N/A	N/A	500
2025	N/A	N/A	500
2026	N/A	N/A	500
2027	N/A	N/A	500
2028	N/A	N/A	500
2029	N/A	N/A	500
2030	N/A	N/A	433
Total (tCo	O ₂ e)		4,947

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

To solicit comments from local stakeholders, a consultation meeting was planned by the project participants, and the project participants sent out invitation letters to the consultation meeting to various stakeholders. Details of the local stakeholders' consultation meeting is summarized as follows:

<Meeting outline>

- Date and Time: Oct. 27, 2020 13:30 14:30, Thai time
- Venue: Meeting room of Thai Delmar Co., Ltd
- Thailand Greenhouse Gas Management Organization (TGO) was participated by document review after the LSC.

<Meeting agenda>

#	Time	Program	Remarks
1	13:30 - 13:40	Introduction of participants	All participants
2	13:40 – 13:50	Overview of the project	Kanematsu KGK
3	13:50 – 14:00	Explanation of technology introduced	Kanematsu KGK and Mayekawa
4	14:00 – 14:20	Questions and answers	All participants
5	14:20 – 14:30	Company outline and Closing remarks	Thai Delmar

<Meeting summary>

In order to share the information of Joint Crediting Mechanism (JCM) model project in Thai Delmar factory and collect the comments/opinions from the persons concerned, the local stakeholder consultation (LSC) was conducted in accordance with above agenda.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
GEC	GEC asked that what is a benefit of	It is expected that JCM application
	the JCM application.	contributes to saving initial cost of
		energy efficiency/renewable energy
		facilities installation. Also, through
		the JCM application, it is satisfied that
		Thai Delmar can reduce GHG
		emissions which their client take
		attention to.
TGO*	TGO asked about the project activities	No action is needed.
	such as the power in refrigeration tons	
	(RT).	

^{*}Comment from TGO was received by e-mail.

F. References

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

Annex

Estimated emissions reductions in each year (TH_AM001)				
Year	Estimated Reference	Estimated Project	Estimated Emission	
	emissions (tCO ₂ e)	Emissions (tCO ₂ e)	Reductions (tCO ₂ e)	
2020	0.0	0.0	0	
2021	316.6	0.0	316	
2022	368.0	0.0	368	
2023	368.0	0.0	368	
2024	368.0	0.0	368	
2025	368.0	0.0	368	
2026	368.0	0.0	368	
2027	368.0	0.0	368	
2028	368.0	0.0	368	
2029	368.0	0.0	368	
2030	368.0	0.0	368	
Total (to	Total (tCO ₂ e)		3,628	

Estimated emissions reductions in each year (TH_AM011)				
Year	Estimated Reference	Estimated Project	Estimated Emission	
	emissions (tCO ₂ e)	Emissions (tCO ₂ e)	Reductions (tCO ₂ e)	
2020	357.8	291.3	66	
2021	711.7	579.5	132	
2022	711.7	579.5	132	
2023	711.7	579.5	132	
2024	711.7	579.5	132	
2025	711.7	579.5	132	
2026	711.7	579.5	132	
2027	711.7	579.5	132	
2028	711.7	579.5	132	
2029	711.7	579.5	132	
2030	352.9	287.4	65	
Total (to	$CO_2e)$	1,319		

Revision history of PDD				
Version	Date	Contents revised		
01.0	XX/XX/2021	First edition		
	30/10/2025	Initial registration at JC7		