JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Installation of Energy Saving Equipment in Lens Factory

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

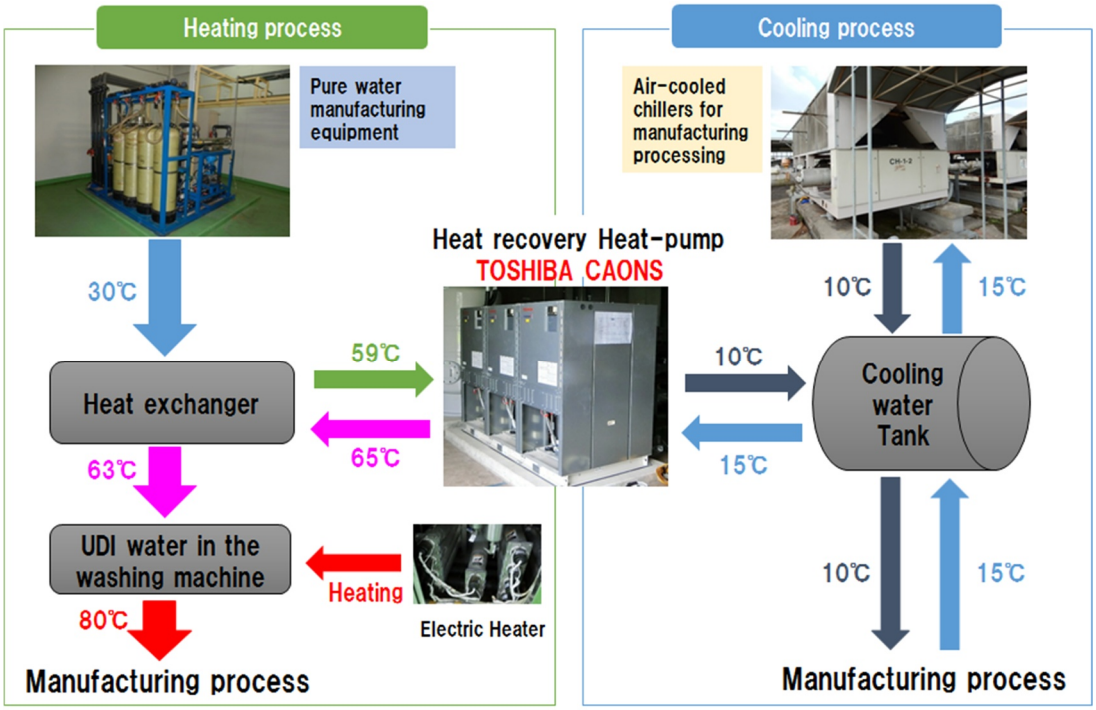
Energy saving equipment, namely inverter type centrifugal chiller and heat recovery electric heat pump (hereinafter referred to as HREHP), are installed at the lens factory of HOYA LENS VIETNAM LTD (hereinafter referred to as HOLV) located in Thu Dau Mot City, Binh Duong Province, Viet Nam.

Installation of centrifugal chiller improves energy efficiency of chiller, which leads to GHG emission reductions. One centrifugal chiller manufactured by Mitsubishi Heavy Industries (product model type “ETI-50”) is installed for this project.

Installation of HREHP leads to reduction of energy consumption by electric heater for heating energy generation and air-cooled chiller for cooling energy generation, which leads to GHG emission reductions. One HREHP manufactured by Toshiba Carrier Corporation (product model type “HWC-WH6702V”) is installed for this project.

Outline of centrifugal chiller installed

Outline of HREHP installed



*"UDI" in the diagram stands for ultra-deionized water.

A.3. Location of project, including coordinates

Country	The Socialist Republic of Viet Nam
Region/State/Province etc.:	Binh Duong Province
City/Town/Community etc:	20 VSIP 2 Street 4, Viet Nam Singapore Industrial Park 2, Hoa Phu Ward, Thu Dau Mot City
Latitude, longitude	11°04'55.7"N 106°40'56.6"E

A.4. Name of project participants

The Socialist Republic of Viet Nam	HOYA LENS VIETNAM LTD
Japan	HOYA CORPORATION

A.5. Duration

Starting date of project operation	Centrifugal chiller: 28/05/2018 HREHP: 01/12/2017
Expected operational lifetime of project	9 years for centrifugal chiller 9 years for HREHP

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.

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	VN_AM011
Version number	Ver1.0
Selected approved methodology No.	VN_AM012
Version number	Ver1.0

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

For VN_AM011

<table>
<tr><th>Eligibility criteria</th><th>Descriptions specified in the methodology</th><th>Project information</th></tr>
<tr><td>Criterion 1</td><td>Project chiller is an inverter type centrifugal chiller with a capacity which is less than or equals to 1,500 USRt.
*1 USRt = 12,000 BTU/hr = 3.52 kW</td><td>An inverter type centrifugal chiller manufactured by Mitsubishi Heavy Industries (product model type “ETI-50”), whose cooling capacity is 460 USRt, is installed for this project.</td></tr>
<tr><td>Criterion 2</td><td>COP for project chiller i calculated under the standardizing temperature conditions* ($COP_{PJ,tc,i}$) is more than the threshold COP values set in the tables below. (“x” in the table represents cooling capacity per unit.)
<table>
<tr><td>Cooling capacity per unit (USRt)</td><td>300≤x<450</td><td>450≤x<550</td><td>550≤x<825</td><td>825≤x≤1,500</td></tr>
<tr><td>Threshold COP value</td><td>5.59</td><td>5.69</td><td>5.85</td><td>6.06</td></tr>
</table></td><td>COP for the project chillers (ETI-50) calculated under the standardizing temperature conditions is 6.22 with a cooling capacity of 460 USRt, which is more than the threshold COP value</td></tr>
</table>

	$COP_{PJ,tc,i}$ is calculated by altering the temperature conditions of COP of project chiller *i* ($COP_{PJ,i}$) from the project specific conditions to the standardizing conditions. $COP_{PJ,i}$ is derived from specifications prepared for the quotation or factory acceptance test data by manufacturer. [equation to calculate $COP_{PJ,tc,i}$] $\mathbf{COP_{PJ,tc,i}} = \mathbf{COP_{PJ,i}} \times [(\mathbf{T_{cooling-out,i}} - \mathbf{T_{chilled-out,i}} + \mathbf{TD_{chilled}} + \mathbf{TD_{cooling}}) \div (\mathbf{37 - 7} + \mathbf{TD_{chilled}} + \mathbf{TD_{cooling}})]$ $COP_{PJ,tc,i}$: COP of project chiller *i* calculated under the standardizing temperature 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 conditions [degree Celsius] $T_{chilled-out,i}$: Output chilled water temperature of project chiller *i* set under the project specific conditions [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 degrees Celsius input 12 degrees Celsius Cooling water: output 37 degrees Celsius input 32 degrees Celsius	set in this criterion.
Criterion 3	Periodical check is planned more than one (1) time annually.	A contract of annual maintenance is signed between the project participant and an

		agent who is authorized by the chiller manufacturer, Mitsubishi Heavy Industries.
Criterion 4	Ozone Depletion Potential (ODP) of the refrigerant used for project chiller is zero.	The refrigerant used for project chiller is R134a whose ODP is zero.
Criterion 5	A plan for prevention of releasing refrigerant used for project chiller is prepared. In the case of replacing the existing chiller with the project chiller, 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 verification, in order to confirm that refrigerant used for the existing one replaced by the project is prevented from being released to the air.	An existing chiller is replaced by the project chiller for this project. Measures to prevent releasing refrigerant used in the existing chiller to the air were taken when it was replaced. The replaced chiller is stored at the project site and monitored the storage status of refrigerant with a pressure gauge to make sure refrigerant is not released to the air. A "WORK INTRUCTION FOR MONTHLY CHECKING THE GAS PRESSURE OF AIR CHILLER NO.2" is prepared to monitor and record the status of refrigerant in order to avoid releasing refrigerant to the air.

		As for the project chiller, airtightness is quite high and all piping and valves are closed, therefore releasing refrigerant to the air is not expected.

For VN_AM012

Eligibility criteria	Descriptions specified in the methodology	Project information
Criterion 1	A project introduces (an) heat recovery electric heat pump(s) (HREHP). In case (an) project HREHP(s) replaces existing equipment, the existing one is not (an) HREHP(s).	HREHP manufactured by Toshiba Carrier Corporation (product model type "HWC-WH6702V") is newly installed for this project.
Criterion 2	Periodical check is planned more than one (1) time annually.	A contract of annual maintenance is signed between the project participant and an agent who is authorized by the HREHP manufacturer, Toshiba Carrier Corporation.
Criterion 3	Ozone Depletion Potential (ODP) of the refrigerant used for project HREHP(s) is zero.	The refrigerant used for project HREHP is R134a whose ODP is zero.
Criterion 4	A plan for prevention of releasing refrigerant used for project HREHP(s) is prepared. In the case of replacing the existing chiller with the project HREHP(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 verification, in order to confirm that refrigerant used for the existing one replaced by the project is prevented from being released to the air.	Airtightness of the project HREHP is quite high, and all piping and valves are closed, therefore releasing refrigerant to the air is not expected. There is no existing chiller replaced with the project implementation.

C. Calculation of emission reductions

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

For VN_AM011

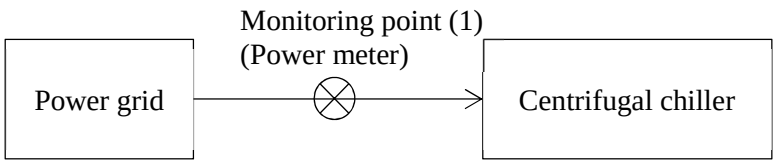
Reference emissions	
Emission sources	GHG type
Power consumption by reference chiller	CO_2
Project emissions	
Emission sources	GHG type
Power consumption by project chiller	CO_2

For VN_AM012

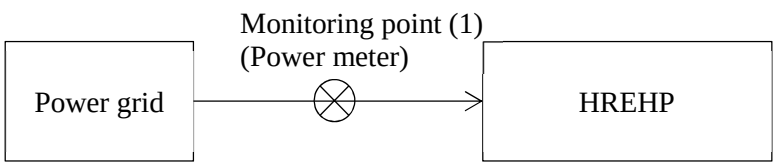
Reference emissions	
Emission sources	GHG type
Power consumption by reference electric heater and air-cooled chiller	CO_2
Project emissions	
Emission sources	GHG type
Power consumption by project HREHP(s)	CO_2

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

Centrifugal chiller [VN_AM011]



HREHP [VN_AM012]



Monitored data are kept and archived for two years after the final issuance of credits.

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	N/A	N/A	93
2018	N/A	N/A	1,176
2019	N/A	N/A	1,220
2020	N/A	N/A	1,220
Total (tCO_{2e})	N/A	N/A	3,709

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 collect comments from stakeholders, a local stakeholder consultation has been conducted on 7 July 2018 at the plant of HOYA LENS VIETNAM LTD where the project was implemented in Binh Duong Province, Vietnam. The schedule and participants of the meetings are provided below.

Date: 7 July 2018
Venue: Factory of HOYA LENS VIETNAM LTD, 20 VSIP 2 Street 4, Viet Nam Singapore Industrial Park 2, Hoa Phu Ward, Thu Dau Mot City, Binh Duong Province
Agenda:

1. Opening remarks

2. Introduction about HOLV
3. Project Overview and introduced Technology and Facility
4. Q&A and comments to receive from the participants:

[Local stakeholders]

No.	Organization	Position
1	HOYA LENS VIETNAM LTD	HR Manager
2	HOYA LENS VIETNAM LTD	Facility Manager
3	HOYA LENS VIETNAM LTD	Facility Staff

[Project participants]

Project participants:

HOYA LENS VIETNAM LTD

HOYA CORPORATION

After explanation about the proposed JCM project, questions and comments were solicited from the stakeholders. A summary of the comments received and consideration of those comments are provided in Section E.2. below.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
Facility Staff	What would be a consequence if estimated emission reductions will not be achieved by the project?	The estimated emission reductions are just for estimation, and they vary depending on production volume. Therefore, there will be no penalty if they will not be achieved by the project. No action is needed.
HR Manager	If there is any other programme by Vietnamese government to support activities which leads to GHG emission reductions, please let us know.	We don't know any other programme by Vietnamese government to support such activities. No action is needed.

F. References

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

Annex

Estimated emissions reductions in each year

[For centrifugal chiller]

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2013	-	-	-
2014	-	-	-
2015	-	-	-
2016	-	-	-
2017	-	-	-
2018	712.1	651.5	60
2019	1,220.9	1,116.9	104
2020	1,220.9	1,116.9	104
Total (tCO_{2e})	3,153.9	2,885.3	268

[For HREHP]

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2013	-	-	-
2014	-	-	-
2015	-	-	-
2016	-	-	-
2017	122.4	29.3	93
2018	1,469.3	352.7	1,116
2019	1,469.3	352.7	1,116
2020	1,469.3	352.7	1,116
Total (tCO_{2e})	4,530.3	1,087.4	3,441

Revision history of PDD		
Version	Date	Contents revised
1.0	18/11/2018	First edition, for public inputs
2.0	11/02/2019	Revisions based on the findings from validation; ● Section B.2 ● Section C.2 ● Section C.3 ● Annex