JCM Validation Report Form

A. Summary of validation

A.1. General Information

Title of the project	Installation of Energy Saving Equipment in Lens Factory
Reference number	VN011
Third-party entity (TPE)	Lloyd's Register Quality Assurance Limited (LRQA)
Project participant contracting the TPE	HOYA CORPORATION
Date of completion of this report	22/03/2019

A.2 Conclusion of validation

Overall validation opinion	☒ Positive ☐ Negative

A.3. Overview of final validation conclusion

Only when all of the checkboxes are checked, overall validation opinion is positive.

Item	Validation requirements	No CAR or CL remaining
Project design document form	The TPE determines whether the PDD was completed using the latest version of the PDD forms appropriate to the type of project and drafted in line with the Guidelines for Developing the Joint Crediting Mechanism (JCM) Project Design Document, Monitoring Plan and Monitoring Report.	☒
Project description	The description of the proposed JCM project in the PDD is accurate, complete, and provides comprehension of the proposed JCM project.	☒
Application of approved JCM methodology (ies)	The project is eligible for applying applied methodology and that the applied version is valid at the time of submission of the proposed JCM project for validation.	☒
Emission sources and calculation of emission reductions	All relevant GHG emission sources covered in the methodology are addressed for the purpose of calculating project emissions and reference emissions for the proposed JCM project.	☒
	The values for project specific parameters to be fixed *ex ante* listed in the Monitoring Plan Sheet are appropriate, if applicable.	☒
Environmental impact assessment	The project participants conducted an environmental impact assessment, if required by the Socialist Republic of Viet Nam, in line with Vietnamese procedures.	☒
Local stakeholder	The project participants have completed a local stakeholder consultation process and that due steps were taken to engage	☒

Item	Validation requirements	No CAR or CL remaining
consultation	stakeholders and solicit comments for the proposed project.	
Monitoring	The description of the Monitoring Plan (Monitoring Plan Sheet and Monitoring Structure Sheet) is based on the approved methodology and/or Guidelines for Developing the Joint Crediting Mechanism (JCM) Project Design Document, Monitoring Plan, and Monitoring Report. The monitoring points for measurement are appropriate, as well as whether the types of equipment to be installed are appropriate if necessary.	☒
Public inputs	All inputs on the PDD of the proposed JCM project submitted in line with the Project Cycle Procedure are taken into due account by the project participants.	☒
Modalities of communications	The corporate identity of all project participants and a focal point, as well as the personal identities, including specimen signatures and employment status, of their authorized signatories are included in the MoC.	☒
	The MoC has been correctly completed and duly authorized.	☒
Avoidance of double registration	The proposed JCM project is not registered under other international climate mitigation mechanisms.	☒
Start of operation	The start of the operating date of the proposed JCM project does not predate January 1, 2013.	☒

Authorised signatory:	Mr. ☒ Ms. ☐
Last name: Chiba	First name: Michiaki
Title: Climate Change Manager - Asia & Pacific	
Specimen signature: [redacted]	Date: 22/03/2019

B. Validation team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Michiaki Chiba	LRQA Ltd.	Team leader	☒	Technical competence authorised	☒
Mr. ☒ Ms. ☐	Srikanth Meesa	LRQA India	Team member	☐	N/A	☒
Mr. ☒ Ms. ☐	Nguyen Tri Thang	LRQA Ltd.	Host country expert	☐	N/A	☒
Mr. ☒ Ms. ☐	Stewart Niu	LRQA China	Internal reviewer	☒	N/A	☐

Please specify the following for each item.

* *Function: Indicate the role of the personnel in the validation activity such as team leader, team member, technical expert, or internal reviewer.*

* *Scheme competence: Check the boxes if the personnel have sufficient knowledge on the JCM.*

* *Technical competence: Indicate if the personnel have sufficient technical competence related to the project under validation.*

C. Means of validation, findings, and conclusion based on reporting requirements

C.1. Project design document form

<Means of validation>

The PDD was checked and confirmed as complete against JCM Guidelines for Developing PDD and MR No. JCM_VN_GL_PDD_MR_ver02.0. A valid form of the JCM PDD Form No. JCM_VN_F_PDD_ver02.0 is used for the initial version of the PDD submitted for public comments that started 21/11/2018. It was re-checked for the revised PDD Version 02.0 dated 11/02/2019. The version is the final version on which the validation was completed.

CAR 3 was issued that the details of resolution are as described below.

The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CAR 3

Nature of the issue raised: PDD was not completed with the table of revision history with the information of version number, date and the contents revised.

Nature of responses provided by the PPs: The PPs submitted the revised PDD Version 2.0 dated 11/02/2019 of which the table of revision history is completed. Assessment of the responses: The table of revision history has been completed for the revised version of the PDD. The CAR was closed. <**Conclusion based on reporting requirements**> *Please state conclusion based on reporting requirements.* The validation team confirmed that the PDD was completed using the valid form of the JCM PDD Form and in accordance with the JCM Guidelines for Developing PDD and MR.

C.2. Project description

<**Means of validation**> The project installs inverter type centrifugal chiller and heat recovery electric heat pump (HREHP) at the lens factory of HOYA LENS VIETNAM LTD (HOLV) in Thu Dau Mot City, Binh Duong Province, Viet Nam. One centrifugal chiller manufactured by Mitsubishi Heavy Industries model ETI-50 is installed for the project that improves energy efficiency of chiller and leads to GHG emissions reductions. One HREHP manufactured by Toshiba Carrier Corporation model HWC-WH6702V is installed for the project that leads to reduction of energy consumption by electric heater for heating energy generation and air-cooled chiller for cooling energy generation and leads to GHG emission reductions. The project is implemented by HOLV from the Socialist Republic of Viet Nam and HOYA CORPORATION from Japan. The start date of project operation is on 28/05/2018 for the centrifugal chiller and 01/12/2017 for HREHP and the expected operational lifetime of the project is for 9 years. The PPs referred to the Statutory useful life for the calculation of depreciation and amortization for machinery and equipment issued by Japan's Ministry of Finance for the basis of the expected operational lifetime of the project chiller indicated as for 9 years (machinery and equipment for the other manufacturing industries). The project receives financial support for JCM model projects from the Ministry of the Environment, Japan. The validation team assessed the PDD and the supporting documents, interviewed the PPs to validate the requirements concerning accuracy and completeness of the project description. The details of the persons interviewed and documents reviewed are provided in the

Section E of this report.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team assessed the project description provided in the PDD with the supporting documents to the requirements on the accuracy and completeness. The validation team confirmed that the proposed JCM project in the PDD is described in accurate and complete manners that is understandable the nature of the proposed project activity.

C.3. Application of approved methodology(ies)

<**Means of validation**>

The project applied the approved methodology JCM_VN_AM011_ver01.0 Energy Saving by Introduction of High Efficiency Inverter Type Centrifugal Chiller, Version 01.0 for application of the centrifugal chiller, and JCM_VN_AM012_ver01.0 Energy Saving by Introduction of Heat Recovery Electric Heat Pump, Version 01.0 for application of HREHP.

LRQA assessed if the selected methodology is applicable to the proposed project. The project applicability was checked against each eligibility criterion in the selected approved methodologies. The steps taken to validate each eligibility criterion and the conclusions about its applicability to the proposed project are summarised as below.

For VN_AM011

Criterion 1: 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

Justification in the PDD: 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.

Steps taken for assessment: The validation team reviewed the technical specification, the commissioning report, and conducted on site assessment including interviews.

Conclusion: Based on the validation processes taken, the validation team confirmed that the project chiller is an inverter type centrifugal chiller with a capacity of 460 USRt that is less than 1,500 USRt, and the criterion is met.

Criterion 2: COP for project chiller i calculated under the standardizing temperature conditions* (COPPJ,tc,i) is more than the threshold COP values set in the tables below. (“x” in the table represents cooling capacity per unit.)

Cooling capacity per unit (USRt)	300≤x<450	450≤x<550	550≤x<825	825≤x≤1,500
Threshold COP value	5.59	5.69	5.85	6.06

COPPJ,tc,i is calculated by altering the temperature conditions of COP of project chiller i (COPPJ,i) from the project specific conditions to the standardizing conditions. COPPJ,i is derived from specifications prepared for the quotation or factory acceptance test data by manufacturer.

[equation to calculate COPPJ,tc,i]

$COP_{PJ,tc,i} = COP_{PJ,i} \times (T_{cooling\text{-}out,i} - T_{chilled\text{-}out,i} + TD_{chilled} + TD_{cooling} \div 37 - 7 + TD_{chilled} + TD_{cooling})$

$COP_{PJ,tc,i}$: COP of project chiller i calculated under the standardizing temperature conditions* [-]

$COP_{PJ,i}$: COP of project chiller i under the project specific conditions [-]

$T_{cooling\text{-}out,i}$: Output cooling water temperature of project chiller i set under the project specific conditions [degree Celsius]

$T_{chilled\text{-}out,i}$: 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

Justification in the PDD: 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 set in this criterion.

Steps taken for assessment: The validation team reviewed the technical specification of the project chiller, the commissioning report, and conducted on-site assessment

including interviews.
Conclusion: Based on the validation processes taken, the validation team confirmed that COP of the project chiller is determined as 6.22 based on the technical specification. The COP value is converted to the standardizing temperature conditions as 6.22 following the procedures stipulated in the approved methodology using output cooling water temperature at 37 ℃ and output chilled water temperature at 7.0 ℃ as per the specification. Thus, the criterion is met by the proposed project.

Criterion 3: Periodical check is planned more than one (1) time annually.
Justification in the PDD: A contract of annual maintenance is signed between the project participant and an agent who is authorized by the chiller manufacturer, Mitsubishi Heavy Industries.
Steps taken for assessment: Document review was conducted on the specification of the periodical maintenance, the contract for the maintenance with the company authorised by the manufacturer, and interviewed the PPs.
Conclusion: The validation team confirmed through the resolution of CAR 1 that the PP has contracted periodical maintenance of the project chiller on annual basis that satisfies the criterion.

Criterion 4: Ozone Depletion Potential (ODP) of the refrigerant used for project chiller is zero.
Justification in the PDD: The refrigerant used for project chiller is R134a whose ODP is zero.
Steps taken for assessment: The validation team reviewed technical specification of project chiller and the Safety Data Sheet of refrigerant used, and conducted the on site assessment.
Conclusion: The project chiller uses the refrigerant R134a whose ODP is zero as confirmed in the supporting documents. Thus, the criterion was confirmed as satisfied by the project.

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.
Justification in the PDD: 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.
Steps taken for assessment: The validation team reviewed the plan inclusive of the detailed procedures to regularly check the pressure gauges installed to the existing chiller replaced by the project and stored at the project site.
Conclusion: The validation team confirmed through resolution of CAR 2 that the PP has provided the plan to prevent releasing of refrigerant from the project chiller and the existing chiller replaced by the project including the detailed procedures to regularly monitor the pressure gauges installed to the existing chiller. Therefore, the criterion is satisfied.

For VN_AM012
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).
Justification in the PDD: HREHP manufactured by Toshiba Carrier Corporation (product model type “HWC-WH6702V”) is newly installed for this project.
Steps taken for assessment: The validation team reviewed the technical specification, the commissioning report, and conducted on site assessment including interviews.
Conclusion: Based on the validation processes taken, the validation team confirmed that the project introduces a new HREHP at the lens factory. The project HREHP displaces a part of cooling energy and heating energy that have been supplied by the existing air-cooled chillers and electric heater respectively. Therefore, the criterion is met.

Criterion 2: Periodical check is planned more than one (1) time annually.
Justification in the PDD: A contract of annual maintenance is signed between the project participant and an agent who is authorized by the HREHP manufacturer, Toshiba Carrier Corporation.
Steps taken for assessment: Document review was conducted on the specification of the periodical maintenance, the contract for the maintenance with the company authorised by the manufacturer, and interviewed the PPs.
Conclusion: The validation team confirmed through the resolution of CAR 1 that the

PP has contracted periodical maintenance of the project HREHP on annual basis that satisfies the criterion.

Criterion 3: Ozone Depletion Potential (ODP) of the refrigerant used for project HREHP(s) is zero.
Justification in the PDD: The refrigerant used for project HREHP is R134a whose ODP is zero.
Steps taken for assessment: The validation team reviewed technical specification of project HREHP and the Safety Data Sheet of refrigerant used, and conducted the on site assessment.
Conclusion: The project HREHP uses the refrigerant R134a whose ODP is zero as confirmed in the supporting documents. Thus, the criterion was confirmed as satisfied by the project.

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.
Justification in the PDD: 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.
Steps taken for assessment: The validation team reviewed the plan and supporting documents provided by the PPs.
Conclusion: The validation team assessed the supporting documents received from the PPs and confirmed the plan is prepared not to release refrigerant. Therefore, the criterion is satisfied.

CAR 1 and CAR 2 were issued that the details of resolution are as described below.
The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.
<Findings>
Please state if CARs, CLs, or FARs are raised, and how they are resolved.
Grade / Ref: CAR 1
Nature of the issue raised: Plan of periodical check as evidence of how the PPs satisfy eligibility criteria (Criterion 3 of AM_VN011 and Criterion 2 of AM_VN012) was not

provided.
Nature of responses provided by the PPs: The PPs confirmed that the contracts for annual maintenance were signed with the authorised agents of the manufacturers each for the centrifugal chiller and the HREHP and provided the copy of the signed contracts with supporting correspondences as the evidence for review by the validation team.
Assessment of the responses: The validation team reviewed the copy of signed contracts for annual maintenance of the project chiller and HREHP and confirmed the requirements of the eligibility criteria are satisfied.
The CAR was closed.

Grade / Ref: CAR 2
Nature of the issue raised: Plan for prevention of releasing refrigerant as evidence of how the PPs satisfy eligibility criteria (Criterion 5 of AM_VN011 and Criterion 4 of AM_VN012) was not prepared.
Nature of responses provided by the PPs: The PPs provided the plan with supporting documents including the detailed procedures for regular checking of the pressure gauges as the preventive measures on release of refrigerant from the existing chiller replaced by the project.
Assessment of the responses: The validation team reviewed the PPs' plan for prevention of releasing refrigerant that include the detailed procedures for regular checking of the pressure gauges for the exiting chiller replaced by the project and kept at the project site.
The CAR was closed.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed that the project applied the valid version of the approved methodology and the applicability was demonstrated to the eligibility criteria as appropriate.

C.4. Emission sources and calculation of emission reductions

<**Means of validation**>

The project provides the cooling and heating services by application of inverter type centrifugal chiller and HREHP. The sources of GHG emissions are power consumption by reference chiller and the project chiller for application of the centrifugal chiller, and power consumption by reference electric heater and air-cooled chiller and project HREHP for application of HREHP. CO2 emissions in the reference and project

scenarios are considered to determine the reference emissions (REs) and the project emissions (PEs).

The annual electricity consumption of project chiller is estimated at 1,216 MWh. The project chiller is expected to consume grid electricity only and the CO2 emission factor is determined as 0.9185 t-CO2/MWh referring to the latest CO2 emission factor of electricity published by MONRE. There is emergency diesel generators on site that are not used for production activities. The COP of the reference chiller is determined as 5.69 applying the default value of the methodology. The COP of the project chiller is 6.22 based on the technical specification that is calculated for the standardizing temperature conditions. The GHG emission reductions during the period p are calculated as: ERp = REp - PEp = EC_PJ,i,p x (COP_PJ,tc,i / COP_RE,i) x EFelec – EC_PJ,i,p x EFelec. The annual GHG emission reductions are calculated using the estimated annual electricity consumption of project chiller as: 1,216 MWh x (6.22 / 5.69) x 0.9185 – 1,216 MWh x 0.9185 = 1,220.9 – 1,116.9 = 104.0 t-CO2e. In the first year of operation, the project chiller is operated from 28/05/2018 and the ERs in the first year is estimated as 1,216 MWh x 7 / 12 months x (6.22 / 5.69) x 0.9185 – 1,216 MWh x 7 / 12 months x 0.9185 = 712.1 – 651.5 = 60.6 t-CO2e.

The annual electricity consumption of project HREHP is estimated at 384 MWh. The project HREHP is expected to consume grid electricity and the CO2 emission factor is determined as 0.9185 t-CO2/MWh referring to the latest CO2 emission factor of electricity published by MONRE. There is emergency diesel generators on site that are not used for production activities. CO2 emission factor for the reference equipment for heating energy generation is calculated from the CO2 emission factor for electricity following the applied methodology as EF_REh = EF_elec/3.6 = 0.9185 / 3.6 = 0.255 tCO2/GJ. The COP of the reference air cooled chiller is determined as 3.08 applying the default value of the methodology. The rated electricity consumption (ECR,i), rated heating capacity (H_PJ,i), and rated cooling capacity (CH_PJ,i) of the project HREHP are 53.1 kW, 180 kW and 126.9 kW respectively based on the specifications of project HREHP system. Efficiency of reference equipment for heating energy generation (η_REh) is determined as 1 applying the conservative default value of the methodology. The GHG emission reductions during the period p are calculated as: ERp = REp - PEp = (EC_PJ,i,p x 3.6) / ECRi x H_PJ,i / η_REh x EF_REh) + (EC_PJ,i,p / ECRi x CH_PJ,i / COP_RE,cool,i x EF_elec) - EC_PJ,i,p x EF_elec. The annual GHG emission reductions are calculated using the estimated annual electricity consumption of project HREHP as: 384 x 3.6 / 53.1 x 180 / 1 x 0.255139 + 384 / 53.1 x 126.9 / 3.08 x 0.9185 - 384 x 0.9185 = 1,195.609 + 273.670 – 352.704 = 1,469.3 – 352.7 = 1,116.6 t-CO2e. In the first year of operation, the project HREHP is operated from

01/12/2017 and the ERs in the first year is estimated as 384 x 1 / 12 x 3.6 / 53.1 x 180 / 1 x 0.255139 + 384 x 1 / 12 / 53.1 x 126.9 / 3.08 x 0.9185 - 384 x 1 / 12 x 0.9185 = 99.63 + 22.81 – 29.39 = 122.4 – 29.3 = 93.1 t-CO2e.

The validation team assessed the documented evidence and by means of on site visit confirmed that all the relevant GHG emission sources covered in the applied methodology are addressed, and the steps taken and the equations applied to calculate PEs and REs for the proposed project comply with the requirements of the approved methodology.

CAR 4 was issued that the details of resolution are as described below.

The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CAR 4

Nature of the issue raised: The CO2 emission factor for heating energy generation was not calculated using the updated CO2 emission factor for consumed electricity in accordance with the applied methodology.

The ex-ante estimation of the emission reductions needed to be explained the relevance including the assumptions used.

Nature of responses provided by the PPs: The PPs corrected the value of CO2 emission factor for heating energy generation for calculation of ERs for HREHP using the latest electricity emission factor.

The PPs also provided the detailed ex-ante estimation of the ERs with information of sources referenced for the calculation.

Assessment of the responses: The validation team reviewed the revised MPS and the details of ex-ante estimation of the ERs and confirmed appropriateness.

The CAR was closed.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed that:

- The methodology was applied correctly to calculate REs and PEs and no other significant emission source was identified that would be affected and reasonably attributed by implementation of the proposed project but not addressed by the applied methodology;
- The choice of whether an emission source or gas is to be included where the applied methodology allows was reasonably justified by the PPs;
- The Monitoring Plan Sheet (MPS) was not altered and the fields were filled in as

required so that all estimates of the REs could be replicated using the data and parameter values provided in the PDD;
- The values for the project specific parameters fixed ex ante listed in the MPS were appropriate with all the data sources and assumptions and the calculations were correct to the proposed JCM project;
- All assumptions and data used by the PPs were listed in the PDD, including their references and sources; and
- All values used in the PDD were considered reasonable in the context of the proposed JCM project.

C.5. Environmental impact assessment

<**Means of validation**>

The proposed project is to adopt inverter type centrifugal chiller and HREHP in an existing lens factory and the PDD stated that an environmental impact assessment is not required by laws of the host country. The validation team assessed the applicable legal requirements in the host country using its local sources/expertise and confirmed that an environmental impact assessment is not required to be conducted for implementation of the project.

The details of the persons interviewed and documents reviewed are provided in the Section E of this report.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed by assessing the relevant documents and using the local sources/expertise that the project does not need an environmental impacts assessment to be conducted to meet the legal requirement of the host country and the PDD satisfies the requirements of the JCM.

C.6. Local stakeholder consultation

<**Means of validation**>

The PPs identified the factory staff as the local stakeholders and collected comments on the proposed project through a meeting. No negative issue was raised through the processes that require actions to be taken by the PPs.

The details of the persons interviewed and documents reviewed are provided in the Section E of this report.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed that the PPs have invited comments to the proposed project from the relevant local stakeholders, the summary of the comments received is provided in the PDD in a complete manner and the PPs have taken due account of all the comments received from the local stakeholders as the processes described in the PDD.

C.7. Monitoring

<**Means of validation**>

The Monitoring Plan (MP) consisting of the MPS and Monitoring Structure Sheet (MSS) was based on the approved methodologies. The monitoring points are power consumption of project chiller for application of the centrifugal chiller and power consumption of project HREHP for application of HREHP respectively.

The power consumption of the project chiller and the project HREHP is directly and continuously measured by electricity meters. The measured data is recorded and stored in the measuring equipment. The recorded data is to be checked on a monthly basis by the responsible staff. Type approval and manufacturer's specification have been prepared and regular calibration is not required according to the applied methodologies.

The project chiller and HREHP use grid electricity only. The CO2 emission factor is sourced from the latest publication by MONRE. The diesel based emergency generators are only used for safety and not for production.

The roles and responsibilities of the persons are described in the MSS in accordance with the requirements of the applied methodologies. The monitored data is compiled and checked by facility staff, facility manager and technical expert of HOLV and the MR is approved by Environmental/Occupational Safety and Health Department Group Leader of HOYA CORPORATION.

The validation team confirmed that the MP complied with the requirements in the approved methodology and that the PPs will be able to apply the MP following the monitoring arrangements described in it. CAR 5 and CL 1 were issued that the details of resolution are as described below.

The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CAR 5

Nature of the issue raised: The Monitoring Plan was not completed with the specific information of the project including the QA/QC procedures and the details of the measuring equipment on accuracy level and calibration information (frequency, date of calibration and validity).

Nature of responses provided by the PPs: The PPs submitted the revised MP for review by the validation team.

Assessment of the responses: The validation team reviewed the revised MP and confirmed that the specific information of the measurement methods and procedures is provided for the project that demonstrated fulfilment of the requirements of the applied methodology.

The CAR was closed.

Grade / Ref: CL 1

Nature of the issue raised: The PPs needed to clarify how the PPs ensure that data monitored and required for verification and issuance be kept and archived electronically for two years after the final issuance of credits.

Nature of responses provided by the PPs: The PPs confirmed implementation of the requirements in the revised PDD.

Assessment of the responses: The validation team confirmed that the statement is added in the revised PDD for keeping of required data.

The CL was closed.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed that the MP was described in compliance with the requirements of the approved methodology and the Guidelines for developing PDD and MR, and the PPs have demonstrated feasibility of the monitoring structure and their ability to implement the MP.

C.8. Modalities of Communication

<**Means of validation**>

The MoC was submitted to LRQA in the form JCM_VN_F_MoC_ver02.0 that nominates HOYA CORPORATION as the focal point and was signed by the authorized representatives of all the PPs with the contact details. The form used is the latest one as of the time of validation.

The validation team assessed the personal identities including specimen signatures and employment status of the authorized signatories through directly checking the evidence for corporate and personal identity of the PPs and their authorised signatories. The validation team also confirmed through reviewing the corporate information of the PPs and by meeting the persons representing the PPs that the information provided in the MoC is correct.
CAR 6 was issued that the details of resolution are as described below.
The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CAR 6
Nature of the issue raised: The MoC was not completed with the date of submission. The title of primary signatory of the HOLV was not updated.
Nature of responses provided by the PPs: The PPs submitted the MoC after corrections.
Assessment of the responses: Revised MoC dated 11/01/2019 was submitted as relevant.
The CAR was closed.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed that the MoC was completed using the latest form after assessment conducted on relevance of the MoC in compliance with the requirements of the JCM Guidelines.

C.9. Avoidance of double registration

<**Means of validation**>

The validation team assessed and confirmed relevance of the written confirmation in the MoC from the PPs that the proposed JCM project was not registered under the other international climate mitigation mechanisms.
The team in addition to the interviews with the PPs checked publicly accessible information of Clean Development Mechanism (CDM), Joint Implementation (JI), Verified Carbon Standard (VCS) and Gold Standard (GS) and found no identical project as the proposed JCM project in terms of the name of entities, applied technology, scale and the location. The result of researches confirmed that the proposed project was not registered under the other international climate mitigation mechanisms than JCM and it will not result in a double counting of GHG emission

reductions.

The details of the persons interviewed and the documents reviewed are shown in the Section E of this report.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirement of the section.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed that the proposed JCM project was not registered under the other international climate mitigation mechanisms.

C.10. Start of operation

<**Means of validation**>

The start date for the operation of the proposed JCM project is indicated as 28/05/2018 for the centrifugal chiller and 01/12/2017 for HREHP in the PDD. The commissioning tests of the project chiller and HREHP were completed on 28/05/2018 and 01/12/2017 respectively. Therefore the validation team confirmed that the date is not before 01/01/2013 as required to be eligible as a JCM project.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The validation team confirmed that the start dates of operation of the proposed JCM project are 28/05/2018 for the centrifugal chiller and 01/12/2017 for HREHP and not before 01/01/2013 as required to be eligible as a JCM project.

C.11. Other issues

<**Means of validation**>

No issue was identified as relevant element not covered above.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Not applicable

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

Not applicable

D. Information on public inputs

D.1. Summary of public inputs

In line with the JCM Project Cycle Procedure, the PDD is to be made publicly available for 30 days to invite public comments. The PDD was made publicly available in line with the requirements of the procedure for the period of 21/11/2018 to 20/12/2018 as per https://www.jcm.go.jp/vn-jp/projects/54.

D.2. Summary of how inputs received have been taken into account by the project participants

No comment was received during the above period to receive public inputs.
Thus no action was required to be taken by the PPs to satisfy the JCM requirement.

E. List of interviewees and documents received

E.1. List of interviewees

HOYA LENS VIETNAM LTD
Jisai Masahiko, Chairman
Huynh Kinh Quoc, General Manager, HR & AD
Hisashi Higuchi, General Manager, Technical Dept.
Hatsuyoshi Nakazawa, Manager, Production 2 Group
Nguyen Thanh Tu, Facility Section Manager

HOYA CORPORATION
Hikaru Isobe, Senior Staff, Environment/Occupational Safety and Health Group, Environment/Occupational Safety and Health Department, QESH Management Systems Global Headquaters

Mitsubishi UFJ Research and Consulting Co., Ltd.
Kei Sato, Consultant, Consulting Business Division, Optimum Solution Business Unit, Social Innovation Co-Creation Dept., Environment and Energy Business Consulting Group

E.2. List of documents received

Category A documents (documents prepared by the PP)
- PDD Version 1.0 dated 18/11/2018 with the Monitoring Spreadsheet
- Revised PDD Version 2.0 dated 11/02/2019 with the Monitoring Spreadsheet
- MoC
- Revised MoC dated 11/01/2019
- Company overview of HOYA LENS VIETNAM LTD
- Specifications of chiller units
- Specification for heat recovery heat pump
- As-built drawing
- Chilled water schematic diagram
- Plant lay out
- Project implementation plan
- Project schedule
- Commissioning report for centrifugal chiller
- Inspection report for heat pump units
- Warranty certificates
- Operator’s manual for the chillers
- Records of training
- Annexes 1 and 2 to the Act of Japan’s Ministry of Finance concerning Statutory useful life for the calculation of depreciation and amortization
- Safety Data Sheet for R-134a
- Refrigerator test records
- Report for introduction of high efficiency inverter turbo refrigerator
- Specification of measuring equipment
- Ministry of Science and Technology Circular No. 23/2013/TT-BKHCN on Group 2 Measuring Instruments
- Inspection report for measuring equipment
- Details of calculation of the estimated emission reductions
- Electricity emission factor for Vietnamese Grid published by the Ministry of Natural Resource and Environment
- Electricity grid emission factor of Vietnam, IGES
- Decree No. 18/2015/ND-CP on Environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plans
- Records of Local Stakeholder Consultation meeting

- Electricity line diagram

Category B documents (other documents referenced)
JCM_VN_AM011_ver01.0 Energy Saving by Introduction of High Efficiency Inverter Type Centrifugal Chiller, Version 01.0, and
JCM_VN_AM012_ver01.0 Energy Saving by Introduction of Heat Recovery Electric Heat Pump, Version 01.0
- Additional Information for
- Safety Data Sheet
- IPCC Forth Assessment Report
- JCM Project Cycle Procedure JCM_VN_PCP_ver04.0
- JCM Guidelines for Validation and Verification JCM_VN_GL_VV_ver01.0
- JCM Guidelines for Developing PDD and MR JCM_VN_GL_PDD_MR_ver02.0
- JCM Glossary of Terms JCM_VN_Glossary_ver01.0
- JCM PDD Form JCM_VN_F_PDD_ver02.0
- JCM MoC Statement Form JCM_VN_F_MoC_ver02.0
- JCM Validation Report Form JCM_VN_F_Val_Rep_ver01.0
- Approved Methodology AM0060 Power saving through replacement by energy efficient chillers
- Approved Methodology AM0070 Manufacturing of energy efficient domestic refrigerators
- Approved Methodology AM0071 Manufacturing and servicing of domestic and/or small commercial refrigeration appliances using a low GWP refrigerant
- Approved Small Scale Methodology AMS II.C. Demand-side energy efficiency activities for specific technologies
- AM_REV_0148 Response to request for modification of procedure for accounting of leakage of emissions from physical leakage of the initial charge of refrigerant in the new chiller
- SSC_510 Clarification on the applicability of AMS-II.C to a project activity replacing multiple low efficiency equipment with a single high efficient equipment
- SSC_539 Clarification on identification of baseline scenario and demonstration of additionality for chiller programme under AMS-II.C
- SSC_540 Clarification on calculation of baseline emissions for chiller programme under AMS-II.C
- SSC_580 Clarification on the requirement of AMS-II.C for project activity replacing inefficient refrigerators
- Chiller Energy Efficiency Project, Philippines, the World Bank

- The Chiller Energy Efficiency Project, Republic of India, the World Bank
- CDM-SSC-PoA-DD/CDM-SSC-CPA-DD Demand Side Management (DSM) for accelerating the diffusion of energy efficient chiller technology
- CDM-PoA-DD/CDM-CPA-DD Philippines – Chiller Energy Efficiency Programme (PCEEP)
- CDM-SSC-PoA-DD/CDM-SSC-CPA-DD Climate Action Response Enterprise (CARE) for Energy Efficiency in Chiller Plants
- Proposed and registered projects under CDM, VCS, Gold Standard, and the other international schemes
- IEC 62053-22:2003, Electricity metering equipment (ac) - Particular requirements. Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)
- List of Grid Emission Factors, Institute for Global Environmental Strategies (IGES)

Annex Certificates or curricula vitae of TPE's validation team members, technical experts and internal technical reviewers

Please attach certificates or curricula vitae of TPE's validation team members, technical experts and internal technical reviewers.

Certificate of Appointment is attached to this report.

Joint Crediting Mechanism Certificate of Appointment

Title of Project: Validation for Installation of Energy Saving Equipment in Lens Factory (VN011)

We hereby certify that the following personnel have engaged in the validation process that has fully satisfied the competence requirements of the validation of the JCM project.

Name of Person	Assigned Roles
Michiaki Chiba	Team Leader
Srikanth Meesa	Team Member
Nguyen Tri Thang	Host Country Expert
Stewart Niu	Technical Reviewer

Signed by

[redacted]

Michiaki Chiba

Climate Change Manager – Asia & Pacific

03/12/2018