JCM Verification Report Form

A. Summary of verification

A.1. General Information

Title of the project	Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids
Reference number	VN008
Monitoring period	01/01/2018 - 31/12/2020
Date of completion of the monitoring report	02/03/2022
Third-party entity (TPE)	Japan Management Association (JMA)
Project participant contracting the TPE	YUKO-KEISO Co., Ltd.
Date of completion of this report	11/03/2022

A.2 Conclusion of verification and level of assurance

Overall verification opinion	☒ Positive ☐ Negative
☒ Unqualified opinion	Based on the process and procedure conducted, *Japan Management Association (JMA)* (TPE's name) provides reasonable assurance that the emission reductions for *Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids* (project name) ✓ Are free of material errors and are a fair representation of the GHG data and information, and ✓ Are prepared in line with the related JCM rules, procedure, guidelines, forms and other relevant documents
(If overall verification opinion is negative, please check below and state its reasons.) ☐ Qualified Opinion ☐ Adverse opinion ☐ Disclaimer	<State the reasons>

A.3. Overview of the verification results

Item	Verification requirements	No CAR or CL remaining
The project	The TPE determines the conformity of the actual	☒

Item	Verification requirements	No CAR or CL remaining
implementation with the eligibility criteria of the applied methodology	project and its operation with the eligibility criteria of the applied methodology.	
The project implementation against the registered PDD or any approved revised PDD	The TPE assesses the status of the actual project and its operation with the registered/validated PDD or any approved revised PDD.	☒
Calibration frequency and correction of measured values with related requirements	If monitoring Option C is selected, the TPE determines whether the measuring equipments have been properly calibrated in line with the monitoring plan and whether measured values are properly corrected, where necessary, to calculate emission reductions in line with the PDD and Monitoring Guidelines.	☒
Data and calculation of GHG emission reductions	The TPE assesses the data and calculations of GHG emission reductions achieved by/resulting from the project by the application of the selected approved methodology.	☒
Avoidance of double registration	The TPE determines whether the project is not registered under other international climate mitigation mechanisms.	☒
Post registration changes	The TPE determines whether there are post registration changes from the registered PDD and/or methodology which prevent the use of the applied methodology.	☒

Authorised signatory:	Mr. ☒	Ms. ☐
Last name: Nemoto	First name: Wako	
Title: Senior Executive of GHG Certification Center, JMA		
Specimen signature: [redacted]		Date: 10/03/2022

B. Verification team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Masao Tomizawa	JMA	Team Leader	☒	Technical competence qualified	☐
Mr. ☒ Ms. ☐	Motoyuki Matsumoto	JMA	Team Member	☒	Technical competence qualified	☐
Mr. ☒ Ms. ☐	Masataka Ajiki	JMA	Team Member	☒	—	☐
Mr. ☒ Ms. ☐	Kenji Suzuki	JMA	Internal Reviewer	☒	Technical competence qualified	☐

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 verification, findings and conclusions based on reporting requirements

C.1. Compliance of the project implementation and operation with the eligibility criteria of the applied methodology

<Means of verification>

Approved methodology "Installation of energy efficient transformers in a power distribution grid, Ver. 01.0 (Ref.2)" was applied to the JCM project. Verification team assessed the compliance of the project implementation and operation with the eligibility criteria of the applied methodology.

Verification team conducted the assessment of the project implementation and operation for the monitoring period (from 1 Jan. 2018 to 31 Dec. 2020) to confirm the eligibility criteria in the registered PDD (Ref.1).

- Document review was conducted using the checklist based on the "JCM Guidelines for Validation and Verification (Ref.14)".
- Follow-up interviews with all project participants were conducted through the internet. The verification was conducted without on-site visit by the following reasons.
  - Due to the COVID-19 pandemic.
  -The information required for verification, which would normally be verified during on-site

assessment, was verified by alternative methods such as document and photo reviews, interviews via internet, and e-mail.

Each criterion in the registered PDD was checked as follows by document review and interviews.

JMA confirmed with relevant references and interviews with PPs via internet that the PPs installed and operated transformers with amorphous metal core in line with the eligibility criteria of the applied methodology.

Detailed assessment by criterion is shown below:

Criterion 1:

Single-phase and/or three-phase oil-immersed transformer with amorphous metal core is installed in the distribution grid.

All transformers described in the registered PDD was confirmed by desk review and interviews with PPs, checking “Specification of equipment (Ref.3-1-1～3)”, and interviews with project participants (PPs). Verification team confirmed that the proposed project have installed a total of 4,841 units of single-phase and/or three-phase oil-immersed transformer with amorphous metal core in the area of the three distribution grids. Also the serial number and installation address were checked with local photos and videos (Ref.13) to confirm that the transformers selected by sampling were installed and operating in the proper location as per the acceptance record of the operation (Ref.3-3). The verification team confirmed that each transformer was installed in an appropriate place. The verification team confirmed that the proposed project satisfied the eligibility criterion 1.

Criterion 2:

Load losses of the project transformer determined in line with IEC 60076-1 or national/industrial standards complying with IEC 60076-1 is equal or smaller than the standard values or specification values of load loss, required by the power company of the grid where the project transformer is installed, corresponding to its capacity and number of phases.

The verification team confirmed that IEC60076-1 and TCVN6306-1 had been valid in Viet Nam during the monitoring period. The verification team checked THIBIDI Tender Specifications of Amorphous Transformers (No-load losses / load losses of the project transformers) (Ref.3-1-1) and Pre-delivery Inspection Reports of Transformers Installed in the four Power Companies (Ref.3-1-2). The verification team confirmed that the installed transformers fulfil the requirements by sampling check. Additionally, the verification team conducted interviews with all PPs to confirm above.

<Findings>

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

No CAR, CL, or FAR was raised for this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Verification team assessed the application of approved methodology of the JCM project with the supporting documents and interviews with PPs.

Verification team confirmed the compliance of the project implementation and operation with the eligibility criteria of the applied methodology.

C.2. Assessment of the project implementation against the registered PDD or any approved revised PDD

<Means of verification>

Verification team assessed the project implementation against the registered PDD by means of checking documents including photographs of current status of project sites and interviews with PPs for this second verification.

Verification team checked that physical features of the project in the registered PDD were in place and that the project participants operated the project for the monitoring period as per the registered PDD.

During desk review, Monitoring Report Sheet (Ref.11-2) provided by the PP with following references were checked:

- The registered PDD including Monitoring Plan Sheet and Monitoring Structure Sheet,
- Final version of the validation report (Ref.9),
- Final version of the first verification report (Ref.10)
- Approved methodology (Ref.2).

The physical features of the project in the registered PDD were checked by interviews with PPs via internet with following references:

- Lists of Transformers Installed in the 4 companies (Ref.3-1-3-A～3-1-3-D),
- Event lists of Transformers for 4 companies (Ref.3-2-1-A～3-2-1-D) and
- Reference of "Expected operational lifetime of project" (Ref.3-4).

Also, project operation as per the registered PDD was checked by interviews with following references:

- Monitoring Structure Sheet of the registered PDD,
- Monitoring manual (Ref.12) and
- Local stakeholder consultation meeting summary (Ref.5-1, 5-2)

<Findings>

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

CAR1:

The verification team found that some of the transformers have been relocated or replaced during the monitoring period due to the change of the electricity demand. The verification team requested PPs to provide the proper event lists and the supporting documents or information to prove them. Also, the verification team requested PPs to correct the operating hours.

⇒Summary of Response and Verification team Conclusion :

The PPs provided the proper event lists and supporting documents including the stop and restart records and photos. The verification team confirmed that the revised event lists were proper and consistent with evidence. PPs corrected the operating hours. The verification team confirmed that the operating hours were corrected. As a result of recalculation of operating hours based on the proper event list, the correct operating hours was 126,982,608 hours and incorrect operating hours was 126,914,952 hours. CAR1 was closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team concluded that CAR1 was closed and that the implemented project was operated during the monitoring period in accordance with the registered PDD.

C.3. Compliance of calibration frequency and correction of measured values with related requirements

<Means of verification>

Compliance of calibration frequency and correction of measured values with related requirements were checked in accordance with the applied methodology and the registered PDD.

The monitoring parameter is 'Energizing time of the project transformer (H,i,p)' of which the monitoring option is ‘Option C’.

The parameter is measured by counting the number of hours of the monitoring period according to the monitoring plan. The number of hours is actually calculated by multiplying 24 hours/day by the number of days during the monitoring period. If there are non-operation days by replacements, relocations and etc., the non-operation days are deducted.

<Findings>

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

No CAR, CL, or FAR were raised for this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Verification team confirmed that the requirements in this section were satisfied by counting the number of hours of the monitoring period.

C.4. Assessment of data and calculation of GHG emission reductions

<Means of verification>

Verification team confirmed that the corresponding Monitoring Report Sheet of the applied methodology was used.

Also, verification team confirmed that the calculation of CO2 emission reductions was conducted appropriately according to the applied methodology by conducting document review and interviews with PPs.

Monitoring Report was checked as follows during document review and interviews with PPs via internet to confirm the data and calculation of GHG emission reductions of Monitoring Report Sheet (Ref.11-2). Monitoring Report was checked with the description of Monitoring Plan Sheet in the registered PDD and the approved methodology.

The verification team compared the operational time based on the event list with the energizing time of the project transformer during the monitoring period in the MRS. The verification team found a difference in the operational time of HCMC and CPC. CAR2 was raised.

Parameters used for calculations were checked as follows.

The values of NLLRE,I,j,k and NLLPJ,I,j,k for all types of transformers were checked by the monitoring plan and no changes was confirmed.

Brp was checked by the applied methodology and no changes was confirmed.

UNCi was checked by the value (0.15) defined in IEC60076-1 and no changes was confirmed.

EFgrid was checked by the default value provided Ministry of Natural Resources and Environment and no changes was confirmed.

The comparison of actual CO2 emission reductions with estimates in the registered PDD has been checked by verification team. The amount of actual CO2 emission reduction (11,633 tCO2) was almost same as the estimated value (11,655 tCO2) in the registered PDD.

Parameters	Monitored values	Method to check values in the monitoring report with sources
Hi,p	126,982,608 hours for all transformers in total during the	The verification team checked the event information such as replacement, relocations, etc. of each transformer during monitoring period based on event list (Ref. 3-2) and evidences of these events (Ref. 3-3).

	monitoring period	The verification team checked that the outage time, which was calculated according to the event information, was subtracted from Hi,p correctly.

<Findings>

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

CAR2:

The verification team found that there are some errors in the calculation of operational hours based on the event lists of HCMC and CPC. The verification team requested PPs to recalculate and submit the proper MRS based on the exact operational hours.

⇒Summary of Response and Verification team Conclusion :

PPs explained that the events of some transformers were unclear and stopping time were conservatively subtract from operating hours in conservative manner. PPs recalculated correct operating hours based on proper event of all transformers. Verification team confirmed that the result of recalculation was correct and that the revised MRS was consistent with the operational hours.

CAR2 was closed.

CL1:

Verification team found the monitoring manual documents (Ref. 12-1, 12-2) was revised by PPs thorough the interviews with PPs. Verification team requested PPs to provide the revised monitoring manual documents to confirm the contents of the revised documents. CL1 was raised.

⇒Summary of Response and Verification team Conclusion :

Verification team confirmed that the revised documents ensured monitoring was conducted more accurately and was consistent with MPS.

CL1 was closed.

Verification team conducted interviews with PPs via internet and document review of evidences to confirm the monitoring of generated power in accordance with the registered PDD and the applied methodology.

Verification team confirmed that the monitoring was conducted appropriately.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Verification team confirmed that the appropriate Monitoring Report Sheet of the applied

methodology was used for Monitoring Report.
CO2 emission reductions during monitoring period are almost the same as the estimated value in the registered PDD.
Verification team concluded that the data was monitored appropriately and the amount of CO2 emission reductions was calculated correctly.

C.5. Assessment of avoidance of double registration

<Means of verification>

The following websites of CDM, JI and VCS were checked whether the projects with similar technology and location had been registered.

1) Website of UNFCCC (Project Search for CDM, JI Projects)
2) Website of IGES (IGES CDM Project Database, IGES JI Project Database)
3) Website of Verified Carbon Standard

Also, written confirmation that the project was not registered under other international climate mitigation mechanisms was submitted and checked.

<Findings>

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

No CAR, CL or FAR were raised for this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team confirmed that the project was not registered under other international climate mitigation mechanisms during the monitoring period.

C.6. Post registration changes

<Means of verification>

There was no post registration change from the registered PDD and/or methodology which prevented the use of the applied methodology.

<Findings>

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

No CAR, CL, or FAR was raised for this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Verification team confirmed that there was no post registration change during the monitoring period.

D. Assessment of response to remaining issues

An assessment of response to the remaining issues including FARs from the validation and/or previous verification period, if appropriate

There is no remaining issue.

E. Verified amount of emission reductions achieved

Year	Verified Reference Emissions (tCO_2e)	Verified Project Emissions (tCO_2e)	Verified Emission Reductions (tCO_2e)
2013			
2014			
2015			
2016			
2017			
2018	6,614.6	2,734.7	3,879
2019	6,605.7	2,730.9	3,874
2020	6,615.6	2,734.9	3,880
Total (tCO_2e)			11,633

F. List of interviewees and documents received

F.1. List of interviewees

YUKO KEISO CO., LTD.
Toshihide Sugawara
Gen Tomita
Shiro Tokura
Saori Iwasaki
Vu Huy Hieu

DA NANG POWER COMPANY
Nguyễn Đình Tuân
Trương Quốc Anh
Võ Văn Phương
Nguyễn Thị Mỹ Vân
Nguyễn Văn Thọ
Nguyễn Đình Toàn
Văn Anh Toàn
Hoàng Đăng Vũ
Trần Thanh Nam
Nguyễn Hoàng

EVN CPC

Bùi Châu Quốc Bảo
Lê Minh Xuân

EVN SPC
Nguyen Dac Thang
Nguyen Hoang Viet
Hoang Tuan Anh

EVN HCMC (including subsidiary companies)
Đỗ Hữu Trung
Nguyễn Hữu Thanh Thi
Nguyễn Trung Nam
Nguyễn Tấn Phúc
Nguyễn Hoàng Lân
Lăng Minh Tú
Nguyễn Duy Phong
Nguyễn Thanh Sang
Phan Văn Dũng
Lại Văn Hiền
Nguyễn Tuyên
Phan Trần Hải Bằng
Lê Đình Tể
Nguyễn Thành Huy
Nguyễn Thành Tài
Đoàn Hải Hưng
Võ Hồ Ngọc
Trần Đình Nam
Nguyễn Ngọc Tâm
Phạm Thành Vinh
Lê Hữu Nghĩa
Phan Minh Tâm
Nguyễn Tam Quyền
Lê Hữu Phước

F.2. List of documents received

1 Project Design Document for JCM project "Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids" (Registration date: 15/08/2018)
2 Approved Methodology "Installation of energy efficient transformers in a power distribution grid, ver1.0"
3 Reference relating to PDD chapter A,B,C
3-1-1 THIBIDI Tender Specifications of Amorphous Transformers (No-load losses/load losses of the project transformers)
3-1-1-A Specifications for EVN Da Nang
3-1-1-B Specifications for EVN CPC
3-1-1-C Specifications for EVN SPC
3-1-1-D Specifications for EVN HCMC
3-1-2 Pre-delivery Inspection Reports of Transformers Installed in the 4 Power Companies
3-1-2-A Specifications for EVN Da Nang
3-1-2-B Specifications for EVN CPC
3-1-2-C Specifications for EVN SPC
3-1-2-D Specifications for EVN HCMC
3-1-3 Lists of Transformers Installed in the 4 companies
3-1-3-A List of transformers installed by EVN Da Nang
3-1-3-B List of transformers installed by EVN CPC
3-1-3-C List of transformers installed by EVN SPC
3-1-3-D List of transformers installed by EVN HCMC
3-1-4 Maps of Transformer Installation Locations
3-1-4-A Maps of EVN Da Nang
3-1-4-B Maps of EVN CPC
3-1-4-C Maps of EVN SPC
3-1-4-D Maps of EVN HCMC
3-2 Event lists of transformers
3-2-1 Event list of EVN Da Nang
3-2-2 Event list of EVN CPC
3-2-3 Event list of SPC
3-2-4 Event list of HCMC
3-3 Acceptant Record of the Operation for each transformer
3-3-1 Documents of EVN Da Nang
3-3-2 Documents of CPC
3-3-3 Documents of SPC
3-3-4 Documents of HCMC
3-4 Reference of "Expected operational lifetime of project

3-4-1 "Guiding Regulations on Management, Use and Depreciation of Fixed Asset" No.:45/2013/TT-BTC Circular, MoF of Viet Nam, April 25,2013
3-4-2 Legal durable years issued by Japan Tax Office
3-6 Standards related to transformers
3-6-1 International Standard IEC 60076-1
3-6-2 Viet Nam Standard TCVN6306-1:2015
4 Reference of "EIA"
4-1 Law on Environmental Protection", No.55/2014/QH13. The National Assembly, June 23, 2014
4-2 Decree 18: "ON ENVIRONMENTAL PROTECTION PLANNING, STRATEGIC ENVIRONMENTAL ASSESSMENT, ENVIRONMENTAL IMPACTASSESSMENT AND ENVIRONMENTAL PROTECTION PLANS", The Government, February 14, 2015
5 Local Stakeholder Consultation
5-1 1) Local stakeholder consultation meeting summary EVN CPC/DNPC (02/08/2017)
5-2 2) Local stakeholder consultation meeting summary EVN SPC/HCPC (03/08/2017)
5-3 3) Invitation letter to EVN CPC (12/07/2017)
5-4 4) Invitation letter to EVN SPC (12/07/2017)
5-5 5) Presentation material "JCM in Viet Nam" by MUMSS, August 2017
5-6 6) Presentation material "JCM Schedule and MRV" by MUMSS, August 2017
5-7 7) List of the Participants for LSC Meetings held on 2/8/2017 & 3/8/2017)
6 Documents_for_NoLoadLoss
7 Emission factor for electricity grid
8 Modalities of communications
8-1 JCM Modalities of Communications Statement Form (Submitted on 7 Feb.2017)
8-2 JCM Modalities of Communications Statement Form ANNEX 1 (Date of Submission :)
8-3 Written confirmation by the PPs (four companies and YUKO-KEISO on 7 Feb.2017)
9 Validation report
10 Verification report
11 Monitoring Report Sheet
11-1 First version of Monitoring Report Sheet (dated 10/12/2021)
11-2 Revised Monitoring Report Sheet (Second version, dated on 2/3/2022)
12 Documents related to monitoring (Prepared by YUKO-KEISO)
12-1 "How to report annual monitoring data of AMDTs?"
12-2 Monitoring Flow
13 Photos_and_videos_of selected_transformers
14 JCM Guidelines for Validation and Verification (JCM_VN_GL_VV_ver01.0)

15 Joint Crediting Mechanism Guidelines for Developing Project Design Document and Monitoring Report (JCM_VN_GL_PDD_MR_ver02.0)
16 JCM Project Cycle Procedure (JCM_VN_PCP_ver4.0)
17 Joint Crediting Mechanism Glossary of Terms (JCM_VN_Glossary_ver01.0)

Annex Certificates or curricula vitae of TPE's verification 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 Competence
for Validation/Verification team

GHG Certification Center
Japan Management Association

Scheme:

The Joint Crediting Mechanism (JCM)

Project Title:

Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids

Validation or Verification:

Verification

Name	Qualification[*1]	Leader/Member/ Technical expert/ Technical Reviewer(TR)	Qualification of Technical area (Renewables)[*2]	JCM scheme competence
Mr. Masao Tomizawa	Validator/ Verifier	Leader	☑	☑
Mr. Motoyuki Matsumoto	Lead Validator/ Verifier	Member	☑	☑
Mr. Masataka Ajiki	Validator/ Verifier	Member	☐	☑
Competence of Verification Team	-	-	☑	☑

[*1]Qualification in accordance with "JMACC's Procedures for Contract and Evaluation of Validators/Verifiers and Technical Experts (GA-110)"

[*2]Competence Requirement in accordance with Competence for Technical area sheet (GA-110-08)

Date 8 Oct. 2021

[redacted]

Kenji Suzuki
Director of Validation & Verification Dept.
GHG Certification Center
Japan Management Association

Certificate of Competence for Technical Review team

GHG Certification Center
Japan Management Association

Scheme:
The Joint Crediting Mechanism (JCM)
Project Title:

Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids

Validation or Verification:
Verification

Name	Qualification[*1]	Leader/Member/ Technical expert/ Technical Reviewer(TR)	Qualification of Technical area (Renewables)[*2]	JCM scheme competence
Mr. Kenji Suzuki	Lead Validator/ Verifier	Technical Reviewer	☑	☑
Competence of Technical Review Team	-	-	☑	☑

[*1]Qualification in accordance with "JMACC's Procedures for Contract and Evaluation of Validators/Verifiers and Technical Experts (GA-110)"
[*2]Competence Requirement in accordance with Competence for Technical area sheet (GA-110-08)

Date 8. Oct. 2021

[redacted]

Kenji Suzuki
Director of Validation & Verification Dept.
GHG Certification Center
Japan Management Association