

JCM Verification Report Form

A. Summary of verification

A.1. General Information


Title of the project	Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Karawang, West Java
Reference number	JCM ID004
Monitoring period	20/12/2014 - 31/05/2016
Date of completion of the monitoring report	01/06/2016
Third-party entity (TPE)	PT Mutuagung Lestari
Project participant contracting the TPE	Nippon Koei Co., Ltd.
Date of completion of this report	19/08/2016

A.2 Conclusion of verification and level of assurance

Overall verification opinion	<input checked="" type="checkbox"/> Positive <input type="checkbox"/> Negative
<input checked="" type="checkbox"/> Unqualified opinion	<p>Based on the process and procedure conducted, <i>PT Mutuagung Lestari</i> (TPE's name) provides reasonable assurance that the emission reductions for <i>Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Karawang, West Java</i> (project name)</p> <ul style="list-style-type: none"> ✓ 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
<p><i>(If overall verification opinion is negative, please check below and state its reasons.)</i></p> <input type="checkbox"/> Qualified Opinion <input type="checkbox"/> Adverse opinion <input type="checkbox"/> Disclaimer	<State the reasons>

A.3. Overview of the verification results

Item	Verification requirements	No CAR or CL remaining
The project implementation with the eligibility criteria of the applied methodology	The TPE determines the conformity of the actual project and its operation with the eligibility criteria of the applied methodology.	<input checked="" type="checkbox"/>
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.	<input checked="" type="checkbox"/>
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.	<input checked="" type="checkbox"/>
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.	<input checked="" type="checkbox"/>
Avoidance of double registration	The TPE determines whether the project is not registered under other international climate mitigation mechanisms.	<input checked="" type="checkbox"/>
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.	<input checked="" type="checkbox"/>

Authorised signatory:	Mr. <input checked="" type="checkbox"/> Ms. <input type="checkbox"/>
Last name: Sidauruk	First name: Ferry
Title: GHG, Energy & HSE Services Division Head	
Specimen signature:	Date: 19/08/2016
	

B. Verification team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. <input checked="" type="checkbox"/> Ms. <input type="checkbox"/>	Ferry Sidauruk	PT Mutuagung Lestari	Lead Verifier	<input checked="" type="checkbox"/>	Yes	<input checked="" type="checkbox"/>
Mr. <input checked="" type="checkbox"/> Ms. <input type="checkbox"/>	Abdul Rahman	PT Mutuagung Lestari	Verification Member	<input checked="" type="checkbox"/>	Yes	<input checked="" type="checkbox"/>
Mr. <input checked="" type="checkbox"/> Ms. <input type="checkbox"/>	Taiki Otono	PT Mutuagung Lestari	Technical Expert	<input checked="" type="checkbox"/>		<input type="checkbox"/>
Mr. <input checked="" type="checkbox"/> Ms. <input type="checkbox"/>	Tony Arifiarachman	PT Mutuagung Lestari	Internal Reviewer	<input checked="" type="checkbox"/>		<input type="checkbox"/>

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>

Based on the information obtained from the Project Participants, the JCM's verification activity in PT Nikawa Textile Industry was conducted for the first time on this verification. It means, there was not any verification report previously produced for this JCM's project. According to the registered/validated PDD, the project chiller was operated since 20/12/2014. The validation of the project chiller was conducted by one of the JCM's TPEs, PT Mutuagung Lestari (Indonesia). The validation report for the JCM's project was completed on 28/01/2016. Verification Team assesses during the on-site visit, whether all physical features of the project were in place and that the project participants have operated the project as per the eligibility criteria of the applied methodology of JCM_ID_AM002_ver02.0.

Verification Team justifies their decision on this report, is based on the assessments through on-site visit and document review methods in accordance with JCM's guidelines.

Verification Team confirms that, the eligibility criteria of the applied methodology have complied to the project implementation and operation conducted by the Project Participants.

The project which applied the methodology has satisfied all of the following criteria:

Criterion 1. Project chiller is a centrifugal chiller with a capacity of less than 1,250 USRt.

* 1 USRt = 3.52 kW.

The Verification Team has verified that, project chiller (Ebara high efficiency centrifugal chiller: RTBF 050) is a centrifugal chiller with a capacity of 499 USRt.

Criterion 2. COP for project chiller i calculated under the standardizing temperature conditions* ($COP_{PJ,tc,i}$) is more than 6.0. $COP_{PJ,tc,i}$ is a recalculation of COP of project chiller i ($COP_{PJ,i}$) adjusting temperature conditions from the project specific condition to the standardizing conditions. $COP_{PJ,i}$ is derived in specifications prepared for the quotation or factory acceptance test data at the time of shipment by manufacturer.

The Verification Team has verified that, the COP for project chiller ($COP_{PJ,tc,i}$) which is introduced to the proposed project is 6.25.

Criterion 3. Periodical check is planned more than four (4) times annually.

The Verification Team has verified that, ERS and PT Ebara Indonesia (PTEI, subsidiary of the ERS which is a chiller manufacturer) conduct at least one direct periodical check per year by PTEI and remote periodical checks every month by the remote monitoring system by ERS.

This remote monitoring system automatically detects the potential error every hour and reports any abnormal condition of chiller to ERS immediately. This periodical check procedure both by direct and remote method is more frequent, effective and better than five times of periodical checks stipulated in the methodology (ID_AM002).

Criterion 4. Ozone Depletion Potential (ODP) of the refrigerant used for project chiller is zero.

The Verification Team has verified, based on document of specification of the refrigerant for the project chiller HFC 245fa, whose ODP is zero.

Criterion 5. Plan for not releasing refrigerant used for project chiller is prepared. In the case of replacing the existing chiller with the project chiller, refrigerant used for the existing chiller is not released to the air.

The Verification Team has verified the letter of consent on not releasing refrigerant used for the project chiller issued by PT Nikawa Textile Industry dated 10 August 2015. This project aims at introduction of a new chiller, thus replacement of existing chiller is not considered.

<Findings>

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

No issue was identified to the requirement.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Verification Team concludes based on the on-site visit and document review methods, the eligibility criteria which are stipulated in the applied methodology of implemented project in PT Nikawa Textile Industry are satisfied.

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

<Means of verification>

Verification Team assesses, by means of on-site visit at the project site of PT Nikawa Textile Industry, whether all physical features of the project in the registered/validated PDD are in place and that the project participants have operated the project as per the registered/validated PDD or any approved revised PDD.

The project implementation was checked whether has satisfied the approved revised PDD version 01.0 dated 19/02/2016. During assessing the verification trail, Verification Team addressed that there was lack of data and signature of responsible staffs in the data sheet of monitoring period.

<Findings>

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

CL 01

Nature of the issue raised:

In the form Monitoring Structure Sheet which is attachment to the Project Design Document, it is described the role of responsible personnel in the plant, such as follows:

- Plant Manager: Responsible for project planning, implementation, monitoring results and reporting
- Supervisor: Appointed to be in charge of confirming the archived data that are manually recorded / collected and provided by auto data collection system (the system) after being checked and corrected when necessary. Also, appointed to be in charge of monitoring procedure (data collection/storage and data sharing with manufacturer), including monitoring

equipment and calibrations, and training of monitoring.

- Chiller Operator: Appointed to be in charge of manual data recording and direct checking of the archived data for irregularity and lack, in order for cross checking of data collected by the system.

Verification Team found there was no authorization in the plant's operation daily report from responsible personnel (e.g. Chiller Operator, Supervisor, nor Plant Manager) of the utilization department. The authorization on the daily report should inform whose prepare, check, and approve those reports. The PPs are requested to provide work instruction related to this matter, and put the work instruction document on the project chiller location, so that responsible staff and operator may see and understand the proper data record process.

Nature of responses provided by the Project Participants:

The work instruction for proper data record process was prepared and put near the project chillier as indicated in "Re_CL01_Electric_Energy_Meter_Recording".

The format of log sheet was modified for the signature of the chiller operators, the utility staff, and the supervisor. The modified sheet and started record with new sheet is shown in "Re_CL01_Operator_Record_with_Sign".

Assessment of the responses:

The Verification Team confirmed, based on review of the document provided by the Project Participants the reports asked to be revised already been modified accordingly. The Project Participants have informed that the work instruction document has been prepared and put in the location of the project chiller where operation staff and operator may see and understand the proper data record process. Those reports and supporting information sent and acknowledged to Verification Team are considered to be accepted as accurate and proper. Thus, CL 01 is closed.

CL 02

Nature of the issue raised:

In the PDD Section B Application of an approved methodology(ies) of Criterion 3 it is stated that, ERS and PT Ebara Indonesia (PTEI, subsidiary of the ERS which is a chiller manufacturer) agreed to conduct at least one direct periodical check per year by PTEI and remote periodical checks every month by the remote monitoring system by ERS. This remote monitoring system automatically detects the potential error every hour and reports any abnormal condition of chiller to ERS immediately. This periodical check procedure both by

direct and remote method is more frequent, effective and better than “more than four (4) times” of periodical checks stipulated in the methodology (ID_AM002_ver2.0).

The Verification Team found in the document “Procedure of Periodical Check and Remote Check for PT Nikawa Textile Industry” provided by the Project Participants, there was no clear description of PTEI roles described in the flow chart nor in the procedure description.

Nature of responses provided by the Project Participants:

The role of PTEI is that technical staff of PTEI is to be dispatched when Ebara remote monitoring centre judges that necessary service or repair is necessary. This is indicated in revised periodical check procedure, “CL02_B-6 Periodical Check Procedure_v2”.

Assessment of the responses:

Verification Team confirmed, based on review of the document supplied by the Project Participants the document that was asked to change, already been modified accordingly. Project Participants have revised the periodical check procedure where role of PT Ebara Indonesia (PTEI) has been clear described on the document. Furthermore, the Project Participants also informed, that the revised procedure has been approved by Ebara Refrigeration System, Co. Ltd. in Japan to be implemented in the operation site of PT Nikawa Textile Industry. The revised procedure and supporting information sent and acknowledged to Verification Team are considered to be accepted as accurate and proper. Thus, CL 02 is closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Verification Team concludes, based on the document review and on-site visit methods, that the monitoring period of the JCM project in PT Nikawa Textile Industry as reported by the Project Participants, there are no changes from the registered or validated PDD or any approved revised PDD.

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

<Means of verification>

Verification Team assessed, whether monitoring of parameters related to the GHG emissions reductions of a project has been conducted by measuring equipments (monitoring Option C defined in the PDD and Monitoring Guidelines). Then, Verification Team determined 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.

<Findings>

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

No issue was identified to the requirements.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Based on the document review and on-site interview to the Project Participants, Verification Team concludes, that all parameters in the Monitoring Report Sheet (power consumption of project chiller, electricity imported from the grid to the project site) during the project period, have been monitored by measuring equipment. It is also concluded by Verification Team that the calibration of the measuring equipment is properly conducted in line with the monitoring plan and all the measured values are appropriately calculated, in line with the PDD and Monitoring Guidelines.

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

<Means of verification>

Verification Team assesses the data and calculations of GHG emission reductions achieved by/resulting from the project chiller by the application of the approved methodology of JCM_ID_AM_002_ver02.0, with title "Energy Saving by Introduction of High Efficiency Centrifugal Chiller, Version 2.0".

When verifying the reported emission reductions, Verification Team confirmed that there was an audit trail which contains the evidence and records that validate the stated values in the Monitoring Report Sheet. It included the source documents that form the basis for calculations and other information underlying the emission reductions.

Parameters	Monitored values	Method to check values in the monitoring report with sources
EC_PJ,i,p	2,586 MWh/p	<p>Data is measured by measuring equipments in the factory.</p> <p>- Specification of measuring equipments:</p> <ol style="list-style-type: none"> 1) Electrical power meter is applied for measurement of electrical power consumption of project chiller. 2) Meter is certified in compliance with national/international standards on electrical power meter.

		<p>- Measuring and recording:</p> <p>1) Measured data is automatically sent to a server where data is recorded and stored. Measured data is manually recorded by responsible staff for calculation of emission reduction.</p> <p>2) Recorded data is checked its integrity once a month by responsible staff.</p> <p>The accuracy level of electric meter is $\pm 0.5\%$.</p> <p>The data monitored and required for verification and issuance will be kept and archived electronically for two years after the final issuance of credits.</p> <p>- Calibration :</p> <p>Calibration was conducted by the Manufacturer at the time of Manufacturer's inspection. Next calibration is required after 10 years.</p>
EI_grid,p	71,804 MWh/p	<p>[for Option B]</p> <p>Data is collected and recorded from invoices from the power company.</p>
h_gen,p	0 hours/p	Data is measured by meter equipped to a generator.

<Findings>

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

CAR 01

Nature of the issue raised:

In the registered Approved Methodology No. 002 ver.2.0 (Section G. Calculation of project emissions), the calculation of project emissions during the period p [$t_{CO2/p}$] is resulted from the power consumption of project chiller i during the period p [MWh/p] multiplied by CO2 emission factor for consumed electricity [$t_{CO2/MWh}$]. Furthermore, on Section H it stated that the emissions reduction is resulted from reference emissions subtracted by project emissions. Based on these formulas, it is concluded that accuracy data record of power consumption of the project chiller is very crucial in order to ensure the calculation of project emissions during the period p are valid and accurate.

In the plant's monthly report of PT Nikawa Textile Industry, e.g. power consumption for the project chiller (coded Factory #2), Verification Team found miss-typing of data record. On the plant's monthly report (Record kWh PT Nikawa Textile Industry of Chiller Turbo 240 kW) of electricity power consumption for the project chiller (coded Factory #2), there were some issues

in the report, such as follows:

- On the report period of 02-10 February 2015, Verification Team found that electricity power consumption of project chiller was same as of 319,451 kWh. But there were not available any remark on the report, indicating causes or reason of the data input. Moreover, it was happened the same case on the report period of 15-24 July 2015, where the power consumption was same as of 86,902 kWh.
- On the report period of 27-30 June 2015, Verification Team found that electricity power consumption were input improperly, e.g. respectively: 4,528 kWh; 9,745 kWh; 14,929 kWh; and 20,133 kWh. While on the report period of 01-26 June 2015 the data of the electricity power consumption, were 875,234 kWh (as of 01 June 2015) up to 999,474 kWh (as of 26 June 2015). Since numbers of electricity power consumption on the report were presented in cumulative, then numbers of electricity power consumption report period of 27-30 June 2015 should be higher than numbers of the electricity power consumption on the report period of 10-26 June 2015.

Nature of responses provided by the Project Participants:

The reason for continuing same energy consumption data in 2-10 February 2015 and 15-24 July 2015 was due to overhaul of independent system and the project chiller was not operated during those period. Remarks are added in the record sheet "Re_CAR01_kwh turbo chiller". The value in the monitor of the electric meter is reset when the accumulated consumption becomes 1,000,000 kWh. Thus, the record in June 27 should be 1,004,528 kWh, not 4,528 kWh. The data record is modified accordingly in the file "Re_CAR01_kwh turbo chiller".

Assessment of the responses:

Verification Team confirms, based on review of the documents supplied by the Project Participants that all reports asked to be revised already been modified accordingly.

On the plant's monthly report (Record kWh PT Nikawa Textile Industry of Chiller Turbo 240 kW) of electricity power consumption for the project chillers (coded Factory #2), the Verification Team has modified the report as follows:

- There are updated information for both report periods of 02-10 February and 15-24 July 2015, where reason on electricity power consumption of project chiller were same for those period, were due to overhaul of independent system thus the project chiller was not operated during those periods.
- The modification has been made on the report period of 27-30 June 2015, where electricity power consumption were modified become respectively: 1,004,528 kWh; 1,009,745 kWh; 1,004,929 kWh; and 1,020, 133 kWh.

Those reports and supporting information sent to Verification Team are appropriate and accurate as communicated by the Project Participants. Thus, CAR 01 is closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Based on verification result, Verification Teams concludes some points, as follows:

- (a) It can be concluded that Project Participants have used the appropriate Monitoring Report Sheet of the applied methodology;
- (b) It can be concluded that a set of data provided by the Project Participants for the monitoring period of 2014/12/20 - 2015/7/31 was complete, and data are available;
- (c) Verification Team assures reported data by Project Participants through document review and interview during the on-site visit at project site factory have been justified;
- (d) Verification Team assures all assumptions, emission factors, default values, and other reference values that were applied in the calculations have been justified.

C.5. Assessment of avoidance of double registration

<Means of verification>

The PPs state in the MoC section 7 of Declaration of avoidance of double registration that, the PPs ensure the proposed JCM project will not result double registration in other climate mitigation mechanisms, which then avoids double counting of GHG emission reductions by the project. In addition, it is declared by the PPs in the MoC if the proposed JCM project is registered under the JCM, the same project will not be registered under other international climate mitigation mechanisms, and vice versa.

Verification Team received a written confirmation from the PPs on 19/07/2016, a document of Modalities of Communication (MoC). The MoC document was signed by authorised representative of the PPs on 21/08/2015.

In addition, Verification Team has conducted a search on the website of the CDM and JI on 26/07/2016, to check whether the projects with similar technology and location in the Republic of Indonesia have been registered. Verification Team confirms that, projects with similar technology and location are not found. Verification Team ensures, through document review and/or interviews with the project participants on whether the project differs from projects registered under other international climate mitigation mechanisms.

<Findings>

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

No issue was identified to the requirement.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The Verification Team concludes, based on the document review and information searching from CDM's and JI's websites, that the project "Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Karawang, West Java" is not registered under other international climate mitigation mechanisms.

C.6. Post registration changes

<Means of verification>

Verification Team confirms, through documents review, that there are no post registration changes from the registered/validated PDD and/or methodology which prevent the use of the applied methodology.

<Findings>

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

No issue was identified to the requirement.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

Verification Team concludes that the project "Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Karawang, West Java" has not been changed from the registered/validated PDD and/or methodology, meaning the project would not prevent the use of the applied methodology.

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

No remaining issues appropriate, including FARs from the validation and/or previous verification period.

E. Verified amount of emission reductions achieved

Year	Verified Emissions (tCO ₂ e)	Reference Emissions (tCO ₂ e)	Verified Project Emissions (tCO ₂ e)	Verified Emission Reductions (tCO ₂ e)
2013				
2014		57.24	51.20	6
2015		1,571.94	1,405.95	165
2016		799.65	715.20	84
2017				
2018				
2019				
2020				
Total (tCO ₂ e)		2,428.83	2,172.35	255

F. List of interviewees and documents received**F.1. List of interviewees**

1. Nippon Koei Co. Ltd., Japan
 - Ms. Yuka Nakagawa (Associate Senior Staff)
 - Mr. SAITO Tetsuya (Associate Senior Staff)
2. PT. Nikawa Textile Industry
 - Mr. Yasuhito Ohmichi (Director, Production)
 - Mr. Rahmat Jaelani (Ass. Manager, Utility Department)
3. PT. Ebara Indonesia
 - Mr. Masahiko Kosho (Manager, Sales - Chiller, Cooling Tower & Pump)

F.2. List of documents received

1. JCM Project Design Document Form Version 2.0 dated 19/02/2016
2. JCM_ID_AM002_ver02.0 Energy Saving by Introduction of High Efficiency Centrifugal Chiller
3. Monitoring Plan Sheet and Monitoring Report Sheet: JCM_ID_AM002_ver02.0
4. JCM Validation Report of "Energy Saving for Air-Conditioning High Efficiency Centrifugal

Chiller to a Textile Factory in Karawang, West Java (JCM ID-004)

5. JCM Modalities of Communication Statement Form of related project.
6. Emission factors for electric power for Jawa-Madura-Bali (Jamali) interconnection systems in 2014 (source: Indonesia JCM Secretariat website, accessed on 20 July 2016)
7. Set of documents of sample invoices from PT. Perusahaan Listrik Negara (Persero)
8. Monitoring Procedure Ebara RTBF Centrifugal Chiller
9. Procedures for checking and maintenance of chillers prepared by ERS Co., Ltd.
10. Organizational structure of the Utility Department of Nikawa
11. Report of Job Completion Commissioning New Turbo Chiller Type RTBF 050 dated 28 November 28, 2014 by PTEI
12. Operation and maintenance manual Ebara RTBF Centrifugal Chiller
13. Weekly report commissioning turbo chiller RTBF050
14. Electricity Energy Data Records of Nikawa
15. JCM Guidelines for Validation and Verification JCM_ID_GL_VV_ver01.0
16. Specification data sheet issued by ERS Co., Ltd.
17. Procedure of site thermal insulation for RTBF centrifugal chiller unit
18. Procedure of the 2nd site wiring construction
19. Operation chiller spinning 3 (economic analysis of chiller replacement)
20. Estimation of annual operation hours
21. Operation manual of refrigerant recovery equipment
22. NR_E8-1_Meter_Test_Certificate and PR_E8-1_Nikawa_Meter_Test_Certificate
23. PR_F12-1_Chiller_energy_consumption_record
24. Daily Log Book report of the electric energy meter of Utility Departement of Nikawa
25. Montly report of the electricity power consumption of Utility Departement of Nikawa
26. Maintenance report of the centrifugal chiller of Utility Department of Nikawa
27. Letter of Consent of Periodical Check and Use of Refrigerant by ERS.
28. Supporting information for calibration of the meter by Nippon Koei Co, Ltd.
29. Work Instruction for Electric Meter Record of JCM Turbo Chiller
30. Other supporting information related to the project.

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.