

Overview of Measuring-Reporting-Verification activities of the JCM program

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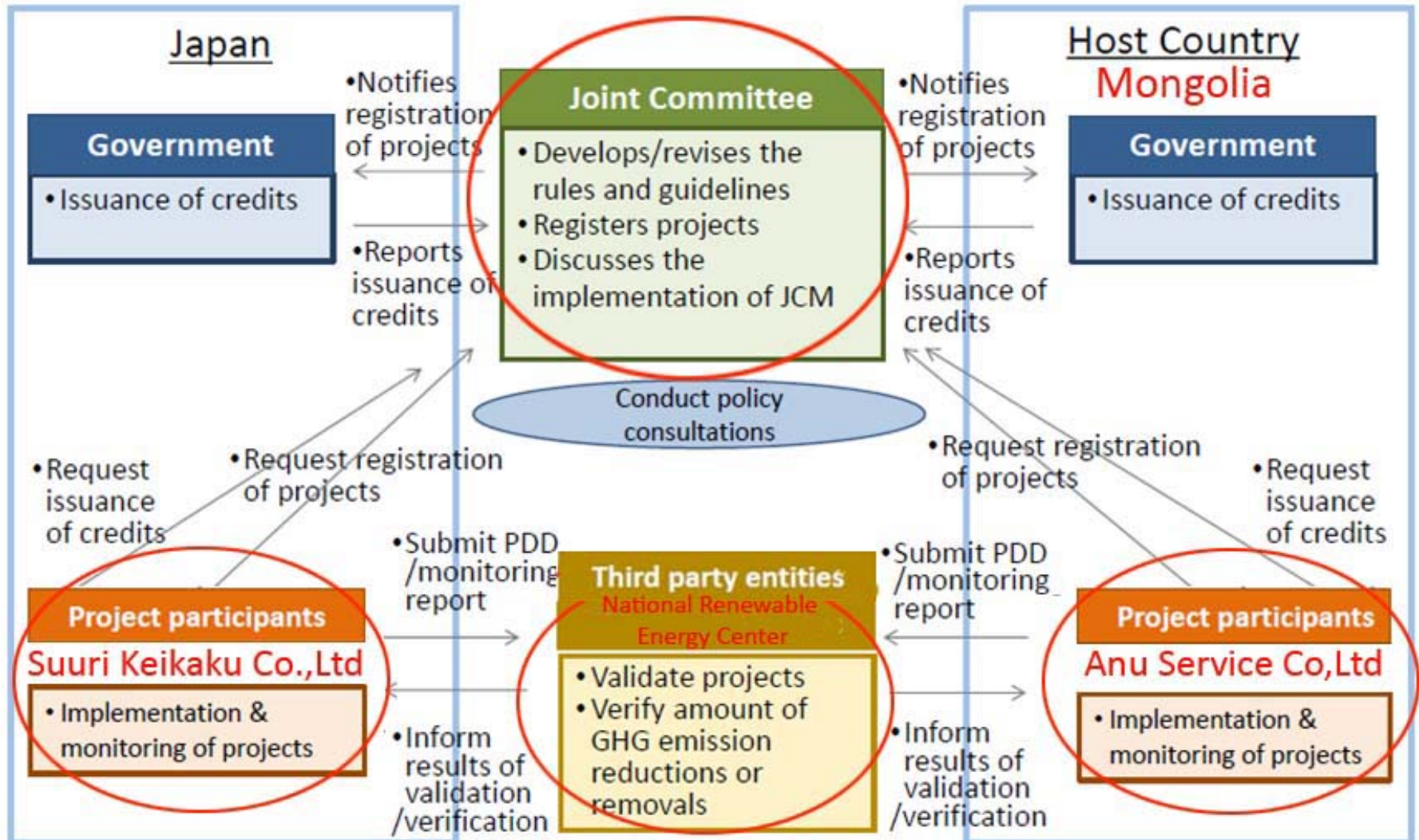
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1. Governance Scheme of the JCM

Main players



Reference: "Recent Development of the Joint Crediting Mechanism (JCM)" Japanese Government, 2014,

2.TPE and their roles and responsibilities in the carbon asset development process

Roles;

- (a) On the basis of requests from project participants, validates the project as described in a PDD prepared by the project participants, in line with the guidelines for the validation as developed by the Joint Committee, and informs the validation result to the project participants;
- (b) On the basis of requests from project participants, verifies GHG emission reductions or removals achieved by the JCM project as described in the monitoring report prepared by the project participants, in line with the guidelines for the verification of GHG emission reductions or removals as developed by the Joint Committee, records the verification result in a verification report and sends the report to the project participants (RoI para.18). - Joint Crediting Mechanism Glossary of Terms

JCM_MN_Glossary_ver01.0

Development of
Methodology

Project Design

Validation

Registration

Monitoring

Verification

Issuance of
Credit

2.TPE and their roles and responsibilities in the carbon asset development process

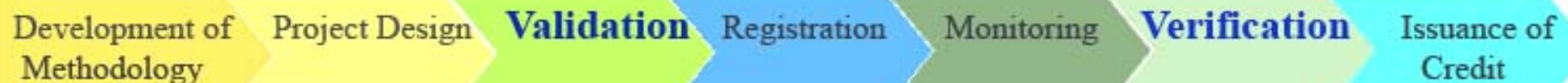
Responsibilities;

Third-party entity should be designated by the Joint Committee. Candidate entities are either;

- Accredited under ISO 14065 by an Accreditation body that is a member the IAF and / or PAC,
- Designated Operational Entity accredited by the EB of the CDM

Requirements;

1. Sufficient knowledge of the JCM,
2. Completing an objective assessment based on evidence,
4. Conformity with requirements of the standards (ISO 14064, ISO 14065, ISO 14066) ,
5. Principles to demonstrate (ISO 14065),
 - Impartiality
 - Competence
 - Factual approach to decision making
 - Openness
 - Confidentiality



3. Project Cycle of the JCM

<Main actors at each process>

Can be conducted by the same TPE
Can be conducted simultaneously



4. Introduction to GHG Measurement, Reporting and Verification (MRV)

Understanding, definition

1. GHG emissions reductions – shall be implemented in a “measurable, reportable and verifiable” manner - Basic understanding of the Bali Action Plan UNFCCC (UNFCCC, 2007), Indonesia
2. MRV is a concept that integrates three independent processes:
 - Measuring or Monitoring (M),
 - Reporting (R) and
 - Verification (V).
3. MRV is a general term describing the process of measuring and collecting data on greenhouse gas (GHG) emissions or mitigation actions, compiling and reporting this information to a respective program, and then subjecting this reported data to a third-party review and verification.



4. Introduction to GHG Measurement, Reporting and Verification (MRV)

4. Monitoring activity of the JCM project carried out after Approval of the Methodology and PDD, registration of the Project.

Monitoring is executed by measuring data/parameters. Measurement is an operational function, while monitoring is a management function.

5. Monitoring steps :

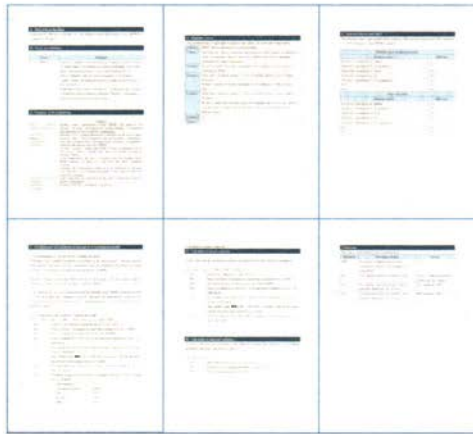
- Establishment of Monitoring plan (MP)
- Approval of MP (Validation)
- Monitoring Activities in accordance with MP
- Preparation of Monitoring Report based on monitoring results

5.JCM Methodology

JCM Methodology consists of:

- Approved Methodology Document
- Monitoring Spreadsheets
 - Monitoring Plan sheet (Includes Input sheet & Calculation sheet)
 - Monitoring Structure sheet
 - Monitoring Report sheet

Approved Methodology Document



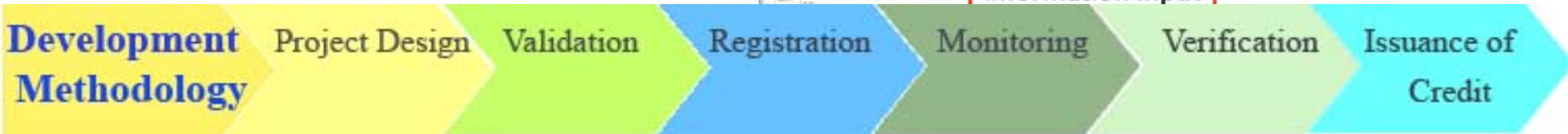
Monitoring Spreadsheet

Monitoring Report Sheet

Monitoring Structure Sheet

Monitoring Plan Sheet

Cells for data & information input



6.Measuring & Reporting

Measuring or Monitoring

Data collection and calculation of emission reductions would be conducted according to the Monitoring Plan, that includes:

- Description of data or parameter
- Monitoring period
- Measuring point.
- Monitored values
- Monitoring option,
- Source of data
- Measuring method-equipment; measuring frequency, related standards,
- Monitoring procedures-(Recording medium, frequency, back up method, QA/QC procedures; such as calibration and verification of measuring equipment
- Trouble shooting procedure of missing data
- Monitoring structure

GHG Emission reductions for the Monitoring period should be calculated by using the parameters monitored ex-post and parameters fixed ex-ante.

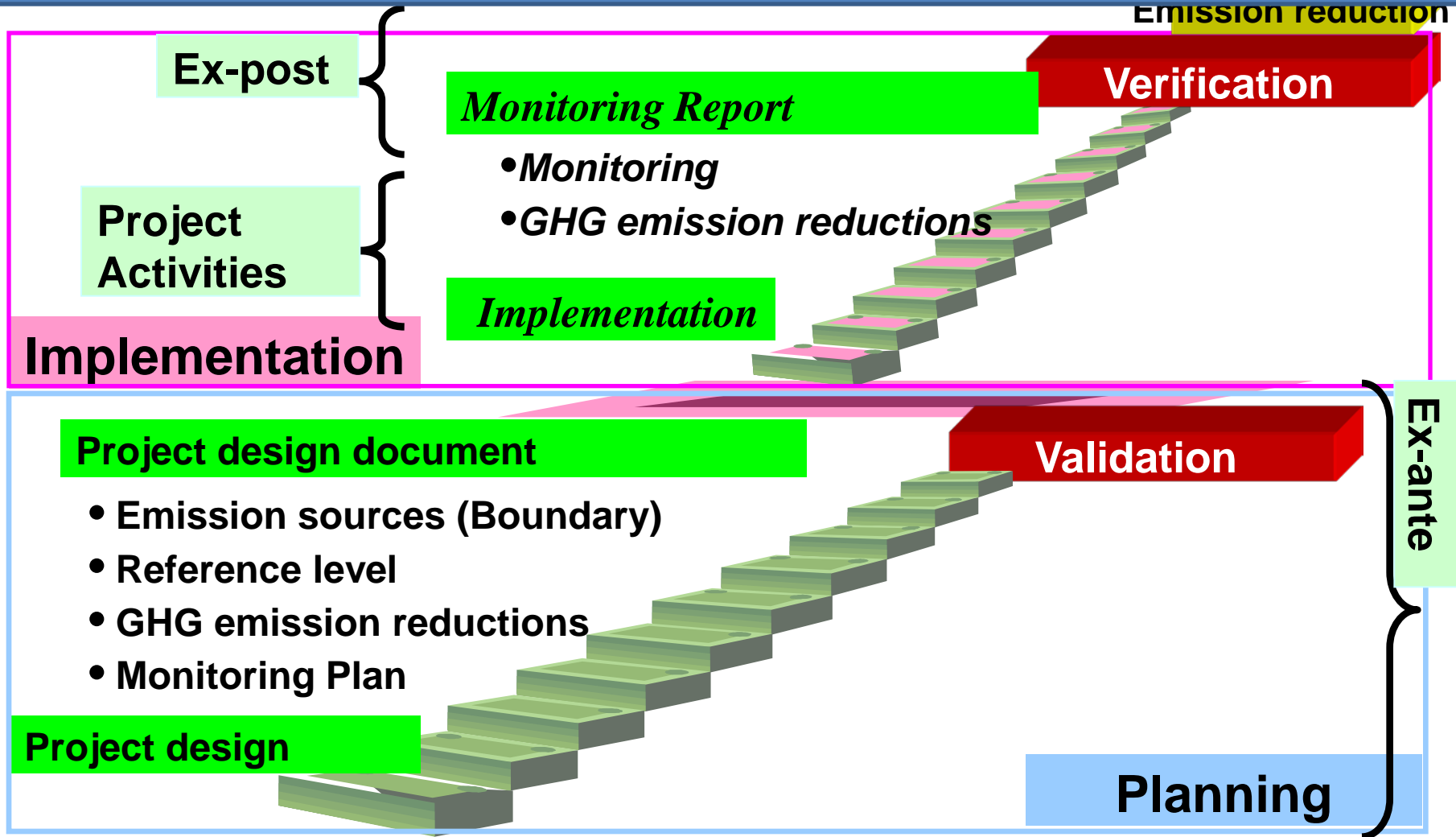
Reporting

- **Monitoring Report should be prepared by filling cells for data input (ex-post) in the Monitoring Report Sheet with monitored values, calculated values**
- Supporting documents should be prepared as the evidence for stated values in the cells for data input
- Other necessary information on monitored parameters are:
 - Monitoring options,
 - Source of data,
 - Measurement methods and procedures, Monitoring frequency

Monitoring and Reporting of the JCM project is conducted in line with “ JCM Project Cycle Procedure”



7. Introduction to the validation and verification process



6. Measuring & Reporting

Monitoring Plan

Monitoring Spreadsheet: JCM_MN_AM002_ver01.0
Sectoral scope: 01

Monitoring Plan Input Sheet [Attachment to Project Design Document]

(a) Monitoring point No.	(b) Parameters	(c) Description of data	(d) Estimated Values	(e) Units	(f) Monitoring option	(g) Source of data	(h) Measurement methods and procedures	(i) Monitoring frequency	(j) Other comments
1	PH _p	Net heat quantity supplied by the project HOB during the period p.				Logged data of net heat	PH _p (Net heat quantity) is measured by the heatmeter. The method of the installation and operational monitoring regarding the heatmeter meets the Mongolian National Standard (MNS). This Standard is "MNS 6241.2011". This Standard name is "Heatmeters. General requirements for the installation, commissioning, operational monitoring and maintenance". Accepted uncertainty is ±5% according to "MNS 4549.2005". This standard name is "Calculator of heatmeter. The method and means of verification". Since the heat meter with the verification (official quality approval) is used, the heat meter shall be verified before the verification validity of the heat meter expire. The verification period of the heat meter is 4 years according to "List of Measuring instruments subject to mandatory verification", approved by the order #A384, of 2014/12/03 of the Chairman of the "Mongolian Agency for Standardization and Metrology".	Measuring frequency: Continuous	Trouble shooting procedure of missing data: Completed by the hourly minimum value

Monitoring Spreadsheet: JCM_MN_AM002_ver01.0
Sectoral scope: 01

Monitoring Report

Monitoring Report Input Sheet [For Verification]

Table 1: Parameters monitored ex post

(a) Monitoring period	(b) Monitoring point No.	(c) Parameters	(d) Description of data	(e) Monitored Values	(f) Units	(g) Monitoring option	(h) Source of data	(i) Measurement methods and procedures	(j) Monitoring frequency	(k) Other comments
21/9/2015 - 15/5/2016	1	PH _p	Net heat quantity supplied by the project HOB during the period p.	3,112	GJ/p	Option C	Logged data of net heat quantity supplied by the project HOB	Measurement methods which are using a heatmeter meet the industrial standards (host country or international standard). Monitoring data is the amount of heat supplied from the project HOB. This monitoring data is recorded in the data logger that is built into the heat meter. Electric data recorded on the data logger is input to the spreadsheet properly. In these monitoring activities, QA/QC be implemented. - In the case that heatmeter with verification is used, the verification validity for the heatmeter does not expire till the last date of the monitoring period. - If the heatmeter with the verification is not required in the industrial standard, uncertainty of the calibration data of the monitoring equipment meet the following conditions: - It is within accepted level of the verification. - It is within the accuracy level of industry standard requires. Required calibration frequency is the frequency which can be confirmed to be within the accuracy level of the requirement of industrial standard.	Measuring frequency: Continuously Recording frequency: Hourly	Trouble shooting procedure of missing data: Completed by the hourly minimum value (excluding abnormal value) of available recorded data during the monitoring period.
21/9/2015 - 15/5/2016	2	HMP _p	Total hours of the project HOB operation during the period p	11,424	hours/p	Option C	Identified by monitoring period	Total time from the start time of monitoring to the end time of monitoring	---	---

Monitoring period

Cells for data input

Table 2: Project-specific parameters to be fixed ex ante

(a) Parameters	(b) Description of data
RPC _{p,HOB}	Rated power consumption of the project HOB
EF _{CO2,grid}	CO ₂ emission factor of the grid electricity consumed by the project HOB

Table 3: Ex-ante estimation of CO₂ emission reductions

CO ₂ emission reductions	Units
92	ICO ₂ /p

Monitoring option

- Option A Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)
- Option B Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)
- Option C Based on the actual measurement using measuring equipments (Data used: measured values)

Table 2: Project-specific parameters fixed ex ante

(a) Parameters	(b) Description of data	(c) Estimated Values	(d) Units	(e) Source of data	(f) Other comments
RPC _{p,HOB}	Rated power consumption of the project HOB	1	kW	Catalog value provided by the manufacturer of the project HOB	
EF _{CO2,grid}	CO ₂ emission factor of the grid electricity consumed by the project HOB	1.1030	ICO ₂ /MWh	The most recent value available at the time of validation is applied and fixed for the monitoring period thereafter. The data is sourced from CDM Mongolia unless otherwise instructed by the Joint Committee.	

Table 3: Ex-post calculation of CO₂ emission reductions

Monitoring Period	CO ₂ emission reductions	Units
21/9/2015 - 15/5/2016	50	ICO ₂ /p

Calculated Emission Reductions

Monitoring option

- Option A Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)
- Option B Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)
- Option C Based on the actual measurement using measuring equipments (Data used: measured values)

7.Introduction to the validation and verification process

Validation is the process of independent evaluation of a proposed JCM project by a third-party entity against the validation guidelines as developed by the Joint Committee on the basis of the PDD (RoI para.24).

Validation steps:

- Receiving of the application for Validation service and Contracting
- Execution of agreement
- **Assignment of team member**
- Assessment of PDD
- Assessment of Monitoring Plan
- Preparation of draft Validation Report
- Technical Review
- Authorization of Validation Report

Validation means:

- Document review
- On-site assessment

Validation Report

- JCM Validation Report Form- JCM_MN_F_Val_Rep_ver01.0

Validation activity conducted in line with “ JCM Guidelines for Validation and Verification”



7.Introduction to the validation and verification process

Verification is the periodic independent review and ex post determination by a third-party entity of the monitored GHG emissions reductions or removals as a result of a registered JCM project during the verification period (RoI para.31).

Verification steps:

- Receiving of the application for verification service and Contracting
- Execution of agreement
- Assignment of team member
- Assessment of monitoring Plan
- Assessment of Monitoring report
- Preparation of draft Verification Report
- Technical Review
- Authorization of Verification Report

Verification means:

- Document review
- On-site assessment
- Data auditing

Verification report:

Verification activity conducted in line with “ JCM Guidelines for Validation and Verification”



8. National Renewable Energy Center's activities- as TPE of JCM

- 2012- Implementation of the MRV model project “Replacement of Coal-fired Boilers by Geo-Thermal Heat pump for Heating”
- 2012- Implementation of MRV model project “Upgrading and Installation of High – Efficient Heat only Boilers”
- 2014 – Accredited as Validation and Verification Entity under ISO 14065, by the Mongolian Agency for Standardization and Metrology,
- 2015- Designated as TPE by the JC of JCM
- 2015 -Validation service of the JCM project “Centralization of heat supply system by installation of high-efficiency heat only boilers in Bornuur soum” -2015
- 2015- Validation service of the JCM project “Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City “

9. JCM Project MN001- "Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City"

Monitoring Plan:

Measuring equipment:

Heat meter Multical 602C

Parameters to be monitored:

1. Net heat quantity supplied by the Project HOB during the monitoring period
2. Total operation hours of the project HOB

Measuring method: Data is recorded in the data logger that is built into the heat meter. Electric data recorded on the data logger is input to the spreadsheet properly. The Measuring Frequency is continuous. The monitoring data is recorded hourly and collected daily. The backup method is the daily back-up in the computer and monthly back-up in the CD.

- **Project Participants:** Anu Service Co.,Ltd, Mongolia and Suuri- Keikaku Co.,Ltd Japan
- **Project Location:** The 118th school in Ulaanbaatar city is located in 8 Khoroo, Khan-Uul District. This school opened relatively new, in 2009. Khan-Uul District of Ulaanbaatar City is the outside of the service area of the heat supply from the thermal power plants. Therefore, HOB is a necessary heating service for schools and kindergartens....
- **GHG emission reduction measures :** This project involves the installation of new HOB for hot water supply system and the replacement of existing coal-fired HOB. The boiler efficiency of the reference HOB is typically lower than that of the project HOB. Therefore, the project activity leads to the reduction of coal consumption, resulting in lower emission of GHGs as well as air pollutants.
- **Applied Methodology:** MN_AM002 "Replacement and Installation of High Efficiency Heat Only Boiler (HOB) for Hot Water Supply Systems"



10.Validation

MN001- "Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City"

Assessment and conclusion items.

A.3. Overview of final validation conclusion

Item	Validation requirements
1	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.
2	Project description The description of the proposed JCM project in the PDD is accurate, complete, and provides comprehension of the proposed JCM project.
3	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.
4	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 <i>ex ante</i> listed in the Monitoring Plan Sheet are appropriate, if applicable.
5	Environmental impact assessment The project participants conducted an environmental impact assessment, if required by Mongolia, in line with Mongolia's procedures.
6	Local stakeholder consultation The project participants have completed a local stakeholder consultation process and that due steps were taken to engage stakeholders and solicit comments for the proposed project.

7	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.
8	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.
9	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.
10	Avoidance of double registration	The proposed JCM project is not registered under other international climate mitigation mechanisms.
11	Start of operation	The start of the operating date of the proposed JCM project does not predate January 1, 2013.



11.Verification

MN001- "Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City"

Assessment and conclusion items

A.3. Overview of the verification results

	Item	Verification requirements	No CAR or CL remaining
1	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"/>
2	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"/>
3	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"/>
4	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"/>
5	Avoidance of double registration	The TPE determines whether the project is not registered under other international climate mitigation mechanisms.	<input checked="" type="checkbox"/>
6	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"/>

Reported features and values:

Measuring equipment:

Heat meter Multical 602C

Monitored parameter:

- 3.112 GJ/p -Net heat quantity supplied by the Project HOB during the monitoring period
- 11.424 hrs- Total operation hours of the Project HOB

Monitoring period : 21/09/2015- 15/5/2016

GHG emission reductions: 50tCO₂/p

Guideline:

Joint Crediting Mechanism Guidelines for Validation and Verification JCM_MN_GL_VV_ver01.0



11.Verification

MN001- "Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City"

On-site Assessment



12.References

- Recent Development of the Joint Crediting Mechanism (JCM), Government of Japan, January 2014
- Joint Crediting Mechanism Glossary of Terms - JCM_MN_Glossary_ver01.0
- Joint Crediting Mechanism Guidelines for Validation and Verification JCM_MN_GL_VV_ver01.0
- Greenhouse Gas Measurement, Reporting And Verification (Mrv), www.IETA.org , 2015
- BOSM Capacity Building Activities, S.Yamamoto, J.Takata, JQA organization, 2012
- PDD of the JCM project MN001- "Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City", Suuri-Keikaku Co.,Ltd, 2015
- Validation Report of the JCM project MN001-"Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City", NREC, 2015
- Verification Report of the JCM project MN001-"Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City", NREC, 2016

Thank you