

Joint Crediting Mechanism Project Design Document Form

Note: This JCM Project Design Document (PDD) is drafted as the result of the GEC's JCM Feasibility Study Programme in JFY2013. Therefore, this draft PDD is not officially approved by any governments involved in JCM, and is subject to change in the future.

A. Project description

A.1. Title of the JCM project

Centralization of heat supply system by installation of high efficiency Heat Only Boiler in Bornuur soum

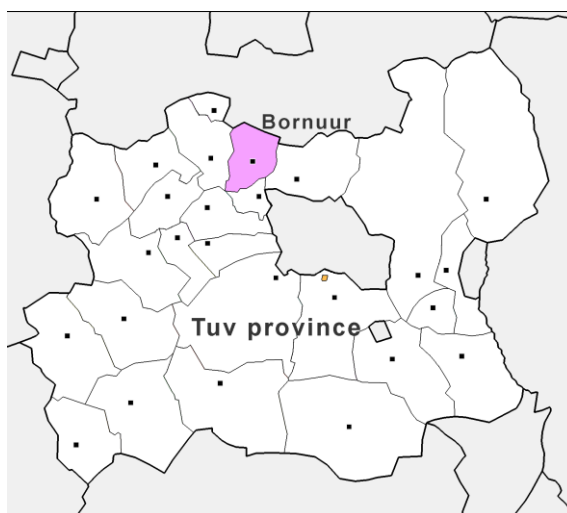
A.2. General description of project and applied technologies and/or measures

The Bornuur is located in the north of Tuv province, 105 km distant from Ulaanbaatar and 155 km from center of Tuv province.

The altitude of the soum is 1000-1500 m above the sea level. In terms of the earthquake, the soum is in 7 magnitudes area.

The soum is harmonious for agriculture and animal husbandry because the location of the soum is in the zone of forest steppe natural.

The summer of the Bornuur soum is cool and dry and the winter is cold. The monthly average temperature in January is -30°C and $+30^{\circ}\text{C}$ in July. The annual average precipitation is 250 - 350 mm.



The total territory of the soum is 114,687 hectares. About 70% of the land is being used for agricultural purpose, 26% is forest reserve and 0.08% represents water resources. As of 2012, about 2.37% of land is in urban areas, 0.11% is in special use territory and 0.92% is covered by roads and networks.

At the end of 2012, the total soum population was 4,825 and the number of households reached 1,387. The population of the soum center was 1,019. The soum is divided into 4 bags (residential districts), the smallest administrative unit.

The total livestock population is 93,153 heads. About 0.05% of them is camel, 7.4% is horse, 12.7% is cow, 44.4% is sheep and 35.4% is goat.

Table 1 Harvest Volume (as of 2012)

Types of harvest	Planted area, hectare	harvest, tons
Wheat	1,500	1,310
Potato	740	15,354

Vegetable	460	5,352
Fodder	1,680	2,576

The soum center is connected to Central grid. It has access to 110/35/10 kW substation and clean water supply. There are 6 wells and 3 water reservoirs with volume of 16 m³ each. As for the drinking water supply, water softening equipment with capacity 30 m³/day was installed.

In the soum center, buildings of local government, health center, cultural center, kindergarten and secondary school have own Heat Only Boilers (HOB).

The soum secondary school, which has 2-story building, has 880 students and 79 teachers. As for kindergarten, there are 234 children and 21 workers. Unfortunately, the building of the kindergarten is in very bad condition. The building needs total refurbishment.

The health center, which has built in 1978 and now has 13 beds, has total of 29 staff, including 4 doctors and 7 nurses.

The soum cultural center, which was constructed in 1959 with 250 seats, is operated by 8 workers. The building needs renovation.

The local government building was constructed in 1959 and needs renovation as well.

In the end of 2013, there are seven HOBs in Bornuur soum. These seven HOBs are four vertical type boilers, two brick boilers and one small size boiler.

Table 2 Existing HOB in Bornuur soum

Facilities Name	Type of HOB	Remark
School	D-27	Brick Boiler
Dormitory	HP25Ж	Vertical Type Boiler
Kindergarten	D-27	Brick Boiler
Cultural center	CLSG	Vertical Type Boiler
Local governor's office	POP-90	Small Size Boiler
Old hospital	HP15Ж	Vertical Type Boiler
New hospital	LSH	Vertical Type Boiler



HOB of school in Bornuur soum



HOB of Dormitory in Bornuur soum

Figure 2 Photo of HOB in Bornuur soum

The project is the infrastructure building in Bornuur soum of Tuv aimag in Mongolia, composed of the installation of Heat Only Boilers (HOBs) as well as pipe laying work, electrical construction and boiler building construction.

The project will alter the current heat supply system in Bornuur soum of individual building based heating, under which the low efficiency HOBs and stoves are used.

The replacement of low efficiency HOB with EKOEFECT (650 kW, high efficiency HOB) leads to CO₂ and other air pollutants emission reductions.

The EKOEFECT BIO 130-600 boilers are designed for comfortable, ecological and economical heating with minimal requirements for manual operation. The boiler operator checks the boiler occasionally, adds fuel and takes out the ash. Fuel is automatically fed from the hopper to the rotary grate. The amount of fuel on the grate is optimized, burning only the minimum amount required to cover the heat demand of the building at the time.

The monitoring equipment which measures the exhaust gas temperature or the exhaust gas O₂ concentration is introduced. The Japanese engineer implemented the technical guidance optimizing the operation of the boiler from these measurement results.

A.3. Location of project, including coordinates

Country	Mongolia
Region/State/Province etc.:	Tuv aimag
City/Town/Community etc:	Bornuur soum
Latitude, longitude	Latitude : 48° 27' 53" Longitude : 106° 15' 26"

A.4. Name of project participants

Mongolia	ANU-SERVICE CO.,LTD.
Japan	SUURI-KEIKAKU CO.,LTD.

A.5. Duration

Starting date of project operation	2013/08/28
Expected operational lifetime of project	7 years (Operational lifetime of HOB is 15 years)

A.6. Contribution from developed countries

Japanese experts of SUURI-KEIKAKU CO., LTD will support the development of telemeter system such as the remote control and automatic record, as the core of MRV activities of JCM. SUURI-KEIKAKU CO., LTD introduces the monitoring equipment which measures exhaust gas temperature or exhaust gas O₂ concentration, and etc.. The Japanese engineer performs the technical guidance optimizing the operation of the boiler from these measurement results.

Japanese side provides financial support to the project.

There are few CDM project in Mongolia. Therefore, there is little experience from the development of the monitoring plan to making the monitoring report. Since EEC is the dominant candidate of the monitoring entity, our Japanese Team implements the capacity development of the monitoring activity to the EEC staffs.


B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	---
Version number	---
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Version number	---
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Version number	---

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

Eligibility criteria	Descriptions specified in the methodology	Project information
Criterion 1	The technology to be employed in this methodology is coal-fired heat only boiler (HOB) for heat water	The purpose of the boilers is to heat school, hospital, kindergarten and cultural center and local governor's office and etc.. The boilers are hot water low pressure

	supply system.	automatic boilers and designed for brown coal (5-25) mm burning only.																						
Criterion 2	The HOB to target for the project activity is defined as a boiler used for heat supply which has capacity of 0.10 MW – 3.15MW.	Three high efficient coal fired boilers EKOEFEKT 600 with capacity of 600 kW each, are being installed at project site.																						
Criterion 3	The project activity encompasses installation of new HOB, replacement of the existing coal-fired one and expansion of the capacity for the existing coal-fired one.	<p>The three new high efficient HOBs EKOEFECT of capacity 600 kW each will replace 7 old small inefficient boilers.</p>  <table border="1"> <tr> <td>Power output</td> <td>600 kW</td> </tr> <tr> <td>Optimal regulation of power output</td> <td>250 - 600 kW</td> </tr> <tr> <td>Consumption of fuel</td> <td>70 - 150 kg/h</td> </tr> <tr> <td>Heated space</td> <td>15000 m3</td> </tr> <tr> <td>Efficiency</td> <td>80%</td> </tr> <tr> <td>Hopper capacity</td> <td>1200 kg</td> </tr> <tr> <td>Max operating pressure of hot water</td> <td>200 kPa</td> </tr> <tr> <td>Max temperature of hot water</td> <td>95 °C</td> </tr> <tr> <td>The noise of the ventilator</td> <td>75 dB</td> </tr> <tr> <td>Boiler weight</td> <td>5500 kg</td> </tr> <tr> <td>Boiler height</td> <td>2800 mm</td> </tr> </table>	Power output	600 kW	Optimal regulation of power output	250 - 600 kW	Consumption of fuel	70 - 150 kg/h	Heated space	15000 m3	Efficiency	80%	Hopper capacity	1200 kg	Max operating pressure of hot water	200 kPa	Max temperature of hot water	95 °C	The noise of the ventilator	75 dB	Boiler weight	5500 kg	Boiler height	2800 mm
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Criterion 4	The project HOBs have dust collectors. In case of a HOB which dust collector is not set up, dust collector is additionally installed with the installed HOB for pollution-abatement measure.	The EKOEFEKT-600 boilers are designed with separate dust collector of capacity 500 kg																
Criterion 5	Boiler operation manual and maintenance manual is established.	The manual of boiler operation will be prepared in Mongolian language.																
Criterion 6	The catalogue value of boiler efficiency of project HOB is more than 75%.	The catalogue value of EKOEFEKT is 80%.																
Criterion 7	<p>One of the following technologies is applied to project HOB.</p> <ul style="list-style-type: none"> ● The boiler has the function to feed uniformly coal on the stoker. ● The boiler has the adjustment system of the combustion air. ● The boiler has the function for preventing air-invasion into the furnace. 	<ul style="list-style-type: none"> ● The boiler has the function to feed uniformly coal on the stoker. <p>Fuel is automatically fed from the hopper to the rotary grate. The amount of fuel on the grate is optimized, burning only the minimum amount required to cover the heat demand of the building at the time. Fuel supply is regulated by a control unit which takes into account the energy requirements of the boiler.</p> <ul style="list-style-type: none"> ● The boiler has the adjustment system 																

		<p>of the combustion air.</p> <p>In order to ensure the complete combustion of flammable substances contained in the fuel, a sufficient amount of air is supplied to the combustion chamber.</p> <ul style="list-style-type: none"> ● The boiler has the function for preventing air-invasion into the furnace. <p>The chamber is coated with a ceramic lining which ensures a high efficiency of combustion. The supply of primary air for combustion is provided by an exhaust fan which is located at the throat of the chimney. The boiler works at a low pressure due to a ventilator draft.</p>
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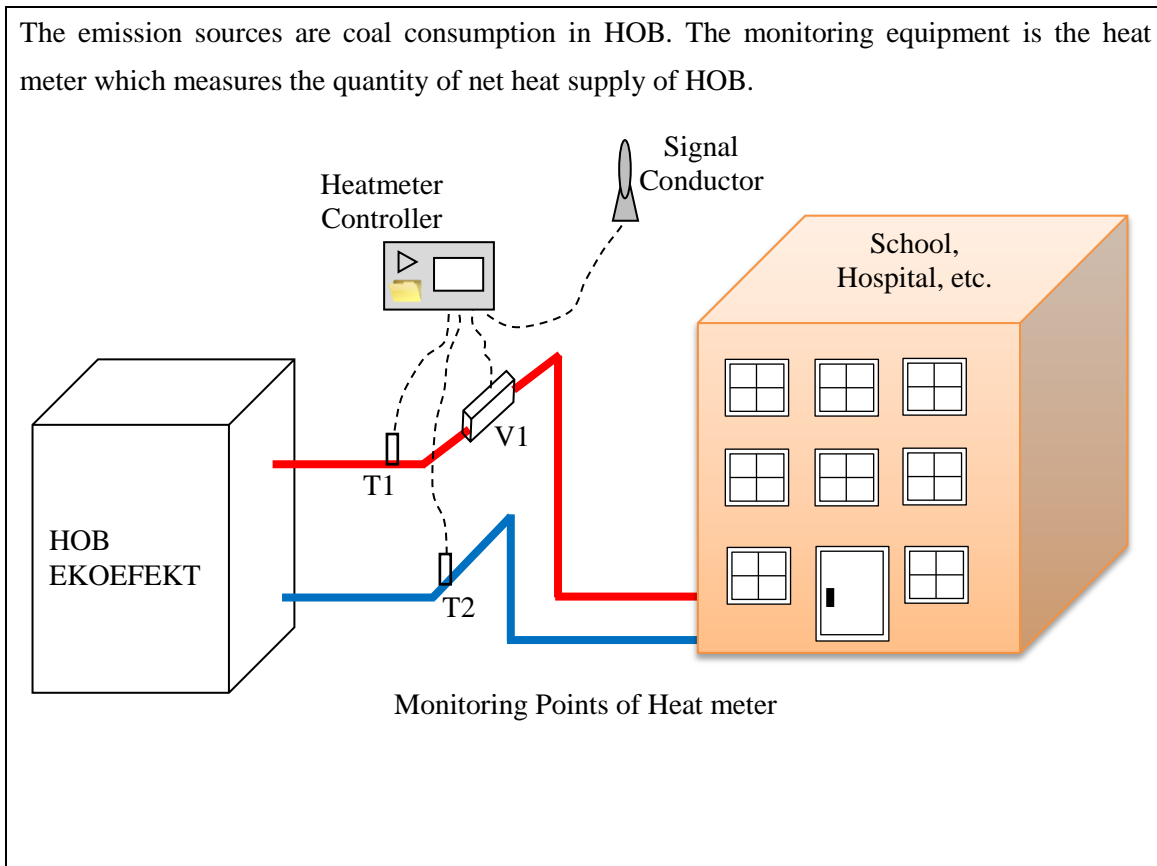
C. Calculation of emission reductions

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

Reference emissions	
Emission sources	GHG type
Coal Consumption of reference HOB	CO ₂
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
Project emissions	
Emission sources	GHG type
Coal Consumption of project HOB	CO ₂
Electricity Consumption of project HOB	CO ₂
N/A	N/A
N/A	N/A
N/A	N/A

N/A	N/A
N/A	N/A

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



C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO _{2e})	Estimated Project Emissions (tCO _{2e})	Estimated Emission Reductions (tCO _{2e})
2013	0	0	0
2014	2,146	1,780	366
2015	2,146	1,780	366
2016	2,146	1,780	366
2017	2,146	1,780	366
2018	2,146	1,780	366
2019	2,146	1,780	366
2020	2,146	1,780	366
Total (tCO_{2e})	15,022	12,460	2,562

D. Environmental impact assessment

Legal requirement of environmental impact assessment for the proposed project

This JCM project is deemed to be necessary to implement the detailed natural environment impact assessment, from following reasons;

- 1) The influence on the natural environments is established by being based on the detailed environment impact assessment.
- 2) The situation that project capacity (3.0MW / h) exceeds the required amount of heat (0.9 MW / h) needs to be confirmed.
- 3) It is necessary to check the actual natural environment basic situation of the JCM project area.
- 4) Confirmation of the expert is required about the design drawing of the boiler building.
- 5) The natural environment conservation assessment and conclusion is put regarding technology choices of the boiler.

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

Date: from 13:30 to 15:00, 26th September 2013

Place: Culture Center in Bornuur soum

Participants: 67 people of living and/or working in Bornuur soum, and 57 people of questionnaire response.

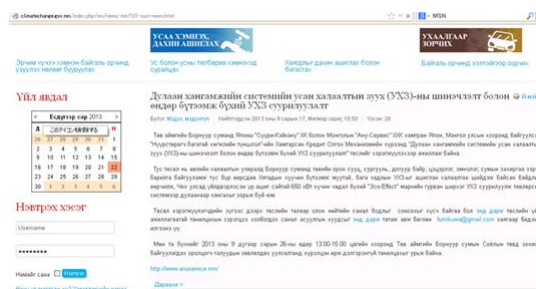
Handout: Questionnaire (Mongolian language), Outline of JCM (Mongolian language)

Agenda:

- 1) Outline of JCM (Mr. Kuwahara),
- 2) Background and progress situation of JCM Project (Mr. Kuwahara),

- 3) Technical review of “Centralization of heat supply system by installation of high efficiency HOB” in Bornuur soum (Mr. Injinaash),
- 4) Q&A,
- 5) closing remark

The announcements of newspaper and web site are as follows;



2013年9月13日 (金) Udrin soum (Daily newspaper)

The circumstances of stakeholder consultation were as follows;



E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
Male “A”	Is there the possibility to use the other fuel other than the coal?	Since coal is abundant in Mongolia, we do not worry the supply of coal, and the price of coal is very low. As a result, the fuel choice is only coal.
Male “B”	Is this infrastructure of HOB system enough for heat supply in whole of Bornuur soum?	Three EKOEFEKT boilers, which have 650 kW capacities, are enough for heat supply. Since the boiler

		house has enough space, the expansion of HOBs is possible in the future.
Male “C”	Does this infrastructure include the water supply and sewerage systems?	This JCM project is only the infrastructure of HOB system, which is only the heat supply system. In the future, we will consider the other infrastructure such as water supply and sewerage systems, etc..
Female “D”	Can we receive the service of the heat supply, if we are living in Bornuur soum and we prepare at own expense?	If you prepare your own money, then we can do the heat supply for your home.
Female “D”	Will the HOB be operated enough stably?	We will realize the stable operation of HOB in the future.
N/A	N/A	N/A
N/A	N/A	N/A

F. References

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

Annex

Revision history of PDD

Version	Date	Contents revised
01.0	21/02/2014	First edition