

INTEGRATED RESEARCH SYSTEM for SUSTAINABILITY SCIENCES (IR3S)

THE UNIVERSITY OF TOKYO, JAPAN

FINAL DRAFT REPORT
OF
NATIONAL FOCAL POINT (NFP)-MONGOLIA
UNDER JCM PROGRAM

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Table of contents:

1. Overview of Network Building activities in Mongolia
 - 1.1 Potential needs for JCM (emphasized areas of projects, sector priority)
 - 1.2 One stop service (preparation of one-stop service)
2. Summary of Study Workshop
3. List of network (study workshop and other potential stakeholders)
4. Future steps for 3E Nexus Networking
 - 4.1 Role of academic community/ researchers in creating future JCM projects
 - 4.2 Measurement, Reporting and Verification (MRV) methods
 - 4.3 Creation of effective network for 3E Nexus/JCM projects within the country
 - 4.4 Potential and Challenges for JCM projects in Mongolia

Main activities of National Focal Point for JCM promotion in Mongolia

1. To establish a one stop service organization as the foundation for promotion of JCM projects, and be the National Focal Point (NFP) which is in charge of this one stop service
2. To organize a study workshop inviting relevant individuals such a researchers and government officials with the purpose to educate participants about JCM, and the build the foundation for creating JCM projects.
3. To participate General Meeting on Energy, Environment and Ecosystems (3E) Nexus Initiative for Sustainable Development in Asian Countries

1. Overview of Network Building activities in Mongolia

1.1 Potential needs for JCM (emphasized areas of projects, sector priority)

Mongolia has harsh and long winters with drops of air temperatures to -30 and -40 degrees of centigrade. About 70% of country's population lives in four major cities and 330 soum centers (administrative units). Ulaanbaatar, Darkhan, Erdenet and Choibalsan cities and 9 aimag centers are provided with centralized heating system.

In general, the national heating system is divided into 3 types depending on coverage area, their capacity and efficiency:

- Centralized heating system provided by Combined Heating Power (CHP) plants in Ulaanbaatar, Darkhan, Erdenet and Choibalsan cities.
- Heating system with medium level capacity in provincial centers
- Hot water boilers systems with small capacities

The energy generating industry of Mongolia is largest GHG emitting sub-sector. Coal fired Combined Heat and Power plants produce approximately 98% of country's electricity. Although, Mongolia is rich in renewable energy sources such as wind, solar, and water, the utilization of these resources is still in its early stages. Currently, small scaled hydroelectric power plants produce less than one percent of total electricity generation in Mongolia.

In order to meet the growing energy demand of the country, new energy sources such as coal fired CHPs for heat and electricity generation, coal fired Thermal Power Stations (TPS) for electricity production, and wind farms are planned to be established.

The second largest GHG emitting source after energy industry is enteric fermentation. Livestock husbandry is the traditional economy sector and it plays important role in the economy, employment and export revenues of the country. The majority of GHG from agriculture is methane from enteric fermentation. About 33% of total GHG emissions is coming from enteric fermentation.

The transport sector is projected to experience high GHG emissions growth rate due to drastic increase of number of vehicles and demand for freight transport.

Residential and Commercial subsector is fourth largest GHG emitting sub-sector. Energy consumption in households is dependent from population growth rate, number of households and their living condition. Recently, the commercial and residential sub-sector accounted for 16% of total coal consumption, 69% of total heat distribution, and 24% of electricity consumption of the country.

According to goals of the National Action Program on Climate Change of Mongolia (2011) focused on environmental sustainability, socioeconomic sector's development to be adapted to climate change, and reduction of GHG emission from different sectors, potential needs for JCM projects in Mongolia could be identified based on previous documentation and analysis at relevant organizations.

For example, Technology Needs Assessment of Mongolia (2013) identified already key mitigation technologies in priority sectors for Mongolia. The sectors were selected considering to both national development priorities and GHG mitigation potential in the country. Basically, contribution to GHG emission reduction and development priorities of the sectors in Mongolia have been selected as criteria for selection of priority sectors in the country. Referring to this analysis, energy industry subsector and residential and commercial subsector have been identified priority sectors for technology improvement and development needs in the future.

Ministry of Environment of Japan has listed project sectors for JCM Project Applications as in below:

- a) Energy efficient appliances and use of Energy Service Companies-ESCO project scheme
- b) Decentralized stand-alone renewable energy projects
- c) Low-carbon waste management projects such as waste reduction, best disposal method etc.,
- d) Low-carbon water-saving water systems (drinking and sewage) including effective use of water resources, water pollution prevention etc.,
- e) Transportation infrastructure development and effective use that includes pollution prevention of air quality etc.,
- f) Creation of low-carbon cities, regions, districts/zones/blocks, and industrial zone using schemes a) to e)
- l) Needs of the country regarding Japanese laws and policies, possibility to introduce Japanese technologies, main contact persons, capacity development, etc. related to scheme a) to f).

The energy sector of Mongolia is most significant source of GHG emissions in the country. High emissions of carbon dioxide from energy sector are mainly attributable to the coal-fired power stations and heat generating facilities. This phenomenon illustrates with coal-fired Combined Heat and Power (CHP) Plants for electricity and domestic heating. The needs of technologies of energy sector of Mongolia have been identified as prioritized projects as in below, namely:

- Large scale dam based hydropower plant

- Wind turbines (onshore, large scale)
- Pulverized Coal Combustion with higher efficiency
- Integrated coal gasification combined cycle
- Medium sized dam based hydropower plant for electricity
- Solar PV (off grid, grid connection and solar systems for household)

In addition, technology needs for residential and commercial subsector identifies following projects:

- Compact Fluorescent Lighting, LED
- Improved Coal Fired Heating Stoves
- Improved Building Insulation
- Liquefied Petroleum Gas (LPG) for households and commercial service

Recognizing list of project sectors which are identified from Ministry of Environment of Japan, for JCM, in Mongolia, waste management, low carbon water saving system, transportation infrastructure development, creation of low carbon residential units are considerable areas in the future.

Energy consumption in Mongolia will continue increasing rapidly due to population growth and economic development, in particularly, due to the development of the mining and quarrying industry in the country. In order to meet this growing energy demand, new energy sources will be required. Currently, a Combined Heat and Power Plant (CHP) in Ulaanbaatar with a capacity of 300MW, and wind farm in Salhit Uul near Ulaanbaatar with a capacity of 50MW, and the Tavan Tolgoi Thermal Power Plant (300-600MW) are being planned for coming years.

In the future, coal fired thermal power plants in Mongolia should be modern, energy efficient and environment friendly, such as pulverized coal thermal supercritical power plant. These technologies can combust pulverized coal and produce steam at high temperatures and under higher pressure, so that the efficiency will be much higher than traditional coal fired thermal power plants and less environmental pollution.

In addition, Mongolia has considerable wind energy resources that more than 10% of the total territory has good potential for wind energy applications on commercial scale. Several wind farm projects with capacity of 30-50MW each in different parts of Mongolia are under consideration.

1.2 One stop service (preparation of one-stop service)

With request of Integrated Research System for Sustainability Science (IR3E), one stop service for promotion of JCM projects in Mongolia aims to: (a) receive requests from Japanese businesses/local governments for the projects and (b) communicate with relevant domestic individuals, businesses, and/or government; and (c) assist in basic data collection for JCM projects.

In order to reach to above aims, one stop service is paying more attention for promotion of communication with local individuals, businesses, and government representatives to initiate JCM projects in key topics.

Different types of activities including dialogue among stakeholders, individuals and businesses and small group meeting among representatives from key/specific sectors and sharing of information and ideas for JCM projects between Japanese businesses and Mongolian experts are recommendable to both parties. In the past two years, some actions such as implementation of JCM demonstration projects and development of guidelines and methodology of JCM projects have been already initiated in Mongolia.

Matters related to networking and communication tool of one service stop for JCM projects in Mongolia and Japan will be discussed in the future.

2. Summary of Study Workshop (including details of the workshop, summary of presentations, summary of Q & A and discussions)

Study workshop on the Joint Credit Mechanism towards Sustainable Low-Carbon Society Development in Mongolia was held in Chinggis Khaan Hotel, Ulaanbaatar city on 13 February, 2015.

Representatives from Mongolian universities, science academy, NGOs and government organization have been participated in this study workshop on JCM project implementation.

According to workshop agenda, four key presentations focused on low-carbon development in Mongolia and Asia has been presented. (Please refer workshop agenda.

First presentation on Policies and Actions towards Low-Carbon Development in Mongolia was made by Ms.Sanaa from Climate Change Coordination Office, CDM National Bureau at Ministry of Environment and Green Development. She introduced about government policy, goals and targets for low-carbon development in Mongolia, strategies of National Action Program on Climate Change, road map of Low-carbon development partnership between Mongolia and

Japan. In addition, basic concept of the JCM and JCM stakeholders and former members from Mongolian government organizations, designated third party entities, selected projects for FY 2013 were presented by presenter.

Second presentation on Role of Renewable Energy sector Promotion of Energy efficiency for Sustainable Low-Carbon Development in Mongolia was made by Dr.Dorjpurev from EEC, LLC. He introduced about current state of energy supply in Mongolia; GHG emission from energy sector; and Mongolian Program on Renewable Energy; different scenarios of energy sector development in Mongolia including renewable energy scenario and energy efficiency scenarios for Mongolia.

Prof. Kensuke Fukushi, Integrated Research System for Sustainability Science (IR3E) of the Tokyo University, Japan has presented about Energy, Environment and Ecosystem (3E) Nexus Initiative towards regional low-emission for sustainable society.

In addition, he introduced on Joint Credit Mechanism (JCM) projects for Sustainable Low Carbon Development in Asia-Pacific Region. He highlighted matters on business platform, local government platform and research platform; comparison of JCM with CDM; criteria of JCM methodology; financing for JCM projects; JCM Project Design Document (PDD); basic concept for crediting under JCM etc.,

General discussion and Q&A on presentations have been done at final stage of the workshop.

The following issues were discussed as most significant barriers for climate technologies including technologies for JCM in Mongolia:

- There is no long term political commitment and government policies are uncertain. For example, large scale Hydro power plant in Egiin gol was planned for construction since mid of 1990s but no real implementation still.
- In general, lack of government control and enforcement for implementation of laws and regulations. In the country, there are many plans and programs but no effective mechanisms for the implementation.
- There is insufficient coordination and among relevant ministries and stakeholders. The roles and involvements of relevant ministries, agencies, local authorities and local community unclear.
- Energy sector in Mongolia is owned by the Government without energy market competition. This results in lack of incentive in the system for energy supply in economically efficient manner.
- Cooperation and communications among the stakeholders is very weak and no major agreement in construction and technological innovation.

- The government should promote climate technologies such as renewable energy generation capacities and introduce feed-in tariff for medium and large scale hydro power plants. Energy regulatory authority should reduce subsidy for conventional energy supply in the country by considering inappropriate financial incentives and high transaction cost of energy. The Government of Mongolia should continue implementing the planned efforts in energy pricing reform.
- As part of efforts to mitigate climate change, REDD+ program for reduction of GHG emissions from deforestation and forest degradation and enhancement of forest carbon sink in forest sector through sustainable forest management should be implemented in northern Mongolia.
- In addition, issues and barriers related to policy, legal and regulatory framework; limited access to new climate technology and lack of experiences in technology extension; weak institutional capacity in climate technology innovation for JCM and inappropriate financial incentives in energy sector and market economy
- Main issues related to reduction of GHG emission from energy sector in Mongolia, creation of renewable energy in selected areas including hydropower plant and solutions for water saving and sanitation facilities have been discussed during the final discussion.
- Another important topic for future development of networking is to set up a small group for proposal development under JCM projects in Mongolia among relevant stakeholders.

3. **List of network** (study workshop and other potential stakeholders)

Based on previous experiences of project implementation for CDM and JCM at different level and output of study workshop on JCM in Mongolia, we may propose name list of stakeholders for JCM project implementation in Mongolia including:

- Ministry of Energy and Mineral Resources
- Ministry of Food, Agriculture and Light Industry
- Ministry of Environment, Green Development and Tourism
- Energy Regulatory Authority
- Mongolian Academy of Sciences
- Mongolian University of Science and Technology
- Mongolian State University of Agriculture
- The Municipal Government of Ulaanbaatar city
- Mongolian Chamber of Commerce and Industry
- Private companies

- NGOs and local communities
- Individual experts and researchers

In the future, above tentative name list of key stakeholders would be updated according to progress, performances and their interest and experiences and implementation outputs of JCM projects in different economy sector of Mongolia.

4. Future steps for 3E Nexus Networking

In order to facilitate JCM project implementation in Mongolia, role of the academic community/researchers in creating future JCM projects, measurement, reporting, verification (MRV) methods related to JCM projects, ideas for creation of effective network for 3E Nexus/JCM projects in Mongolia, potential and challenges for JCM projects in Mongolia identified and discussed in this report.

4.1 Role of academic community/ researchers in creating future JCM projects

The role of academic community joining with government agents of Mongolia is crucial matter for the future development of JCM project proposals and for the implementation of climate technologies in different economy sectors of Mongolia. Particularly, institutional capabilities and capacities of different stakeholders in Mongolia for the implementation of JCM projects are not sufficient. In this case, it is essential to determine task and responsibilities of key stakeholders for JCM project implementation.

Main role and task of key stakeholders in Mongolia for JCM implementation

No	Name of stakeholder organization	Main task and responsibility for JCM
1.	Ministry of Energy and Mineral Resources	Formulate a policy, political commitment and regulation for JCM project in energy sector
2.	Ministry of Food, Agriculture and Light Industry	Policy support for JCM projects in commercial and industry sector
3.	Ministry of Environment, Green Development and Tourism	Develop MRV procedure and accreditation of JCM projects
4.	Mongolian University of Science and Technology	Input of Research and Development for JCM projects
5.	The Municipal Government of Ulaanbaatar city	Implement the JCM projects in Municipal areas
6.	Energy Regulatory Authority	Coordinate and enforce implementation of climate technologies in energy sector
7.	Private companies	Implement JCM projects
8.	Individual experts and researchers	Develop project document and assist MRV of JCM projects

In order to provide readiness of stakeholders for JCM project development, project document development (PDD) is initial stage of JCM project implementation. Before and after PDD stage, communication and information sharing among stakeholders will be important for their future implementation of JCM projects.

4.2 Measurement, Reporting and Verification (MRV) methods

MRV can be interpreted as the means to address country's commitments to collect and share information on the progress of the implementation of provisions and/or commitments of Parties, according to the UNFCCC.

Under the Bali Action Plan (COP 13, 2008), developed and developing country Parties alike agreed to enhance their action on mitigation of climate change, notably by implementing "measurable, reportable, and verifiable nationally appropriate mitigation actions" (NAMAs).

According to concepts of measurement, reporting and verification, the domestic network in Mongolia could contribute to MRV under JCM using following requirements. There are:

a) For **Measurement** of JCM projects:

- Use integrated approaches for estimating as appropriate, anthropogenic GHG emissions by sources and removals by sinks from

b) For **Reporting** of JCM projects:

- Be transparent for all data and with clear outputs of JCM project
- Be consistent taking into account institutional capabilities and capacities
- As far as possible accurate in order to reduce uncertainty

c) For **Verification** of JCM projects:

- Be accessible for stakeholders with interests of climate and low-carbon technology implementation in Mongolia
- Available and suitable for review of experts from designated authorities

Considering national capacity and capabilities of stakeholders, there are two ways of MRV system for JCM project implementation in Mongolia:

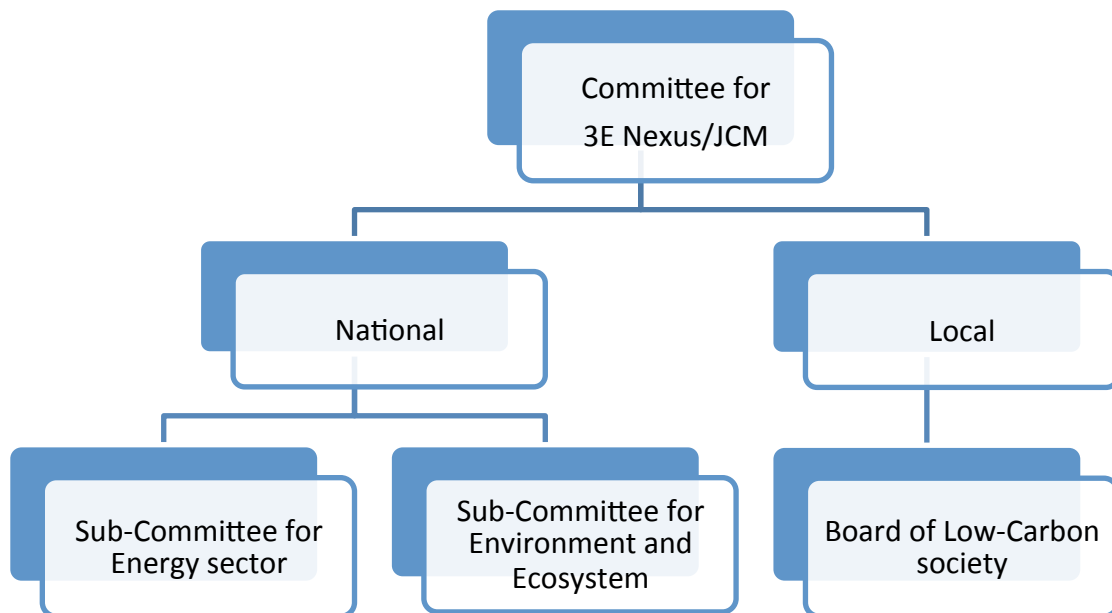
1. To establish ad-hoc expert group for MVR of JCM projects
2. To designate National Authority for MRV of JCM projects under JCM Committee

4.3 Creation of effective network for 3E Nexus/JCM projects within the country

The effectiveness of networking for Energy, Environment and Ecosystems-3E Nexus needs to meet with basic requirements of low carbon industry, climate technologies and environmental friendly society. Regarding this requirements, effective network for 3E Nexus/JCM projects could be created basing on their strong interest and commitment of stakeholders.

In order to create effective networking for 3E Nexus/JCM projects in Mongolia, it is necessary to conduct the study analysis for weakness, resources (technical, human and financial) and their preparedness of stakeholders for JCM project implementation. For successful implementation of JCM projects in different economy sectors, current pre-condition of stakeholders regarding their capacity and capabilities should be considered at initial stage of project implementation.

For networking of 3E Nexus/JCM in Mongolia, we would recommend following hierarchical scheme of networking at national and local level with different subject goals.



Each sub-committee of 3E Nexus/JCM will consist from number of scientists and experts representing different field related to low-carbon and climate technologies. Main task and responsibility of this network is to promote communication among stakeholders and local societies and share information on climate and low carb on technologies with local communities and residents.

4.4 Potential and Challenges for JCM projects in Mongolia

Based on Technology Needs Assessment related to JCM project, the following potential projects are challenging:

- In energy supply sector
 - Large scale Hydro Power plants
 - Wind Parks
 - Pulverized coal combustion technologies
- In residential and commercial sector
 - Efficient lighting
 - Improved insulation of panel apartment buildings

Energy supply and its use are most significant sources of GHG emission in Mongolia. High emissions of carbon dioxide from the energy industries subsector are largely attributable to the coal-fired power and heat generating facilities. Power and heat generation accounted for about 65% of the carbon dioxide emissions from fuel combustion in the country. About 90% of the electrical power generated in Mongolia is produced by coal Combined Heat and Power plants (CHPs) in Mongolia.

For large hydropower plants, particular proposals have been developed for Shuren 330MW, Egiin gol 220MW, and Orkhon 100MW Power Plants.

Recent studies show that Mongolia has huge potential for wind power generation. The wind resource potential is around 10% of the total land area and it is classified suitable for utility scale applications (power density of 400-600W per square meter) and could potentially supply over 1,100 GW of installed capacity.

With various factors such as policy and regulatory framework that provides private sector investment incentives and access to electricity markets, high potential of wind energy, high demand of electricity, various large scale power projects are being developed by the private sector in the country.

The conventional pulverized coal combustion technology is used in Combined Heat and Power Plants in Mongolia. Major coal based technologies that are available today at various stages of development include (i) conventional pulverized coal combustion (PC); (ii) circulating fluidized bed combustion (CFB); (iii) supercritical (SC) and ultra-supercritical (USC) PC combustion; and (iv) integrated gasification combined cycle (IGCC). Worldwide operational experiences of USC and SC plants show that this technology could be implemented in Mongolia in the future.

Main input of 3E Nexus Network will be focused in the field of information sharing, communication and networking among stakeholders for the project implementation of climate and low-carbon technologies in Mongolia.

3E Nexus Network will bring opportunities to:

- Enhance awareness of scientific community and stakeholders for low-carbon technology and JCM project implementation
- Create comprehensive understanding of national capacities, capabilities and circumstances related low-carbon technology through JCM project implementation
- Define institutional arrangements for JCM project implementation
- Ensure effective implementation of low-carbon technologies and test effectiveness of JCM projects
- Develop communication of JCM project partners and enhance integration of components of 3E Nexus
- Develop MRV system for JCM projects to assess implementation outputs of the project activities