

INTEGRATED RESEARCH SYSTEM for SUSTAINABILITY SCIENCES (IR3S)

THE UNIVERSITY OF TOKYO, JAPAN

FINAL REPORT

OF

NATIONAL FOCAL POINT (NFP)-MONGOLIA

3E Nexus Initiative and JCM Project Development

Prepared by:

Tsogtbaatar Jamsran, PhD.

GeoEcology Institute

Mongolian Academy of Sciences,

Ulaanbaatar

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Main activities of National Focal Point for JCM project Development 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 on 3E Nexus and Development of JCM Projects inviting relevant stakeholders from private sector in Mongolia such a researchers and government officials with the purpose to disseminate information about JCM, and the build the platform for the development 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)

In Mongolia, total gross greenhouse gas (GHG) emissions were 18,868 gigagrams (Gg) of carbon dioxide equivalent (CO₂-eq) and net emissions were 15,628 Gg CO₂-eq. About 65.4 percent of net GHG emissions were emitted by the energy sector (including stationary energy, transport and fugitive emissions), 41.4 percent by agriculture and livestock sector. Through Technology Needs Assessment have been identified the sectors in Mongolia and these sectors selected according to both national development priorities and GHG mitigation potentials (Technology Needs Assessment: Climate Change Mitigation in Mongolia. 2013).

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 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

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.

As indicated above, 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.

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

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)

For promotion of JCM projects in Mongolia, one stop service under the guidance of Integrated Research System for Sustainability Science (IR3E), aims to: (a) disseminate information and guidance to 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 facilitated through in-country workshop and meetings 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 discussed during the meetings, workshop and publications from Mongolian JCM Secretariat etc.,.

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 “Khukh Asar” Conference Hall of Ulaanbaatar Hotel, Ulaanbaatar city, Mongolia on 23 February, 2016.

Representatives from Mongolian private companies, academic organizations, NGOs and government organization have been participated in this study workshop on 3E Nexus and development of JCM projects in Mongolia.

According to workshop agenda, four key presentations focused on low-carbon development in Mongolia and Asia has been presented during the morning session of the workshop. (Please refer study workshop agenda).

At the beginning of the workshop, Dr.Geetha Mohan from IR3S from Tokyo University, Japan made the presentation on Energy, Environment and Ecosystems (3E) Nexus Initiative for Sustainable Development. He introduced about vision of 3E Nexus Initiative for Sustainable Development and current networking and achievements of past two years period of project implementation.

Another key presentation of the workshop made by Dr. Hirotaka Matsuda from 3E Nexus Secretariat, Integrated Research System for Sustainability Science (IR3S) on Joint Credit Mechanism (JCM) projects for Sustainable Low Carbon Development in Asia-Pacific Region. He introduced about JCM focused on facilitating diffusion of leading low carbon technologies and products, services and infrastructure as well as implementation of mitigation actions and contributing to sustainable development of developing countries. Historically point of view, he gave comparative information on JCM and CDM with differences of indicators of both mechanisms. In addition, Dr. Matsuda delivered message on contents of JCM Project Design Document (PDD) which is essentially important to workshop participants.

Third presentation on Policies and Actions towards Low-Carbon Development in Mongolia was made by Ms.Kh.Undarmaa from JCM Secretariat and Climate Change Coordination Unit at Nature Conservation Fund under Ministry of Environment, Green Development and Tourism of Mongolia. She introduced about Development of Low-Carbon Initiative in Mongolia and JCM project implementation in Mongolia. In addition, basic concept of the JCM and JCM stakeholders and former members from Mongolian government organizations, designated third party entities, selected projects in the past were presented.

Forth presentation on Introduction on GHG Emission in Mongolia and Monitoring, Reporting and Valdation of JCM projects was made by Ms.E.Sanaa from Climate Change Coordination Unit at Nature Conservation Fund under Ministry of Environment, Green Development and Tourism of Mongolia. She introduced about current state of GHG Emission in Mongolia especially introducing GHG emission from energy sector in Mongolia and others. She

highlighted about procedure and requirements of JCM project implementation regarding the monitoring, reporting and validation of project outputs.

In addition, three presentations made on experiences and matters on potential JCM project implementation in Mongolia.

First presentation made by Ms.D.Gantsetseg from private company “ANU Service” in Mongolia. She introduced some experiences and outputs of first JCM project implementation in Mongolia.

This presentation showed case of implementation of JCM project for renovation of heating stove system used Heat OnlyBoiler /HOB. This project was implemented by in 118th school of Ulaanbaatar city and in “Bornuur” soum of Central aimag “ANU Service” Company joining with Suuri-Keikaku company of Japan.

Following agenda of workshop, Dr.Anarmaa Sharhuu from Global Green Growth Institute Office in Mongolia made presentation on Green policy strategies regarding Development of Green Energy Systems in Mongolia.

During this session, Mr.Hajime Uchida from Ulaanbaatar Office of Sumitomo Mitsui Banking Corporation made notice on financing constraints of JCM projects in Mongolia.

In the afternoon during the video session, Prof. Kensuke Fukushi, Integrated Research System for Sustainability Science (IR3E) of the Tokyo University, Japan has presented about Development of JCM Project Design Document (PDD), criteria of JCM methodology of project selection, basic concept for crediting under JCM etc., He highlighted matters on business platform and financing for JCM projects under JCM projects during the video session of the workshop.

General discussion and Q&A on presentations have been done at final stage of the workshop. Representatives from private companies in Mongolia such as UniGas company, Wood Industry Entrepreneurs Association of Mongolia, Selenge Dulaan” Company and Azumi Shipping Company, Ulaanbaatar office of Sumitomo Construction and Banking Corporation and Ulaanbaatar office Marubeni Corporation had continuous discussion on opportunities and development of JCM project in coming years.

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

- There is insufficient coordination and among relevant ministries and stakeholders. The roles and involvements of relevant ministries, agencies, local authorities and local community unclear. Cooperation and communications among the stakeholders is very weak and no major agreement in construction and technological innovation.

- 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.
- 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. The government could promote climate technologies such as renewable energy generation capacities and introduce feed-in tariff for small and medium scale 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.
- 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.
- ADB project financed by Japan Fund for Poverty Reduction on “Sustainable Forest Management to improve livelihoods of Local Communities could bring some outputs of feasibility studies regarding wood pellets production for heating in local areas.
- 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
- Another important topic for future development of networking is to set up a small group for proposal development trainings under JCM projects PDD 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
- Nature Conservation Fund
- Global Green Growth Institute Office in Mongolia
- Energy Regulatory Authority
- Mongolian Academy of Sciences
- Mongolian University of Science and Technology

- Mongolian State University of Life Sciences
- The Municipal Government of Ulaanbaatar city
- Mongolian Chamber of Commerce and Industry
- Private companies (ANU Service, UniGas and others)
- 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	Nature Conservation Fund	Facilitation of JCM Secretariat
6.	The Municipal Government of Ulaanbaatar city	Implement the JCM projects in Municipal areas
7.	Energy Regulatory Authority	Coordinate and enforce implementation of climate technologies in energy sector

8.	Private companies	Implement JCM projects
9.	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:

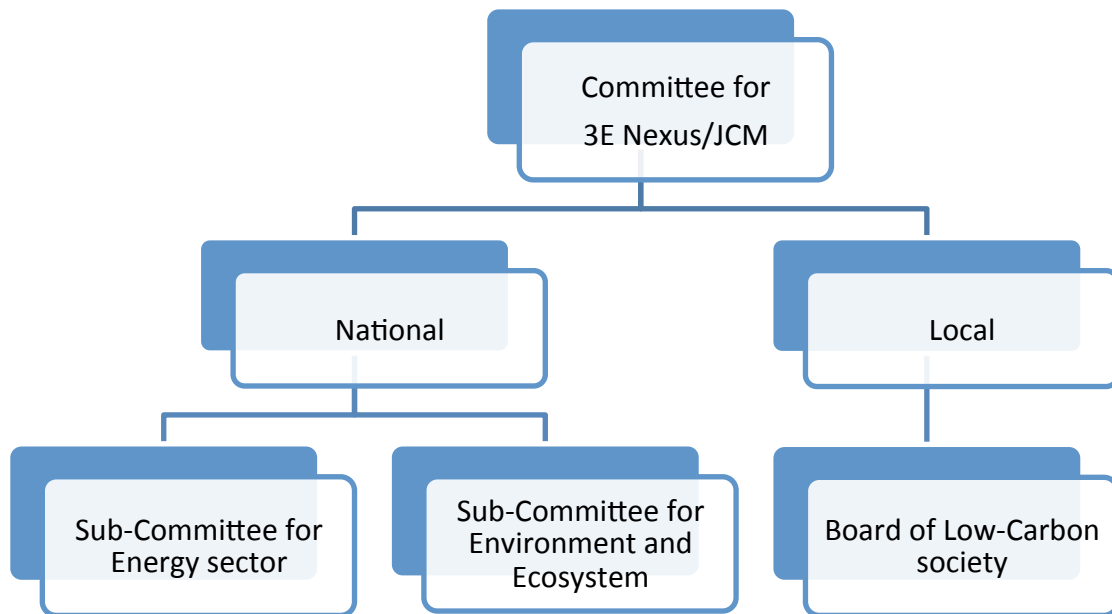
1. To establish ad-hoc expert group for MVR of JCM projects
2. To designate National Authority for MRV of JCM projects under JCM Committee

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

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.

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

- In energy supply sector
 - Liquefied Petroleum Gas (LPG) for households and commercial service
 - Gas application in transportation in city areas
 - Small and Medium scale Hydro Power plants
 - Wind Parks
 - Pulverized coal combustion technologies
- In residential and commercial sector
 - Efficient lighting
 - Improved insulation of panel apartment buildings
 - Production of wood and coal fed pellets

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 Initiative and Network will bring opportunities to:

- Enhance awareness of scientific community and stakeholders for low-carbon technology and JCM project implementation
- Create comprehensive understating 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 through the feasibility studies
- Develop and facilitate 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

