

**Memorandum of Understanding (MoU)**  
**on**  
**joint study "Gobitec and Asian Super Grid" for renewable energies**

This Memorandum of Understanding is agreed between:

1. **The Energy Economics Institute (KEEI)** of the Republic of Korea, 665-1 Naeson-dong, Uiwang-si Gyeonggi-do, the Republic of Korea, 437-713, hereinafter referred to as "KEEI" -, and
2. **The Energy Charter Secretariat (ECS)**, Boulevard de la Woluwe 56, 1200, Brussels, Belgium, hereinafter referred to as "ECS" -, and
3. **The Ministry of Energy of Mongolia (MoE)**, Government Building-2, XIV, Chinggis avenue, Khan-Uul district, Ulaanbaatar – 17060, Mongolia, hereinafter referred to as "MoE" -, and
4. **The Japan Renewable Energy Foundation (JREF)**, Renai Partire Shiodome 3F, 2-18-3, Higashi Shinbashi, Minato-ku, Tokyo 105-0021, Japan, hereinafter referred to as "JREF",
5. **The Energy Systems Institute (ESI)** named after L.A. Melentiev, 130 Lermontov St., Irkutsk, 664033, Russia, hereinafter referred to as "ESI".

KEEI, ECS, MoE, JREF and ESI hereinafter jointly referred to as "**the Parties**". The word "Party", in the singular form, hereinafter refers to any one of the Parties.

**Preamble**

Arising from common objectives to strengthen and enhance cooperation in all aspects of the energy chain, in particular promotion of renewable energy sources, infrastructure development, in addition to encouraging private sector investments in energy projects, the parties wish to cooperate in preparing a joint study on "Gobitec and Asian Super Grid" for renewable energies.

The "Gobitec" is a new industrial initiative by which electricity from renewable energy sources is produced in the desert regions of Mongolia and China and brought via high-voltage lines to the industrial centers of Mongolia, China, the Republic of Korea, and Japan.

The Asian Super Grid (ASG) Initiative aims to construct High-Voltage Direct Current Transmission (HVDC) in Asia regions and interconnect national grids of Japan, the Republic of Korea, China, Mongolia and Russia so that abundant renewable energy sources in remote areas could be utilized.

The core objective of the joint study is to provide the countries in the region of North-East Asia and the international community with reliable information and data concerning the potential of renewable energy sources in the region, stimulate interest of private sector and international investors, provide recommendations on how to maximize international and regional cooperation in order to promote the "Gobitec and Asian Super Grid" initiatives.

**The Parties agree on the following:**

**Article 1**

**Purpose of intended Cooperation**

1. The Parties agree to cooperate and provide inputs on the joint study "Gobitec and Asian Super Grid" for renewable energies in accordance with the attached Terms of Reference.
2. This MoU aims to strengthen cooperation between the Parties and shall, with the exception of Article 4, Article 5 and paragraph 13 in Article 6, be non-binding.

**Article 2**

**Fields of Cooperation**

3. The Parties will collaborate in:
  - The exchange of information and experiences regarding: public energy statistics and data, scientific findings, policy developments, results of feasibility studies and other related matters of Gobitec and ASG Initiatives in order to jointly prepare the study "Gobitec and Asian Super Grid";
  - Joint efforts for the energy transition towards a renewable-based energy future, especially concerning the facilitation of policy, legal and regulatory frameworks that strongly support the deployment of renewable energies to realize sustainable energy systems; and
  - Cooperation in any other area which the Parties may identify in mutual consent.

**Article 3**

**Organisation**

4. Each Party will designate one representative who coordinates the collaboration between the Parties.
  - The representative for KEEI is Yongduk Pak, Senior Research Fellow.
  - The representative for ECS is Zafar Samadov, Senior Expert. The ECS will act as a lead partner to coordinate the study.
  - The representative for MoE is Bayarbat Sangajav, Director General.
  - The representative for JREF is Shuta Mano, Senior Researcher.
  - The representative for ESI is Boris Saneev, Professor, Deputy Director.

**Article 4**  
**Intellectual property**

5. Any knowledge held by a Party, especially studies, publications, patents, trademarks, but also any other intellectual property, technical or scientific information, knowledge, data, databases, softwares, files, drawings, schematics, or any other type of information in any form (the "Proprietary Information"), remains the property of the holding Party. The Proprietary Information may be used by the other Parties solely for the purpose of the joint study under this MoU. Notwithstanding the foregoing, the Proprietary Information specified by the holding Party to require its consent may not be used by the other Parties without the holding Party's prior written consent.
6. The Proprietary Information shall be provided "AS IS" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of fitness for a particular purpose, or non-infringement of intellectual property rights of any third party.
7. The Parties shall jointly retain property rights of the study "Gobitec and Asian Super Grid".
8. If a Party so requests, its logo shall be displayed at cover pages of all intermediate reports and a final publication.

**Article 5**  
**Confidentiality**

9. Each Party shall keep any Confidential Information (as defined hereinafter) disclosed to it under this MoU by any other Party strictly confidential and shall not use or disclose such Confidential Information to any third party (whether individual, corporation, or / and any other entity) except with the prior written permission of the disclosing Party. When a Party discloses its Confidential Information, it shall clearly label or mark the information as "confidential" at the time of disclosure. If any Confidential Information is orally or visually disclosed, the disclosing Party shall identify the information as "confidential" at the time of disclosure and confirm the confidentiality by a written specification with the term "confidential". Such specification shall be issued to the receiving Party within thirty (30) days after the date of the relevant oral or visual disclosure.
10. "Confidential Information" means any information, whether communicated orally, in written or electronic form, or contained in any other media. This shall not apply to information which, as can be established by the receiving Party, (a) was already known to the receiving Party; or (b) was developed independently by the receiving Party; or (c) was rightfully communicated to the receiving Party from a third party; or (d) was already in the public domain or subsequently entered the public domain through no fault of the receiving Party; or (e) is required to be disclosed by law, or accounting or stock exchange regulations in which case the receiving Party will consult with the disclosing Party about the form and content of such required disclosure as soon as possible.

**Article 6**  
**General Terms and Termination**

11. Each Party decides on its own to communicate and to cooperate with the other Parties. Nothing in this MoU is construed as establishing a contract or other legally binding commitment except Article 4, Article 5 and paragraph 14 in Article 6.
12. The KEEI and the ECS intend to make financial contributions towards the costs of an external consultant who will provide around 40 man/days of the consultancy work for the joint study. The ECS will act as Contracting Authority for the contract with such external consultant and bear all the legal responsibilities under the consultancy contract.
13. The ECS will provide the KEEI with a quote for the contract with external consultant described in the preceding paragraph. Within 30 days of the receipt of the quote, the KEEI shall transfer half of the amount specified in the quote to the bank account which is designated by the ECS.
14. The JREF, the MoE and ESI shall not be obligated to provide money, goods, or services of any kind to any legal entity or to the other Parties, or to enter into a contract (or into another legally binding commitment) with any legal entity.
15. This MoU constitutes the entire cooperation between the Parties and it may be modified, revised, extended or renewed only by written amendment.
16. Each Party may terminate this MoU on its part at any time upon 3 months' prior written notice to all the other Parties. Notwithstanding such termination, this MoU with relation to the other Parties will remain effective, and in such event the remaining Parties will discuss the handling of the part of the Party that has withdrawn from this MoU. Article 5 "Confidentiality" shall be legally binding for 1 year following any termination.

**Article 7**

**Validity**

17. The provisions of this MoU shall be effective upon the signature by all the Parties.
18. This MoU was signed in 5 originals, in English language, and all originals being equally authentic.

**Article 8**

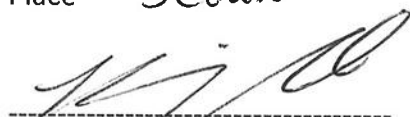
**Accession of new parties**

19. This MoU is open for signature by new partners from the region of North-East Asia in particular from the People's Republic of China until 31 March 2013 inclusive. Any such accession is subject to the approval by all the original partners (the KEEI, the ECS, the JREF, the MoE and the ESI).

Korea Energy Economics Institute

Date 22 Feb 2013

Place Seoul



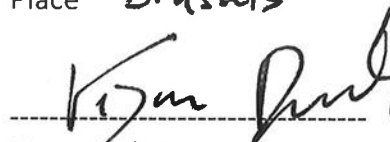
Name and signature

Nam-Yll KIM

Energy Charter Secretariat

Date 6 March 2013

Place Brussels



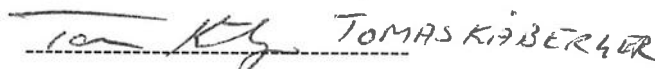
Name and signature

URBAN RUSNAK

Japan Renewable Energy Foundation

Date 28 February 2013

Place Tokyo



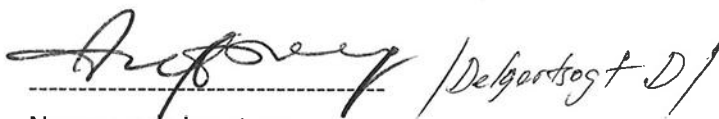
Name and signature

Ministry of Energy of Mongolia

State Secretary

Date 15-02-2013

Place Ulaanbaator



Name and signature

Energy Systems Institute of the Russia Federation

Date 28 February 2013

Place Tokyo



Name and signature

## Terms of Reference (ToR)

for

### study on the "Gobitec and Asian Super Grid" for renewable energies

#### Background

The Energy Charter Treaty<sup>1</sup> (ECT) provides a multilateral framework for energy cooperation that is unique under international law, and the strategic value of the rules provided therein is likely to increase in the context of efforts to build a legal foundation for global energy security, based on the principles of open, competitive markets and sustainable development. The member and observer countries of the ECT aim at promoting access to international markets and works towards developing an open and competitive energy market.

Mongolia as an ECT member country has recently shown a keen interest in further developing regional co-operation in the area of renewable energy and infrastructure development with countries in the North-East Asia region, namely, Japan (ECT member country), the Republic of Korea (ECT observer country) and China (ECT observer country).

Combined with modern power transmission technologies, renewable energy can support the long-term economic prosperity of the region. According to the Mongolian National Renewable Energy Center, Mongolia has a potential renewable energy capacity of 2.6 million megawatts. It is estimated<sup>2</sup> that this figure is seven times that of all the world's operational nuclear reactors. The Gobi Desert is estimated to be the third largest potential source of solar energy in the world and also blessed with steady, strong wind speeds making it ideal for both technologies. However, this attractive geographic zone for development of renewable energy sources is very isolated and requires investment and connection to the regional energy market.

The "Gobitec" is an industrial initiative, a concept similar to the DESERTEC Concept, by which energy is produced in the desert regions of China and Mongolia, and brought via high-voltage lines to the industrial centers of China, South Korea and Japan.

In this context, it is also important to make a reference to a recent Memorandum of Understanding (MoU) signed between Japan Renewable Energy Foundation (JREF) and DESERTEC Foundation to promote as Asian Super Grid Initiative (ASG) for renewable energies on March 10, 2012.

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<sup>1</sup> The Energy Charter Treaty (ECT) and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects were signed in December 1994 and entered into legal force in April 1998. To date, the Treaty has been signed or acceded to by fifty-one states, the European Community and Euratom (the total number of its members is therefore fifty-three).

<sup>2</sup> Source: Mongolian National Renewable Energy Center

The ASG initiative aims to construct High-Voltage Direct Current Transmission (HVDC) in Asia and interconnect national grids of Japan, the Republic of Korea, China, Mongolia and Russia so that abundant renewable energy sources in remote areas could be utilized.

It was stated<sup>3</sup> that “[t]echnologies to harness solar and wind energy have improved dramatically in the last few years. Combined with modern power transmission technologies, renewable energy can support the long-term economic prosperity of the region. Establishing an Asian Super Grid will be challenging and require a high-level international collaboration, but its benefits make it worth the effort.”

It was also noted<sup>4</sup> “[t]he efficient use of the practically inexhaustible energy of the East Asia desert sun in combination with the expansion of renewable energy sources can sustainable [sic] improve living conditions for current and future generations of Mongolia, China, Japan, the Koreas and the Mekong region. It also offers these countries the chance to take a leading role in the fight against climate change by harnessing the most abundant of all energy sources on earth.”

### **Partners**

The KEEI ([www.keei.re.kr](http://www.keei.re.kr)) is based in the Republic of Korea and it is a research institute that utilizes world-class expertise specializing in the energy sector to take the lead in understanding changing circumstances in the energy industry both at home and abroad. KEEI achieves this goal by reinforcing its function to lead energy policy, stabilize research infrastructure, and strengthening organizational capacity with expanded responsibilities.

The ECS ([www.encharter.org](http://www.encharter.org)) is based in Belgium and it is the secretariat of an international organization that was established in 1994 under the Energy Charter Treaty in order to serve the Energy Charter constituency. The ECS works on encouraging and facilitating international energy co-operation. Its key principles of openness of energy markets and non-discrimination have the potential to stimulate foreign direct investment and cross-border trade.

The Ministry of Energy (MoE) of Mongolia ([www.energy.gov.mn](http://www.energy.gov.mn)) is a line ministry in charge of policy-making for the energy sector. The policy areas under the Ministry of Energy include: development of energy resources; energy use; import and export of energy; construction of power plants, lines and networks; energy conservation; use of renewable energy sources; monitoring the sector; approving rules and regulations for the sector and international cooperation.

JREF ([www.jref.or.jp](http://www.jref.or.jp)) is based in Japan and it has a mission to establish a society based on renewable energy. JREF's activities include: research, development of policies, development of measures and financial/business models that are based on the dynamics of markets and society, promotion of renewable energy. The foundation builds up partnerships and networks with international/domestic organizations and civil societies to promote capacity

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3 Dr. Tomas Kaberger, JREF Executive Board, Press Release of 10 March 2012, JREF

4 Dr. Thiemo Gropp, Director of the DESERTEC Foundation, Press release of 12 March 2012, JREF

building and support public awareness for further recognition and deployment of renewables.

ESI ( [www.sei.irk.ru](http://www.sei.irk.ru)) is based in the Russia Federation and it has expertise with focus on optimal development and operation of electric power systems of different levels, including territorial, regional, national, and international. The Institute contributed to development of the energy strategies and programs for several regions of the Russian Federation. The institute has established extensive contacts with scientific organizations in many countries and participates in international research projects, and organizes international conferences and workshops.

### **Scope of Study**

The core objective of the joint study is to provide the countries in North-East Asia and the international community with reliable information and data concerning potential of renewable energy sources in this region, stimulate interest of private sector and international investors, provide recommendations on how to maximize international and regional cooperation in order to promote the “Gobitec and Asian Super Grid” initiatives.

### **Methodology**

The general requirements of the study methodology are:

- It must be technically simple, cost effective and non-resource consuming;
- It must analyze all the issues and present a simple and understandable report for energy and environmental specialists, national authority officials and interested members of the public.

Due to limited resources, the study will be limited to a desktop study research, interviews and consultations with relevant national authorities and the private sector. The study does not envisage an extensive research but rather build upon the existing research work and the materials from relevant international and national organizations.

### **Division of responsibilities**

ECS will hire a qualified consultant(s), bearing the overall responsibility to prepare intermediate and final reports.

The project partners will also use internal human resources to prepare certain parts of the study, namely:

- ECS will contribute to Chapter 1, 3, 5 and the study. Specifically, ECS will be a leading author in chapter 3 and coordinate the study.
- KEEI will contribute to Chapters 1, 2, and 5. Specifically, KEEI will be a leading author in chapter 2.
- MoE will contribute to all chapters for relevant information.



- JREF will contribute to Chapters 4 and 5. Specifically, JREF will be a leading author in chapter 4;
- ESI will contribute to all chapters for relevant information.
- All the partners need to provide the relevant information for each chapter if the leading author request to the partners.
- External Consultant will be a leading author in Chapter 1 and 5 and has an overall responsibility to integrate all inputs from all partners, to prepare remaining chapters and deliver the intermediate and final reports to all project partners.

KEEI and ECS are responsible for publishing the study and share costs of publication. Upon the successful completion of the study, the ECS will make publication of the study in hard copies (number of copies to be decided by ECS). All project partners are invited to publish electronic copy of the publication at their respective web site free of charge.

### **Meetings**

Regional meetings among interested partners could be organized, where necessary, provided that such meetings are affordable in terms of financial resources.

The project partners might conduct a workshop and / or Conference in the interested country in North East Asia to discuss outcomes of the study and opportunities to intensify regional co-operation involving Energy Charter constituency, private sector and international organizations.

### **Reporting**

The work of an external consultant shall operate under the management of the Contracting Authority<sup>5</sup>. All communication with the external consultant must be channeled through ECS.

All reports shall be in English. Draft reports from consultant shall be first submitted to KEEI and ECS for approval. After such approvals, those reports shall be disseminated to all project partners.

- First draft report shall be submitted by July 31, 2013.
- Final report to be submitted October 31, 2013 unless otherwise agreed in the course of the action.

### **Duration of the study**

Starting date: 1 February 2013  
 Finishing date: 31 October 2013 (or when all outputs are delivered)

### **Qualification of consultants**

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<sup>5</sup> The ECS acts as a Contracting Authority with a consultant

Number of consultant man/days: 40

The team of the Consultant (altogether 40 man/days) will include at least the following key competences:

- Programme Manager: Socio economist (5 years university studies and 15 years of experience) with experience on the development of energy policies and strategies, and knowledge of the regional context.
- an Energy Economist: (5 years university studies and 15 years of experience) with extensive experience in the countries of East Asia, good expertise in development of strategy, energy policies and renewable energy sources;
- a Senior Analyst: a specialist in modeling energy scenarios and database (5 years university studies and 10 years of experience) with good experience in modeling of energy policy, project management and modeling tool development.

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<A Draft of ASG Preliminary Concept Design>

□ Concept Diagram of Target System

- “Develop the grand Renewable Energy Sources (Wind & Solar) more than a few hundreds GW of GOBI Desert and Transmit the produced electricity to East countries like RUSSIA, CHINA, KOREA and final destination JAPAN through ASG (Asian Super Grid, Trunk Line)”.
- Power Grids including conventional, renewable power sources, transmission, distribution systems and electricity consumers of each country (MO, RU, CH, KO, JP) could interconnected to Trunk Line. This means power grids of all countries connected to Trunk Line will operate in parallel at the same time, but asynchronously. GOBITEC produced electricity will supply to all countries connected to Trunk Line and also all countries could trade or exchange electricity depending on their load curve and surplus/deficit of real time demand/supply status with each other.
- The Grand Trunk Line would be constructed using HVDC technology option and its length will be longer than a few thousand km. But, the detailed technology specifications should be studied and determined. Economic Benefits would be highly dependent on detailed technology specifications, transmission length and electricity tariffs.

**(GOBITEC > 100GW) HVDC Trunk Line Power Transmits to MO, RU, CH, KO, JP with mainly Renewable Source**

