North-East Asian Regional Power Interconnection and Cooperation Forum 2018

CURRENT STATUS AND PROGRESS IN MONGOLIA FOR POWER INTERCONNECTION

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CONTENT

- Introduction of the MEEI
- Power Sector Policy for Regional Cooperation
  - Current State and Regional Cooperation Policy
  - Recent Aspiration towards Energy Cooperation Development
    - Changes on Legal Environment
    - Power Sector Objectives in Government Action Plan 2016-2020
- Regional Cooperation Potential
  - Primary Energy Endowments
  - Energy trade
  - Potential Cooperation Projects
MONGOLIAN ENERGY ECONOMICS INSTITUTE

INTRODUCTION OF THE MEEI

HISTORY

1959
- First established by the Minister of Industry, with total staff of 7 people.

1969
- It was expanded to “Mining, power plant design and research institute”

1998
- It was transferred to Ministry of Education and Science and was named “Energy corporation”, state owned, self-sustained enterprise.

2013
- It has been transferred from the Ministry of Education and Science to the Ministry of Energy. The name of “Energy Corporation” has been changed to “Mongolian Energy Economics Institute”

2017
- It was transferred to be administered by the Government agency for policy coordination on state property.
Researches Implemented

- Feasibility studies of 200 MW Gas Power plant and 50 MW Heavy Fuel Oil Packaged power plant, which were done for Korean “East Asia Energy” LLC.

- Feasibility study and preparation of technical design plans for the “Solar energy project” in the capital of Dundgobi province.

- Feasibility study of 700 MW Power plant to be built near Ovoot tolgoi coal mine in Gurvantes county of Umnugobi province.

- Preliminary research work for the technical updates of regional electricity distribution networks of “Baganuur, southeast region’s electricity distribution network” SOJSC and “Darkhan Selenge’s electricity distribution network” JSC.

- Feasibility studies of 50 MW expansion Choibalsan Power plant

- Feasibility studies of 50 MW expansion Amgalan heating plant
National vision towards regional energy connectivity

1. Vision statement
   Vision of this policy document is to fully provide reliable operation of the energy sector, energy security, sustainable development and economic growth of the country and become an energy exporting country with efficient and environmentally friendly technology.

2. Strategies
   One of total 6 strategic goals in the document is - 3.1.2 Developing a mutually beneficial cooperation with neighboring and regional countries on energy;

3. Specific policies
   - Establish long-term agreement on energy trade with neighboring countries
   - Enhance legal environment for foreign investment in the energy sector
   - Support export oriented energy projects
POWER SECTOR POLICY FOR REGIONAL COOPERATION

National vision towards regional energy connectivity

PRIORITY AREAS AND STRATEGIC GOALS

SAFETY

- Ensure energy safety and reliable supply
- Develop mutually beneficial cooperation with regional countries
- Develop a human resource

STATE POLICY ON ENERGY 2015-2030

EFFICIENCY

- Transfer the state dominated energy sector into private based competitive market
- Support innovation and advanced technology in energy sector, and implement conservation policy

ENVIRONMENT

- Increase the production share of renewables and reduce negative environmental impact from traditional power generation and greenhouse gas
Main drivers and motivation towards energy connectivity for Mongolia

- Big territory and rich energy resource
  - Rich domestic primary energy resources
  - Few population and limited domestic market

- Economic Benefits
  - Job creation
  - Diversification of economy
  - Cheap electricity from big generation unit

- Social Benefits
  - Poverty/unemployment reduction
  - Improved local infrastructure development
  - Increased energy security
Recent aspiration towards regional energy cooperation development:

- **Concession Law approved in 2010** - Establish the framework for granting concessions to private investors to use existing infrastructure facilities owned by the state, and to construct new infrastructure facilities for the purpose of providing services to the general public.

- **Investment Law approved in 2013** - Protect the legal rights and interests of investors in the territory of Mongolia, to establish a common legislative guarantee for investment, to stabilize the tax environment.


Government Action Plan 2016-2020 was approved in Sep 2016

- **Power Sector Objectives:**
  - Extend capacity of existing Combined Heat and Power Plants
  - Build new power plants in central region
  - Implement export oriented open mount power plant Project /based on Shivee-Ovoo and other coal deposits /
  - Increase share of renewable generation
  - Extend power transmission network
  - Renew heat supply systems in province centers
  - Enhance efficiency and introduce advanced technology
  - Enhance legal environment of Coal bed methane gas, implement pioneer projects
### Structure of Primary Energy Supply by Source

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>'00-'05</td>
</tr>
<tr>
<td>Coal</td>
<td>1,798</td>
<td>1,895</td>
<td>2,324</td>
<td>6,884</td>
<td>4,247</td>
<td>1.0%</td>
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<tr>
<td></td>
<td>70.2%</td>
<td>67.7%</td>
<td>65.6%</td>
<td>80.7%</td>
<td>71.2%</td>
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<tr>
<td>Oil</td>
<td>472</td>
<td>584</td>
<td>879</td>
<td>1,284</td>
<td>1,243</td>
<td>4.3%</td>
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<tr>
<td></td>
<td>18.4%</td>
<td>20.9%</td>
<td>24.8%</td>
<td>15.1%</td>
<td>20.8%</td>
<td></td>
</tr>
<tr>
<td>Hydro</td>
<td>0.25</td>
<td>0.28</td>
<td>4.73</td>
<td>8.96</td>
<td>18.72</td>
<td>2.1%</td>
</tr>
<tr>
<td></td>
<td>0.01%</td>
<td>0.01%</td>
<td>0.13%</td>
<td>0.11%</td>
<td>0.31%</td>
<td></td>
</tr>
<tr>
<td>Traditional Fuels &amp; Others</td>
<td>293</td>
<td>321</td>
<td>337</td>
<td>348</td>
<td>370</td>
<td>1.8%</td>
</tr>
<tr>
<td></td>
<td>11.4%</td>
<td>11.5%</td>
<td>9.5%</td>
<td>4.1%</td>
<td>6.2%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2,564</td>
<td>2,800</td>
<td>3,545</td>
<td>8,526</td>
<td>5,968</td>
<td>1.8%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

### Trend in Supply Share


- Coal: 70.2 → 67.7 → 65.6 ↑ → 80.7 → 71.2
- Petroleum Prodts: ↑: 18.4→20.9→24.8→15.1→20.8
- Hydro: ↑: 0.01→0.01→0.13→0.31
- Tradnl Fuels & Others: ↓: 11.4→11.5→9.5→4.1→6.2
**Mongolian Energy Economics Institute**

**Chadan, Russia, 110 kV line connection**
- Import 107 GWh /75% of western system/

**Buryat Energo, Russia, 220 kV line connection**
- Import 176 GWh /5% of central system/
- Export 54 GWh

**IMPC, China, 220 kV line connection**
- Import 1200 GWh /15% of central system/

**Current State of Power Sector**

**Power Generation Sources**
- Total Capacity 1.3 GW
- Coal fired Thermal Power Plant 77%
- Diesel Engines 0.08%
- Solar 0.007%
- Wind 2.2%
- Hydro 0.85%

**Import** 20%
- Diesel Engines
- Coal

**Export** 54 GWh
- Coal

**10-35 kV line connections**
Estimated total resources ~ 173 billion ton in 15 coal basins
Over 370 identified occurrence in 85 deposits
Proven Reserves 12 billion ton, of which 2 billion is coking coal
Around 1/3 in Gobi Region
Around 1/3 in Eastern Region

Mines in Gobi area are for export /17 million in 2015/
- Nariin Sulhait
- Tavan Tolgoi

Mines in other region are for power production and household heating /7 million in 2015/
- Baganuur, Shivee-Ovoo, Sharin Gol, Aduunchuluun etc.,
Rich resources of Solar, Wind and Hydro in Mongolia:

- **Solar:** 270-300 sunny days in a year, 4.3-4.7 kWh/meter or higher per day
- **Wind:** 10% of the total land area can be classified as excellent for utility scale applications, Power density 400-600 W/m², the resource could potentially supply over 1100 GW of installed capacity.
- **Hydro:** Theoretical potential 6.2 GW, more than 1 GW of these has been identified
### Energy Production, Imports and Exports by Source in 2015

<table>
<thead>
<tr>
<th>Sources</th>
<th>Coal</th>
<th>Crude Oil</th>
<th>Petroleum Products</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous Production</td>
<td>10'934.5</td>
<td>1'109.8</td>
<td>0.0</td>
<td>476.5</td>
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<tr>
<td>Import</td>
<td>0.0</td>
<td>0.0</td>
<td>1’224.9</td>
<td>121.8</td>
</tr>
<tr>
<td>Export</td>
<td>6'872.5</td>
<td>1’109.8</td>
<td>0.0</td>
<td>4.4</td>
</tr>
<tr>
<td>Domestic supply</td>
<td>4’247</td>
<td>0.0</td>
<td>1’242.9</td>
<td>593.9</td>
</tr>
</tbody>
</table>

**Indigenous Production**
- Coal: 10'934.5
- Crude Oil: 1'109.8
- Petroleum Products: 0.0
- Electricity: 476.5

**Import**
- Coal: 0.0
- Crude Oil: 0.0
- Petroleum Products: 1’224.9
- Electricity: 121.8
  - 95% from Russia
  - 4% from China
  - 1% from others

**Export**
- Coal: 6'872.5
- Crude Oil: 1’109.8
- Petroleum Products: 0.0
- Electricity: 4.4
  - 100% to Russia

**Domestic supply**
- Coal: 4’247
- Crude Oil: 0.0
- Petroleum Products: 1’242.9
- Electricity: 593.9

(Unit: 1,000 TOE)

**Energy Trade Graph**
- Indigenous Production
- Import
- Export
- Domestic Supply

(Unit: 1,000 TOE)
ENERGY TRADE

Trade Value of Mongolian Energy Trade

(Unit: million USD)
Recourse Based Power Trade

Coal Based

- Metallurgical coal will be extracted for exports
  - Raw coal, Washed coal, Produced coke
- Thermal coal resources can be utilized for on-site electricity production for the purpose of export.
  - Abundant thermal coal resources in Mongolia
  - Possible export markets: China, Korea, Japan lead its Electricity demand in the region
  - Ultra-high voltage (UHV) electricity transmission technology /800 kV, 1000 kV and above/ is developing year by year.
Recourse Based Power Trade

Renewable based

- Rich Solar and Wind Rich Resources in Gobi Area /Southern part of Mongolia and Northern part of China/
- Green and Sustainable Energy
  - Gobi Tec and Asia Super Grid Initiative
THANK YOU FOR YOUR ATTENTION