North-East Asia Power Interconnection and Cooperation
- for a clean, sustainable and reliable regional power grid

Hongpeng Liu
Director, Energy Division
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Niggata, Japan

Total Primary Energy Supply 1990-2017

Source: International Energy Agency (IEA), World Energy Statistics and Balances
## Energy Self-Sufficiency of the NEA Subregion in 2016

<table>
<thead>
<tr>
<th>Country</th>
<th>Energy production (MTOE)</th>
<th>Total primary energy supply (MTOE)</th>
<th>Self-sufficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>2,360</td>
<td>2,958</td>
<td>80%</td>
</tr>
<tr>
<td>DPRK</td>
<td>21.3</td>
<td>8.8</td>
<td>242%</td>
</tr>
<tr>
<td>Japan</td>
<td>35.4</td>
<td>426</td>
<td>8%</td>
</tr>
<tr>
<td>Mongolia</td>
<td>20.8</td>
<td>5.0</td>
<td>416%</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>51</td>
<td>282</td>
<td>18%</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1,374</td>
<td>732</td>
<td>188%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,863</strong></td>
<td><strong>4,412</strong></td>
<td><strong>88%</strong></td>
</tr>
</tbody>
</table>

Source: IEA 2017

## Top five importers & exporters by energy source in Asia-Pacific, 2016 (MTOE)

### Asia-Pacific top 5 energy importers by source, 2016

- **China**: 381
- **Japan**: 256
- **India**: 116
- **ROK**: 109
- **Singapore**: 109

### Asia-Pacific top 5 energy exporters by source, 2016

- **Russia**: 256
- **Australia**: 232
- **Indonesia**: 208
- **Iran**: 133
- **Singapore**: 97
Electricity Generation in North-East Asia (TWh)

Electricity generation in 2015

China, 6187.11
Russia, 1088.94
Mongolia, 5.667
Japan, 1051.8
DPRK, 16.926

Electricity Trade in North-East Asia (GWh)

Source: Energy Systems Institute, Russia, and Ministry of Energy, Mongolia
Current Electric Generation from Renewables in 2016 (GWh)

Population without Access to Electricity in NEA, 2016

<table>
<thead>
<tr>
<th>Country</th>
<th>Electrification rate (%)</th>
<th>Population without electricity (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Urban</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>39.2</td>
<td>39.2</td>
</tr>
<tr>
<td>Mongolia</td>
<td>82</td>
<td>95.8</td>
</tr>
</tbody>
</table>

Source: World Bank, cited from ESCAP, 2017
Benefits of power interconnection

Energy security
• stable supply of electricity
• improvements of subregional and regional security
• peaceful relations among member states

Efficient use of resources and Economic benefits
• collectively utilizing power capacities/lower cost of energy supply due to optimized use of energy resources (smaller reserve margins)/balance load
• reducing investment and operational costs
  • Greater Mekong Sub-region study suggests that regional cooperation in energy could reduce energy costs by nearly 20%, for a saving of $200 billion from 2005 to 2025 (ADB)
  • In Europe the potential benefits of market integration range from US$ 14 billion to 45 billion per year, or roughly 1% to 10 % of system costs. (Booze & Co)

Renewable energy uptake
• integration of more renewables to the grid

Energy access improvement

Proposals/initiatives for Power Grid Interconnections in NEA
• Northeast Asia Super Grid (Skoltech Institute of Science and Technology, Russia)
• Northeast Asian Electrical System Ties (Malentiev Energy System Institute of Russia and Korea Electrotechnology Research Institute)
• Gobitec and Asian Super Grid (Mongolia, Energy Charter)
• Asia Super Grid (Renewable Energy Institute, previously, Japan Renewable Energy Foundation)
• Northeast Asia Super Grid (Korea Electric Power Corporation)
• Strategy for Northeast Asia Power System Interconnection (Mongolia, ADB)
• Northeast Asia Regional Power Interconnection and Cooperation Forum a communication and cooperation mechanism for Northeast Asia regional grid among stakeholders (China Electricity Council, State Grid Corporation of China, GEIDCO)
Political support to power interconnection

- Russian President Vladimir Putin on the North-East Asia Super Energy Ring in September 2016/Russia’s New East Asia Policy
- President Moon/Korea’s New Northern Policy
- Chinese President Xi Jinping on the Global Energy Interconnection in September 2015
- China-ROK Summit National Energy Administration of China and Ministry of Trade, Industry and Energy (MOTIE) of ROK made MOU for intergovernmental cooperation to establish a cooperation channel in the energy sector, December 2017
- Japan-Russia Summit, the Russian Federation reemphasized the need for a “Japan-Russia Power Bridge”, April 2017
- Mongolia Gobitec and Asian Super Grid
- Mongolian President Battulga proposed to establish a working group for an organization to support implementing the “North East Asian Super Grid” project, Sept 2018
Northeast Asia Energy Connectivity: Impacts & Strategy

- Late-mover advantage
- Political trust needs to be further nurtured
- 2030 Agenda for Sustainable Development
- The Belt and Road Initiative is also extended to the Eastern part of Asia, China could become the hub of the energy system in the NEA
- Only possible based on mutual benefits and political trust among all countries in NEA

Challenges

**Political**
- Lack of political will or political support to promote interconnections
- Current Government policy does not support interconnections
- National priorities that focus on domestic issues without considering transboundary power trade

**Regulatory**
- Investment restrictions
- Lack of competition
- Trade barriers
- Institutional arrangements

**Technical**
- Uncoordinated planning
- Incompatible technical standards
- Lack of expertise
- Lack of legal/regulatory framework

**Economic/financial**
- Electricity subsidies
- Uncertain laws and policies
- Lack of access to capital & investment
Way Forward to a power connected NEA

- Develop forums and policy dialogues for greater harmonization between regional electricity industry operators
- Encourage and foster the development of a regional energy power pooling market in order to enhance competitive trading opportunities
- Further studies to identify the socio-economic and environmental benefits with a specific focus on quantifying the economic benefits to strengthen the incentives for political commitment/innovative technologies
- Understand the importance of regulatory framework (power markets with policy goals to pursue sustainability of power generation)
- Explore to develop a non-binding regional agreement that focuses on the integration of sustainable generation to facilitate the acceleration of transboundary power trade

ESCAP’s work for power interconnections in NEA

ESCAP has a mandate to promote power interconnections in the region based on

- Ministerial Declaration of the Asian and Pacific Energy
- ESCAP Resolution 74/9 “Implementation of the outcomes of the second Asian and Pacific Energy Forum”

ESCAP supports dialogues and studies on energy cooperation in North-East Asia

- Annual North-East Asia Energy Security Forum in collaboration
- Annual Northeast Asia Regional Power Interconnection and Cooperation Forum (NEARPIC)
- In-depth study on transboundary power trade in Asia; subregional and regional consultations; a roadmap on power grid connectivity in Asia
ESCAP’s Role & Plan

- Play a valuable role in promoting the exchange of knowledge and wider application on good practices
- Improve performance of ongoing initiatives
- Provide neutral platform to build trust among countries, subregions and organizations
- Establish a better foundation (relationships, standards, institutions, etc.) for future integration
- Facilitate intergovernmental process/Expert Working Group-Energy Connectivity

Thank you!

E-mail: liu4@un.org