North-East Asia Power Interconnection and Cooperation

- for a clean, sustainable and reliable regional power grid

Hongpeng Liu

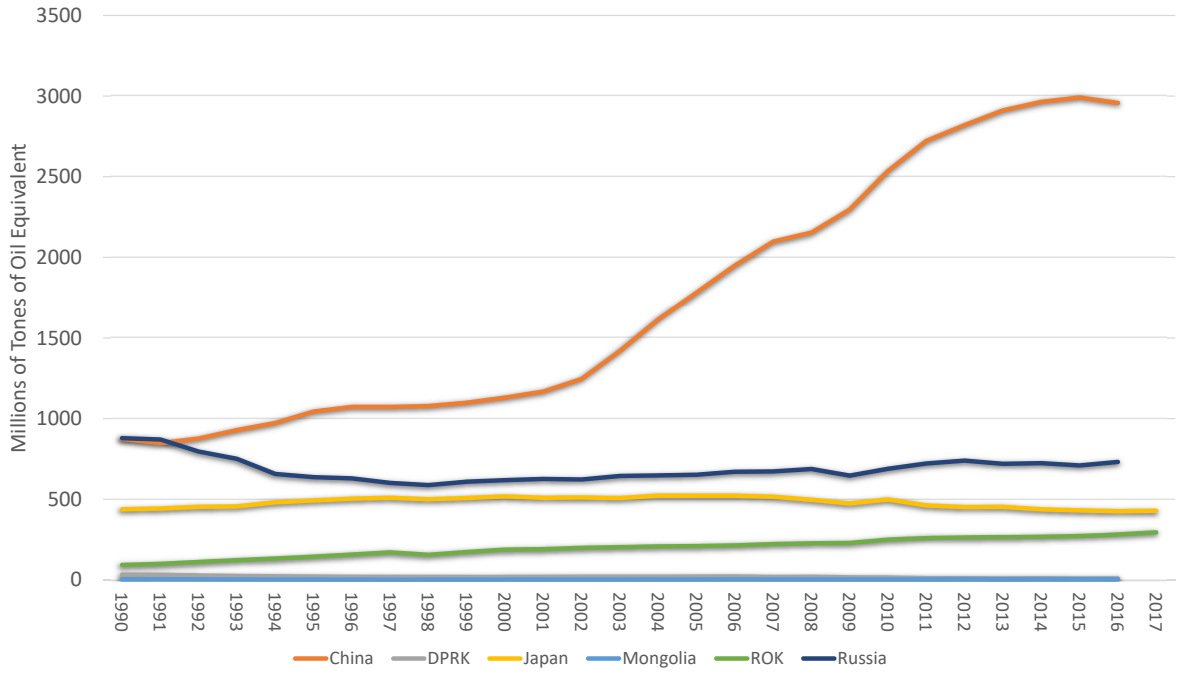
Director, Energy Division

30 Jan 2019

Niggata, Japan

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Total Primary Energy Supply 1990-2017



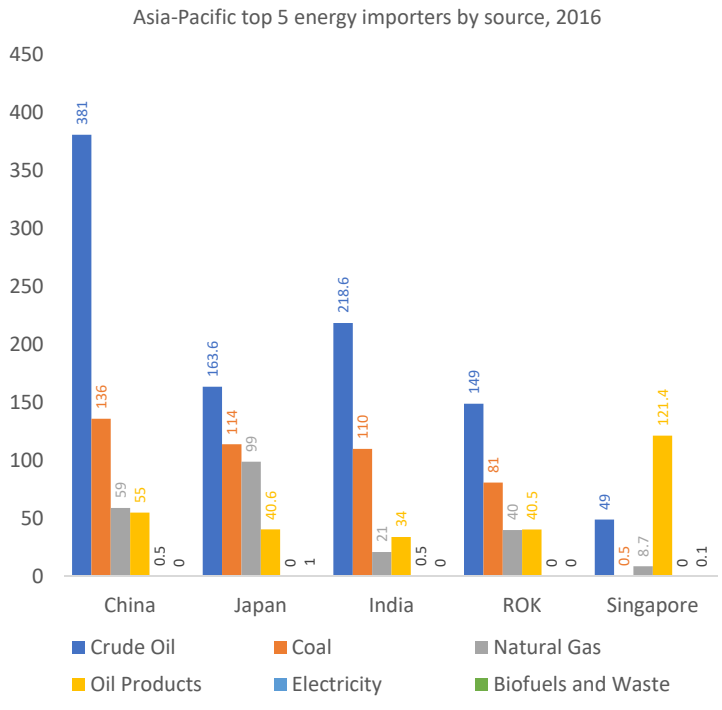
Source: International Energy Agency (IEA), World Energy Statistics and Balances

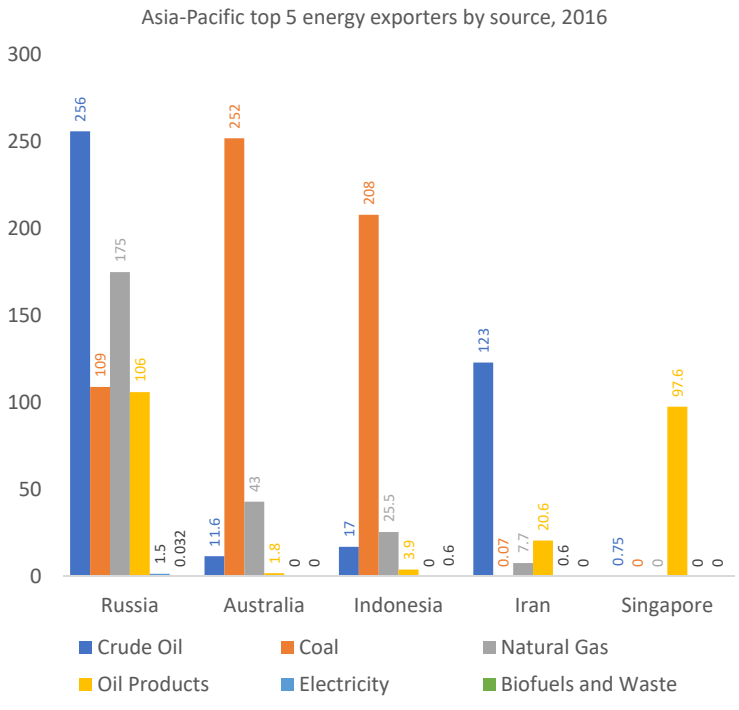
Energy Self-Sufficiency of the NEA Subregion in 2016

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

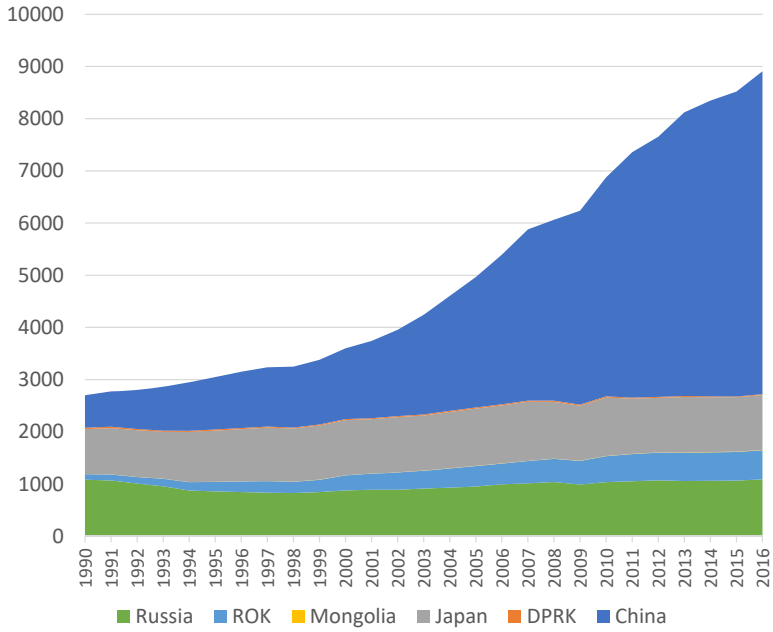
Source: IEA 2017

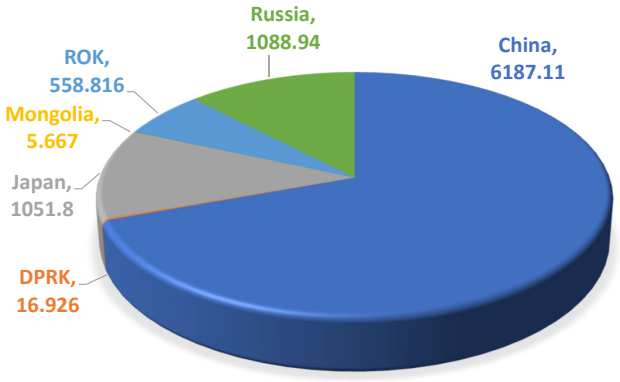
Top five importers & exporters by energy source in Asia-Pacific, 2016 (MTOE)





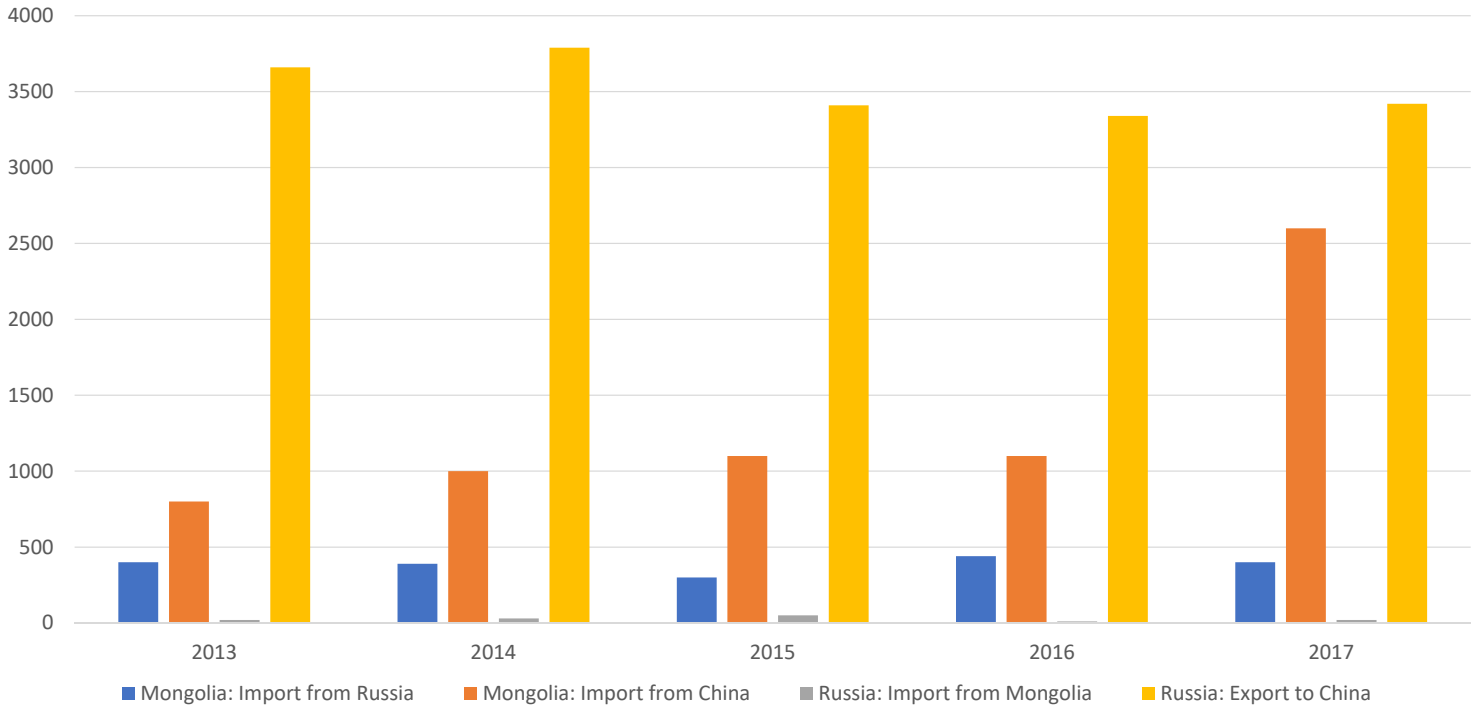
Electricity Generation in North-East Asia (TWh)





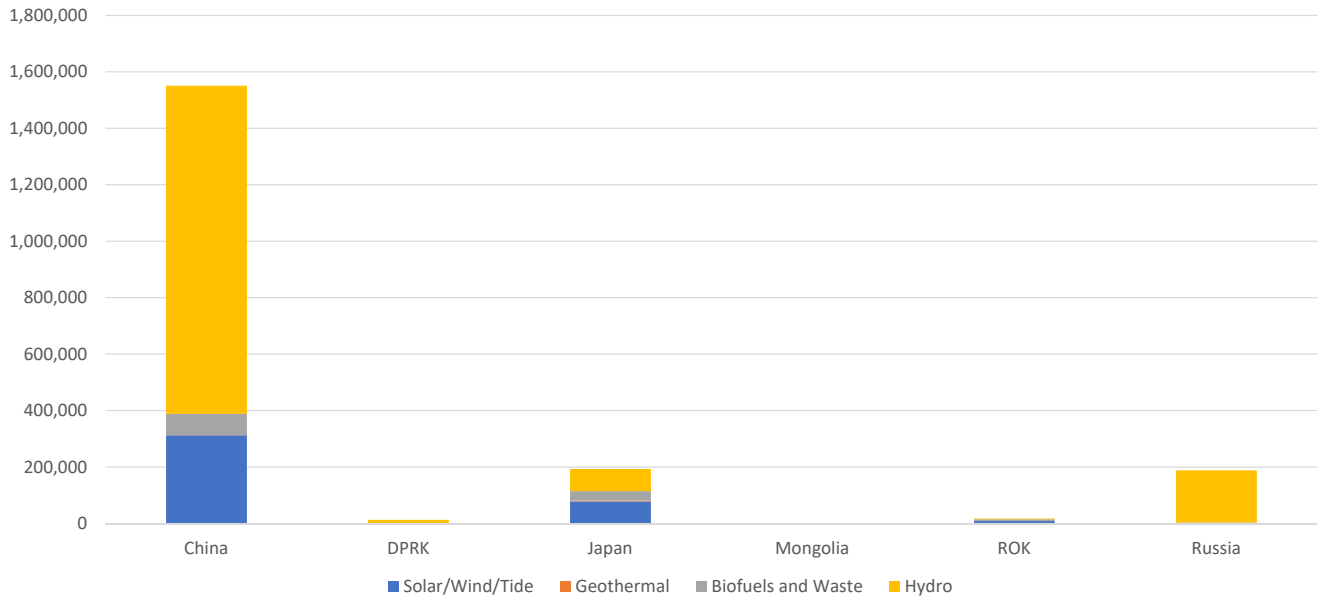
Electricity generation in 2015

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

Country	Electrification rate (%)			Population without electricity (millions)
	Total	Urban	Rural	
DPR Korea	39.2	39.2	39.2	15.4
Mongolia	82	95.8	44.2	0.6

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

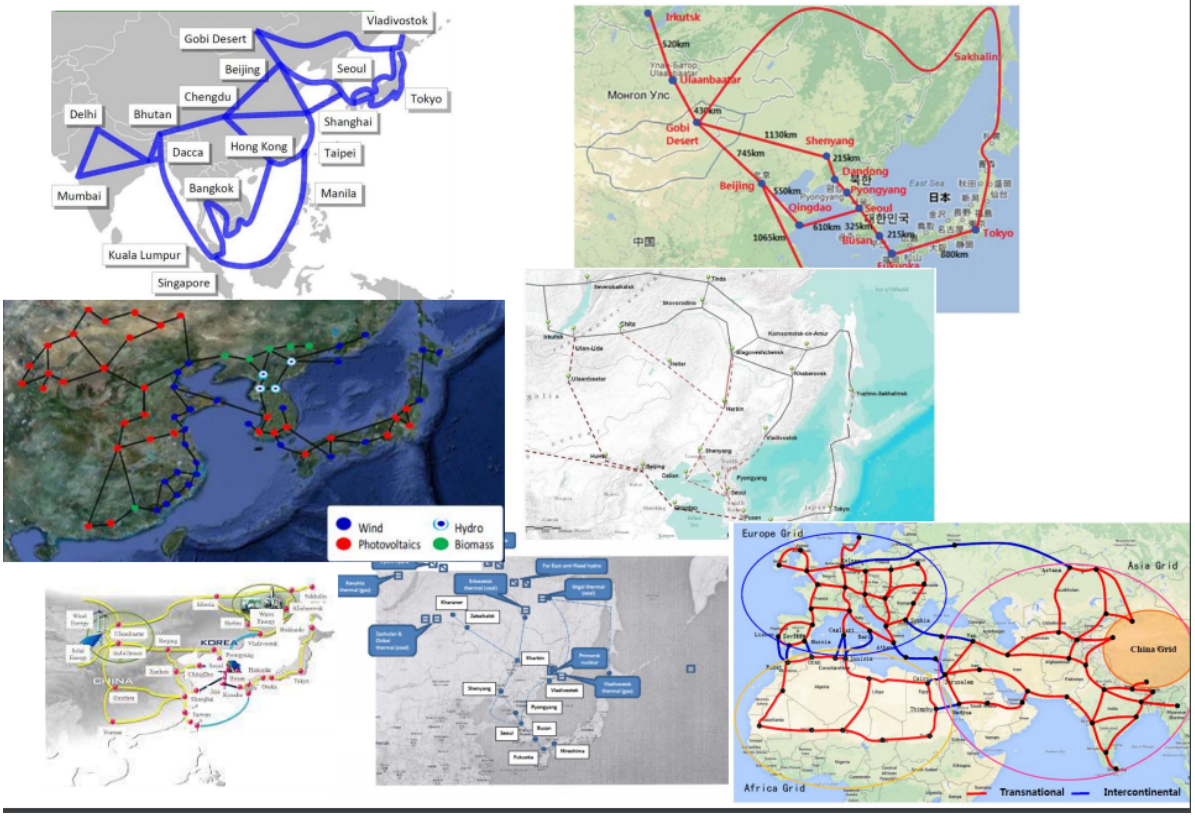
- integration of more renewables to the grid

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)
- ***International Consortium on Super Grid for Northeast Asia*** (Mongolian Society of Asian Super Grid, Korean Consortium for Super Grid and China Renewable Energy Society)
- ***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)

New approaches to cooperation: Power Grid Interconnections



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 Initiativet 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

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific