

Perspectives on Regional Energy Cooperation in North East Asia

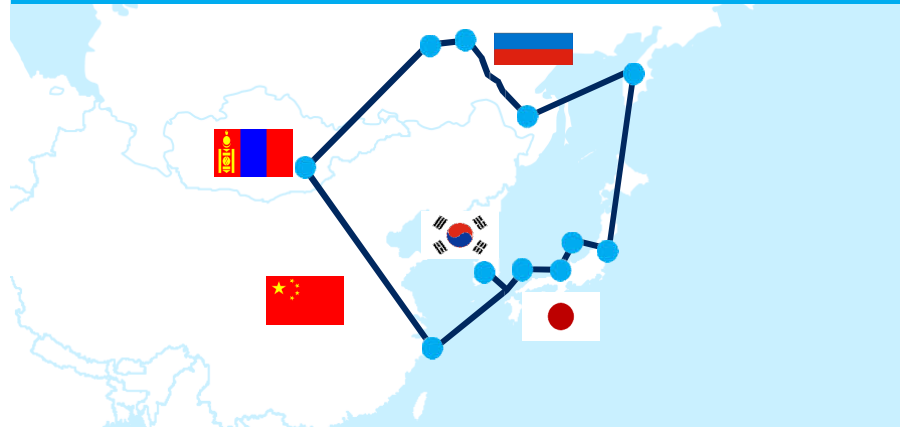
1. Status of NEA Energy and Necessity of Cooperation
2. Energy Cooperation in Gas and Power
3. Geopolitics, Geoeconomics and Innovation
4. Catalyst

Discussion document



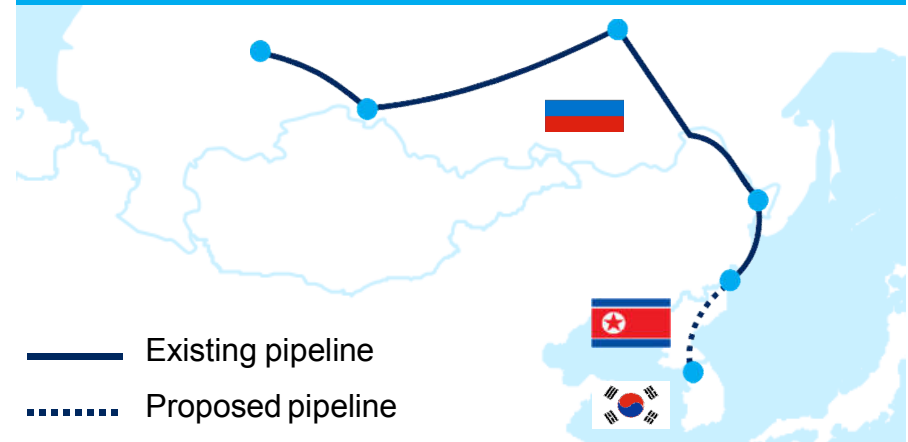
Over the last 25 years, various discussions on energy cooperation have taken place in Northeast Asia, especially focusing on power and gas

Energy cooperation in power Grid interconnection in NEA



- **Interconnecting electric power by connecting power systems between countries** in NEA
- Not only sharing existing electric power, but also includes **new development of energy sources** such as renewable energy, as well as building long-distance, ultra-capacity **transmission system**

Energy cooperation in gas Trans-Korea gas pipeline project



- **Building a gas pipeline** run from Russia's far east to South Korea through North Korea to **deliver 10 billion cubic meters of natural gas per year**
- Potential **economic benefit by replacing from LNG to PNG**, which costs 20-30% less than LNG

Discussions on NEA energy cooperation has recently become more materialized, moving beyond a mere political declaration to actual discussions on profitability and feasibility

Fundamental changes are happening in global energy markets with significant uncertainties, making energy cooperation a good strategy for NEA countries to achieve sustainable prosperity

Relevant for NEA energy cooperation



1 Energy demand plateau, power demand grows

- Global energy demand growth decelerates, following a structural decline in energy intensity
- However, electricity demand grows 4 times faster than all other fuels



2 Coal → Gas, Oil → LNG

- Coal demand peaks in next decade, oil in the next two
- In contrast, gas continues to grow modestly
- Especially, LNG is the fastest growing fossil fuel with price cyclicality, implying another price increase within 5-7 years



3 Renewable ↗

- Renewables' cost decline accelerates further, out-competing new-built fossil capacity today and existing capacity in 5-10 years
- Solar + ESS will become cost-competitive against coal within 5-10 years



4 CO₂ emissions plateau

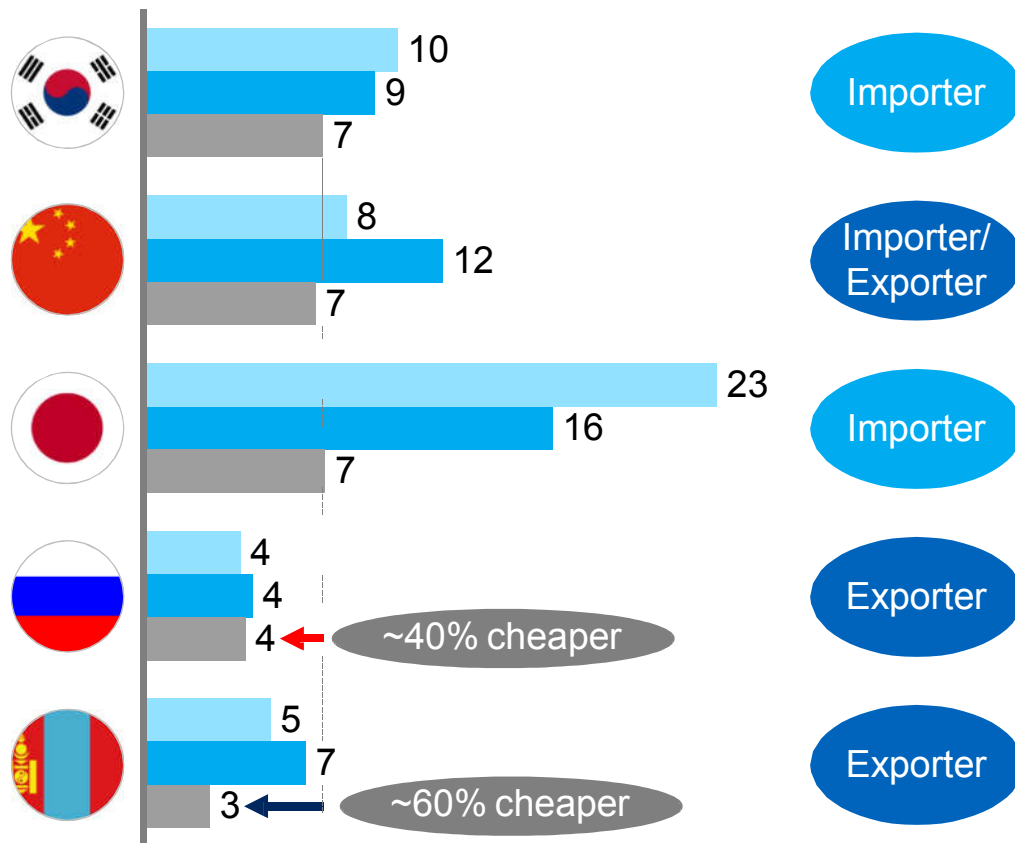
- CO₂ emissions plateau by 2030 and remain far from a 2°C pathway

Considering attributes of NEA power market, mutual complementarity of power supply and demand is expected to lead to great economic/political benefits from grid interconnection

Residential use Industrial use wholesale

Energy market conditions

Average wholesale/retail price comparison (P)
Cent/KWH, 2016



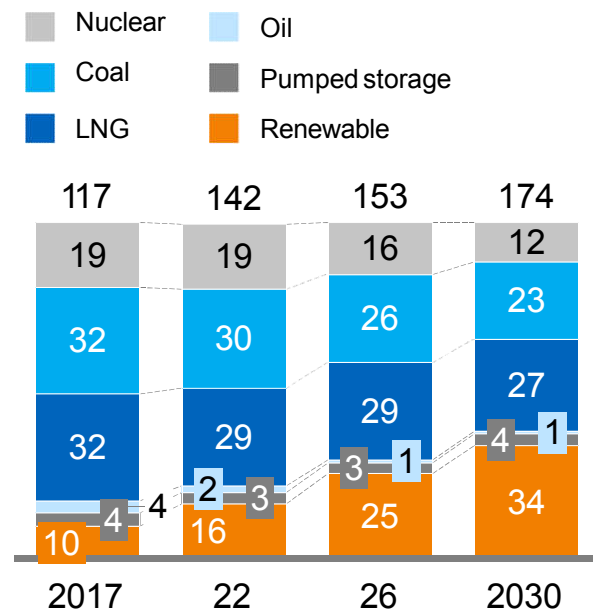
- Direct economic benefits can be expected through building power grid as countries show up to 60% differences in electricity wholesale prices
- Also, additional economic / political benefits are expected as countries in Asia can maintain close relationship by securing energy stability and forming economic cooperation
- Joint development of energy sources and continued expansion of power system are expected according to demand for green energy sources in each country

Korea 8th Basic Plan for Electricity Supply / Demand and Renewable Energy 3020 will boost Korea's nuclear phase-out and expansion of renewable energy

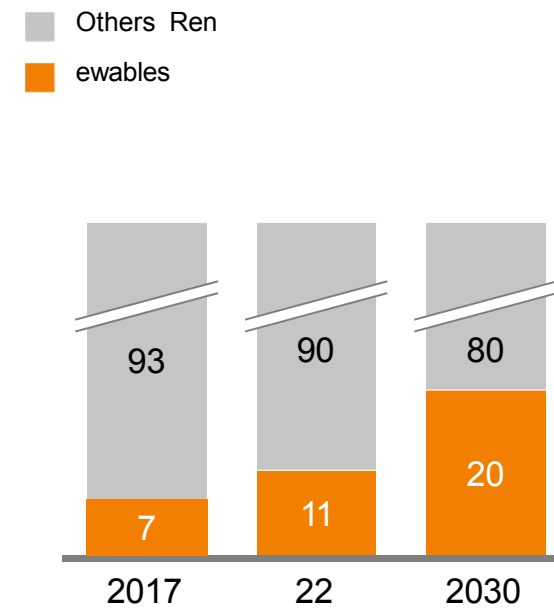
Outlook for domestic renewable energy according to 8th basic plan for long-term electricity supply/demand and renewable energy 3020

Power mix outlook for power facility capacity¹

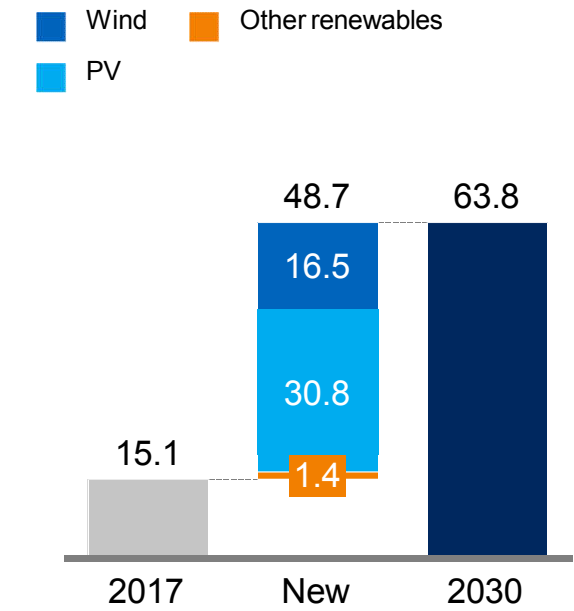
GW; Percentage



Renewable mix goals with 2030 power generation as a basis



New facility capacity for renewable mix goals






- Connect national power generation sources with power generation market to **address imbalances in power supply-demand and secure power stability**
- **Efficiently use regional energy sources** and expand renewable energy to **respond to climate change** and gain economic benefits from **power price drop**
- Form long-term power community, **expected to evolve into a regional community**

¹ Korea 8th Basic Plan for Long-term Electricity Supply and Demand, based on rated facility capacity

SOURCE: Korea 8th Basic Plan for Long-term Electricity Supply and Demand, 2nd Energy Master Plan, Team analysis

Recommendation needs to be thoroughly reviewed in order to prepare for potential major challenges

	Potential challenges and risks	Initial thoughts on how to address them
<p>Geopolitical risks</p> 	<ul style="list-style-type: none"> ▪ Political issues associated with the Korean peninsula such as <ul style="list-style-type: none"> – Increase in energy transit fee by North Korea – Sudden changes to negative attitude by North Korea to surrounding countries 	<ul style="list-style-type: none"> ▪ Establish an association that address the issue of cross-border exchange of energy ▪ Policies agreed between countries in the region such as <ul style="list-style-type: none"> – Reduce cost of new projects by efficient preparation, supply chain and connection – Collaboratively determine the demand for the import and export of energy ▪ Establish and strengthen collaboration between countries in the region for institutional, financial, legal and regulatory support
<p>Economic feasibility</p> 	<ul style="list-style-type: none"> ▪ Concerns to commercial and financial viability of energy cooperation such as High CAPEX, investment risks and uncertainty about future regional power demand between countries in the North East Asia 	
<ul style="list-style-type: none"> ▪ Global transition to renewable energy for power and gas 	<ul style="list-style-type: none"> ▪ Renewable energy targets to electrify the remote areas by installing wind power, solar PV and hydro power capacity 	

End of Document



NORTH
KOREA

A satellite night view of North Korea, showing a dense network of city lights and a yellow border. The text "NORTH KOREA" is centered over the map.