

Korea's Energy Security and Policy

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Global Energy Challenge



Concentration of Natural Resource Supply

Long transit distance and period

- ▶ Prone to disruption and the consequent risks of supply interruption



Climate Change

Sustainability

- ▶ Quantity vs. Quality



Shale Revolution

New Energy Geopolitics

- ▶ Stability vs. Instability



✓ Availability of Sufficient Supplies

- ▶ How to maintain the steady flow of supplies
- ▶ How to respond disruptions, dislocations and emergencies

✓ Access to Energy at Affordable Prices

- ▶ How to promote investments and innovation

✓ Creation of Cooperative Regime

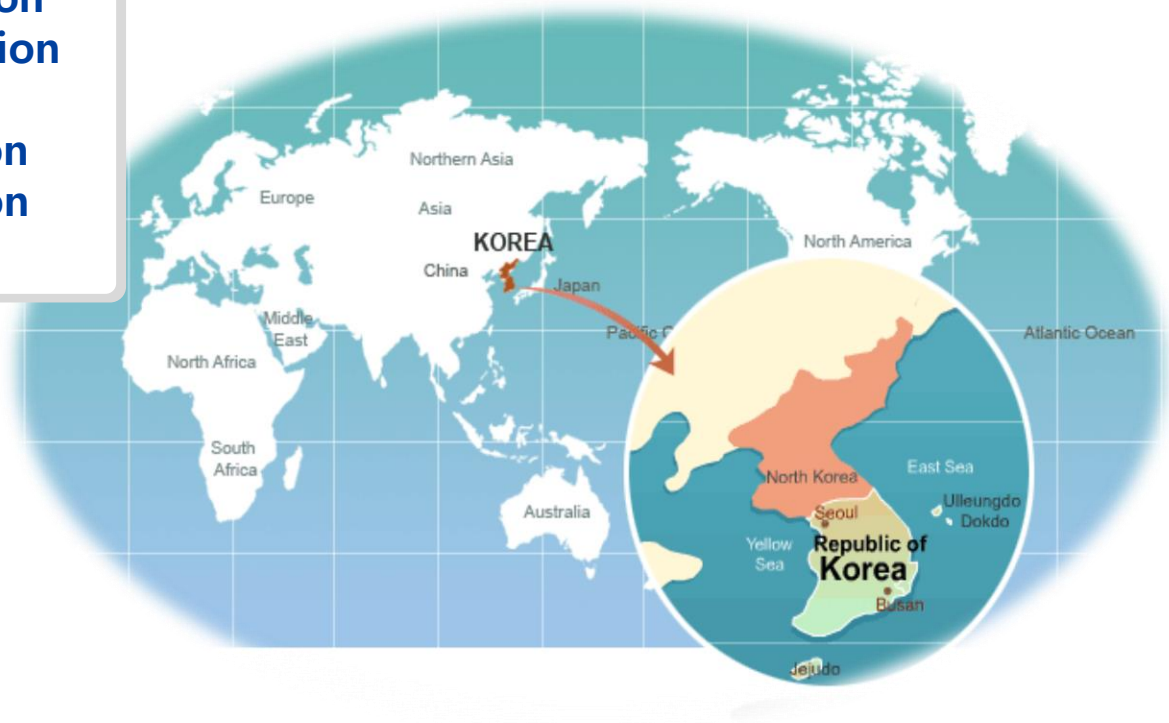
- ▶ How to make relations with suppliers and consumers

Korea's Energy Configuration



Major Indicator of Korea (2018)

Area	100,188 km²
Population	\$51.7 million
GDP	\$1,721 billion
Exports	\$605 billion
Imports	\$535 billion

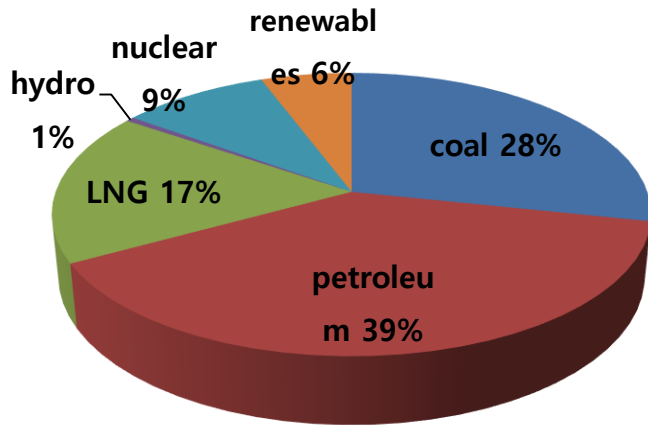


Korea's Energy Configuration

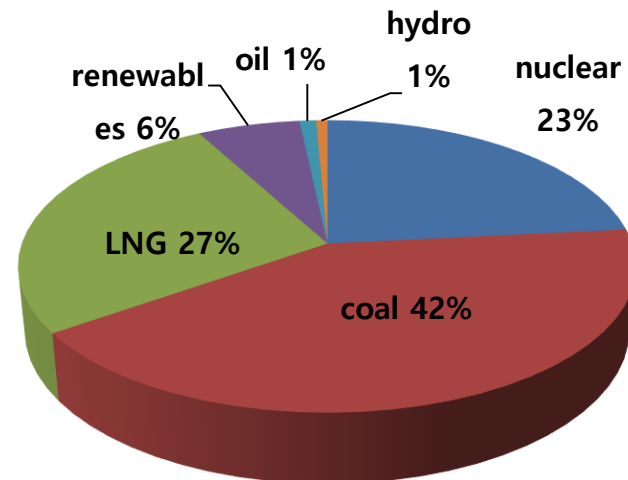


Energy Mix of Korea & Power Generation (2018)

Energy Mix



Power Generation



Korea's Energy Configuration



Korea's Energy Insecurity

World's **8th**
largest energy
consumer

3rd largest
LNG Importer

4th largest
Coal importer

5th largest
Oil Importer

Overseas Energy Dependency : **94.7%** (2018)

- No manufacturing industry without imports of overseas energy
- Vulnerability to global supply & demand and price fluctuations

Energy Imports : **\$144 billion** (2018)

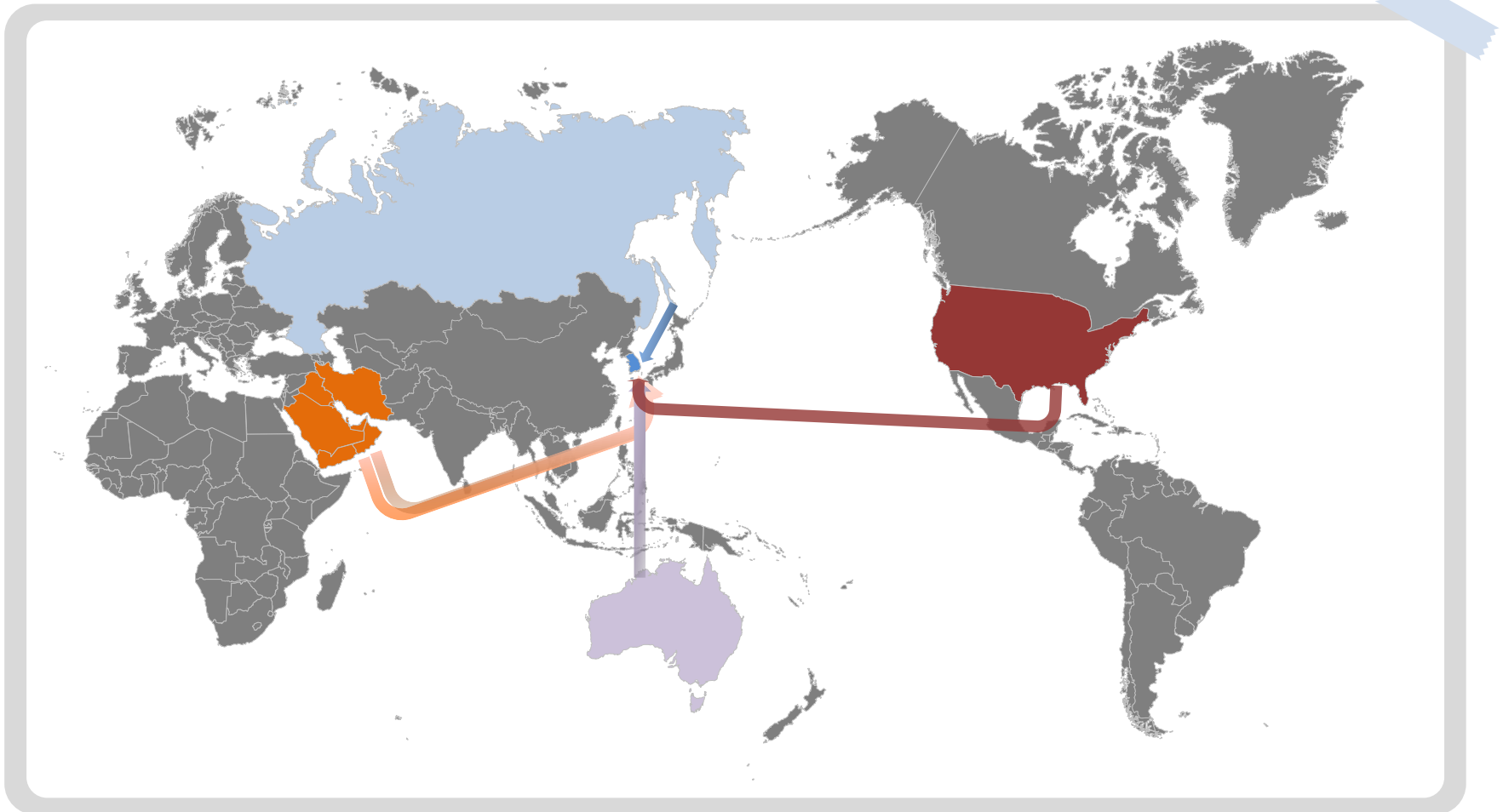
- Coal \$14.5 billion
- Crude oil \$79.9 billion
- Petro Products \$20.9 billion
- LNG Imports \$26.5 billion

Korea's Energy Policies



Diversification : Availability of Sufficient Supply

- ➔ Oil : Middle East (+ USA)
- ➔ LNG : Middle East (+ USA + Australia + Russia))

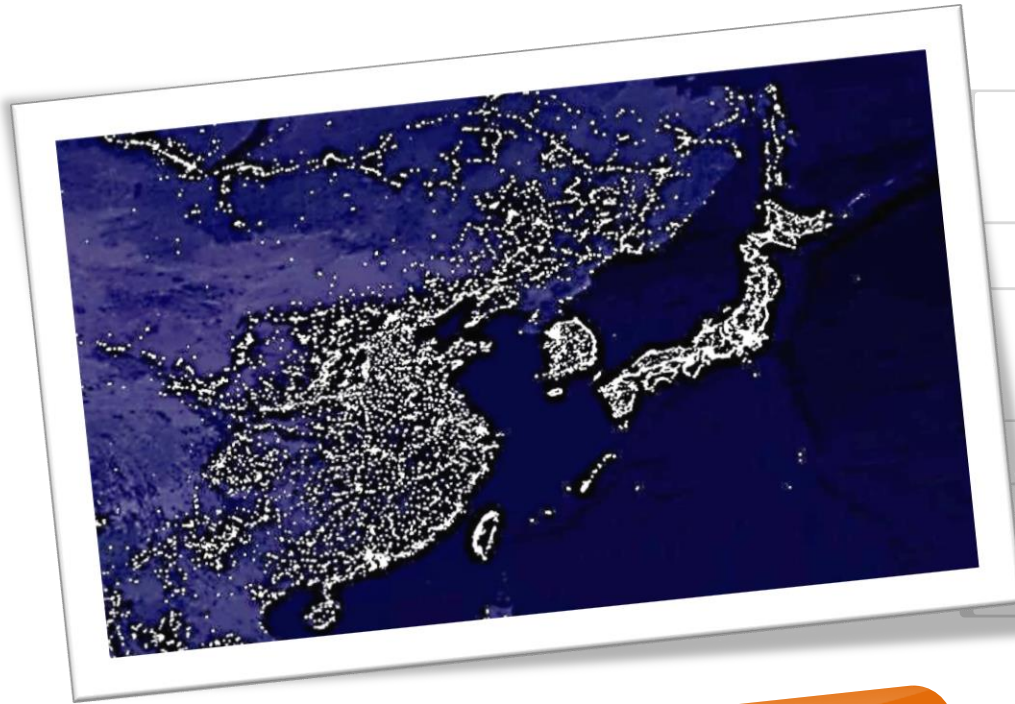


Korea's Energy Policies



Super Grid Project

➔ Power Generated by RE in Mongolia and Russia to China, Korea, Japan



Complementarity in Demands

Increased Use of Renewable Energy

Shared Prosperity by Interdependence

No Interconnection in Northeast Asia

Korea's Energy Policies



Transition to Clean and Safe Energy (May 2017)

➔ **Quantitative Expansion of Supply ⇒ Efficient management of Supply & Demand**

7th Long-Term Electricity Supply and Demand Plan (Jul 2015)

➔ Share of RE generation : 11.3% up to 2030

Renewable Energy 3020 Implementation Plan (Dec 2017)

➔ 20% of RE generation by 2030, 97% of new capacity by PV & Wind

8th Long-Term Electricity Supply and Demand Plan (Dec 2017)

➔ Coal-fired plants to be abolished or converted into LNG plants

Renewable Energy Industry Reinforcement Plan (Apr 2019)

➔ 10 bil \$ of export and 40,000 of new employment by 2030

3rd Korea Energy Master Plan (2019-2040) (Jun 2019)

➔ 35% of RE generation by 2040, Promote of Future Energy Industry

Korea's Energy Policies



Transition to Clean and Safe Energy (May 2017)

Renewable Energy Supply Accelerated

Capacity

2,989MW in 2018 (45% increase from 2017)

* 2018 goal in Renewable Energy 3020 plan : 1.7GW

18.3 GW RE capacity (14.8%) / Total 124 GW (2018)

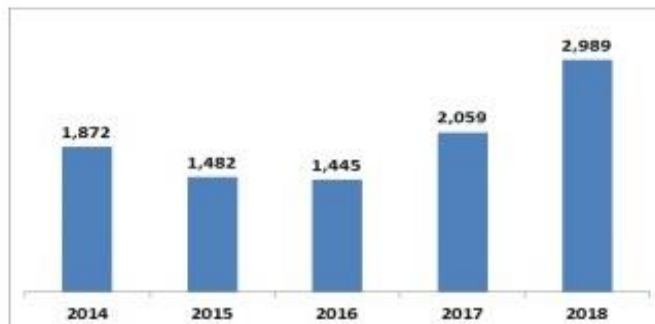
* PV(8,099MW, 44.2%), Wind(1,303MW, 7.1%), Hydro(1,798MW, 9.8%), Bio(3,065MW, 16.1%), Waste(3,813MW, 20.8%), Others(255MW, 1.4%)

Power Supply

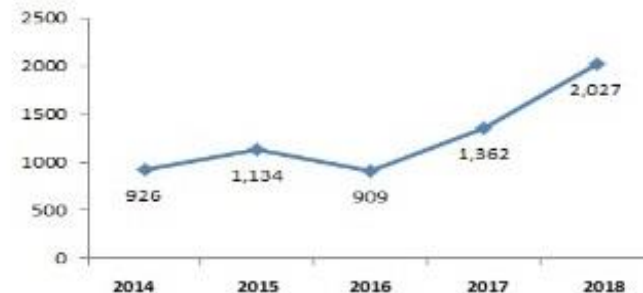
48.6 TWh RE (8.2%) / Total 594TWh (2018)

* Waste(24.4TWh, 50.1%), PV(9.2TWh, 19.0%), Bio(8.7TWh, 17.9%), Wind(2.5TWh, 5.1%), Hydro(3.4TWh, 6.9%), Others(255MW, 1.4%)

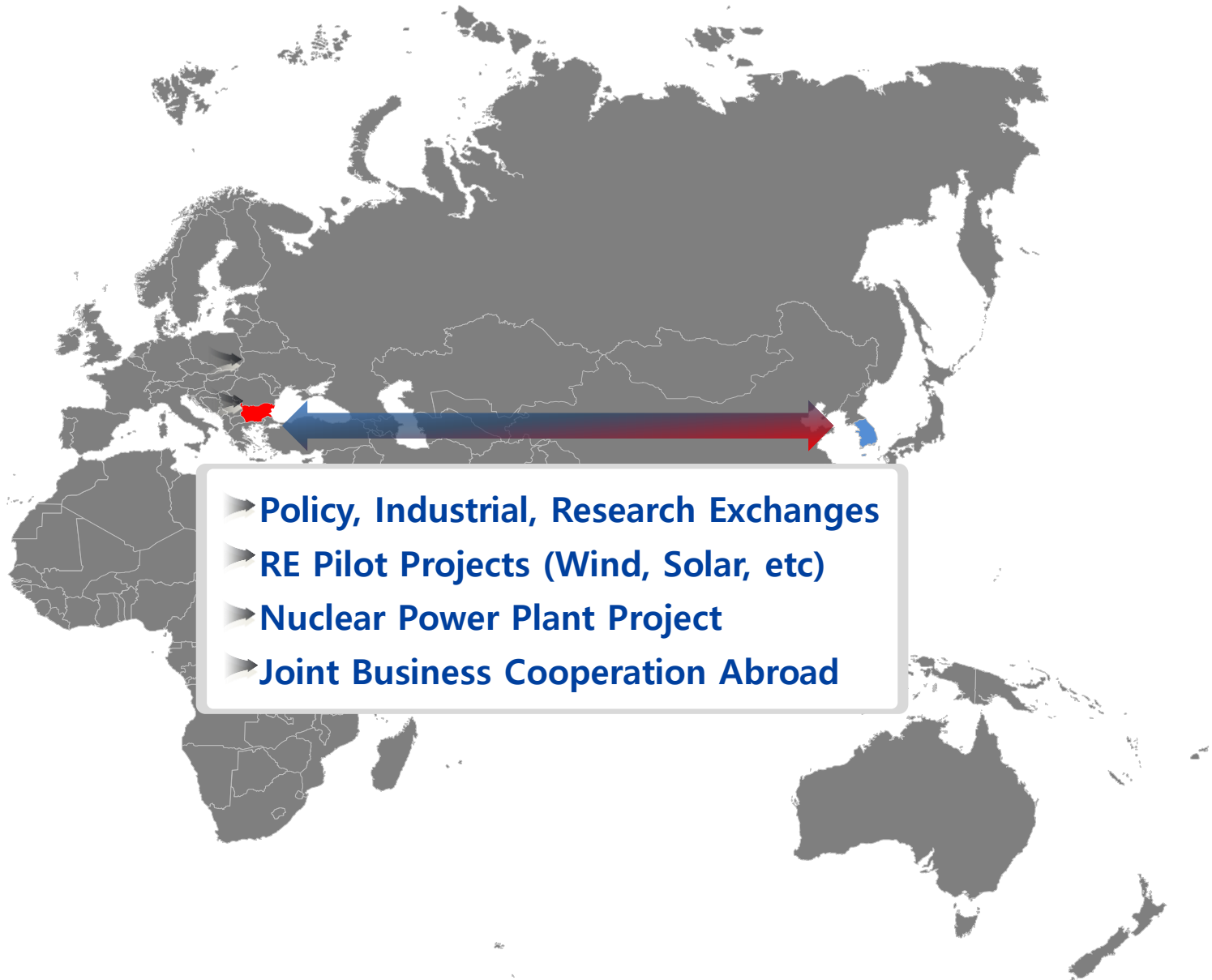
< New RE facility installation (MW) >



< New PV facility installation >



Energy Cooperation with Bulgaria



- **Policy, Industrial, Research Exchanges**
- **RE Pilot Projects (Wind, Solar, etc)**
- **Nuclear Power Plant Project**
- **Joint Business Cooperation Abroad**

Energy Cooperation with Bulgaria



➔ Policy, Industrial, Research Exchange



Bulgaria's geo-strategic situation

- Energy and gas center in South East Europe
- Energy transit route between producers and consumers

Prime Minister Boyko Borissov's visit to Korea(Sep 2019)

- MOU on Cooperation in the Field of Energy Policy, Industrial, Research Exchanges

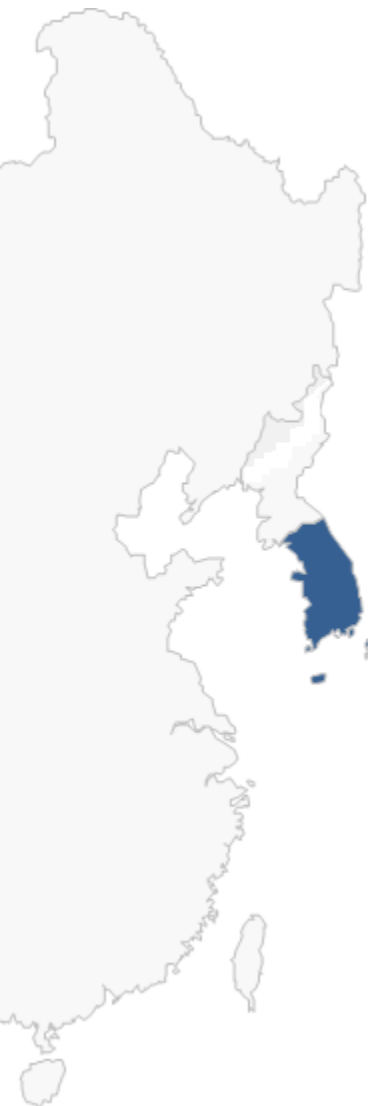
Possible Areas for Cooperation

- Renewables(PV, Waste), ESS, Electric/Hydrogen cars, and more

Energy Cooperation with Bulgaria



➔ Photovoltaic



Advanced Technology

- World-class Technology

Strong Supply Chain

- More than 400 companies
- Complete Value Chain from Construction to Management

Cooperation with Bulgaria

- Korea South-east Power CO. & SDN' PV projects including RES and ASM (total 42 MW) in Veliko Tarnovo
- LG CNS's PV projects in Yambol, Valchin, Skobelevo, and Smolnik (total 21.3 MW)
- LSIS's PV project in Yambol (14.5 MW)
- ESS & Hydrogen could contribute to the increased use of renewables
- Long-term and consistent policies are essential

Energy Cooperation with Bulgaria



➔ Waste

Advanced Technology and Experiences

- Waste / RE (production) 60%, (power generation) 51%

➔ EV/FCEV

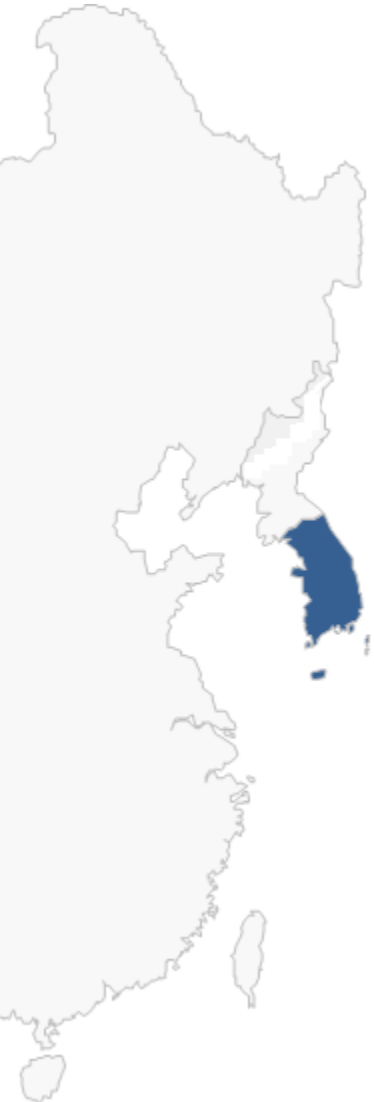
Increasing EV market (Bulgaria) + Advanced EV technology (Korea)

- 31 Bulgarian companies are providing components for Hyundai Motors
- Bulgarian Car Sharing Company 'SPARK' will use 170 KONA EVs

Energy Cooperation with Bulgaria



➔ Hydrogen



Hydrogen Economy Roadmap (Jan 2019)

- Goals
 - (Mobility) Production of 6.2 million FCEV, Operation of 1,200 refilling stations by 2040
 - (Energy) Deployment of 15 GW fuel cell for power generation and 2.1 GW fuel cell for home and office by 2040
- The world's first hydrogen-refilling station in the National Assembly
- Hydrogen car (NEXO) chosen as a presidential car
- Plans to build three hydrogen-power cities by 2022

Korea MOFA

- International Hydrogen Conference (Jun 2019)

Future Cooperation with Bulgaria

- Korea - advanced in FCEV and fuel cell
- Bulgaria - to build 10 hydrogen refilling stations by 2025

Energy Cooperation with Bulgaria



➔ Nuclear Power Plant Project



Outstanding Experience

- 25 Units are under O&M support in Koera, including 2 Framatome designs
- Support O&M for overseas NPP in UAE, successfully

Strong Supply Chain

- 22,000 qualified suppliers from Domestic and International source
- Complete Value Chain from Construction to Waste-management

Advanced Technology

- Advanced O&M service with 40 years Know-how
- Developed State-of-art technology through continuous construction and Safety enhancement from Fukushima Accident

Energy Cooperation with Bulgaria



➔ Joint Business Cooperation Abroad



Korea – Reliable Partner for Shared Prosperity

UAE Barakah NPP project

➔ MOU to explore potential collaboration on new nuclear energy projects in third countries (Sep 2019)

Thank you very much.

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