Introduction to Energy Transition and Green New Deal in Korea

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Who is Agora Energiewende?
Agora Energiewende: An independent and non-partisan Think Tank & Policy Lab

~ 50 experts on energy system transformation

Diverse financing structure (primarily philanthropic foundations)

Vision: A prosperous & carbon neutral global economy by 2050

We advise & inform policy decisions to deliver clean power, heat & industry – in DE, EU and around the globe
The role of Agora in policy debates

The Policy funnel

Climate and energy topics entering the political process

Agenda setting

Solution space

Solution development

Legislation

Acceptable corridor for outcome

Agora

Narrowing down the solution space to ensure decisions within an acceptable corridor through thought leadership, strategic anticipation, joint fact finding & strategic communication

NGOs, interest groups, companies, others
Advocacy, campaigning, etc.

Agora Energiewende
The role of Agora in policy debates

<table>
<thead>
<tr>
<th>Towards a Climate-Neutral Germany</th>
<th>A Clean Industry Package for the EU</th>
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**Towards a Climate-Neutral Germany**

Three Steps for Achieving Climate Neutrality by 2050 and an Intermediate Target of 45% in 2030 as Part of the EU Green Deal

**A Clean Industry Package for the EU**

Executive Summary

Making sure the European Green Deal secures the transition to climate-neutral industry

IMPULSE
Our global partners: The International Network of Energy Transition Think Tanks
Energy Transition in Korea
## Korea and Brazil at a glance

### Korea and Brazil

![Korea and Brazil maps](https://via.placeholder.com/560x360.png)

### Comparative indicators between Korea and Brazil

<table>
<thead>
<tr>
<th>Indicator</th>
<th>KOR</th>
<th>BRA</th>
</tr>
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<tbody>
<tr>
<td>Surface area [km²]</td>
<td>100,284</td>
<td>8,515,767</td>
</tr>
<tr>
<td>Population [thousand, 2019]</td>
<td>51,225</td>
<td>211,050</td>
</tr>
<tr>
<td>Population density [per km², 2019]</td>
<td>529.8</td>
<td>25.3</td>
</tr>
<tr>
<td>GDP [billion current USD, 2019]</td>
<td>1,530.7</td>
<td>2,055.5</td>
</tr>
<tr>
<td>GDP per capita [current USD, 2019]</td>
<td>30,025.2</td>
<td>9,821.4</td>
</tr>
<tr>
<td>GDP growth rate [annual %, const. 2010 prices, 2019]</td>
<td>3.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Economy structure [Agriculture / Industry / Service, % of GVA]</td>
<td>2.2 / 39.6 / 58.3</td>
<td>5.2 / 22.6 / 72.2</td>
</tr>
<tr>
<td>CO2 emission [Mt / tons per cap., 2019]</td>
<td>587.2 / 11.7</td>
<td>529.8 / 2.6</td>
</tr>
<tr>
<td>Energy production, primary [PJ, 2019]</td>
<td>2,117</td>
<td>12,183</td>
</tr>
<tr>
<td>Energy supply per capita [GJ, 2019]</td>
<td>232</td>
<td>59</td>
</tr>
</tbody>
</table>
Main drivers of Energy Transition

### Energy Consumption Increase

- Rapid increase of energy consumption
- Highly dependent on imported energy resources
  - 94.0% imported in 2018, USD 109.5bn (20.4% of total import USD 535.2bn)

### Environmental Events

- Fukushima nuclear disaster in 2011
- M5.8 Earthquake in Gyeongju in 2016
- Fine dust problems

![Chart showing Primary Energy consumption](chart.png)

Author based on KEEI statistic

Reuters TV, New Daily, Joongangilbo
**Communication Platform**

**Moon 1st street for Presidential Election Campaign in 2017**

Candidate’s advertisement website

- Copy of famous online shopping website: “the very first policy shopping website”
- Voters **buy** policies
- The most clicked agenda - safe and clean energy policy
  cf. His first pledge - job creation - was 5th most clicked.

Current Status

- 24 plants (23.2GW) in operation
- 145 TWh generation in 2019 (26% of total electricity)

Energy Transition and Nuclear Phase-out Roadmap (Oct. 2017) and 8th Master plan for electricity supply and demand (Dec. 2017)

- No new plants except 4 plants (5.6GW) under construction: cancelation of 6 plants’ construction plan approved in the former government
- No lifetime expansion
- Phase-out expected by 2084

Author based on MOTIE (2017)
Energy Transition: Renewables (Minister announcement and Cabinet Meeting in Dec. 2017)

Current Status
→ 16.0 GW in operation, 36.4 TWh generation in 2019 (6.5% of total electricity)
→ 3GW new PV added yearly since 2018

→ 20% of power generation from RES by 2030: 95% of new capacity from PV & Wind

3rd Basic Energy Plan (Jun. 2019)
→ 30~35% of power generation from RES by 2040

*Except for non-renewable waste*
## Energy Transition: Coal (Cabinet Meeting in Dec. 2017 and Nov. 2019)

### Current Status
- 60 plants (35GW) in operation, 40% el. generation in 2018

### 8th Master plan for electricity supply and demand (Dec. 2017)
- No new plants except 7 plants (7.2GW) under construction
- 10 old plants over 30 years shut-down by 2022

### Countermeasures against Fine Dust Problems (Nov. 2019)
- Establishment of NCCA (Apr. 2019) and NCCA’s recommendations (Sep. 2019)
- Shutdown or 80% output operation from Dec. to Mar.

### 9th Master plan for electricity supply and demand (Nov. 2020 expected)
- Setting lifetime to 30 years, Replacement of old coal power plants over lifetime with LNG power plants
## Energy Transition: LNG and Hydrogen

### Current Status of LNG
- 51 plants (38.3GW) in operation
- 11 plants under construction

### 8th Master plan for electricity supply and demand *(Dec. 2017)*
- 10 GW new plants added by 2031

### Hydrogen Economy Roadmap
- **(Vision)** Becoming the world’s leading Hydrogen economy: achieving the first place in FCEV and fuel-cell markets, evolve from a country of fossil resources to a major, eco-friendly producer of hydrogen fuel
- **(FCEV)** current 18,000 production capacity to 81,000 by 2022 and 6.2 million H-vehicle by 2040
- **(Fuel cell power generation)** current 307 MW capacity to 1.5GW by 2022 and 15GW by 2040
- **(Hydrogen Supply)** current 130,000 t/year to 470,000t/year by 2022 and 5,260,000 t/year by 2040
Effect of Energy Transition

**Economic Effect**

- RES yearly installed capacity increase: 2,092MW in 2017 → 3,533MW in 2018
- Rapid increase of RES related service sectors*: (Sales) KRW 3.28tn in 2017 → KRW 4.39tn in 2018 (+34.0%), (Employees) 20,129 in 2017 → 21,330 in 2018 (+6.0%)  
  * Construction, erecting/assembling, electrical works, education, consultation, maintenance, etc.
- RES manufacturing for domestic: (Sales) KRW 4.14tn in 2017 → KRW 4.64tn in 2018 (+11.1), (Employment) 14,452 in 2017 → 13,885 in 2018 (-3.9%)
- However, decrease in exports: (Export) KRW 3.96tn in 2017 → KRW 3.49tn in 2018 (-11.2%) due to dramatic decrease of module manufacturing costs worldwide

**Social Effect**

Barriers to Energy Transition Policy

Socio-political barriers: Public acceptance

→ (Political opposition) Nuclear Industry/Academia + Opposition parties + Conservative News media
→ (Fake News) cancer resulting from electromagnetic waves from PV modules, mercury/cadmium in the PV module, light reflex from PV modules leading to airplane accident, wind turbines killing wild birds, etc.
→ (Local Resistance) Environmental damages and fake news leading to local inhabitants’ collective action, RE conflicts causing decrease in reputation on RES

Technical barriers: Grid bottle-neck

→ (Geopolitical Condition) Energy island Korea - no grid network with neighboring countries
→ (Geographical Features) Mountains and forest covering 70% of the land
→ (Path Dependency) Very centralized grid system resulting from huge scale of nuclear and coal power plants
Outlook for Energy Transition

Political Environment: Continuous Progress on Energy Transition
→ Absolute majority ruling Democratic Party in the National Assembly, Very high approval rating for the President

Pledge of Carbon Neutrality 2050:
→ President’s announcement on 28th Oct. 2020 and calling for reexamination of existing plans/policies

Faster coal phase-out deriving from Fine-dust-problem and Thunberg’s effect:
→ Air pollution problem as the most urgent political challenging
→ Youth generation getting more serious on climate change issue

Tasks awaiting solution
→ (Energy Efficiency) Slow rate of energy efficiency in industry sector due to cheap electricity
  - (Electricity price) KR 110 USD/MWh, BR 196 USD/MWh
→ (Heat/Transport sectors) Energy consumption increases, but no measures rather than campaign to reduce demand. Necessary to encourage(or mandate) renewable heat/fuel promotion and electrification, etc.
Korean Green New Deal
# Main drivers of Green New Deal

<table>
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<tr>
<th>Civil society initiative</th>
<th>COVID Pandemic</th>
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| → Impulse leading to movements: Korean civil society seize a political opportunity from US.  
  • Submitting Green New Deal to the U.S. Senate by Alexandria Ocasio-Cortez | → After successfully managed Corona-virus in April, Government seeking a way of economic stimulus |

![Image of Alexandria Ocasio-Cortez speaking](image_url)

**South Korea Reports No New Domestic COVID-19 Cases**

Newly confirmed COVID-19 infections in South Korea

Source: Korea Centers For Disease Control and Prevention
**Manifesto for General Election in April**

**Ruling party’s Green New Deal (Mar. 2020)**
- Net-zero carbon emissions by 2050
- Introduction of carbon tax
- Phase-out of domestic and overseas coal project financing
- Large-scale investment in RES

**President’s announcement of Korean New Deal as economic recovery from COVID-19 (Jul. 2020)**
- Total KRW 114 trillion (USD 94.5 billion)
- Digital New Deal (KRW 44.8tn), Green New Deal (KRW 42.7tn), Strong Safety Net (KRW 26.6tn)
Korean Green New Deal

To overcome climate-ecological & economic crisis

Investment of KRW 42.7tn (USD 37bn) by 2025:
Green Transition of Infrastructures (KRW 12.1tn),
Low-carbon and Decentralized Energy Supply (KRW 24.3tn),
Innovation in the Green Industry (KRW 6.3tn)

659 thousand jobs creation & 12.3 million tons GHG reduction

More detailed information on Korean New Deal: http://english.moef.go.kr/pc/selectTbPressCenterDtl.do?boardCd=N0001&seq=4948
Key Project 1 – Green Remodeling

Overview: Improving energy efficiency in buildings by installing solar panels and eco-friendly insulation systems. Public sector first, then spur efforts in the private sector

→ (Old Buildings) Solar panels and high-performance insulation systems for over 15 years old public rental housings and 2,170 daycare centers, public health centers and hospitals

→ (New Buildings) High-efficiency energy equipment and eco-friendly materials for newly built 440 public daycare centers and 51 public sports facilities

→ (Cultural Facilities) Energy-saving facilities (e.g. solar power systems and LED lights) to 1,148 cultural facilities (e.g. museums or libraries)

→ (Government Complexes) High-performance insulation for 3 old complexes and energy management systems for other existing 6 complexes

→ (Underground Cables) Replacement of overhead cables in school zones and some other areas

→ (Policy Actions) Faster enforcement of zero-energy building construction obligatory
Key Project 1 – Green Remodeling

<table>
<thead>
<tr>
<th>Target &amp; Time-line</th>
<th>2020</th>
<th>2022</th>
<th>2025</th>
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<tbody>
<tr>
<td>Improvement of Old Rental Housing</td>
<td>-</td>
<td>186,000</td>
<td>225,000</td>
</tr>
<tr>
<td>Energy-efficient Daycare Centers</td>
<td>-</td>
<td>194</td>
<td>440</td>
</tr>
<tr>
<td>Energy-saving Cultural Facilities</td>
<td>-</td>
<td>287</td>
<td>1,148</td>
</tr>
</tbody>
</table>

Key Investments and Expected Outcomes

- Invest USD 1.6bn (KRW 1.8tn) from the treasury by 2022, and create 78,000 new jobs
- Invest USD 2.6bn (KRW 3.0tn) from the treasury by 2025, and create 124,000 new jobs
Key Project 2 – Green Energy

Overview: Promoting renewable energy industries by expanding R&D and pilot projects as well as providing additional facilities

→ (Wind) Support the measurement of wind conditions, the implementation of feasibility studies on up to 13 regions to develop large-scale offshore wind farms

→ (Solar) Provide various supports to encourage public participation in utility scale PV projects, support for 200,000 households to install private-use PV modules in residential or commercial buildings

→ (Hydrogen) Support the development of all core and original technologies for hydrogen throughout all phases, Support the establishment of hydrogen model cities (e.g. Ulsan, Jeonju & Wanju, Ansan)

→ (Fair Transition) Support regions facing challenges from the reduced use of coal-fired power and conventional resources to adapt to the renewable energy sector (e.g. green mobility, digital management of renewable energy, manufacturing platform for offshore wind turbines)
# Key Project 2 – Green Energy

## Target & Time-line

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<tr>
<th></th>
<th>2020</th>
<th>2022</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation Capacity</td>
<td>12.7GW (in 2019)</td>
<td>26.3GW</td>
<td>42.7GW</td>
</tr>
<tr>
<td>(Solar and Wind Energy)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Core and Original</td>
<td>Basic-level Research</td>
<td>-</td>
<td>Possession of Core and</td>
</tr>
<tr>
<td>Technologies for</td>
<td></td>
<td></td>
<td>Original Technologies</td>
</tr>
<tr>
<td>Hydrogen</td>
<td></td>
<td></td>
<td>(by 2026)</td>
</tr>
<tr>
<td>Standards for</td>
<td>-</td>
<td>Testing Standards</td>
<td>-</td>
</tr>
<tr>
<td>Hydrothermal</td>
<td></td>
<td>Prepared (By 2023)</td>
<td></td>
</tr>
<tr>
<td>Technologies</td>
<td></td>
<td></td>
<td></td>
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## Key Investments and Expected Outcomes

- Invest USD 3.2bn (KRW 3.7tn) from the treasury by 2022, and create 16,000 new jobs
- Invest USD 7.8bn (KRW 9.2tn) from the treasury by 2025, and create 38,000 new jobs
### Overview: Accelerating the green transition from old diesel vehicles and vessels to electric vehicles (EVs) or hydrogen vehicles

- **(EVs)** 1.13 million EVs (accumulated) along with installation of 15,000 rapid chargers and 30,000 slow chargers, EV subsidies extended by 2022
- **(Hydrogen Vehicles)** 200,000 hydrogen vehicles (accumulated) along with installation of 450 charging facilities
- **(Scrappage Incentives for trading Old Diesel Vehicles)** Scrappage of 1.16 million diesel vehicles and construction machinery, 32,000 farming machinery, transition of 135,000 freight and 88,000 school-buses to LNG vehicles
- **(Transition of Old Vessels)** Public vessels, navy fleets, and private vessels to LNG or hybrid vessels, 80 public vessels with DPF (diesel particulate filters)
- **(Support for R&D Activities)** Support R&D activities for future EVs, hydrogen fuel cell systems and eco-friendly fuels for vessels
# Key Project 3 – Eco-friendly Mobility of the Future

## Target & Time-line

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<tr>
<th></th>
<th>2020</th>
<th>2022</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Electric Vehicles</td>
<td>91,000 (in 2019)</td>
<td>430,000</td>
<td>1,130,000</td>
</tr>
<tr>
<td>Number of Hydrogen Vehicles</td>
<td>5,000</td>
<td>67,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Scrappage of Old Diesel Cars</td>
<td>1,060,000</td>
<td>1,720,000</td>
<td>2,220,000 (by 2024)</td>
</tr>
<tr>
<td>Transition of Old Diesel Freight Cars to LPG</td>
<td>15,000</td>
<td>60,000</td>
<td>150,000</td>
</tr>
</tbody>
</table>

## Key Investments and Expected Outcomes

- Invest USD 4.8bn (KRW 5.6tn) from the treasury by 2022, and create 52,000 new jobs
- Invest USD 11.1bn (KRW 13.1tn) from the treasury by 2025, and create 151,000 new jobs
Criticism to Korean Green New Deal

**No Concrete target of Climate Neutrality by 2050**

→ “The Moon administration vows to move towards carbon neutrality, but has failed to come up with any specific target or action plans to reduce greenhouse gas emissions” (Greenpeace)

**Repetition of precedent measures:**

→ Nothing new: all of 8 main projects and 3 key projects similar existing ones

→ “resemblance to the unpopular Green Growth initiative driven by former President Lee Myung-bak”

**Lack of detailed budget execution:**

→ Private investment of KWR 20.7tn of total KRW 73.4tn (KRW 42.7tn from the government treasury) expected, however no specific incentives to encourage the private investment

→ In addition, “no sufficient protection measures for the workers to be affected by the industrial transition”
Outlook

Further Development under the current Presidency

- Strategy Meeting on the Korean New Deal Chaired by the President
- Joint Committee between the Government and the Democratic Party
- Working-level Task Force led by the Vice Minister of Economy and Finance

For the next Presidency

- Ambitious lawmakers’ enthusiasm in ruling party: Green New Deal as a main manifesto for next President Election
- Green New Deal as a core policy for implementing the carbon neutrality by 2050
Conclusion: Lessons from Korean Energy Transition and Green New Deal
### 3 Key Findings and Suggestions

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<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>Civil society's initiative</strong></td>
<td>Keep your heart up even if there were no political interests on climate protection and Green New Deal. Civil society including independent think-tanks should do its best to initiate and advocate innovative policy area.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td><strong>Open communication platform</strong></td>
<td>Not only to easily survey public preferences but also to strengthen the legitimacy of certain policy, a transparent and open governance platform can be an effective tool.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td><strong>Climate Neutrality by 2050</strong></td>
<td>Early movers can get opportunities to prepare economic and social dislocation deriving from net-zero transition, and finally to create new businesses such as renewables, efficiency or hydrogen.</td>
</tr>
</tbody>
</table>
Thank you for your attention!

Questions or Comments? Feel free to contact me:
kwanghee.yeom@agora-energiewende.de

Agora Energiewende is a joint initiative of the Mercator Foundation and the European Climate Foundation.