



Key policies for transitioning to carbon-neutrality in Korea's industrial sector

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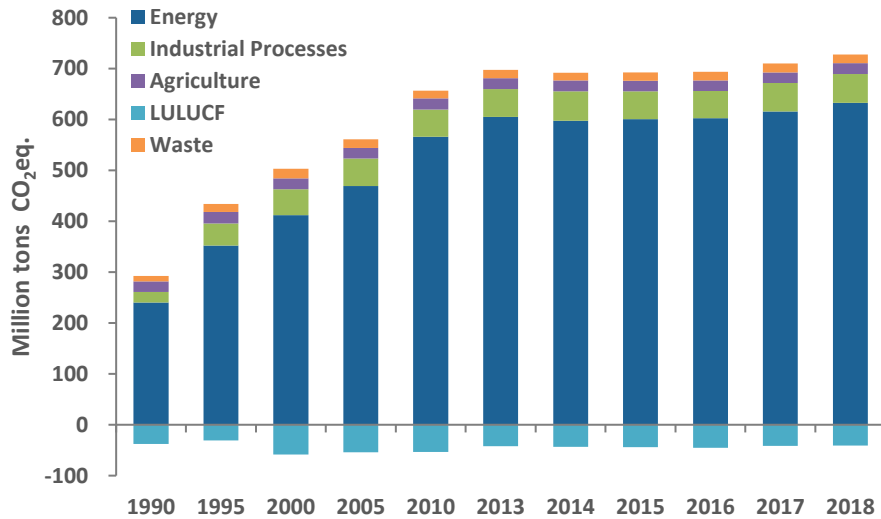
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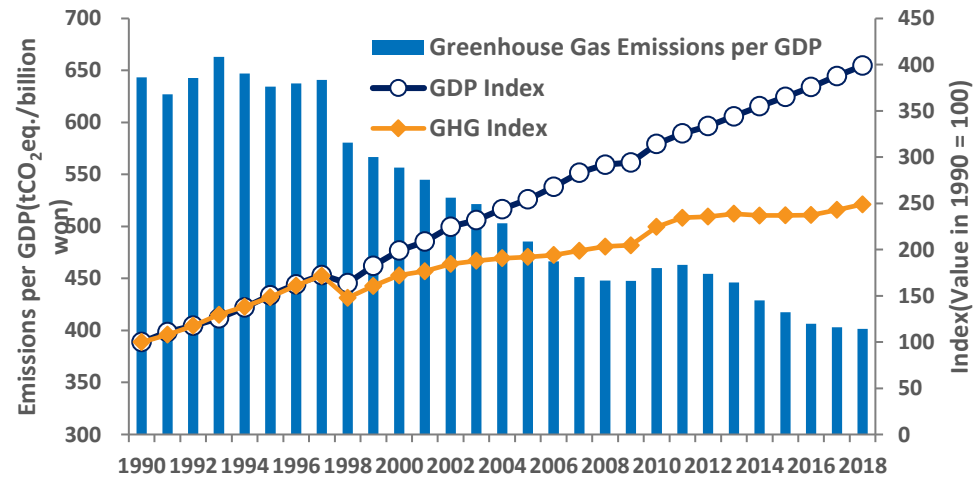
Current Status and Trend of Emissions in Korea

- Total GHG Emissions in 2018 recorded 727.6 mil. tCO₂e (net 686.3 mil. tCO₂e)
 - Emissions skyrocketed until 2010, but emissions remain stable since 2013.
- Energy Sector is the largest contributor to total emissions in Korea.
- Emission Intensity (CO₂/GDP) has largely decreased since the late 1990's.

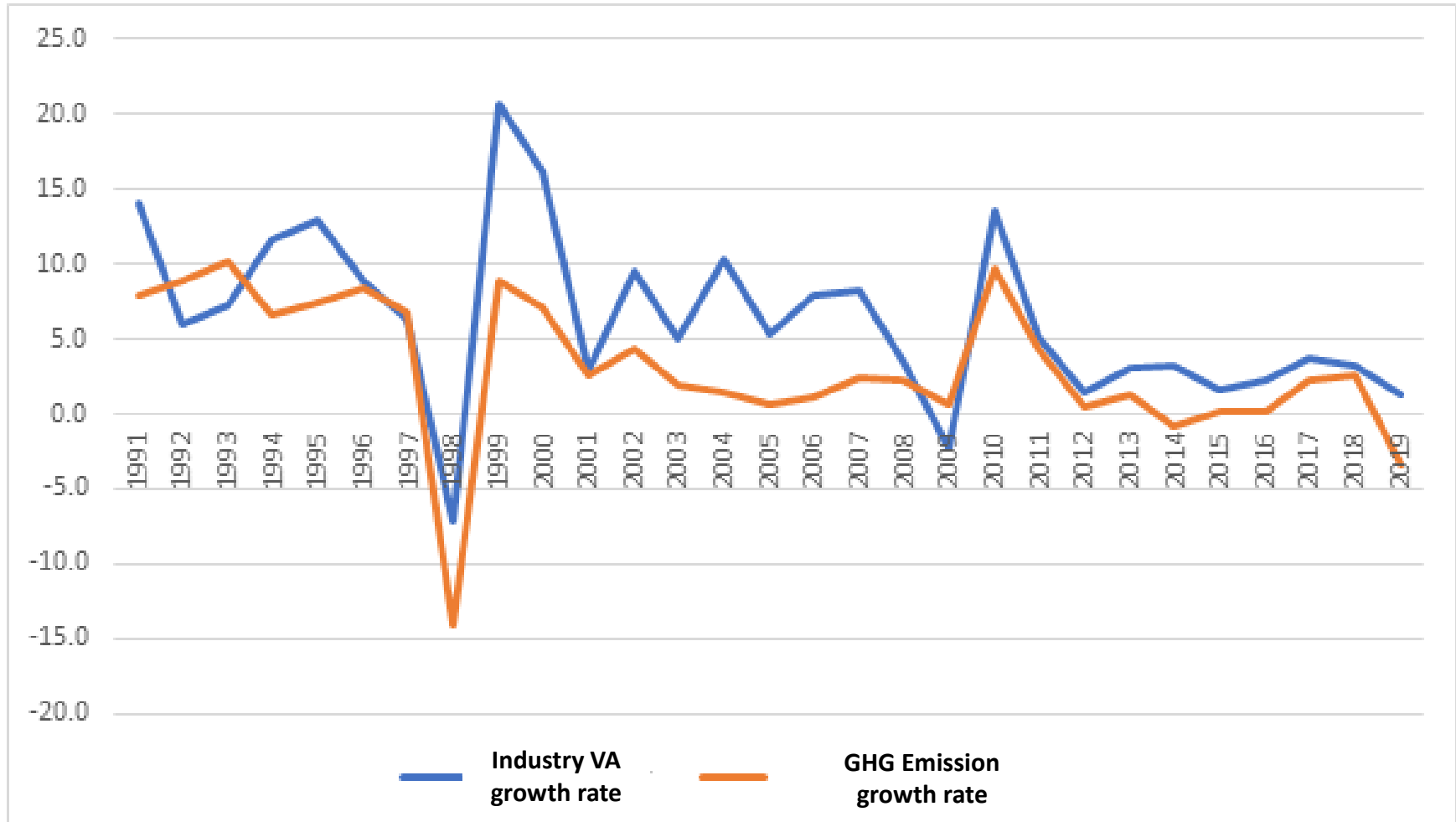
< GHG Emissions (mil. tCO₂) >



<GDP and Emissions/GDP>



Coupled growth: Industry value added vs. GHG Emissions



Korea (Green) New Deal (Jul. 2020)



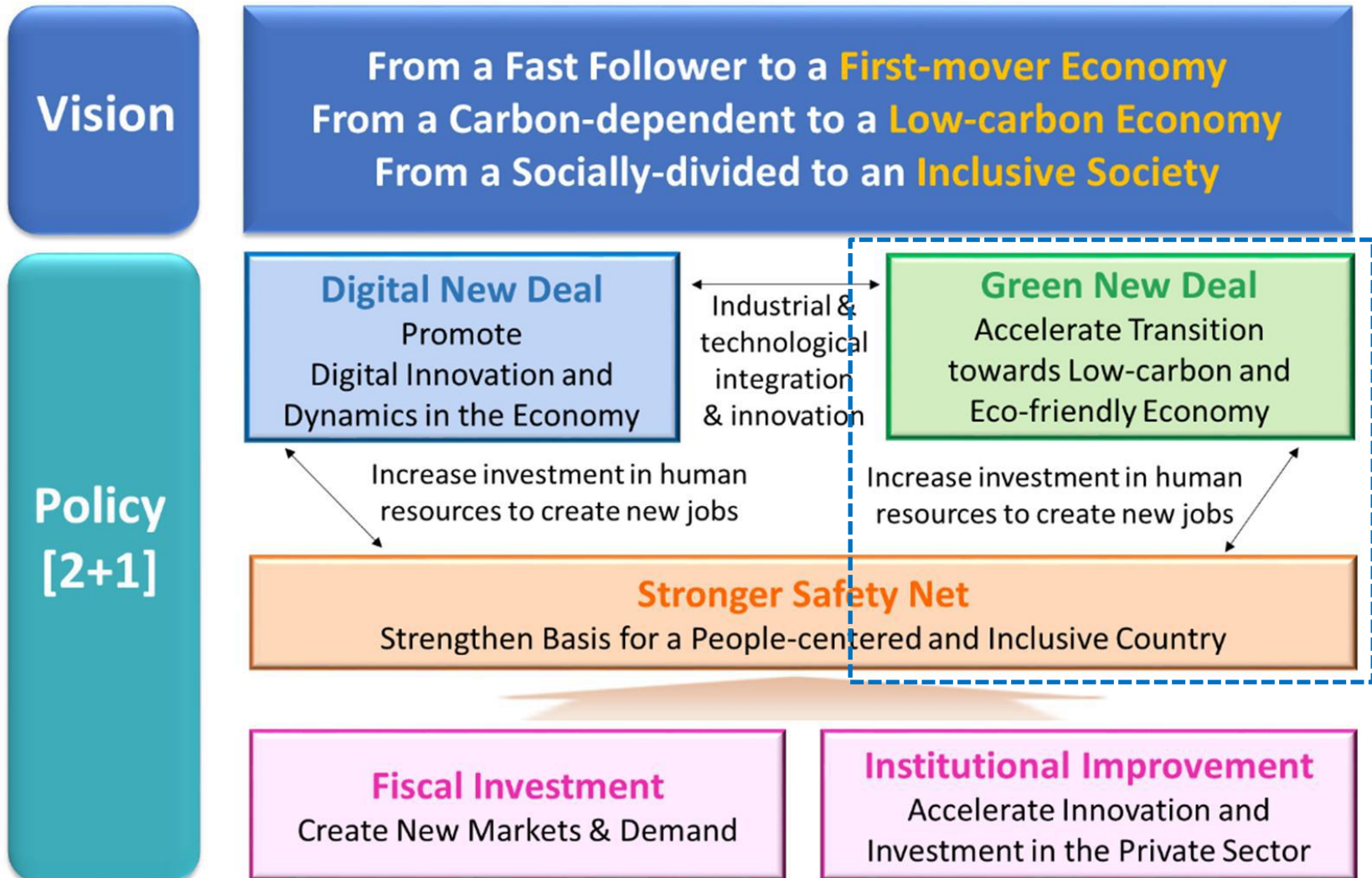
Declaration of 2050 Carbon Neutrality (Oct. 2020)



2050 Long-term Low Emission Development Strategy (Dec. 2020)
2050 Carbon Neutrality Strategy (Dec. 2020)



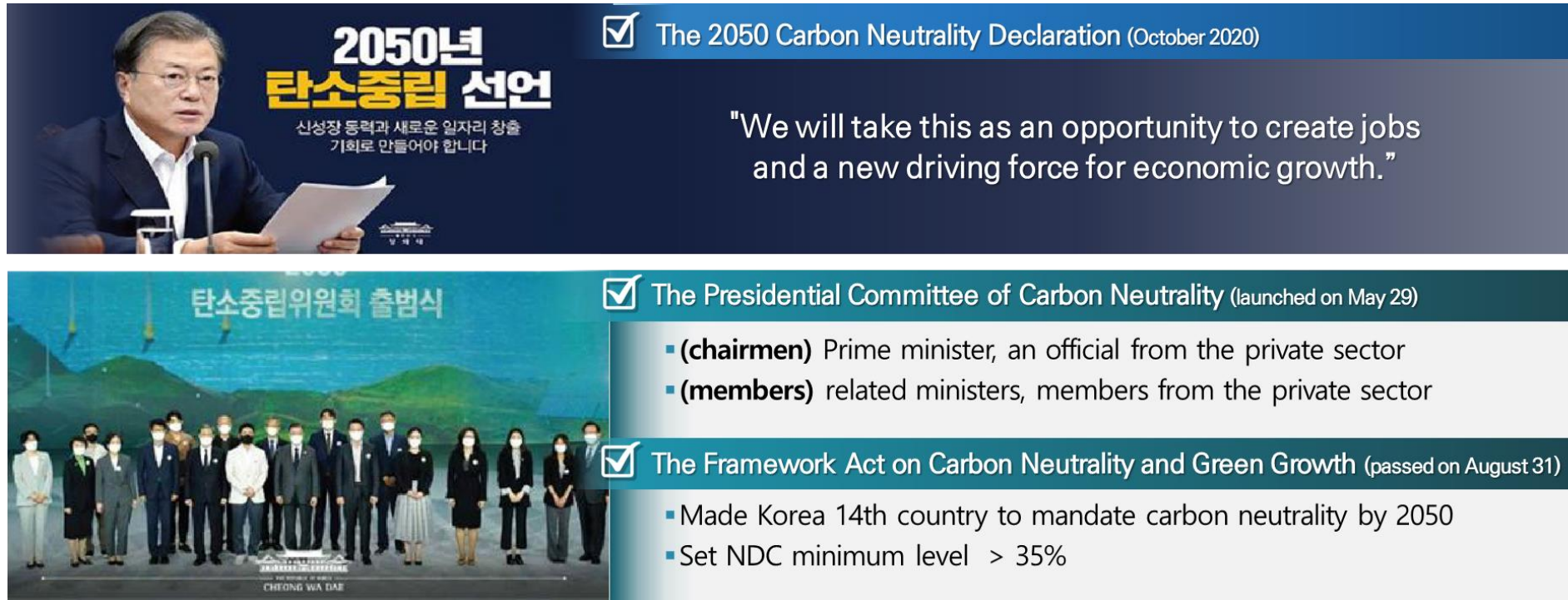
Presidential Panel on Carbon Neutrality (May 2021)
2050 Carbon Neutrality Scenario (Oct. 2021)
Sectoral 2050 Carbon Neutrality Strategies (Dec. 2021)



Declaration of 2050 Carbon Neutrality

- Carbon Neutrality by 2050 (Oct. 2020).

“Together with the international community, we will actively respond to climate change and target carbon neutrality by 2050.”

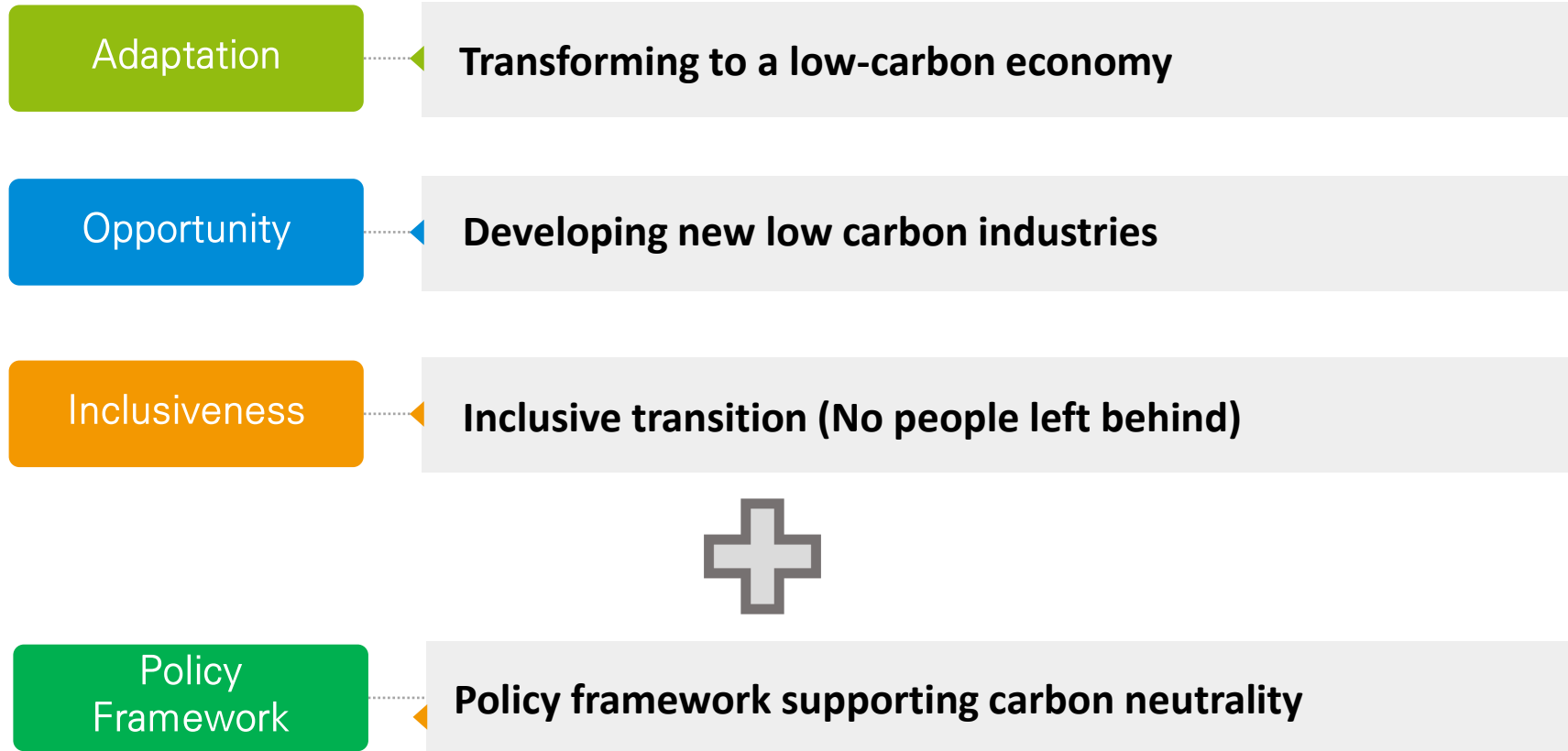


2050년 탄소중립 선언
신성장 동력과 새로운 일자리 창출
기회로 만들어야 합니다

탄소중립위원회 출범식

- ✓ The 2050 Carbon Neutrality Declaration (October 2020)
 - “We will take this as an opportunity to create jobs and a new driving force for economic growth.”
- ✓ The Presidential Committee of Carbon Neutrality (launched on May 29)
 - **(chairmen)** Prime minister, an official from the private sector
 - **(members)** related ministers, members from the private sector
- ✓ The Framework Act on Carbon Neutrality and Green Growth (passed on August 31)
 - Made Korea 14th country to mandate carbon neutrality by 2050
 - Set NDC minimum level > 35%

From “Adaptive Reduction” to “Proactive Response”



To achieve carbon neutrality, economic growth, and improvement of quality of life

Transforming to a low-carbon economy

Accelerating Energy Transition

Enhancing energy system through **innovation in energy supply, power system and industry**

Innovation in carbon intensive industry structure

Transition away from carbon intense industry structure (Manufacturing Renaissance 2.0); Supporting SME's low carbon transition

Transition to future mobility

Accelerating shifts from **internal combustion to eco-friendly vehicles**; Promoting innovation in overall mobility including public transportation, railroads, and ships

Low carbon cities and land

Promoting **carbon-neutral city and national land planning**; Promoting low-carbon agriculture, forestry and marine ecosystem

Fostering New Industries

Fostering **low carbon new industries** (e.g. batteries, green hydrogen) and **climate-related industries** (green service, CCUS)

Innovation ecosystem

Promoting innovative ventures and start-ups that lead the green economy; Regional industry reorganization and expansion of special regulation-free zones

Circular Economy

Decoupling economic growth and resource use by enhancing **product sustainability** and **establishing waste resource circulation networks** for each sector

2050 Carbon neutrality scenario: Industry (Oct. 2021)

2018 (Mtoe)

2050 (Mtoe)

2018 (mil. tCO₂e)

2050 (mil. tCO₂e)

현황

감축 후 에너지수요

현황

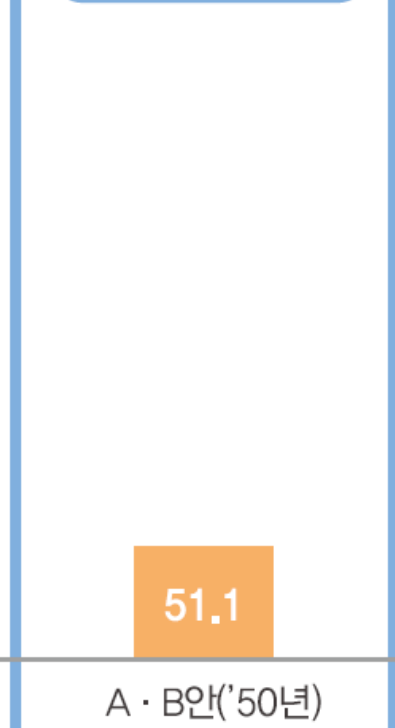
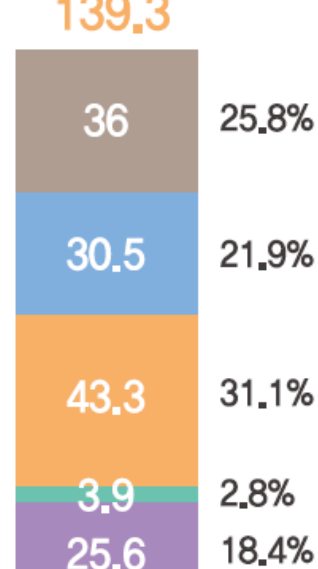
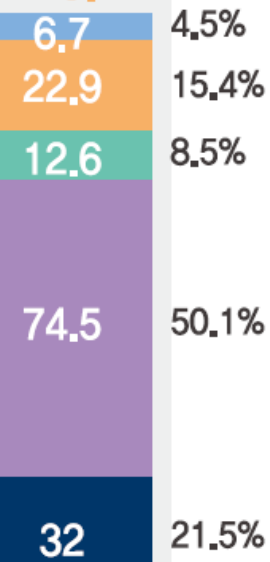
감축 후 배출량

148.7

139.3

260.5

51.1



■ 석탄 ■ 석유 ■ 도시가스 ■ 전력 ■ 신재생 ■ 수소
 Coal Oil Gas Electricity Renewable Hydrogen

▶ Change in GHG Emissions (mil. tCO₂eq) : ('18) 260.5 → ('50) 51.1 (△80.4%)

- Future Technologies in Hard-to-Abate Sectors

- (Steel) **Hydrogen reduction** steelmaking, Electric arc furnace with scrap metal
 - ✓ Demonstrating and developing the technologies from 2025
 - ✓ R&D and **clean and reliable infrastructural base for a large-volume of hydrogen** and energy production is critical
- (Cement) 100% **fuel conversion** (coal → waste, hydrogen etc.) **and raw material conversion** (limestone → slag, etc.)
- (Chemical) **Fuel conversion** (electric heating furnace) and **raw material conversion** (pet. naphtha → bio, hydrogen)
 - ✓ **Large-volume hydrogen supply chain** is required

▶ **Change in GHG Emissions (mil. tCO₂eq) : ('18) 260.5 → ('50) 51.1 (△80.4%)**

- (Others) **Electrification** + Efficiency improvement + **Hydrogen**
 - Electricity demand: 22.9 Mtoe ('18) → 43.3 ('50)
 - Electricity consumption increases as **electricity replaces a significant portion of oil, coal, and city gas** in the industrial sector.
 - Hydrogen demand: 0 Mtoe ('18) → 36 ('50)
- Industrial Process Emissions
 - (Semiconductor, Display) Emission control technology (scrubbers) , **F-gas substitutes with low GWP**
 - (Auto, Electronics) **low GWP refrigerant**

('21.12.10)

- **Korea's first comprehensive strategy to achieve carbon neutrality in the industry and energy sector**
- **Various policy measures including tax benefits, finance, and regulatory innovation for firms**

Vision

No.4 Industrial powerhouse to lead low-carbon economy
(Manufacturing Renaissance 2.0)

Objectives

1. Share of renewables

3.6 ('18) → 70.8% (increase by 20 times)

2. Self-sufficiency rate of clean hydrogen

0 → 60%

3. Share of high value-added, eco-friendly items

16.5 → 84.1% (increase by 5 times)

4. Carbon intensity in the manufacturing industry

496 → 68tCO₂eq/KRW billion (decrease by 86%)

5. Export ranking

6th (Jul. '20) → 4th in the world

Carbon Neutrality Vision and Strategy for Industry and Energy:

5 Strategies

에너지경제연구원



Transforming to low-carbon industrial structure

- Reorganize industrial R&D based on carbon neutrality
- Provide full-fledged support in tax + KRW 35 trillion policy financing
- Build a customized institutional system for the carbon neutrality transition

Building a carbon-neutral ecosystem

- Secure a stable clean energy supply system
- Create a market reflecting carbon value (price)
- Seamless carbon-neutral supply chain management

Fostering carbon neutral new industries

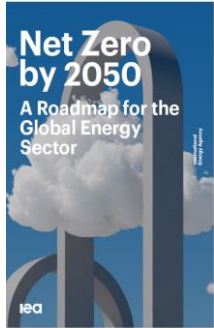
- Boost new growth engines
 - ✓ i) environment-friendly infrastructure; ii) low-carbon materials, parts and equipment; iii) green engineering

Achieving fair transition to leap forward together

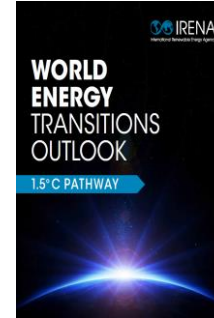
- (SMEs) provide support for business innovation
- (traditional) Preemptive transformation of traditional industries and manpower
- (regional) Promote green local economy for balanced growth

Establishing carbon neutral transition governance

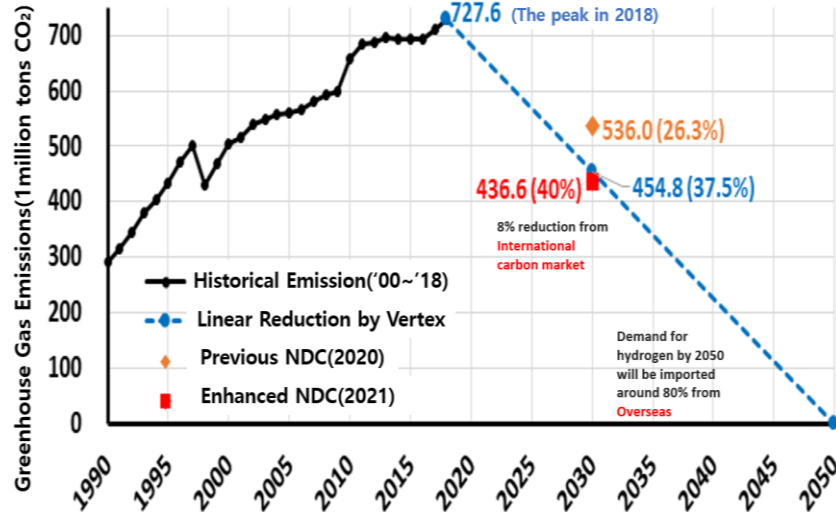
- Enact 「Special Act on Industrial Transformation to Carbon Neutrality」
- Build agile policy management system



“The pathway to net-zero emissions by 2050 will require an unprecedented level of **international cooperation** between governments. This is not only a matter of all countries participating in efforts to meet the net zero goal, but also of all countries working together in an effective and mutually beneficial manner”



“**International cooperation** plays a role in the improvement of 1.5-S over PES, more strongly felt during the first decade”



<Agendas for International Cooperation>

- Sharing Energy Transition policies and know-how
- How to create and utilize the international carbon market
- Discovering overseas reduction measures for GHG
- Carbon neutral related technology cooperation (joint R&D, mutual investment, etc.)

Thank you.

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