27th AIM International Workshop
September 30, 2021

The Republic of Korea's first NDC and its Revision

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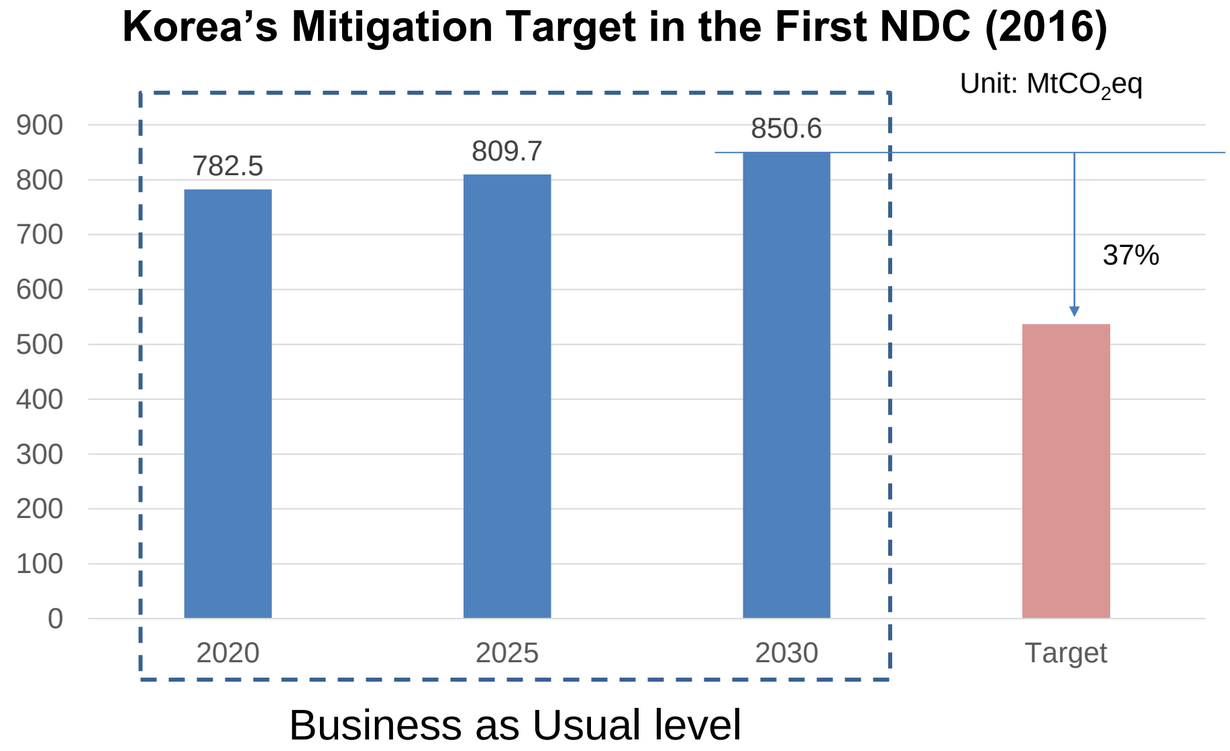
Korea's First NDC in 2016

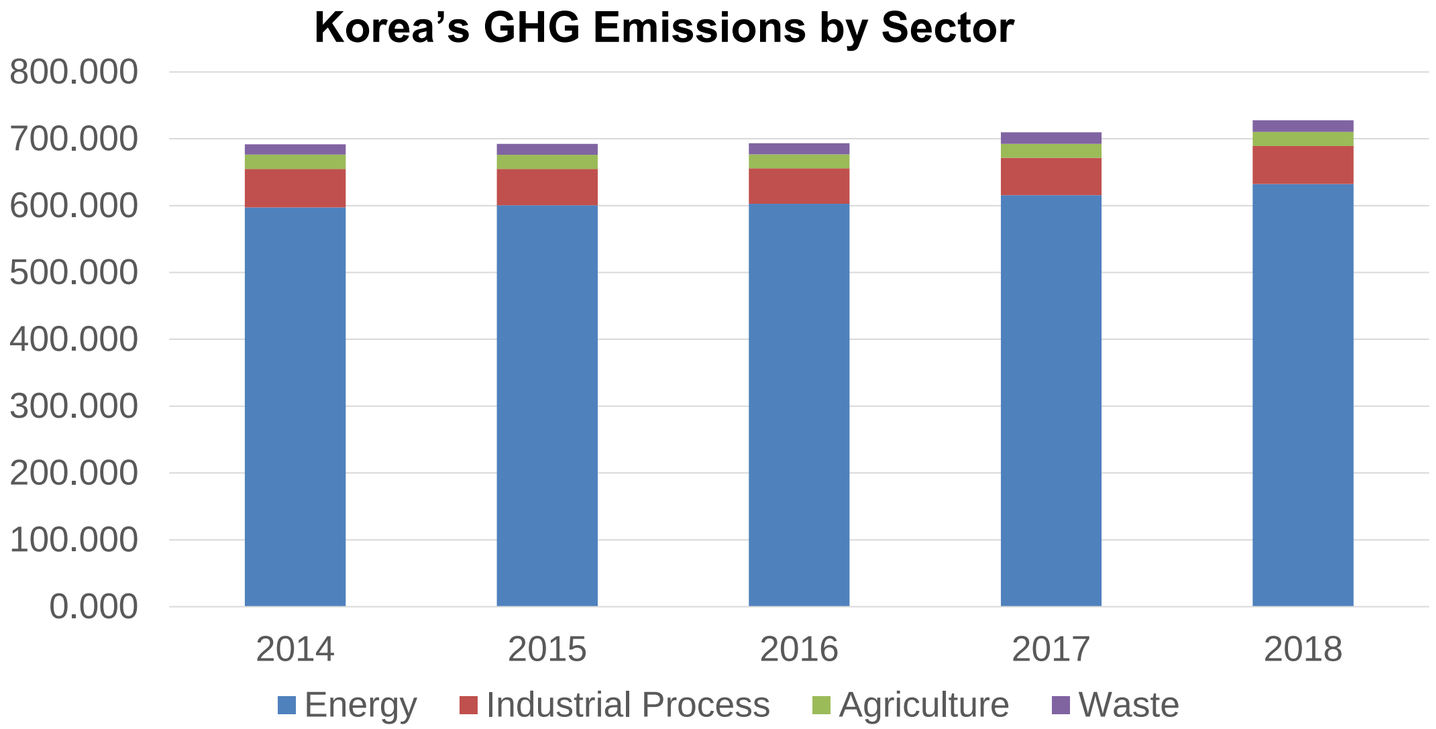
- The Republic of Korea (thereafter, "Korea") submitted the Intended Nationally Determined Contribution (INDC) to the UNFCCC in 2015 and established the 2030 Basic Roadmap for Achieving the National Greenhouse Gas (GHG) Reduction Target (2030 Roadmap). Followed by the ratification of Paris Agreement, the submitted INDC was registered as the first NDC.
- The Initial NDC of Korea set a target to reduce its greenhouse gas emissions by 37% from the Business-as-Usual (BaU) level by 2030 (Gov of Korea. 2016).



Source: Government of Korea. 2016. Submission by the Republic of Korea Intended Nationally Determined Contribution

GHG Emission of the Republic of Korea

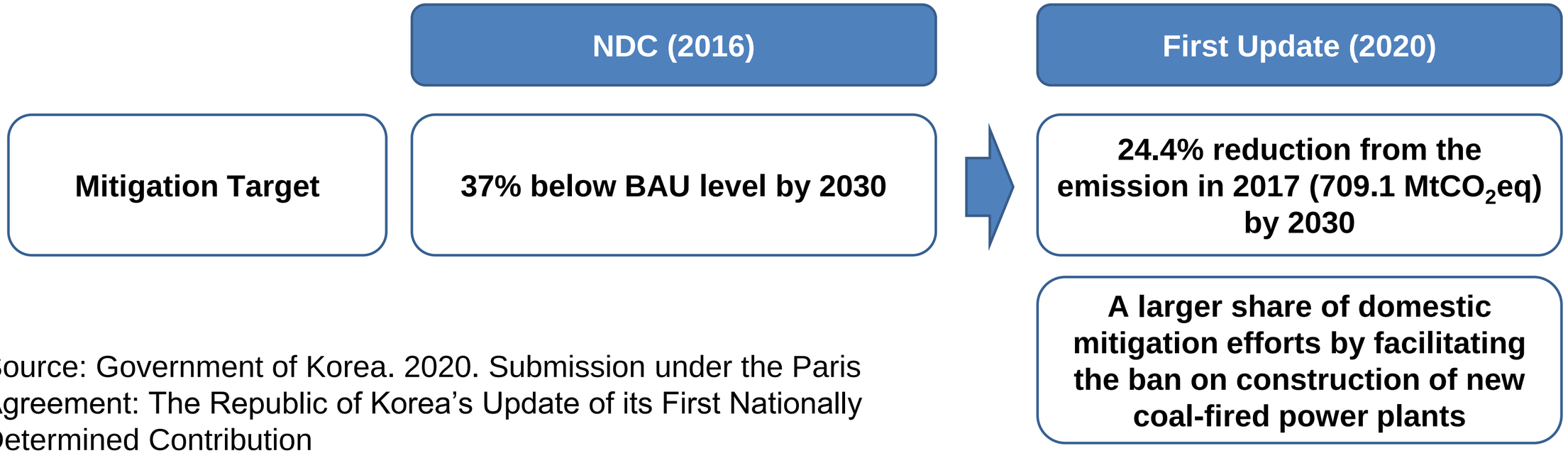
- The national GHG emission has been increased continuously, and this leads to increasing demands for taking more ambition and aggressive actions to mitigate GHG emissions at both national and international level
  693.5 $MtCO_2eq$ (2016) → 709.8 $MtCO_2eq$ (2017) → 727.6 $MtCO_2eq$ (2018)
- As the COVID-19 situation raised awareness of carbon neutrality and climate actions, the Korean government plans to enhance the national contribution to achieving the long-term temperature goal that is agreed in the Paris Agreement



Source: Statistics Korea. 2021. Greenhouse gas emissions by sector

Korea's Update of First NDC in 2020

- Korea updated its first NDC in December 2020 by setting more clear and specific mitigation target and increasing the share of the domestic mitigation efforts. By shifting emission reduction targets from Business-as-Usual to absolute target, Korea set a clearer target to reduce 24.4% from the total national GHG emissions in 2017
- The first update emphasized the national will to facilitate domestic mitigation efforts, such as the ban on the construction of new coal-fired power plants
- To ensure the legal basis, the government amended "The Enforcement Decree of the Framework Act on Low Carbon, Green Growth" to include the updated target (Government of Korea. 2020)



Source: Government of Korea. 2020. Submission under the Paris Agreement: The Republic of Korea's Update of its First Nationally Determined Contribution

Korea's Update of First NDC in 2020

- Five Key updates of the update of the Korea's first NDC (Government of Korea. 2020)

- **Set the ambitious target of reducing 24.4% of the GHG emissions from national GHG emissions in 2017 by 2030, despite of national energy-intensive and export-driven economy**

- **Replace its BAU-based target used in the first NDC to the absolute emission reduction target**

- **Increase the share of domestic mitigation by facilitating mitigation efforts, such as ban on the construction of new coal-fired power plants**

- **Share the information to facilitate clarity, transparency, and understanding of the NDC, earlier than required**

- **Plan to use voluntary cooperation under Article 7 of the Paris Agreement as a complementary measure**

Revising the updated NDC in 2021

- As of September 2021, the revised version of NDC is under preparation, and the Korean government plans to announce it officially at COP 26 in November 2021 and submit it to UNFCCC in December 2021
- On August 31st, the Korea's Parliament passed **the Framework Act on Carbon Neutrality and Green Growth**, and it makes Korea the 14th country that legislated a carbon neutrality act. In addition, the Act specifically mentioned to set a range of the national GHG mitigation target by 2030 to be 35% or higher compared to the GHG emission in year 2018.
- This indicates the mitigation target suggested by the revised version of the Korea's NDC, which will be submitted by the end of this year, would be equal or more than 35% compared to the GHG emission in year 2018. The previous national target was to reduce 26.3% from the GHG emission in year 2018, and the revised NDC would target at least approximately 9%p above the previous national mitigation target.

Revising the updated NDC in 2021

- Though the Korean government has not announced its emissions reduction targets by 2030 publicly, the Presidential Committee on Carbon Neutrality announced the draft of the Carbon Neutrality Scenarios by 2050 in August 2021. This 2050 scenarios, though not legally binding, provides some hints of the Korean government's decision on NDC, and the emission reduction targets by 2030.
- The Scenarios are prepared by the working groups that are comprised of sectoral experts, and the relevant government departments, and reviewed by the Presidential Committee on Carbon Neutrality
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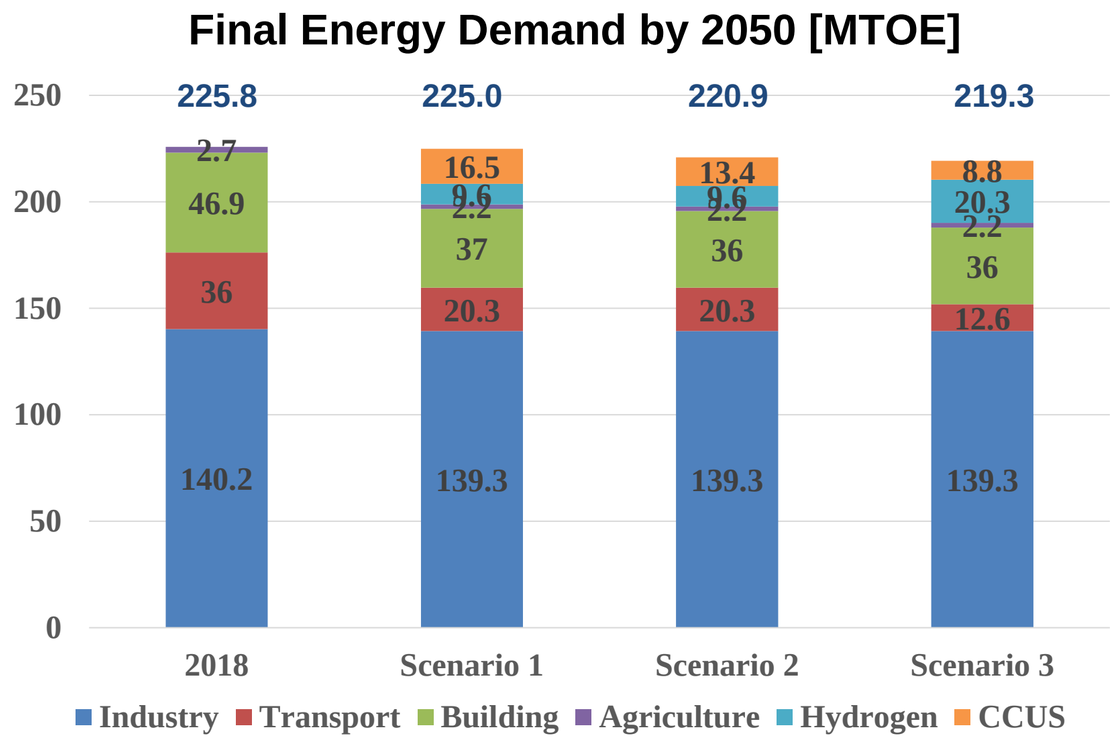
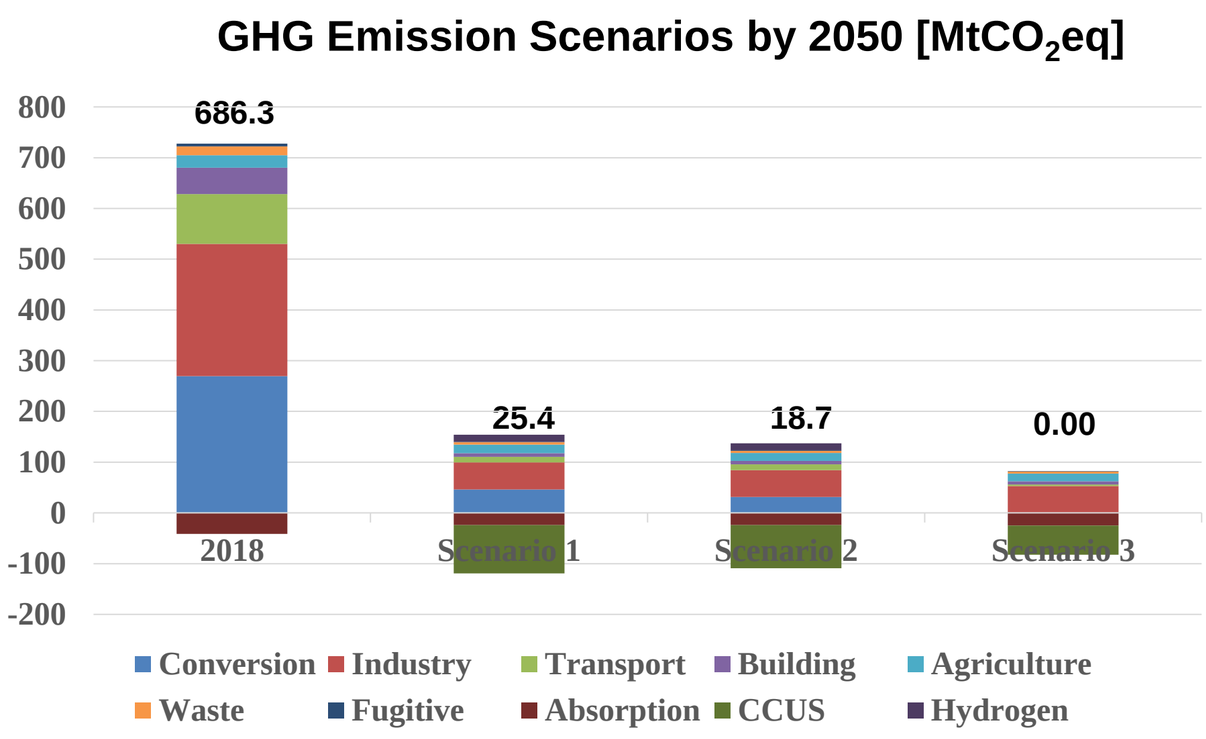




Carbon Neutrality Scenarios (tentative) by 2050

- Scenario 1 [-96.3% compared to 2018-level]: Utilizing the current system and incorporating the technology development and fuel switch (minimum coal-fired power plants)
- Scenario 2 [-97.3% compared to 2018-level]: In addition to measures considered in Scenario 1, additional reductions from conversion (stop coal-fired power plants) and behavioral change
- Scenario 3 [-100% compared to 2018-level]: Significant reductions from aggressively reducing the use of fossil fuel and fully utilizing green hydrogen

GHG Emission Scenarios in detail by 2050 [$MtCO_2eq$]

	2018	Scenario 1	Scenario 2	Scenario 3
TOTAL	727.6 (686.3)	25.4	18.7	0 (Net Zero)
Conversion	269.6	46.2	31.2	0
Industry	260.5	53.1	53.1	53.1
Transport	98.1	11.2 (-9.4)	11.2 (-9.4)	2.8
Building	52.1	7.1	7.1	6.2
Agriculture	24.7	17.1	15.4	15.4
Waste	17.1	4.4	4.4	4.4
Fugitive	5.6	1.2	1.2	0.7
Absorption	-41.3	-24.1	-24.1	-24.7
CCUS	0	-95	-85	-57.9
Hydrogen	0	13.6	13.6	0

Source: The Presential Committee on Carbon Neutrality. 2021. Draft of 2050 Carbon Neutrality Scenarios
Note: (-9.4) in Transport refers 9.4 $MtCO_2eq$ from Direct Air Capture for CO_2 for e-fuel

Carbon Neutrality Scenarios (tentative) by 2050

- (Power Sector) Significantly reduce GHG emissions by 82.9% ~ 100% compared to the 2018-level from power sector [GHG emission in 2018: 269.6 $MtCO_2eq$]

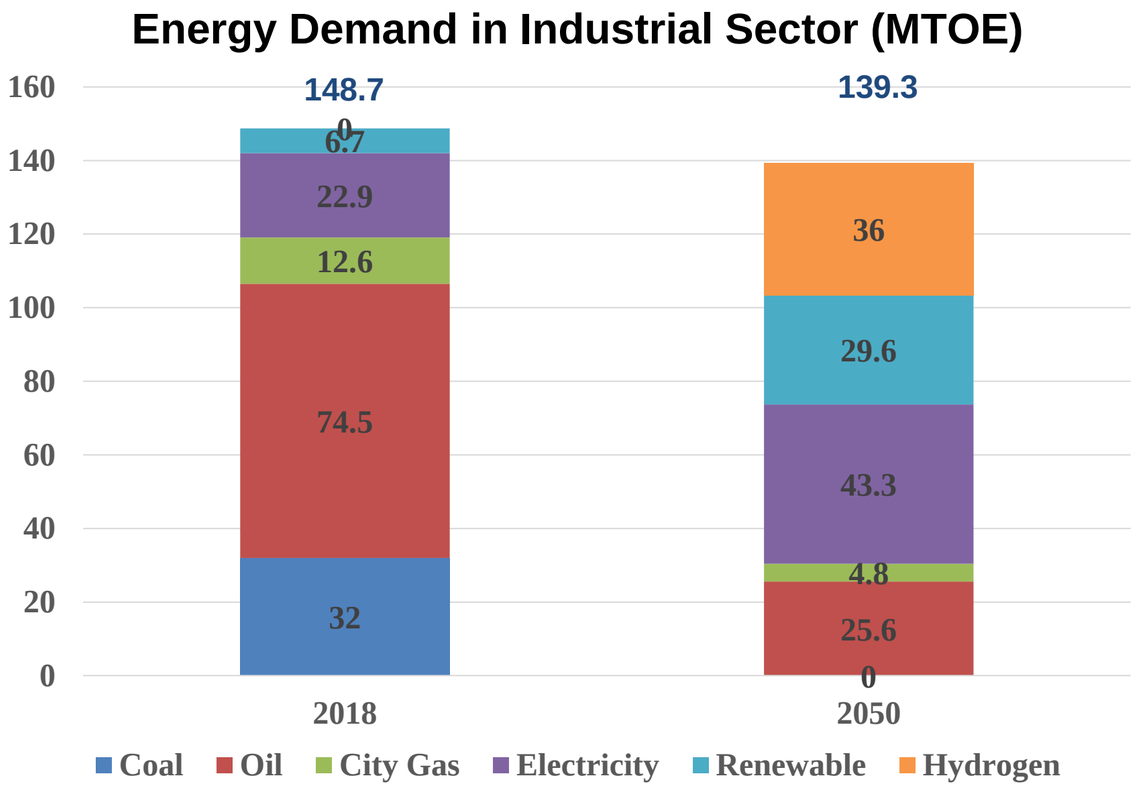
Electricity Generation by Source (TWh) and GHG Emissions ($MtCO_2eq$)

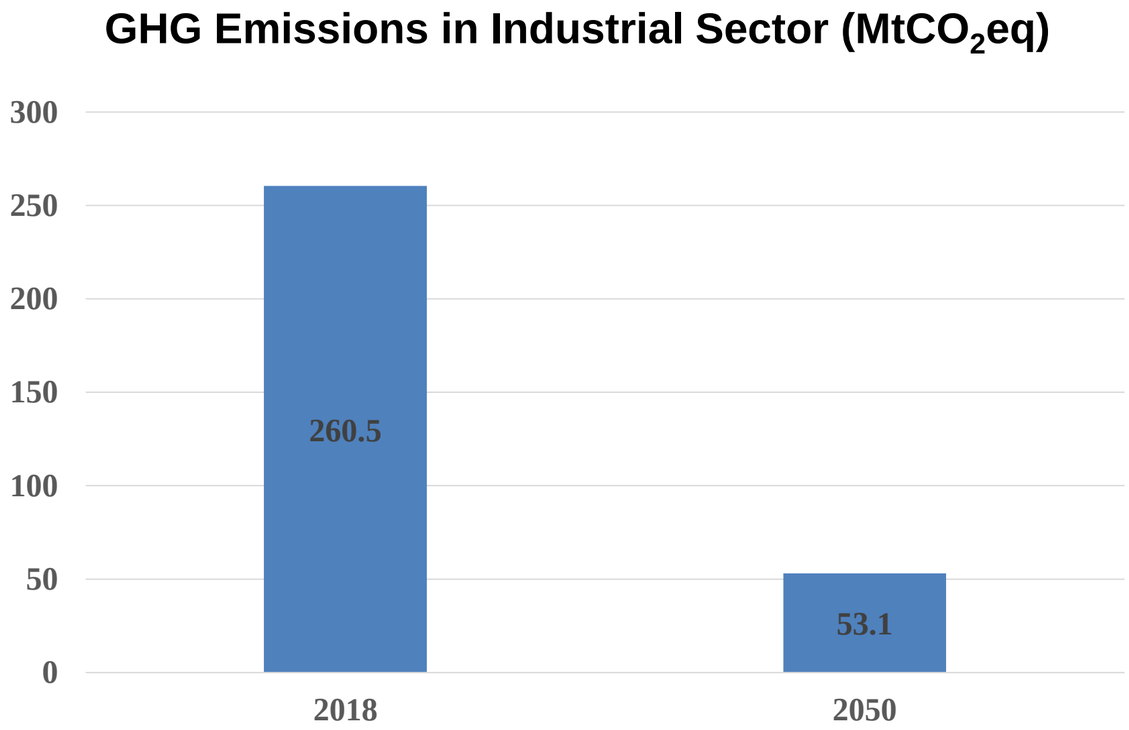
Scenario	Nuclear	Coal	LNG	Renewable	Fuel cell	Internal grid	Non-carbon sources	By-product Gas	Total Emissions (MtCO2eq)
1	89.9	19.1	101.1	710.7	121.4	33.1	177.2	3.9	46.2
2	86.9	0.0	92.2	710.6	121.4	33.1	159.6	3.9	31.2
3	76.9	0.0	0.0	891.5	17.1	0.0	270.0	3.9	0

- Scenario 1: Continue to use the remaining coal-fired power plants and apply CCUS
- Scenario 2: Complete shutdown of coal-fired power plants
- Scenario 3: Complete shutdown of both coal-fired and LNG power plants

Carbon Neutrality Scenarios (tentative) by 2050

- (Industry Sector) Reduce GHG emissions by 79.6% compared to the 2018-level
  260.5 $MtCO_2eq$ (2018) ➔ 53.1 $MtCO_2eq$ (2050)
- [Steel] Introduce 100% Hydrogen direct reduced iron; Replace blast furnace to electric furnace
- [Petrochemical] Accelerate fuel switch, such as introducing electric heating furnace and replacing biomass boiler, replace Naphtha by using bio and hydrogen sources

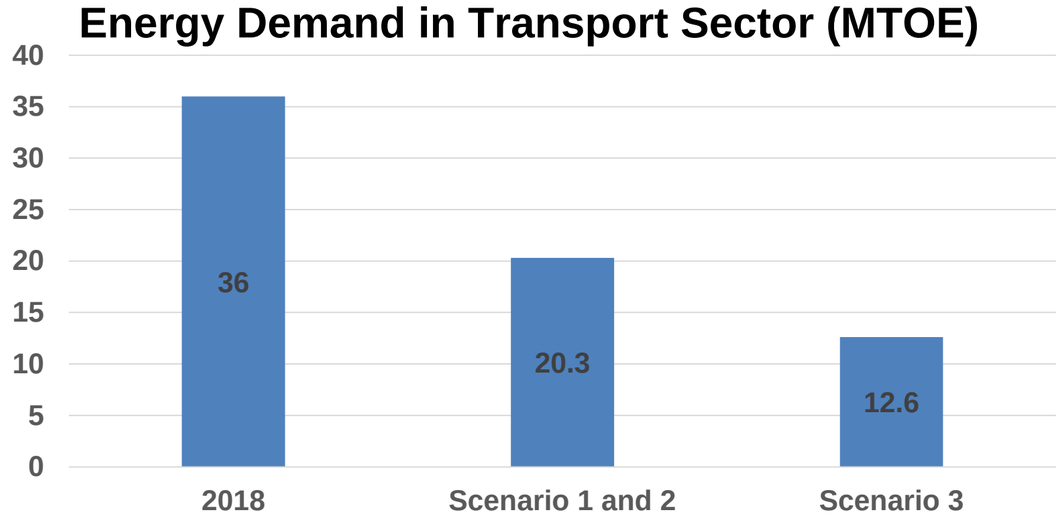


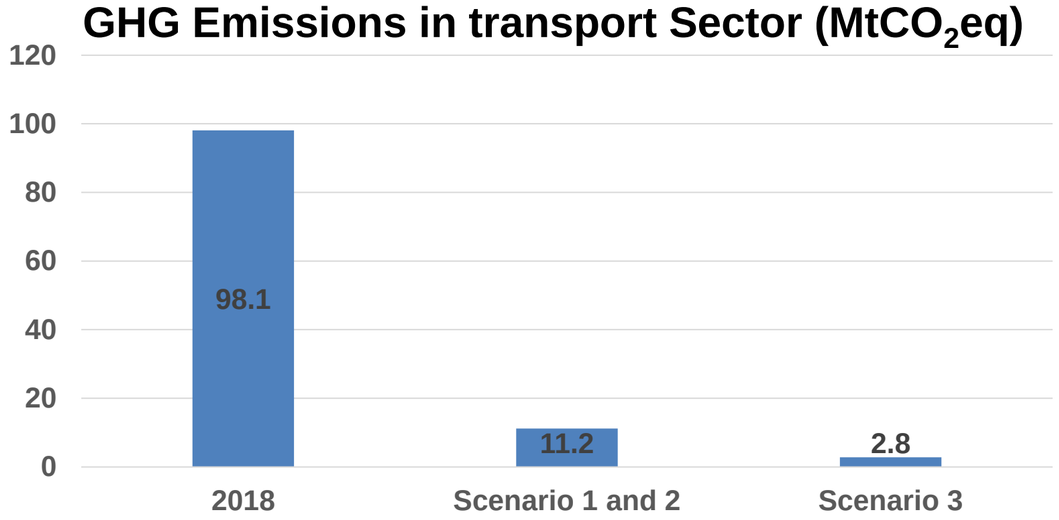


All three Scenarios

Carbon Neutrality Scenarios (tentative) by 2050

- (Transport Sector) Energy demand in year 2050 is expected to become 12.6 ~ 20.3 MTOE, which is reduced by 50.8% ~ 65.0% from the 2018-level (36 MTOE)
  98.1 $MtCO_2eq$ (2018) ➔ 2.8 $MtCO_2eq$ (S3) ~ 11.2 $MtCO_2eq$ (S1, S2)
- Transport demand control by expanding public transportation and personal mobility, shifting shipping modes, and shared vehicles
- Supply clean vehicles, such as electric or hydrogen vehicles, extensively [76% (S1, S2) ~ 97% (S3)]



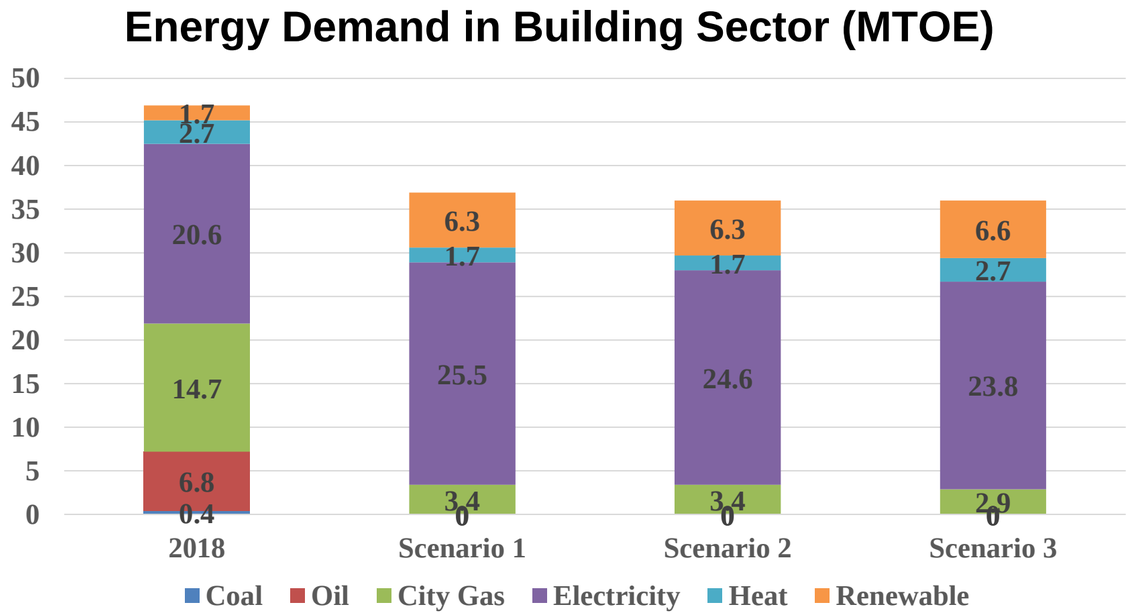


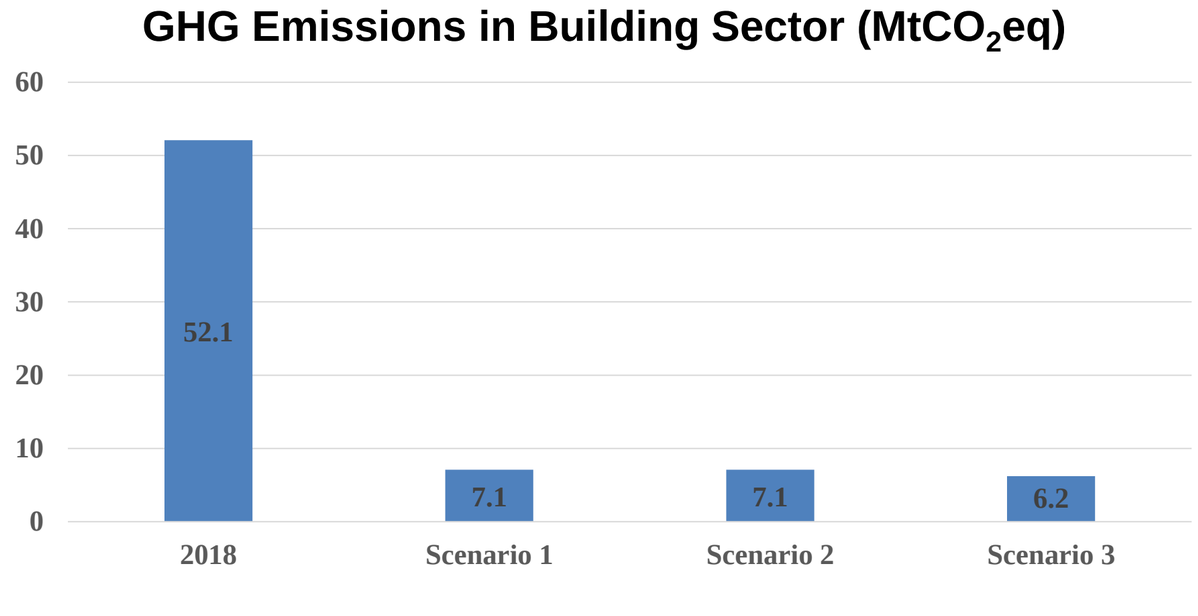
($MtCO_2eq$)

Road	Rail	Ship	Air
1.0 (S3) ~ 9.4 (S1, S2) [Offset: 0 (S3) ~ -9.4 (S1, S2)]	0	0.3	1.5

Carbon Neutrality Scenarios (tentative) by 2050

- (Building Sector) Energy demand in year 2050 is expected to become 36.0 ~ 37.0 MTOE, which is reduced by 21.1 ~ 23.2% from the 2018-level (46.9 MTOE)
  52.1 $MtCO_2eq$ (2018) ➔ 6.2 $MtCO_2eq$ (S3) ~ 7.1 $MtCO_2eq$ (S1, S2)
- Enhance energy efficiency of buildings (i.e., supply zero energy buildings, expand green remodeling businesses)
- Supply high-efficiency appliances (i.e., improve energy efficiencies and expand labelling, improve lighting and equipment energy consumption per unit)
- Smart energy management





Thank you