
Facilitative Sharing of Views

Republic of Korea

Fourth Biennial Update Report

7 June 2023
SB58 – Bonn, Germany



The Government of
the Republic of Korea

Overview

- 1 NATIONAL CONTEXT
- 2 GHG INVENTORY
- 3 MITIGATION ACTIONS AND EFFECT
- 4 INT'L SUPPORT AND COOPERATION
- 5 ETF TRANSITION AND IMPLEMENTATION

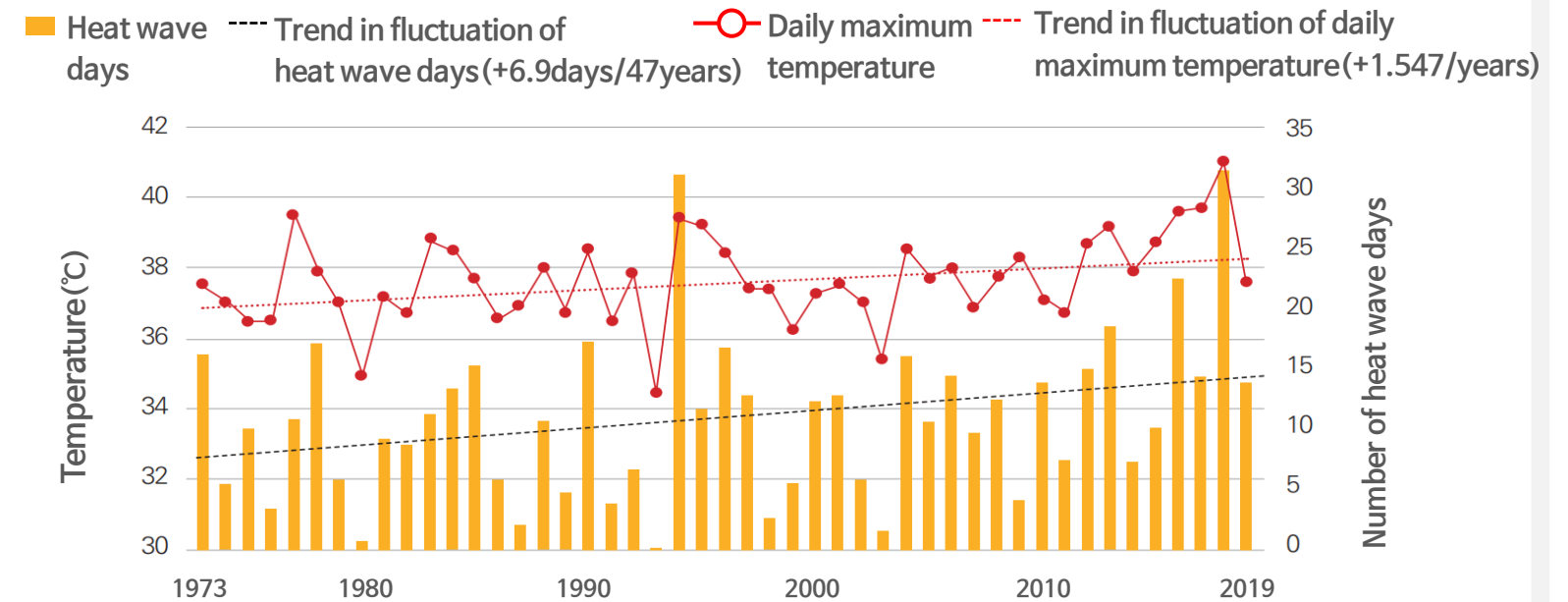


Profile of the Republic of Korea



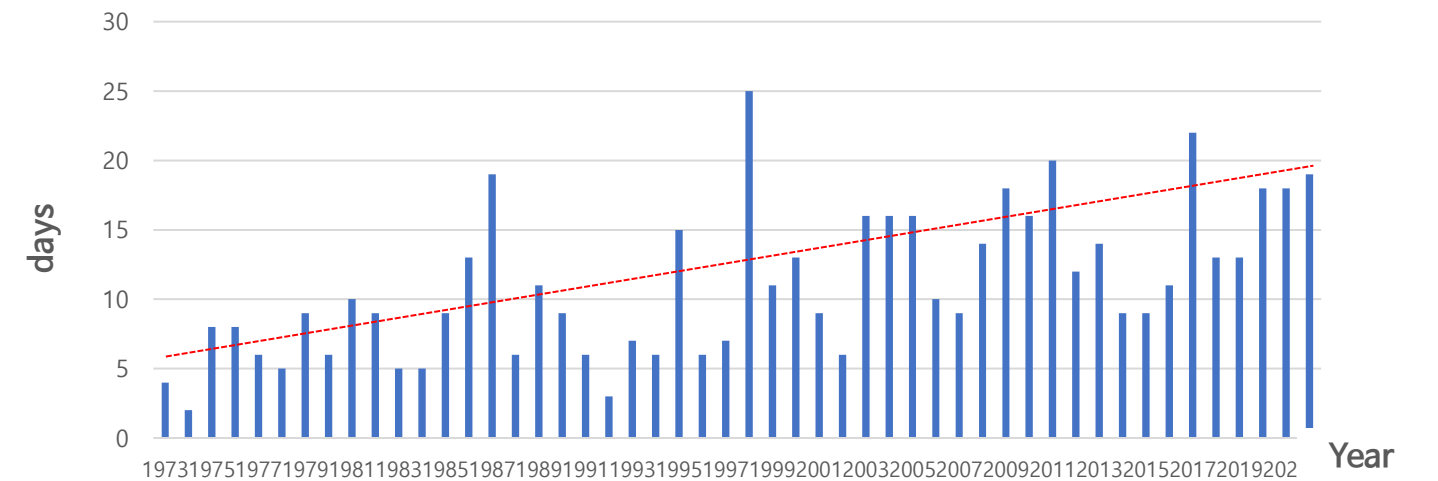
- A peninsular state located on the northeast end of the Asian Continent
- Limited access to power grid connected to neighboring countries

► Frequency and Intensity of Heat Wave by Year



* Source: Heat Wave Impact Report (Korea Environment Institute, 2020)

► No. of Days with at least 50mm of rain in summer (Jun-Aug)



* Source: National Climate Data Center of the Korea Meteorological Administration

National Economy

Scale of growth between 1990 and 2020

Nominal GDP and GDP per capita grew eight- and nine-fold, respectively

Korean economy in a mature phase

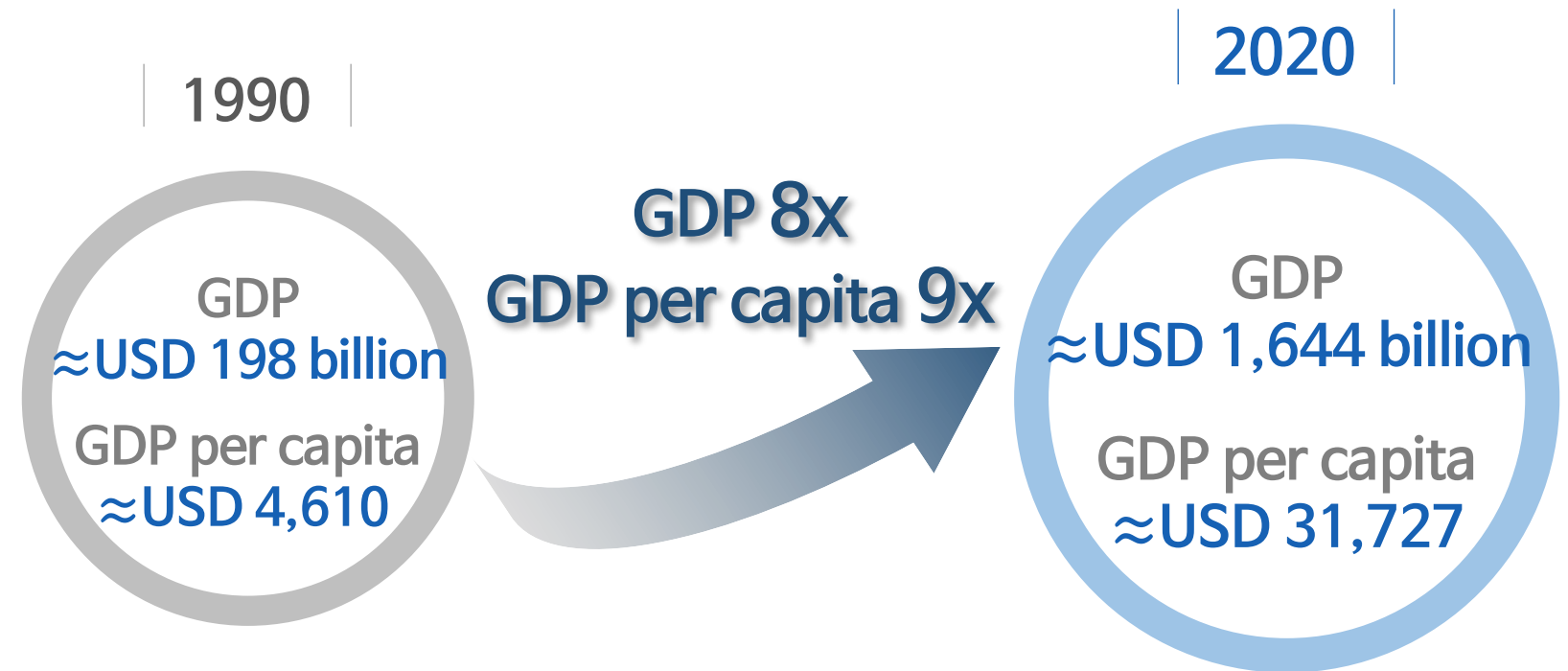
Annual growth rate of real GDP* has stabilized at around 3.0% on average since 2011 after having recorded 9.3% in 1990

* Real GDP in 2010 KRW

Exports and manufacturing sector play a significant role in the national economy

Type \ Year	1990	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dependence on exports	22.95	40.77	44.30	42.87	40.83	38.59	35.95	33.03	35.34	35.06	32.84	31.16	35.60
Share of manufacturing sector	27.7	30.2	30.9	30.5	30.3	29.5	39.0	28.8	29.5	29.1	27.5	27.1	27.9

* Source: GDP per Economic Activity (Statistics Korea)



Institutional Arrangement

Framework Act on Carbon Neutrality ('21)

Defining the minimum NDC target for 2030 as at least 35% reduction for 2018

2030 NDC & 2050 LEDs ('20)

Actively respond to climate change & to the era of great transition to Carbon Neutrality

Revised 2030 GHG Reduction Roadmap ('18)

Facilitating the achievement of the national GHG Reduction Target

2030 Roadmap ('16)

Basic Roadmap to achieve the National GHG Reduction Target for 2030

Framework Act on Low Carbon, Green Growth ('10)

Overcome climate change, energy crises and create new growth engines

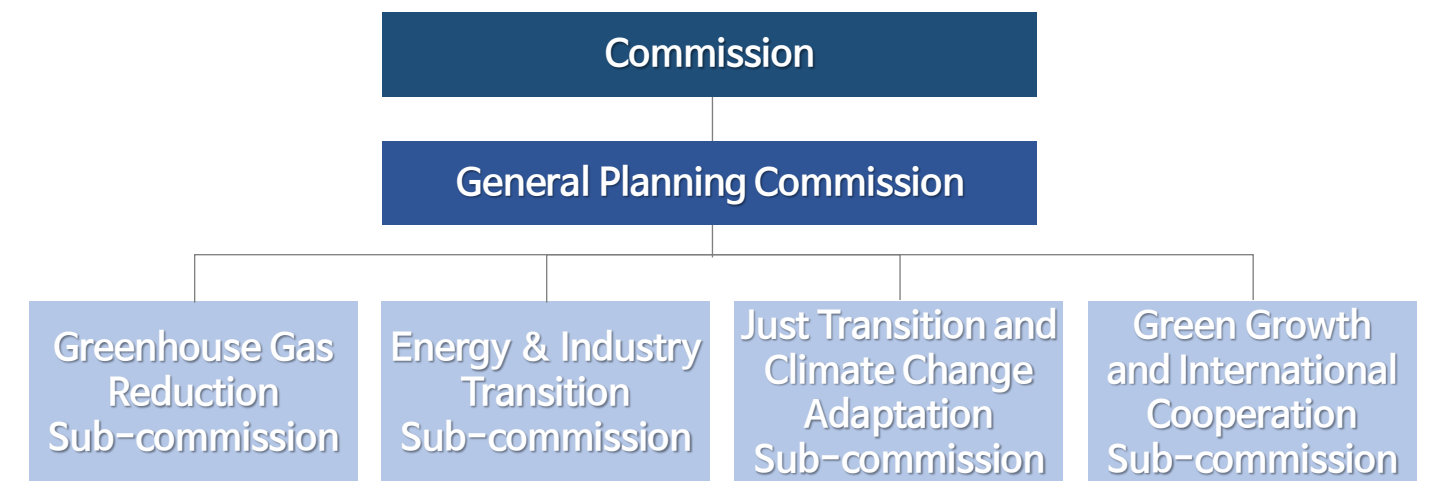
2020 Nationally Appropriate Mitigation Actions ('09)

To suggest mid-term GHG reduction targets by 2020

Low Carbon, Green Growth National Development Vision ('08)

Building the foundation for realizing a low-carbon society and green growth

Organization Chart of the Presidential Commission on Carbon Neutrality and Green Growth('22.03)

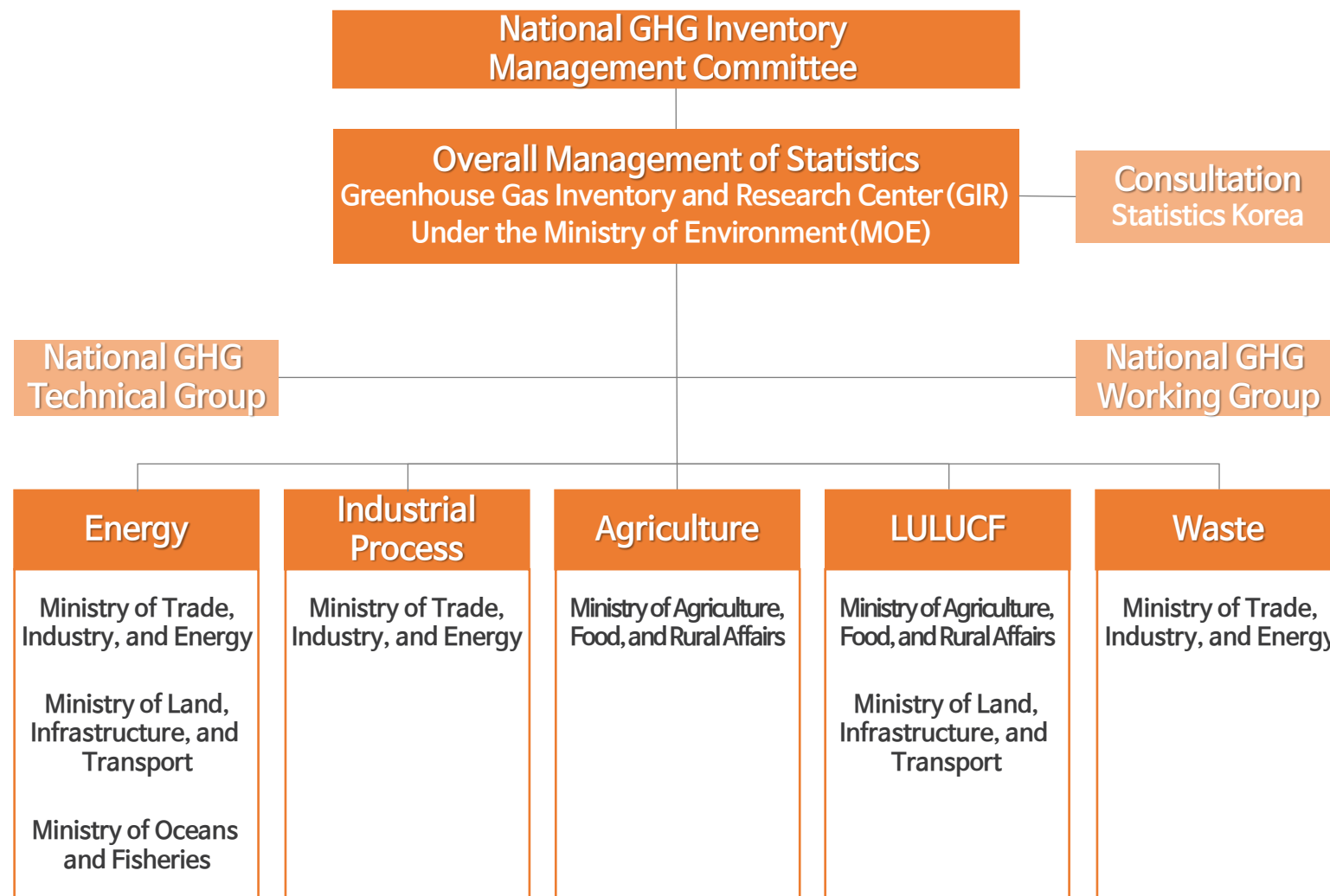


National Strategy and 1st Plan for Carbon Neutrality and Green Growth('23.03)

- Specifying Action Plans
- Combination of Nuclear Power and Renewables
- Government, Local, and Private Initiative
- Proactive Response with Innovative Approach
- Cross-departmental Support
- Transparent and Systematic Tracking and Assessment Mechanism

MRV System

Organization Chart for National GHG Inventory Development



* Source: 4th Biennial Update Report of the Republic of Korea (Government of ROK, 2021)

Preparation Process

Measurement and Reporting

- GIR prepares the MRV Guidelines to determine methodologies
- The relevant ministries collect activity data and estimate the GHG inventory based on the MRV guidelines
- The relevant ministries submit sectoral inventory to GIR through the National Inventory Report System

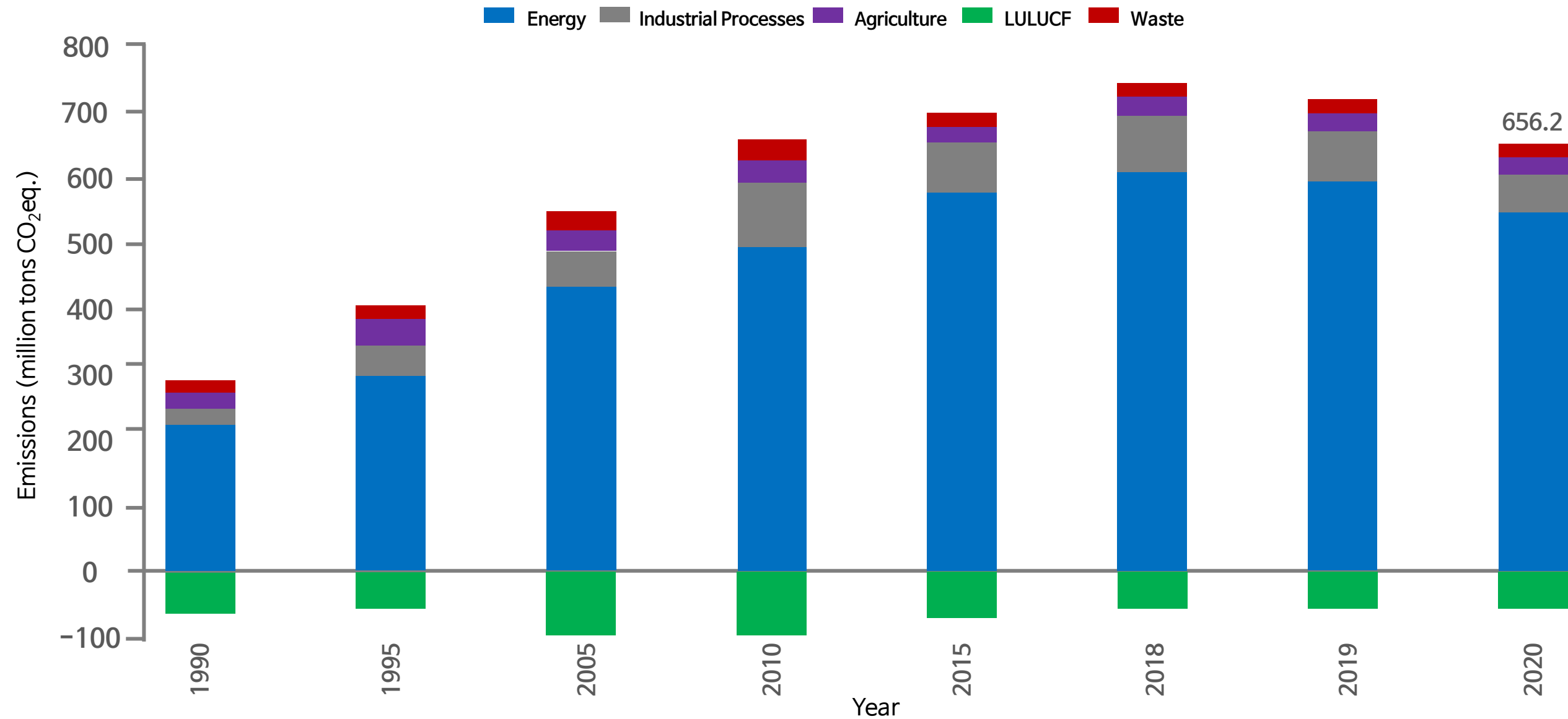
Verification

- GIR reviews and verifies the measurement methodology, activity data, and appropriateness of emission and removal factors to identify any errors in the emission calculations of subcategories

Final Confirmation and Publication

- The revised draft is confirmed through the final evaluation by the working group and committee
- The approved NIR is published through several platforms

GHG Emissions Trends (1990-2020)



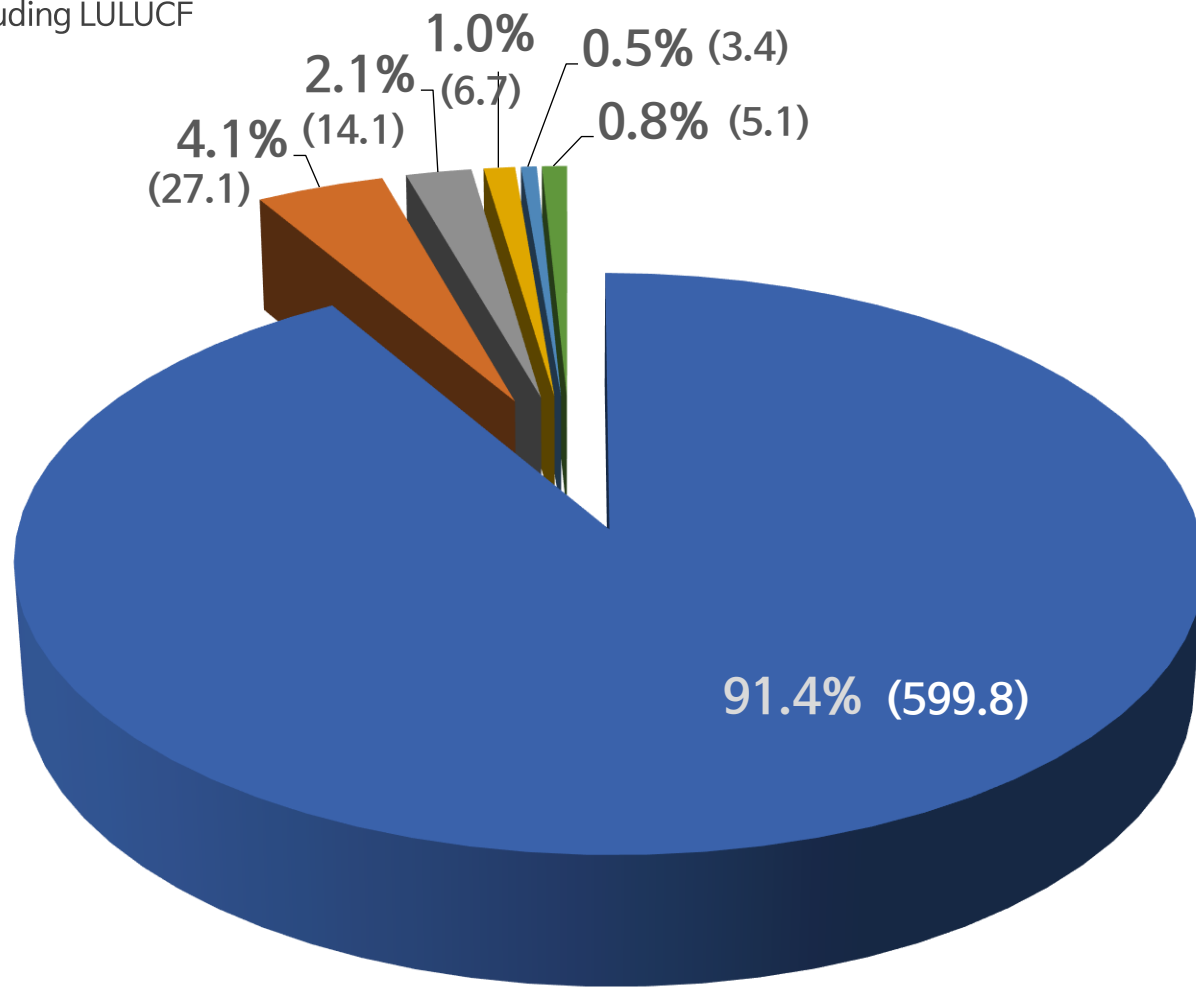
* Source: 2022 National Greenhouse Gas Inventory Report of Korea (Greenhouse Gas Inventory and Research Center, 2023)

GHG Emissions by Gas and Sector (2020)

by Gas

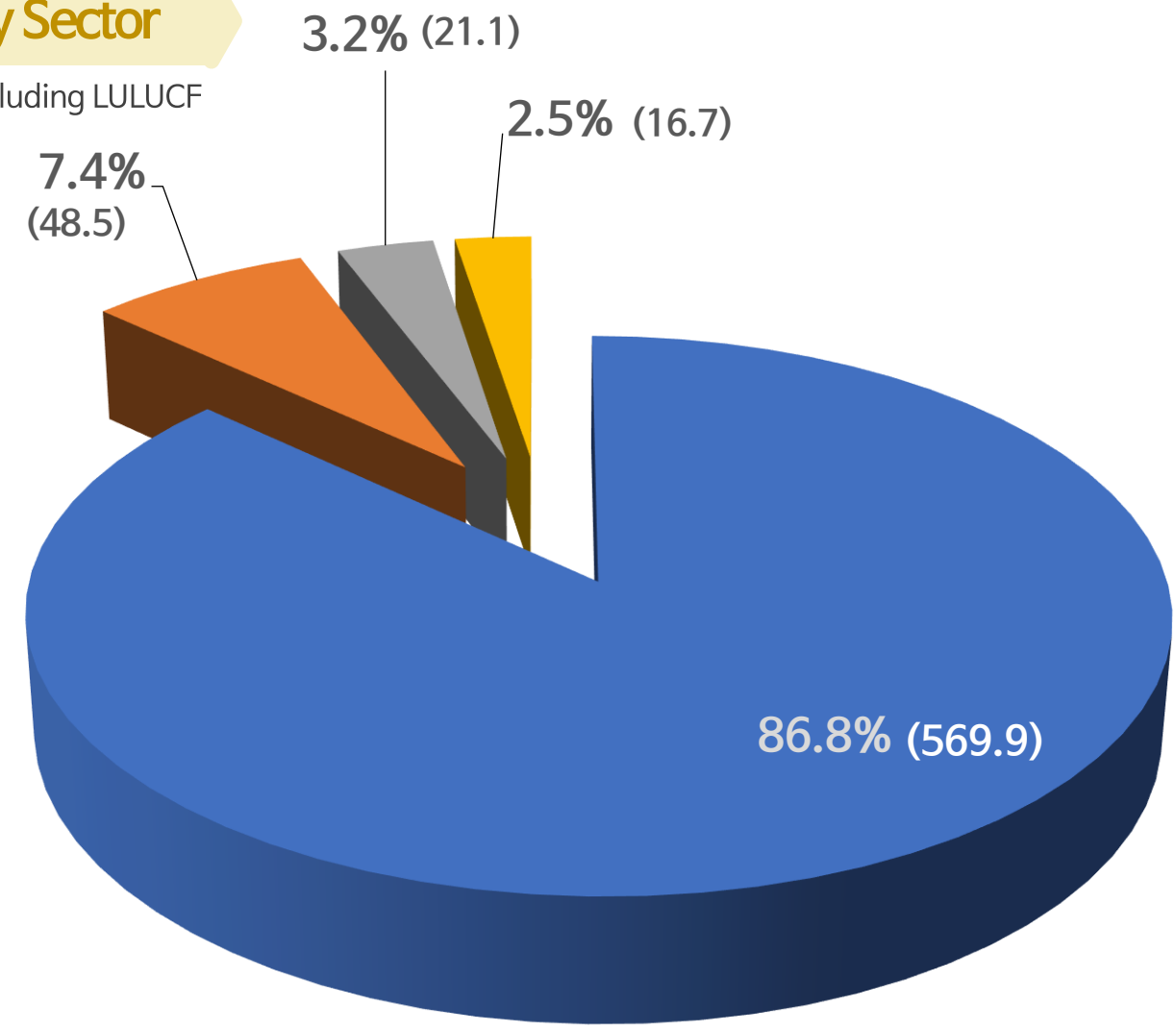
Total GHG Emissions: 656.2MtCO₂eq

* Excluding LULUCF



by Sector

* Excluding LULUCF



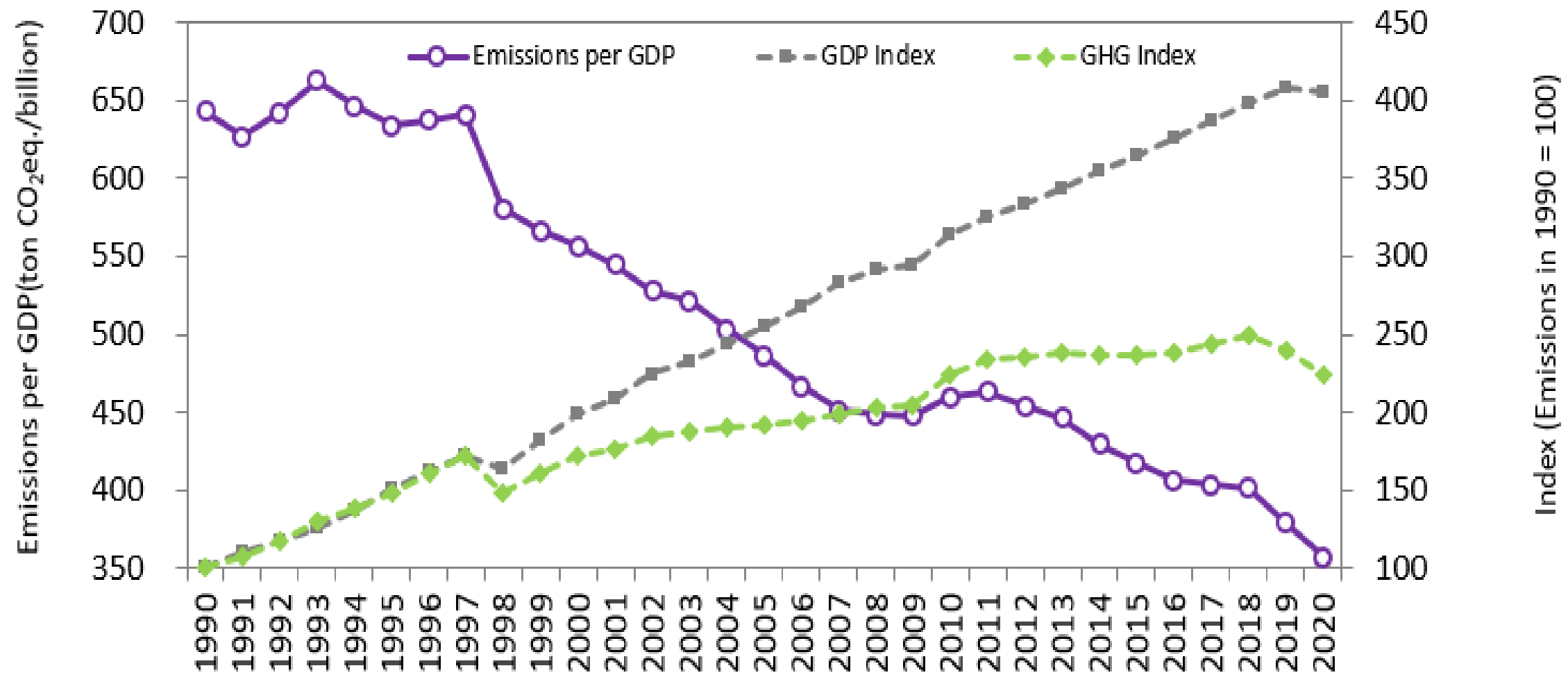
■ CO₂ ■ CH₄ ■ N₂O ■ HFCs ■ PFCs ■ SF₆

■ Energy ■ Industrial Processes ■ Agriculture ■ Waste

GDP* vs. GHG Emissions (1990-2020)

Real GDP in 2010 KRW

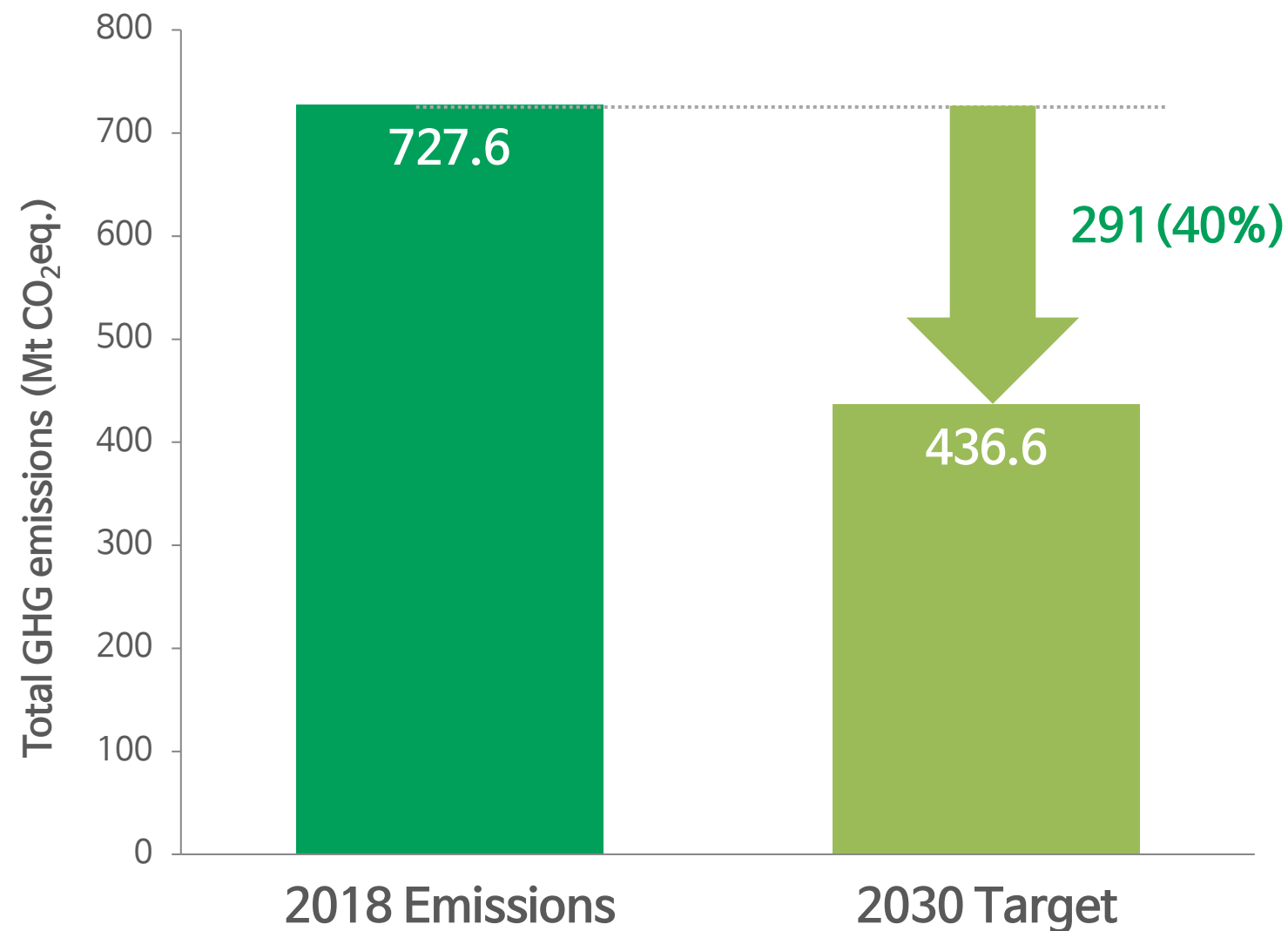
Total GHG Emissions per GDP in 2020: 356.7tCO₂eq./billion won



$$\text{Emissions per GDP} = \frac{\text{GHG Emissions}}{\text{GDP}} \quad \text{GDP index} = \frac{\text{respective year's GDP}}{1990\text{YR GDP}} \times 100 \quad \text{GHG index} = \frac{\text{respective year's GHG Emissions}}{1990\text{YR GHG Emissions}} \times 100$$

National GHG Reduction Target

2030 National GHG Reduction Target



* Source: 4th Biennial Update Report of the Republic of Korea (Government of ROK, 2021)

Five Major Pillars of Carbon Neutrality of LEDs



Increase the use of clean electric power and hydrogen



Improve innovative energy efficiency in connection with digital technologies



Facilitate the development and commercialization of carbon-free future technologies



Promote sustainable industrial innovation and circular economy



Strengthen the carbon sink functions of nature and ecology including forests, mud flats, and wetlands

Tracking and Assessment of GHG Reduction Progress

Progress Tracking Across Government Ministries and Offices

Central Government

- Define indexes and set goals by sector and task
- Collect and submit yearly performance data

Category	All	Transition	Industry	Building	Transport	Waste	Public	Agriculture & livestock	Forestry
Led by	MOE OPC	MOTIE	MOTIE	MOLIT MOTIE	MOLIT MOTIE	MOE	MOE	MAFRA	KFS
Supported by	Relevant ministries & offices	-	MAFRA, MOLIT, MOF	-	MOE MOF	-	MOLIT MOTIE	RDA KFS	-

GIR

- Supervise the drafting of Full-scope Assessment Report
 - Organize and operate an expert team to develop a Full-scope Assessment Report
 - Work in cooperation with national research institutes for the respective sectors including Korea Energy Economics Institute, Korea Institute of Construction Technology, and Korea Transport Institute
 - Invite the relevant ministries and offices to take part in developing the Report



Progress Tracking Across Government Ministries and Offices

- Manage the government's progress tracking mechanism
- Review the results of tracking and assessment, advise on policy strategy

* Source: 4th Biennial Update Report of the Republic of Korea (Government of ROK, 2021)

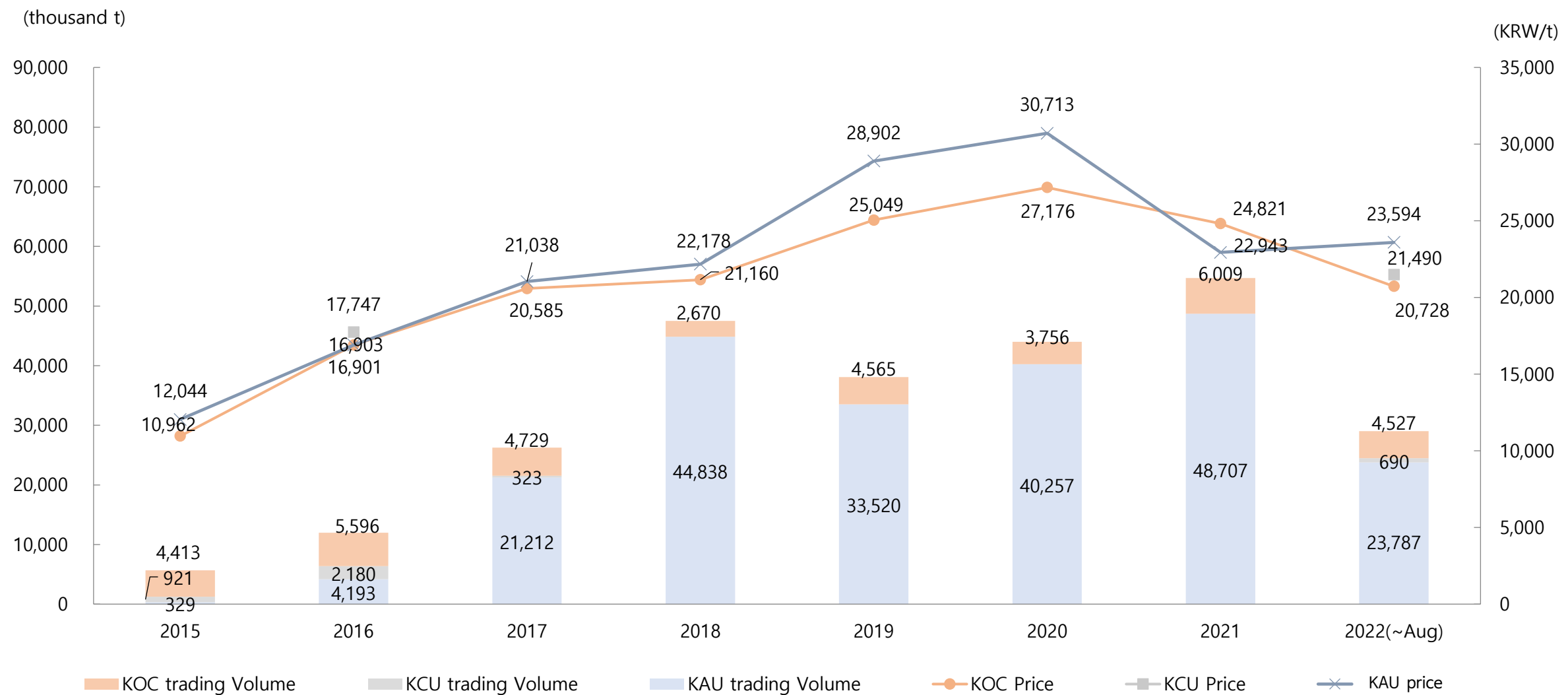
Korean Emissions Trading System

- Emission permits subject to auctioning increased from 3% in phase II to 10% in phase III
- Sub-sectors for BM allocation was expanded from 7 to 12 sub-sectors
- Cap was set at 3,048.3 Mt (609 Mt/year) for 5 years in Phase III

Type		Phase II('18~'20)	Phase III('21~'25)
Covered emissions		70%	73%
Covered entities		591	684
Cap		1,771.1 Mt (for 3 years)	3,048.3 Mt (for 5 years)
Auction	Sub-sectors	26 out of 64 sub-sectors	41 out of 69 sub-sectors
	Ratio	3% of allocation to entities	10% of allocation to entities
BM sub-sectors		Oil refining, cement, aviation, power generation, integrated energy supply (residential & industrial), waste	Phase II + Steel, petrochemicals, buildings, pulp, wood

Emission trading from 2015 to Aug.2022

- The amount of trade volume is 257.2 Mt (KAU 84.3%, KOC 1.6%, KCU 14.1%)
- The average emission price is \$ 17.4 (KRW 23,204)
- The total trading volume is \$ 4.65 billion (KRW 6.2 trillion)



GHG and Energy Target Management System

- Started in 2010 to meet the national mid-term GHG Reduction Target as **a precursor of K-ETS**
- Manages GHG emissions or energy consumption of business entities that are **not covered by K-ETS**
 - Business entities (sites) whose annual average GHG emissions of the past three years are above with energy consumption of above 50 kt (15 kt) or 200 TJ (80 TJ), respectively

► Criteria for Selection of Controlled Entities Under the GHG & Energy Target Management System

Category	~ 2011		~ 2012		~ 2014	
	Entity	Business site	Entity	Business site	Entity	Business site
GHG Emissions (tCO ₂ eq.)	125,000	25,000	87,500	20,000	50,000	15,000
Energy Consumption(TJ)	500	100	350	90	200	80

Performance in 2018

A total of **774** liable entities in public sector reduced **980,000 tons of CO₂eq.**

* Source: Guidelines for the Operation of the GHG & Energy Target Management System (Mar. 2021)

Policies and Measures by Sector



Key Reduction Policies in the Energy Transition Sector

- 3rd Energy Master Plan (Jun. 2019)
- Renewable Energy 3020 Plan (Dec. 2017)
- 10th Basic Plan for Long-term Electricity Supply and Demand (Jan. 2023)

Key Reduction Measures in the Energy Transition Sector

- Renewable Portfolio Standards (RPS)

► Progress of RPS Performance and Assessment of Achieved Supply of Renewable Energy

Category	2019	2020	2021
RPS Requirement (%)	6.0	7.0	9.0
Supplied Renewable Energy			
Total (MW)	4,493	5,347	4,275
- Photovoltaic	3,927	4,664	3,915
- Wind	191	160	64
- Water	12	3	18
- Bio	290	454	187
- Waste	73	65	90

* Source: 2020 Evaluation of Progress of GHG Reduction (Greenhouse Gas Inventory and Research Center, 2022)

Policies and Measures by Sector



Key Reduction Policies in the Industry Sector

- 2nd Climate Response Master Plan (Oct. 2019)
- Revised 2030 Roadmap (Jul. 2018)

Key Reduction Measures in the Industry Sector

- Energy Consumption Efficiency Grade Labeling System
- Factory Energy Management System (FEMS)
- Energy Efficiency Resource Standards (EERS)
- Pilot Project of Voluntary Energy Efficiency Targeting
- Expansion of Installation of Energy-efficient Facilities

► Progress of Factory Energy Management System and Expansion of Installation of Energy-efficient Facilities

Category		2019	2020	2021
No. of business sites that installed FEMS (cumulative, site)		132	184	227
Expansion of installation of energy-efficient facilities	Area of expanded renewable energy facilities (ha)	1,381	1,401	1,424
	Area of expanded energy-saving facilities (ha)	12,518	13,413	14,151

* Source: 2020 Evaluation of Progress of GHG Reduction (Greenhouse Gas Inventory and Research Center, 2022)

Policies and Measures by Sector



Key Reduction Policies in the Building Sector

- 2nd Master Plan on Green Building (Dec. 2019)
- 2nd Climate Response Master Plan (Oct. 2019)
- Revised 2030 Roadmap (Jul. 2018)

Key Reduction Measures in the Building Sector

- Zero-Energy Building Certification
- Green Remodeling
- Carbon Point Program

► Progress of Zero-Energy Building Certification

Category(Unit)	2019	2020	2021
Zero-Energy Building Certification (No. of ZEB Certificates Granted)	41	506	1,063

* Source: 2020 Evaluation of Progress of GHG Reduction (Greenhouse Gas Inventory and Research Center, 2022)

► Progress of Participation in the Carbon Point Program

Category	2019	2020	2021
Carbon Point Program (10 thousand households)	299	310	325

* Source: 2020 Evaluation of Progress of GHG Reduction (Greenhouse Gas Inventory and Research Center, 2022)

Policies and Measures by Sector



Direction of Major Reduction Policies in the Transport Sector

- Local Government's Bicycle Promotion Plan
- 2nd National Sustainable Transport Development Master Plan 2021–2030 (Jul. 2021)
- 4th Development and Distribution of Environment friendly Automobiles Promotion Master Plan (Feb. 2021)
- Future Cars and Market Occupation Strategy (Oct. 2020)

Key Reduction Measures in the Transport Sector

- Expansion of public transportation
- Distribution of eco-friendly vehicles
- Biodiesel blending in road transport
- Improvement of average fuel efficiency of vehicles

► No. of Future Car Chargers Built by Year (as of December 31, 2021)

Category (Unit)	~ 2018	2019	2020	2021	Total
Electric	27,352	17,440	19,396	42,513	106,701
Fast	5,213	2,183	2,409	5,262	15,067
Slow	22,139	15,257	16,987	37,251	91,634
Hydrogen	14	22	34	100	170

* Source: Status of Supply of Electric and Hydrogen Vehicles and Establishment of Charging Infrastructure (Ministry of Environment, 2022)

Policies and Measures by Sector



Direction of Major Reduction Policies in the Waste Sector

- 2nd Climate Response Master Plan (Oct. 2019)
- 1st Resource Circulation Master Plan (2018~2027) (Sep. 2018)

Key Reduction Measures in the Waste Sector

- Waste disposal levy program, mandatory separation of recyclable waste, extended producer responsibility (EPR), environmental assessment for recycling waste
- Methane gas recovery in landfills

► Progress of Fulfillment of Recycling Obligation

Category	2009	2011	2013	2015	2017	2018	2019	2020	2021
Recycling Obligation (Kilo tons)	758.8	895.4	925.6	1,096.8	1,179.6	1,209.1	1,221	1,218.3	1,321.9
Recycling Rate (%)	75	78	75	82	80	78	78	78	80

* Source: Korea Resource Circulation Service Agency (2023) (<http://www.kora.or.kr>)

Policies and Measures by Sector



Public and Other

Direction of Major Reduction Policies in the Public and Other Sectors

- Green New Deal
- 2nd Climate Response Master Plan (Oct. 2019)
- Revised 2030 Roadmap (Jul. 2018)

Key Reduction Measures in the Public and Other Sectors

- Implementing the GHG and Energy Target Management System in the Public Sector
- Increasing the LED lighting supply

► Progress of LED lighting supply

Category (Unit)		2019	2020	2021
LED lighting cumulative supply rate (%)	Indoor	86.8	94.7	94.9
	Outdoor	42.9	56.2	54.5

* Source: 2020 Evaluation of Progress of GHG Reduction (Greenhouse Gas Inventory and Research Center, 2022)

► Operational Results of the GHG and Energy Target Management System in the Public Sector

Category (Unit)	2019	2020	2021
Reduction Rate of the GHG and Energy Target Management System in the Public Sector (%)	23.5	30.3	-

* Source: 2020 Evaluation of Progress of GHG Reduction (Greenhouse Gas Inventory and Research Center, 2022)

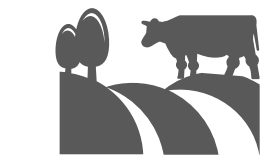
Policies and Measures by Sector

Direction of Major Reduction Policies in the Sector

- Detailed Master Plan for Climate Change Adaptation in Agriculture, Fisheries, and Food Sector (May. 2011)
- Revised 2030 Roadmap (Jul. 2018)

Key Reduction Measures in the Sector

- Voluntary GHG Reduction Projects of Agriculture and rural sectors
- K-ETS by External Project in Agriculture Industry
- Low-Carbon Agricultural and Livestock Goods Certification
- Smart Farm



Agriculture and Fishery

► Progress of GHG Reduction Projects by Year in the Agriculture Sector

(Unit: tCO₂eq.)

CATEGORY	2015	2016	2017	2018	2019	2020
Voluntary GHG Reduction Projects for agriculture Industry and farmhouses	14,144	16,480	16,547	14,047	11,425	9,738
K-ETS by External Project in the Agriculture Industry	-	-	3,229	12,413	24,224	35,551
Low-Carbon Agricultural and Livestock Goods Certification	9,154	11,901	25,963	68,455	74,947	77,769

* Source: 2020 Evaluation of Progress of GHG Reduction (Greenhouse Gas Inventory and Research Center, 2022)

Policies and Measures by Sector



Key Reduction Policies for the Forest Carbon Sink Sector

- 2nd Climate Response Master Plan (Oct. 2019)
- 6th National Forest Master Plan 2018–2037 (Jan. 2018)
- 3rd Comprehensive Plan for Improvement of Carbon Sink (May. 2023)

Key Reduction Measures for the Forest Carbon Sink Sector

- Sustainable Forest Management
- Establishment of new carbon sinks including urban forests
- Utilization of forest biomass energy
- Utilization of domestic wood
- Forest Carbon Offset Scheme

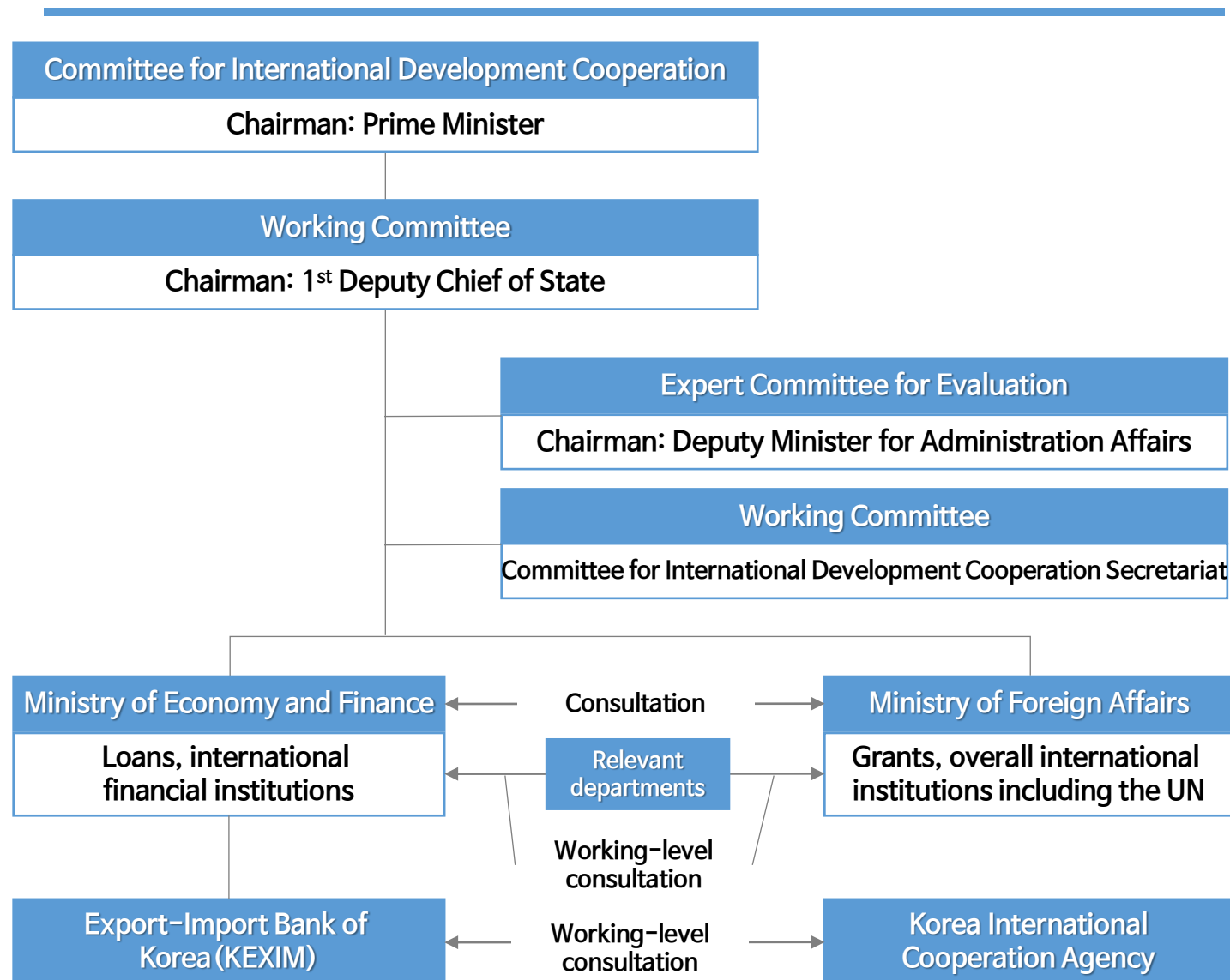
► Assessment of Quantitative Indicators in the Forest Carbon Sink Sector

Category(Unit)		2019	2020	2021
Forest Nurturing	Area of forest nurturing (1,000 ha)	186	229	209
Establishment of new carbon sinks including urban forests	Area of newly created carbon sinks such as urban forest (1,000 ha, cumulative)	48	54	54.6
Utilization of forest biomass energy	Quantity of domestic pellets produced (1,000 tons)	243	331	658

* Source: 4th Biennial Update Report of the Republic of Korea (Government of ROK, 2021)


Finance

ROK's ODA Implementation Process




* Source: 4th Biennial Update Report of the Republic of Korea (Government of ROK, 2021)

Grant aids



GREEN CLIMATE FUND

(‘19) Additional contribution of KRW 233.05 billion to GCF



Global Green Growth Institute

(‘21) Signing of MOU with GGGI to create a trust fund

Concessional loans

▪ (‘21.01.05) Expanding support in green areas

2020

KRW 200 Billion

Proportion of support: 22%


»

2025

KRW 690 Billion

Proportion of support: 40%

▪ Climate-related Official Development Assistance (ODA):

	(USD)	2016	2017	2018	2019
 Multilateral		87.6M	» 31.6M	» 56.9M	» 70.1M
Bilateral, etc.		59.0M	» 151.7M	» 147.3M	» 161.7M

Technology Development & Transfer

Climate Technology and National R&D Investment in 2020

Category	Investment per Major Area of Climate Technology R&D			Total National R&D
	Reduction	Adaptation & Convergence	Climate Technology Total	
Total Investment (1million. USD)	1,542.2	738.9	2,281.6	17,861.1
No. of Research Projects (Case)	4,187	1,057	7,219	44,563

* Source: Report on the Survey and Analysis of National R&D Projects on Climate Technology (NIGT, 2021)

* Exchange rate applied USD : KRW (2023) 1,336.50

Policies and Strategies Regarding Climate Technology

- The Carbon Neutrality Technology Innovation Strategy (Mar. 2021)
 - Presenting 10 major technologies for carbon neutrality in consideration of the level of contribution to GHG reduction and issue analysis per sub-sector based on LEDS
 - Presenting Mid-to long-term innovation strategies
 - Strategies on strengthening research capabilities that include enhanced international cooperation and capacity building

Climate Technology Centre & Network (CTCN)

- An organization for the implementation of technological mechanisms of the UNFCCC
 - Cooperative projects are being promoted to support the demand for climate technology in 12 countries, and some are linked to other projects of ODA or GCF; thus enabling continued implementation
 - CTis (Climate Technology Information System) is an integrated information platform that systematically provides information focused on climate technology including international trends, statistical data, and climate technology demand based on a system that classifies climate technologies into 45 categories

Capacity Building

Greenhouse Gas
Inventory &
Research Center

Ministry of
Environment

Forest Training
Institute of the Korea
Forest Service

- **UNFCCC-GIR-CASTT Programme on Greenhouse Gases**
4-week intensive professional training on GHG inventory compilation for national experts from developing countries
- **International Specialized Course on Environmental Technology: Atmospheric Environment Management to Counter Climate Change**
Strategies for countering climate change, outline of air quality improvement technologies, and company field visits
- **REDD+ Capacity Building Program**
Explore bilateral cooperation and support measures with regard to countering climate change through capacity building of public officials from tentative REDD+ Pilot Program countries

Lessons Learned

Participate in International Consultation and Analysis

1st BUR

'14.12.29



TA

'15.05.18 ~ '16.02.10



FSV

'16.05.20

2nd BUR

'17.11.16



TA

'18.03.03 ~ '18.11.09



FSV

'19.06.19

3rd BUR

'19.11.30



TA

'20.06.22 ~ '21.02.12



FSV

'21.06.12

4th BUR

'21.12.30



TA

'22.06.20 ~ '23.03.21



FSV

'23.06.07

Assessment and Improvement

Improvements in the Transparency of Reporting on Institutional Arrangements

- Improved transparency of information by specifically describing institutional arrangements related to the preparation of NC and BUR compared to previous reports.

Improvements in Reporting Information on Mitigation Policies and Measures

- Facilitate better understanding of the reported information on mitigation actions by reporting information in tabular format and on quantitative goals

Improvements in Reporting on Methodology and Implementation Information

- Reporting information on the progress of implementation, involvement in international market mechanisms, and domestic MRV system

ETF Transition and Implementation

Establishment of Implementation System for Carbon Neutrality



Development of an objective performance management system by applying quantitative indicators for each policy/measure



Permanent consultative committee and systematic stock-taking



Increase of accuracy of local GHG statistics by developing the National Carbon Balance Map

Preparing for Transition to Enhanced Transparency Framework

Application of the 2006 IPCC Guidelines

- Establishment of plan for improving activity data and developing measures to secure new activity data to facilitate the application of the 2006 IPCC Guidelines

Implementation Plan for the Measurement of Indirect GHG Emissions

- Foundation for cooperation regarding the method and procedures for using statistics

Development and Application of Country-Specific Emissions and Removal Factors

- Plan to develop, verify, and announce the national factors by sector to ensure the accuracy of its inventory, apply the 2006 IPCC Guidelines

Performance-Oriented Review

- Review of PaMs based on Transparency, Timeliness, Responsibility, and Feedback

Implementation Arrangement for the Preparation and Submission of BTR no later than Dec.2024

Thank you



The Government of
the Republic of Korea