



グループ別発表 1
発表 1

「韓国¹の建築部門のエネルギー政策と関連事業」

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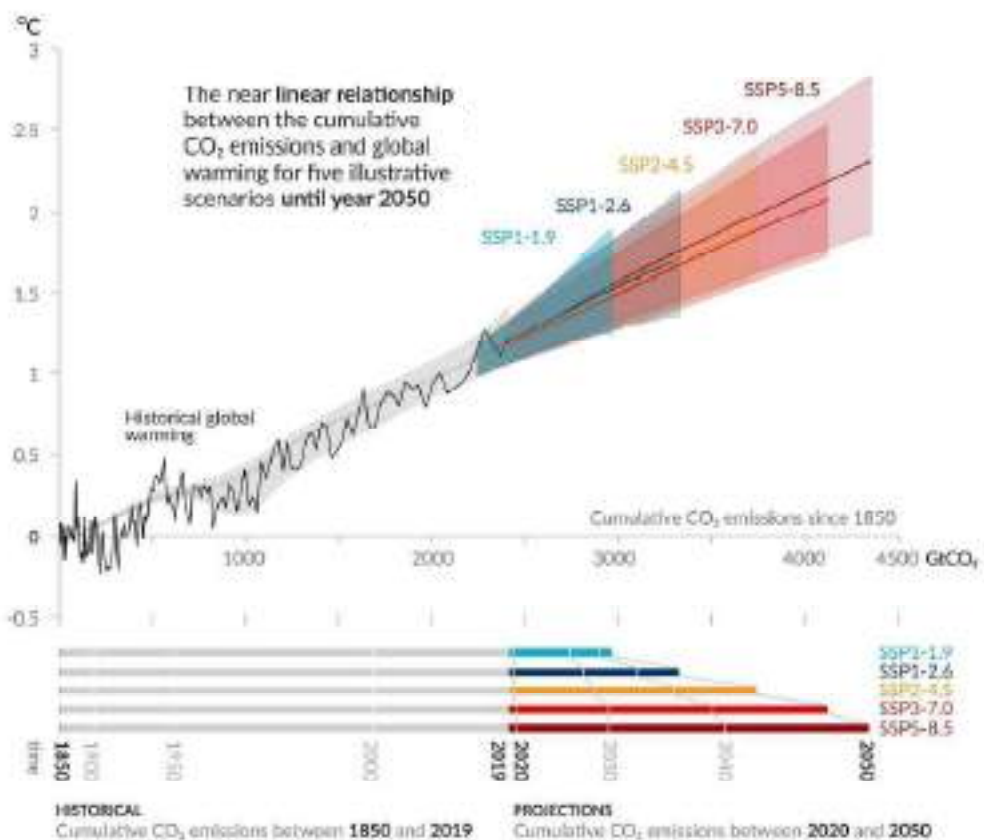
韓国

副教授

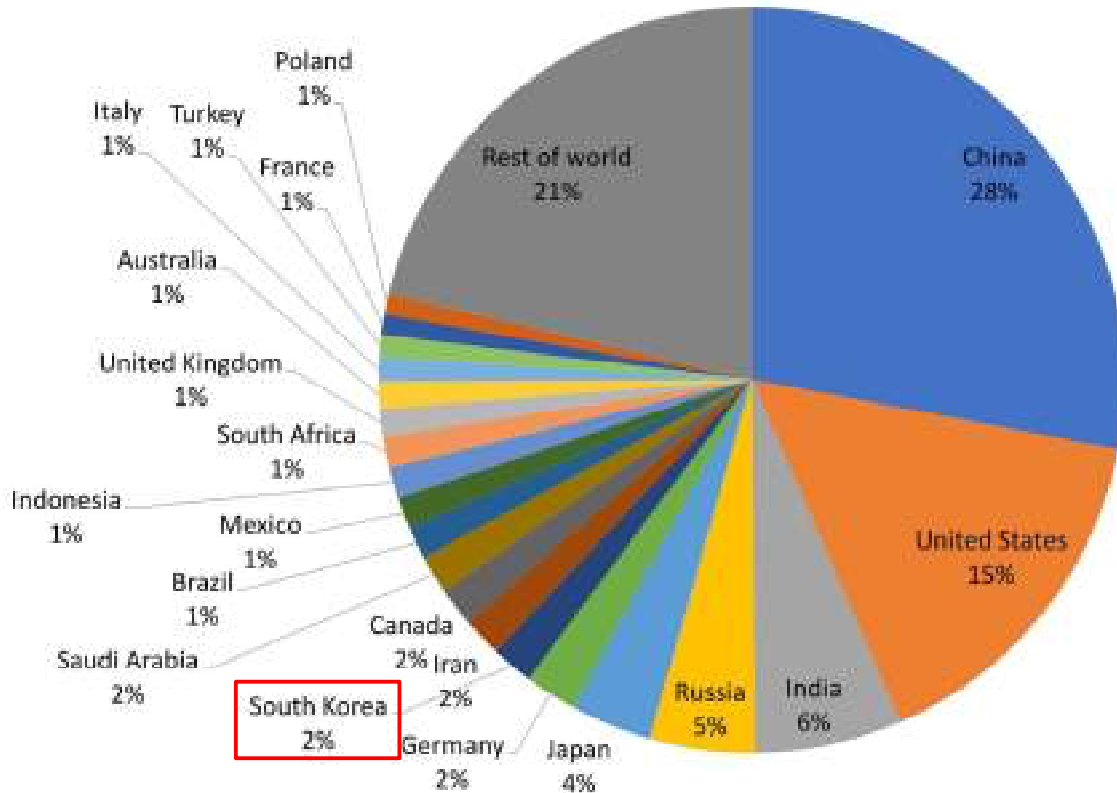
Policies and Projects in the Korean Building Energy Sector

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Global warming scenario



CO₂ emissions by country



IEA, Union of Concerned Scientists, 2015

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Roadmap to GHG reduction in building sector in Korea

- Long-term objective: "Holding the increase in the global average temperature rise (as of the year of 2100) to well below 2°C above pre-industrial levels, and pursuing efforts to limit warming to "1.5°C"
- NDC (Nationally Determined Contribution) roadmap (2015)
 - **To reduce GHG emissions by 37% from business as usual (BAU, 851 MtCO_{2eq}) level by 2030**
 - Reduction target in Korea by 2030: 315 MtCO₂
 - Reduction target in building sectors: 35.8 MtCO₂ (Reduction rate is 18.1% in the sector)
- Modified NDC roadmap 2030 (2018)
 - Reduction of GHG emissions by 37% from the BAU level by 2030
 - Adjustment of the carbon emission credit trading proportion 11.3% → 4.5%
 - Reduction target in building sectors: **64.5 MtCO₂ (32.7%)**
- Updated NDC roadmap (Dec. 2020)
 - Carbon emission target by 2030: 536 MtCO₂
 - 24.4% reduction compared to 709.1 MtCO₂ of GHG emission in Korea in 2017 (26.3% compared to that of 2018)
 - Reduction target in building sectors: 22.3 MtCO₂ (14.4%)

LEDS Carbon Neutral Scenario 2050

- LEDS, Long-term low greenhouse gas Emission Development Strategies
- Vision: 2050 Carbon Neutrality
- Scenario draft (Dec. 2020, compared to the final draft at the end of Oct. 2021)
 - First draft, 24.5 MtCO₂, existing scheme used + technical development and fuel conversion
 - Second draft, 18.7 MtCO₂, First draft + fossil fuel reduction + change in a way of living
 - Third draft, 0 MtCO₂, Significant reduction of fossil fuel + hydrogen society
- Basic strategy in building sector
 - Strengthening insulation and air-tightness performance and expanding the use of high energy efficient products → Minimization of building energy
 - Promotion of renewable energy in buildings such as solar and geothermal energy → Realization of building energy self-sufficiency
 - Accelerated conversion of existing buildings to green buildings, ZEB for new buildings (step-by-step expansion of mandatory targets) → Maximization of energy efficiency
 - Improvement of product energy efficiency in buildings such as lighting and household and office equipment
 - Reduction of dependence on city gas for cooling, heating and cooking → Review of the possibility of wide use of electricity and hydrogen energy source technology



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Main policies and projects

- Policies
 - G-SEED
 - ZEB (3.4 MtCO_{2eq} reduction)
 - Improvement of energy consumption patterns by users (Reduction of 3.6 MtCO_{2eq})
- Projects
 - Green Remodeling (5.9 MtCO_{2eq} reduction)
 - Diagnosis of building energy and developing a database
 - Zero Energy City
 - Smart Green City



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G-SEED



- On-going policies from 2002
- Green Standard for Energy and Environmental Design
- Enforced targeting apartments in 2002
- Currently, mandatory certificate needed for apartments whose number of households is more than 500 and buildings whose floor area is more than 3,000m² of public institutions
- Similar to the LEED program of USGBC
- Four certificate rating levels
- Providing incentives of six items such as tax reduction of acquisition tax and property
- Evaluation and merit point items

Categories	Land usage and transportation	Energy and environmental pollution	Materials and resources	Water cycle management
	Maintenance	Ecological environment	Indoor environment	
Merit point items	Housing performance area	Innovative design		



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Energy items assessment method

- Building energy performance index (EPI)
 - Points acquired in the stage of design drawings
 - Determined whether energy saving techniques are applied
 - Points can be calculated without energy-related simulations → Easy to access by architects
- Building energy efficiency rating
 - The use of ECO2, which is the DIN V 18599-based energy consumption assessment program
 - Calculation of load, end energy, and primary energy in cooling, heating, hot water, lighting, ventilation, and renewable energy

Rating	Residential building	Non-residential building
	Primary E. Consumption (kWh/m ² year)	Primary energy consumption (kWh/m ² year)
1+++	60 or less	80 or less
1++	60 – 90	80 – 140
1+	90 – 120	140 – 200
1	120 – 150	200 – 260
2	150 – 190	260 – 320
3	190 – 230	320 – 380
4	230 – 270	380 – 450
5	270 – 320	450 – 520
6	320 – 370	520 – 610
7	370 – 420	610 – 700



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ZEB

- On-going Policy from 2020
- The mitigation of the current 15–11% (ZEB 1–5 rating) floor area ratio and building height limit is expanded to 20–15%.
- If ZEB is certified from the private sector, additional points are given such as grant assistance and design evaluation merit points.
- Roadmap to expand ZEP

	2020	2023	2025	2030
Public sector	More than 1,000 m ² (Rating 5)	More than 500 m ² (Rating 5)	More than 500 m ² (Rating 4)	More than 500 m ² (Rating 3)
Private sector	n/a	n/a	More than 1,000 m ² (Rating 5)	More than 500 m ² (Rating 5)

Rating	Energy self-sufficiency rate	Prerequisite
1	100% or higher	
2	80 - 100%	(1) Energy efficiency rating 1++ or higher or
3	60 - 80%	(2) Building energy management system (BEMS) or
4	40 - 60%	(3) Installation of six or more remote meter readers
5	20 - 40%	



Zero energy cities

- Zero-energy and carbon neutral city projects are under way in three cities in Korea (including Suwon city)
- 988,104m², 7,179 houses
- Planned in 2016 and expected to complete by 2025



Web page of international competition



Winner



Green remodeling of public buildings

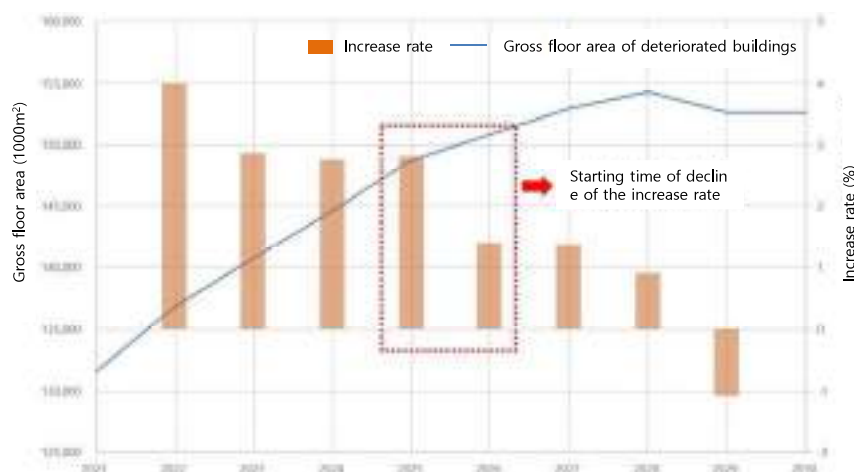
- On-going project from 2020
- Scope of Green Remodeling
 - Passive: Improvement of thermal transmittance in walls and windows
 - Active: Replacement to high-efficiency air-conditioner and boiler
 - Renewable: Installation of photovoltaics, etc.
- Focusing on areas related to the reduction of building energy consumption
- Target buildings and budget
 - 821 cases 300 MUSD, 2020
 - 895 cases 300 MUSD, 2021
 - Remodeling target buildings are expanded and the budget is increased at a rate of 150% every year from 2022 to 2025
- Status of GR project in 2021
 - 524 cases are conducted (as of the end of September 2021)
 - The reduction rate of energy consumption is 5–73%, which is 29% on average.



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Measure to promote GR

- The increase rate of gross floor area of deteriorated public buildings will decline from 2026.
- The enforcement of mandatory green remodeling of public buildings is under review to expand the GR market (The enforcement starts from 2025)
- Implementation of building energy performance evaluation standards and development of systems to derive improvement measures through the outcome analysis of ongoing projects (2021–2024)
- Expansion of interest assistance project for private sectors
 - Assistance of construction cost-related interest cost (1–3% interest rate)
 - 352 cases in 2014 ... 8,551 cases in 2017 ... 12,000 cases in 2020



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Database development project of building energy diagnosis

- Database development project of building energy diagnosis information
 - Building energy diagnosis conducted targeting deteriorated buildings
 - The diagnosis results are databased and used in new energy projects.
 - Assistance target: Buildings more than 1,000m² of floor area and more than 15 years of service life after completion
 - 800 buildings supported since 2021
- Additional projects of mandatory diagnosis
 - On-going project from 2007
 - SMEs whose annual energy consumption is 2,000–10,000 toe
 - Encouraging the improvement of energy efficiency and low-energy structure for SMEs
 - 30% of the diagnosis cost is supported.
 - 140 SMEs are supported in 2021.



Thank you very much

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