GHG Indicators: Experience in Korea

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GHG Emission Target of Korea

- **Updated NDC (2021)**
  - ✓ 40% reduction (net) from 2018 gross emission (previous: 24.4%)
  - ✓ Basic Plan for Carbon Neutrality and Green Growth (2023)

Sector	2018	2023	2024	2025	2026	2027	2028	2029	2030	
Power	269.6	223.3	218.4	215.8	211.8	203.6	189.9	173.7	145.9	-45.9%
Industry	260.5	256.4	256.1	254.8	252.9	250.0	247.3	242.1	230.7	-11.4%
Building	52.1	47.6	47.0	46.0	44.5	42.5	40.2	37.5	35.0	-32.8%
Transportation	98.1	93.7	88.7	84.1	79.6	74.8	70.3	66.1	61.0	-37.8%
Agriculture	24.7	22.9	22.4	21.9	21.2	20.4	19.7	18.8	18.0	-27.1%
Waste	17.1	15.1	14.7	14.1	13.3	12.5	11.4	10.3	9.1	-46.8%
Hydrogen		3.4	4.1	4.8	5.5	6.2	6.9	7.6	8.4	
Fugitive	5.6	5.1	5.0	5.0	4.9	4.8	4.5	4.2	3.9	-30.4%
Sink	-41.3	-33.5	-31.3	-28.9	-30.4	-29.1	-28.3	-27.6	-26.7	
CCUS					-0.4	-0.7	-1.3	-3.2	-11.2	
Foreign									-37.5	
Total	686.4	634.0	625.1	617.6	602.9	585.0	560.6	529.5	436.6	-36.4%

Net Zero Scenario for 2050

- **2050 Net Zero Scenarios**
  - ✓ Scenario ‘A’ (No Fossil Power) or ‘B’ (Proactive CCUS utilization)
  - ✓ CCUS -55.1 MtCO2e in Scenario A and -84.6 in Scenario B
    - ➢ DAC -7.4 MTCO2e and Hydrogen +9.0 in Scenario B
  - ✓ Power sector
    - ➢ Net zero in Scenario A and + 20.7 Mt in B
  - ✓ Transportation
    - ➢ 2.8 in A and 9.2 in B
  - ✓ Industry 51.1 Mt, Building 6.2 Mt, Agriculture 15.4 Mt, Waste 4.4 Mt
  - ✓ 60~70% renewable power to meet 1,200 TWh demand
  - ✓ Hydrogen direct reduced iron 100%, EV/HV 97%, Hydrogen 27 Million ton/year (Import by 80%)

Target Indicators for Implementation

- **Annual Evaluation of NDC Implementation by GIR**
  - ✓ GIR: GHG Inventory & Research Center under Ministry of Environment
  - ✓ Monitoring and evaluation of yearly sectoral targets
- **Research report commissioned by GIR**
  - ✓ Analysis
    - ➢ Yearly emissions by sectors, energy supply/consumption by sources, GHG intensities by sectors
    - ➢ Index decomposition analysis: demand, energy/carbon intensity
      - ▪ Power sector: Electricity demand, generation mix, generation efficiency, GHG intensity by fuel
  - ✓ Monitoring and evaluation of target indicator for implementation
    - ➢ Administrative targets with responsible ministries

Target Indicators for Implementation

- **Power**
  - ✓ Fuel mix (%) for coal and renewable
  - ✓ RPS compliance (%), Renewable energy capacity (MW)
  - ✓ CCUS
- **Industry**
  - ✓ Number of products for Energy efficiency labeling
  - ✓ Number of implementation of Factory Energy Management System
  - ✓ ETS allocation (% reduction w.r.t base year emission
  - ✓ ETS auction (%) and BM allocation (%), ETS compliance (%)

Target Indicators for Implementation

- **Building**
  - ✓ Cumulative number of zero-energy houses
  - ✓ Number of Green remodeling project
  - ✓ Number of participating houses for carbon point scheme
  - ✓ Cumulative number of AMI installation
- **Transportation**
  - ✓ Cumulative number of EV, HV, HEV
  - ✓ Average fuel efficiency (km/l)
  - ✓ Length of ITS road
  - ✓ Bio diesel mix ratio, length of railway, bicycle road,
  - ✓ Pubic transportation share of transportation

Lessons and Challenges

- **Difficulty of comprehensive and coherent indicators**
  - ✓ Impossible to develop a set of indicators that are exhaustive and mutually exclusive
  - ✓ Impossible to allocate responsibilities for meeting sectoral emission targets among ministries
  - ✓ Impossible to attribute an emission gap to indicators or ministries
- **Role of indicators for ETS sector**
  - ✓ ETS allows emissions trading among sectors but,
  - ✓ Sectoral targets and supplementary indictors could lead to additional burden of redundant efforts, reducing the benefit of flexibility mechanism
- **Allocation of targets among sectors**
  - ✓ make political process much harder
  - ✓ though it's a good way to manage the national target