

SOUTH KOREA



CLIMATE TRANSPARENCY REPORT COMPARING G20 CLIMATE ACTION AND RESPONSES TO THE COVID-19 CRISIS

This country profile is part of the **Climate Transparency Report 2020**. Find the full report and other G20 country profiles at: www.climate-transparency.org

PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS ABOVE G20 AVERAGE

GHG emissions (incl. land use) per capita (tCO₂e/capita)¹



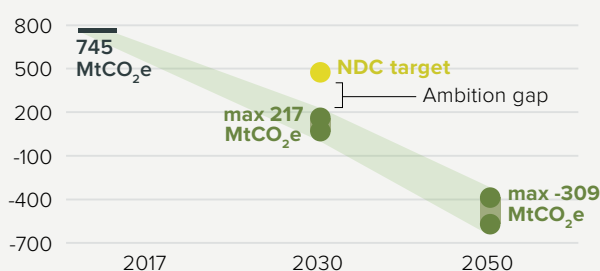
Data for 2017. Sources: Enerdata, 2020; UN Department of Economic and Social Affairs Population Division, 2020; Gütschow et al., 2019

NOT ON TRACK FOR A 1.5°C WORLD



South Korea needs to reduce its emissions to below 217 MtCO₂e by 2030 and to below -309 MtCO₂e (net sink) by 2050 to be within its 'fair-share' compatible range. South Korea's 2030 NDC, however, would only limit its emissions to 539 MtCO₂e. All figures exclude land use emissions and are based on pre-COVID-19 projections.

South Korea 1.5°C 'fair-share' pathway (MtCO₂e/year)^{1&2}



Source: Climate Action Tracker, 2020

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



LESS RELIANCE ON COAL

South Korea wants to move to less reliance on coal, but still produces more than 40% of its electricity from coal and has new coal power plants being constructed. It needs to develop a plan for phasing out coal by 2029.



DEVELOP A ZERO EMISSIONS STRATEGY

The ruling party has committed to developing a net-zero emissions strategy. South Korea needs to revise its NDC target to reflect a Paris-compatible pathway towards net-zero emissions in 2050.



LIFT RENEWABLE ENERGY BARRIERS

The growth of renewables is hampered in South Korea by an outdated grid, power market, land and maritime policies. For a clean energy transition, the country needs major reforms in these areas.

RECENT DEVELOPMENTS



The USD 63bn Green New Deal announced in July 2020 by President Moon Jae-In is expected to reduce only 12.29m tonnes of CO₂ emissions over the next five years.



On October 28th 2020, President Moon Jae-in announced that South Korea would commit to achieving carbon neutrality by 2050.



In 2020, government-owned utility KEPCO invested USD 51m in new coal power plants in Indonesia and USD 190m in Vietnam. More than USD 2bn in export credit and government bank loans followed.

References: Farand, 2020; IEA, 2019b; Ho, 2020

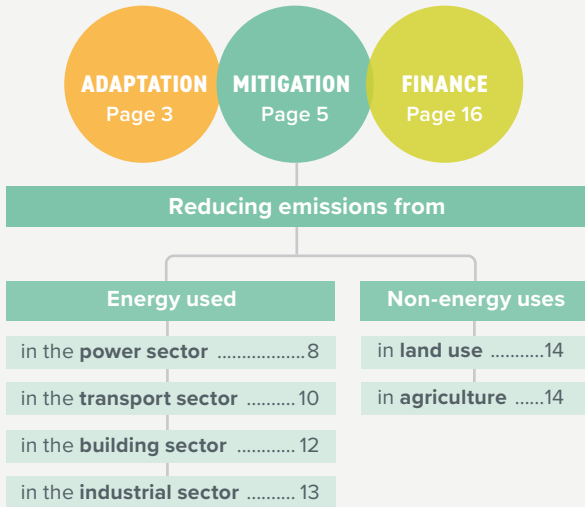
CORONAVIRUS RECOVERY

Due to an effective strategy to contain the spread of the virus, the South Korean government limited the damage to the domestic economy and output is shrinking less than in any other OECD country. The government has introduced unprecedented measures totaling KRW 437tn (approx. USD 376bn) to mitigate the pandemic's impact. Of this, KRW 160tn (approx. USD 138bn) was designated for the Korean New Deal to create 1.9 million new jobs by 2025. Spending for the Green New deal will be KRW 73.4tn (approx. USD 63bn) while that for the Digital New Deal will be KRW 58.2tn (approx. USD 50bn), and investment in social safety net projects will be KRW 28.4tn (approx. USD 24bn). Liquidity provisions and credit guarantees will raise government support to 14.3% of GDP.

References: OECD, 2020; Climate Action Tracker, 2020; Ministry of Economy and Finance, 2020; Government of the Republic of Korea, 2020

CONTENTS

We unpack South Korea's progress and highlight key opportunities to enhance climate action across:



LEGEND

Trends show developments over the past five years for which data are available. The thumbs indicate assessment from a climate protection perspective.



Decarbonisation Ratings⁴ assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.



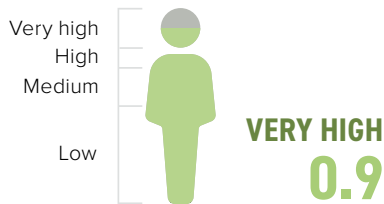
Policy Ratings⁵ evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



SOCIO-ECONOMIC CONTEXT

Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. South Korea ranks very high.

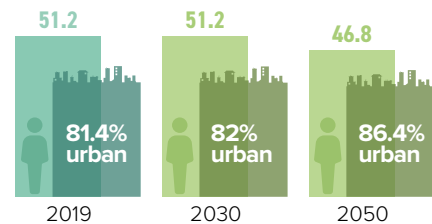


Data for 2018. Source: UNDP, 2019

Population and urbanisation projections

(in millions)

South Korea's population is expected to decrease by about 9% by 2050.



Sources: The World Bank, 2019; United Nations, 2018

Gross Domestic Product (GDP) per capita

(PPP constant 2015 international \$)



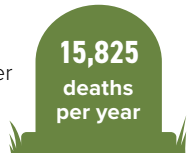
Data for 2019. Sources: The World Bank, 2019; United Nations, 2018

Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1 000 population per year, age standardised



Almost 16,000 people die in South Korea every year as a result of outdoor air pollution, due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to total population, this is still one of the lower levels in the G20.



Data for 2016. Source: WHO, 2018

JUST TRANSITION



Despite government statements about a shift away from reliance on coal in the electricity mix, South Korea has no concrete national commitment, framework or policy instrument to phase out coal. Discussions on whether to go ahead with the planned construction of Kori 5 and 6 nuclear reactors raised concerns about the impacts of coal plant closures on workers. Notably, South Korean unions representing energy, transport and public

sector workers announced a call for a just energy transition, stating their support for the phase-out of coal and nuclear, but calling for a roadmap to be developed.

South Korea would be better placed to make a sound and just transition away from coal, while achieving a multitude of co-benefits, including improvements in air quality, job opportunities from higher investments in renewable energy and a reduction in energy import dependency.

References: Climate Analytics, 2020a; Climate Transparency, 2019

1. ADAPTATION

ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE

PARIS AGREEMENT Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.

VULNERABLE TO CLIMATE CHANGE
 South Korea is vulnerable to climate change and adaptation actions are needed.

EXTREME WEATHER EVENTS
 On average, **44 fatalities and almost USD 1,030m** losses occur yearly due to extreme weather events.

SEVERE IMPACTS ON AGRICULTURE SECTOR
 With global warming, society and its supporting sectors are increasingly exposed to severe impacts such as droughts and reduction in crop duration in the agricultural sector.

ADAPTATION NEEDS

Climate Risk Index

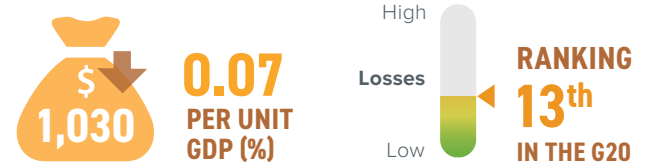
Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

Annual weather-related fatalities



Source: Based on Germanwatch, 2019

Annual average losses (USD mn PPP)



Source: Based on Germanwatch, 2019

Exposure to future impacts at 1.5°C, 2°C and 3°C

Impact ranking scale:

! Very low ! Low ! Medium ! High ! Very high

| | | 1.5°C | 2°C | 3°C |
|------------------------|---|----------------------------|-----|-----|
| WATER | % of area with increase in water scarcity | ! | ! | ! |
| | % of time in drought conditions | ! | ! | ! |
| HEAT AND HEALTH | Heatwave frequency | ! | ! | ! |
| | Days above 35°C | ! | ! | ! |
| AGRICULTURE | Rice | Reduction in crop duration | ! | ! |
| | | Reduction in rainfall | ! | ! |

Sources: Water, Heat and Health: own research. Agriculture: Arnell et al., 2019

Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and therefore entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.

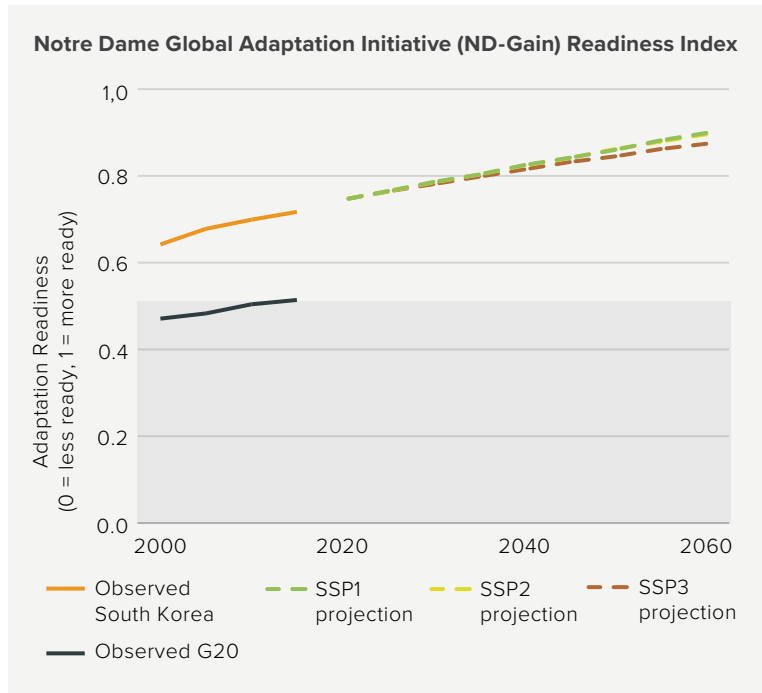
CORONAVIRUS RECOVERY

The Korean Green New Deal does not significantly refer to adaptation efforts except the plan of establishing AI-based water management system in response to flooding and drought. According to the Korean Green New Deal Comprehensive Plan, the South Korean Government plans to mandate subnational governments to establish adaptation measures in accordance with the '2nd Basic Plan for Climate Change Response', although we could find no policy instrument to enforce compliance thereof.

Reference: Government of the Republic of Korea, 2020

Adaptation readiness

The figure shows 2000-2015 observed data from the ND-GAIN Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2015-2060.



South Korea scored well above the G20 average between 2000 and 2015 and is projected to continue doing so given its combination of social, economic and governance structures. While adaptation challenges still exist, the Republic of Korea is well positioned to adapt to the impacts of climate change.

The readiness component of the Index created by the Notre Dame Global Adaptation Initiative (ND-GAIN) encompasses social economic and governance indicators to assess a country's readiness to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of possible futures. The three scenarios shown here in dotted lines are qualitatively described as a *sustainable development-compatible scenario (SSP1)*, a *middle-of-the-road (SSP2)* and a *'Regional Rivalry' (SSP3)* scenario. The shaded area delineates the G20 average in 2015 for easy reference.

Source: Andrijevic et al., 2020

ADAPTATION POLICIES

National Adaptation Strategies

| Document name | Publication year | Fields of action (sectors) | | | | | | | | | | | | M&E process | |
|---|------------------|----------------------------|--------------|---------------------------|------------------------|---------------------|-----------------------|----------|--------|----------------|---------|-----------|----------|-------------|---|
| | | Agriculture | Biodiversity | Coastal areas and fishing | Education and research | Energy and industry | Finance and insurance | Forestry | Health | Infrastructure | Tourism | Transport | Urbanism | | Water |
| 2nd National Climate Change Adaptation Plan (2016-2020) | 2016 | ● | ● | ● | ● | ● | | ● | ● | ● | | | | ● | Annual M&E and update of the strategy every 5-years |

Source: MOE 2018

Nationally Determined Contribution (NDC): Adaptation

| Targets | Actions |
|---------------|--|
| Not mentioned | Actions mentioned but not further specified (sectors: water, ecosystems, health) |

2. MITIGATION

REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE

PARIS AGREEMENT Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

EMISSIONS OVERVIEW

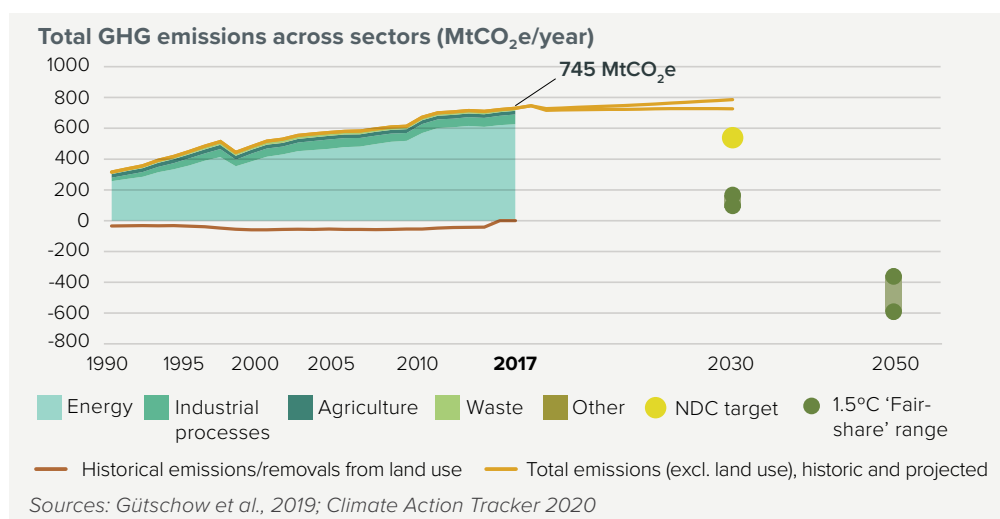
DECREASE EMISSIONS South Korea's GHG emissions increased by 136% from 1990 to 2017. The government's climate target for 2030 of 24.4% below 2017 levels is not in line with a 1.5°C pathway.

Source: Climate Action Tracker, 2020

COMPATIBILITY In 2030, global CO₂ emissions need to be 45% below 2010 levels and reach net-zero by 2050. Global energy-related CO₂ emissions must be cut by 40% below 2010 levels by 2030 and reach net-zero by 2060.

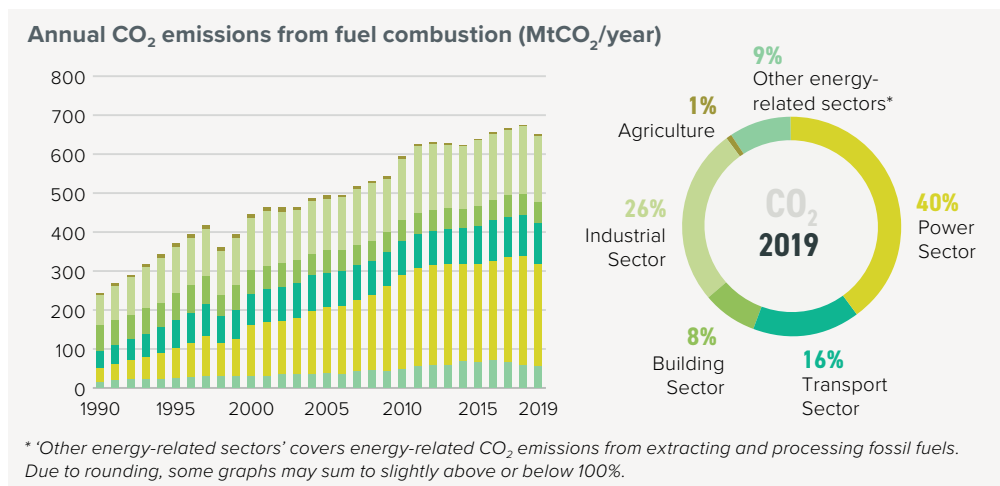
Source: Rogelj et al., 2018

GHG emissions across sectors and CAT 1.5°C 'fair-share' range (MtCO₂e/year)



South Korea's emissions (excl. land use) have more than doubled from 1990 to 2017, due mainly to a sustained increase in energy-related emissions. The most recent emissions projections show that under current policies, emissions will continue to increase up to 2030 and be insufficient for South Korea to meet its NDC target, which is rated as highly insufficient. Far greater emissions reduction will be required to become 1.5°C 'fair-share' compatible.

Energy-related CO₂ emissions by sector



In South Korea, energy-related emissions have gone down in 2019 for the first time since 2014. They have almost been stable over the last decade. The electricity sector, a 40% share, is the largest contributor, followed by industry and transport with 26% and 16% respectively.

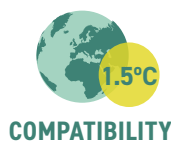
CORONAVIRUS RECOVERY The Korean Green New Deal unveiled in July 2020 mentions that South Korea will aim for a net-zero emissions society, but it does not include a net-zero timeframe or a new greenhouse emissions target for 2030. The USD 63bn Korean Green New Deal is expected to reduce only 12.3MtCO₂ emissions over the next five years, indicating that greenhouse gas emissions reduction is not the focus of the package.

References: Soh, 2020; Government of the Republic of Korea, 2020; Ministry of Environment, 2020

ENERGY OVERVIEW



Fossil fuels still make up 86% of South Korea's energy mix (incl. power, heat, transport fuels, etc). Despite increases in renewable energy over the last two decades, the carbon intensity of the energy mix has hardly changed. Energy-related CO₂ emissions fell in 2019 for the first time since 2014.

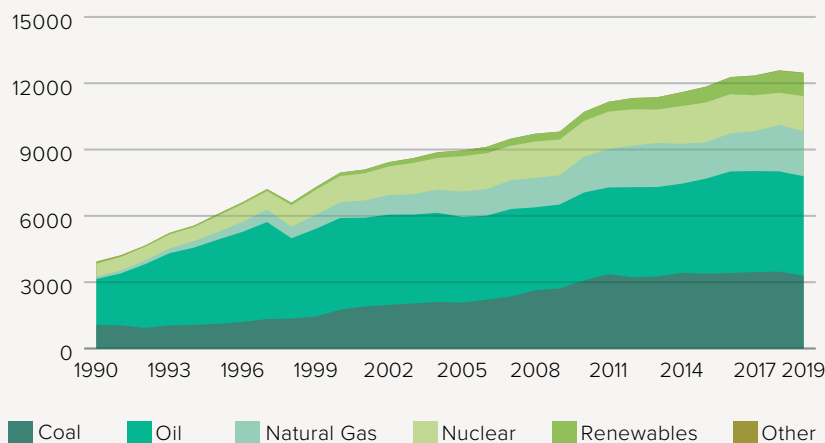


The share of **fossil fuels in the global primary energy mix needs to fall to 67% by 2030 and to 33% by 2050** (and to substantially lower levels without Carbon Capture and Storage).

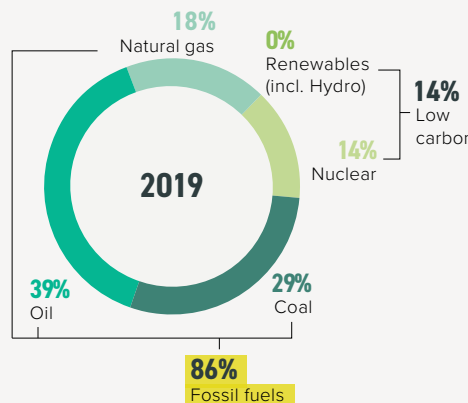
Source: Rogelj et al., 2018

Energy Mix

Total primary energy supply (PJ)



Source: Enerdata, 2020

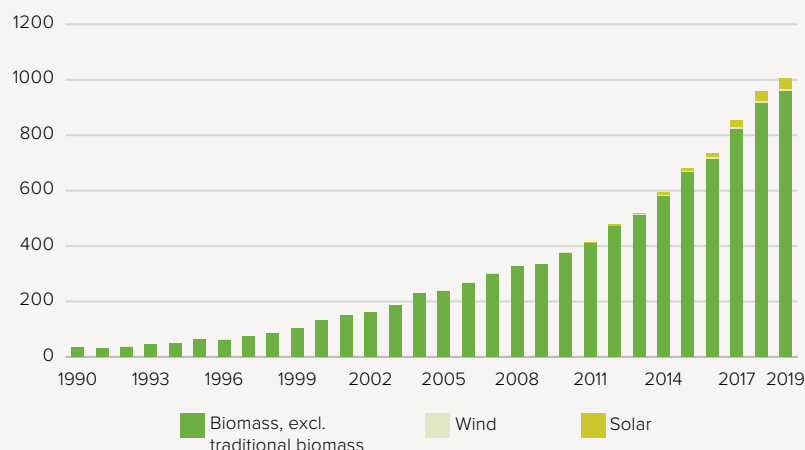


Due to rounding, some graphs may sum to slightly above or below 100%.

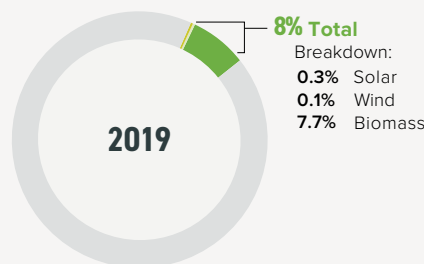
This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, cooking, but also for transport fuels. Fossil fuels (oil, coal and gas) still make up 86% of South Korea's energy mix, which is higher than the G20 average.

Solar, Wind, Geothermal, and Biomass Development

Total primary energy supply (TPES) from solar, wind, geothermal and biomass (PJ)



Solar, wind, geothermal and biomass account for 8% of South Korea's energy supply



Source: Enerdata, 2020

Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts. Due to rounding, some graphs may sum to slightly above or below 100%.

Decarbonisation rating: RE share of TPES compared to other G20 countries



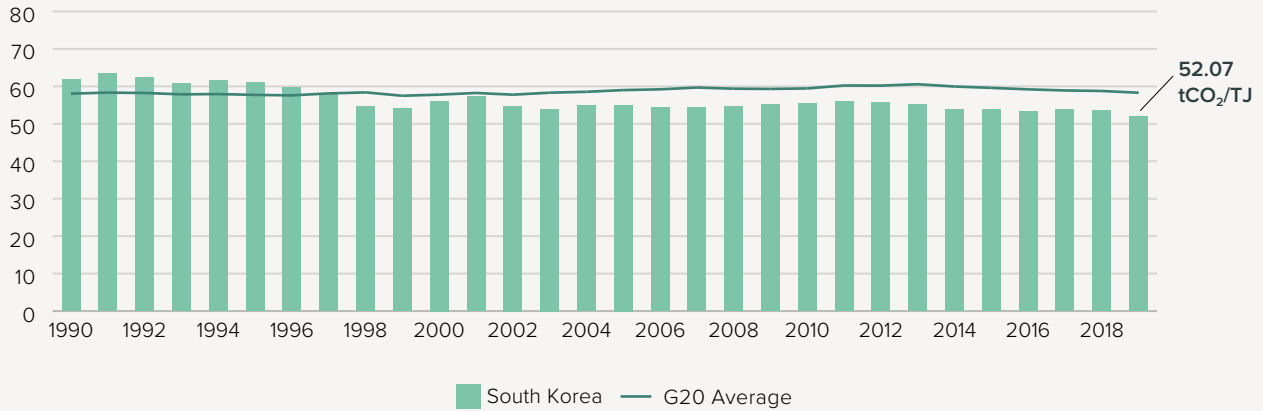
Source: own evaluation

Solar, wind and modern biomass account for around 8% of Korea's energy supply. Despite emitting more CO₂ than coal (per unit energy), biomass generation is heavily subsidised to the detriment of true renewables like solar and wind. Biomass generation received nearly 40% of renewable energy certificates issued between 2014 and 2018. Electricity generation from burning biomass has grown from 106 MWh in 2012 to 6,490 MWh in 2018.

Source: Enerdata, 2020

Carbon Intensity of the Energy Sector

Tonnes of CO₂ per unit of total primary energy supply (tCO₂/TJ)



Source: Enerdata, 2020

Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries



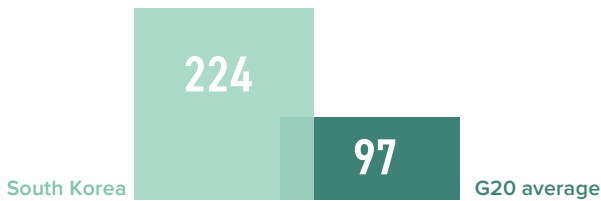
Carbon intensity shows how much CO₂ is emitted per unit of energy supply.

In South Korea, carbon intensity has remained almost constant at around 53 tCO₂/TJ over the last five years and is below the G20 average.

Source: Enerdata, 2020

Energy supply per capita

(GJ/capita)



Sources: Enerdata, 2020; The World Bank, 2019

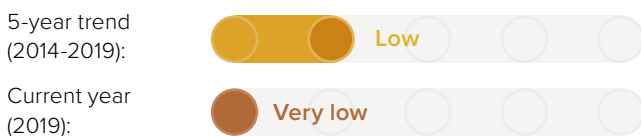
TPES per capita (GJ/capita): 5-year trend (2014-2019)



The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy.

Energy use per capita in South Korea is with 244 GJ/capita, well above the G20 average, and is increasing (7%, 2014-2019) at a much higher rate than the G20 average (1.9%).

Decarbonisation rating: energy supply per capita compared to other G20 countries



Source: own evaluation

Energy intensity of the economy

(TJ/PPP USD2015 millions)



Data for 2018. Source: Enerdata, 2020; The World Bank, 2019

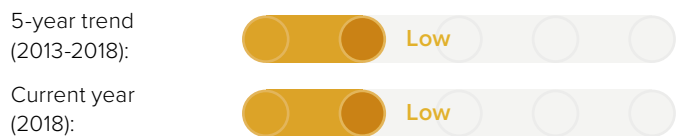
Energy intensity of the economy: 5-year trend (2014-2019)



This indicator quantifies how much energy is used for each unit of GDP, which is closely related to the level of industrialisation, efficiency, climatic conditions and geography.

At 5.78 TJ/PPP USD2015 million, South Korea's economy has an energy intensity above the G20 average of 4.46 and has decreased less (-3.9% over 2013-2018) than the G20 average (-11.6%).

Decarbonisation rating: energy intensity compared to other G20 countries



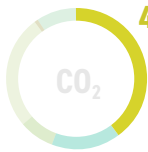
Data for 2018. Source: own evaluation



POWER SECTOR

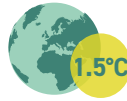
Emissions from energy used to make electricity and heat

South Korea still produces 42% of electricity from coal and 7 new coal-fired power plants are planned. South Korea needs to phase out coal by 2029.



40% Electricity and heat accounted for 40% of energy-related CO₂ emissions in South Korea in 2019.

Source: Enerdata, 2020



COMPATIBILITY

Coal and decarbonisation

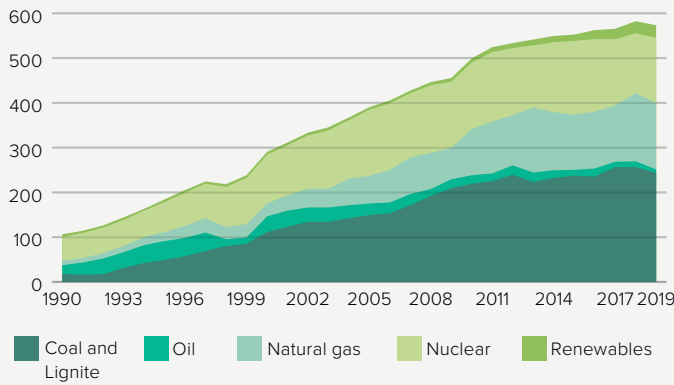
Worldwide, coal use for power generation needs to peak by 2020, and between 2030 and 2040 all the regions of the world need to phase out coal-fired power generation. Electricity generation has to be decarbonised before 2050, with renewable energy the most promising alternative.

Sources: Rogelj et al., 2018; Climate Analytics, 2016; Climate Analytics, 2019

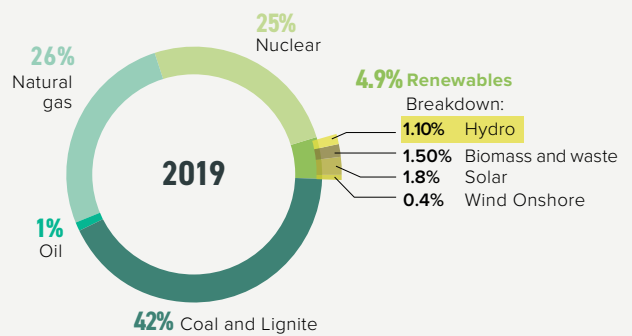
STATUS OF DECARBONISATION

Electricity mix

Gross power generation (TWh)



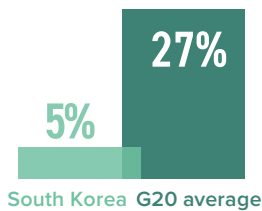
Source: Enerdata, 2020



Due to rounding, some graphs may sum to slightly above or below 100%.

Share of renewables in power generation

(incl. large hydro)



Source: Enerdata, 2020

Share of renewables in power generation: 5-year trend (2014-2019)



+107%
South Korea



+19.5%
G20 average

Decarbonisation rating: share of renewables compared to other G20 countries

5-year trend (2014-2019):



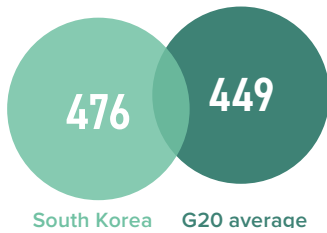
Current year (2019):



Source: own evaluation

Emissions intensity of the power sector

Country vs G20 average (gCO₂/kWh)



Source: Enerdata 2020

Emissions intensity: 5-year trend (2014-2019)



For each kilowatt hour of electricity, 476gCO₂ are emitted in South Korea. This is slightly above the G20 average. The emissions intensity has increased marginally against the decreasing trend in the G20 (average of -10%) because the use of fossil fuels and, in particular, coal for power generation has hardly dropped (still 70% of the power mix).

Decarbonisation rating: emissions intensity compared to other G20 countries



Source: own evaluation

POLICY ASSESSMENT

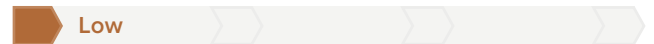
Renewable energy in the power sector



South Korea aims to increase the share of renewables in the power mix to 20% by 2030. Under a draft electricity plan, a share in capacity of 40% is proposed, which is an increase above the currently targeted 33% share in capacity. However, with current policies, South Korea will remain short of reaching its targeted 20% renewable energy share by 2030. Incentives for burning biomass are undermining the growth of renewables, like solar and wind, despite being more polluting than coal power per unit of energy. Biomass generation received 27% of renewable energy certificates in 2018 while wind only received 7%.

Sources: Lee and Murtaugh, 2020; Climate Action Tracker, 2020

Coal phase-out in the power sector



In the current electricity plan (BPE8) from 2017, South Korea committed to stop further additions to the coal power plants pipeline and to gradually reduce the use of coal power. However, the targets for the 2030 electricity generation mix foresee maintaining coal's dominant role in the electricity mix.

The 9th Basic Plan for Electricity Supply and Demand 2020-2034 is currently under development. It includes a plan to phase out half of South Korea's 60 coal power units by 2034, but, according to the most recent draft of this plan, this will be accompanied by an addition of gas combined cycle plant whose capacity is almost equivalent to the retired coal power plants. The share of coal in South Korea's energy mix will continue to exceed 50% in 2030.

Source: Climate Action Tracker, 2020



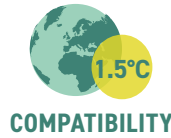
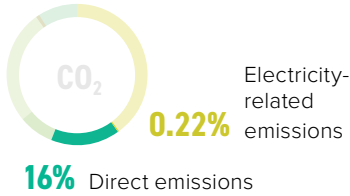
TRANSPORT SECTOR

Emissions from energy used to transport people and goods

Emissions from transport are still on the rise, with 60% of passenger transport by private car and 88% of freight transport by road. Both sectors are still dominated by fossil fuels. Electric vehicles made up 2.2% of new car sales in 2018. For staying within a 1.5°C limit, passenger and freight transport need to be decarbonised and 100% of new car sales should be zero emissions by 2035.

Share in energy-related CO₂ emissions from transport sector

Source: Enerdata, 2020



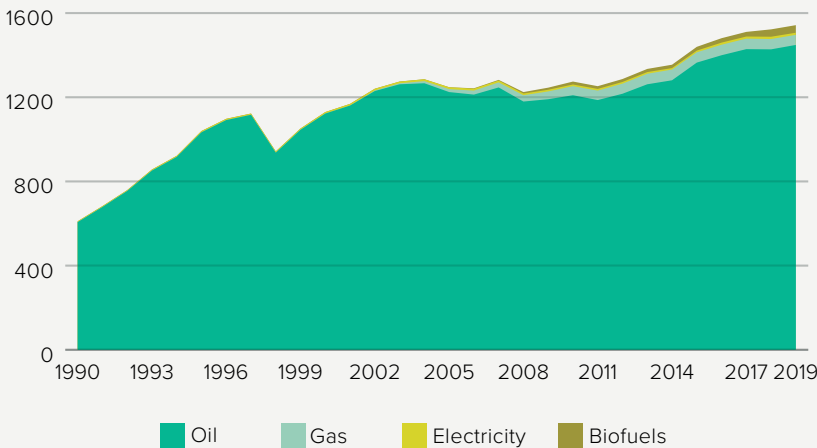
The share of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

Source: Rogelj et al., 2018

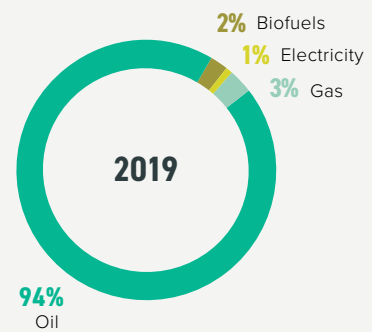
STATUS OF DECARBONISATION

Transport energy mix

Final energy consumption of transport by source (PJ/year)



Source: Enerdata, 2020



Due to rounding, some graphs may sum to slightly above or below 100%.

Electricity and biofuels make up only 3% of the energy mix in transport.

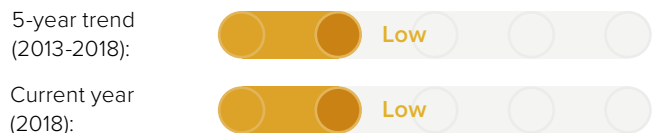
Transport emissions per capita

excl. aviation (tCO₂/capita)



Data for 2018. Sources: Enerdata, 2020; The World Bank, 2019

Decarbonisation rating: transport emissions compared to other G20 countries



Source: own evaluation

Transport emissions: 5-year trend (2013-2018)



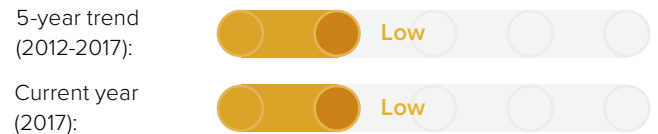
Aviation emissions per capita⁶

(tCO₂/capita)



Data for 2017. Source: Enerdata, 2020

Decarbonisation rating: aviation emissions compared to other G20 countries



Source: own evaluation

Aviation emissions: 5-year trend (2012-2017)

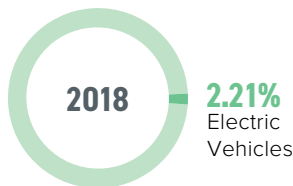


Motorisation rate

464 VEHICLES PER 1,000 INHABITANTS (2018)

Source: Vieweg et al., 2018

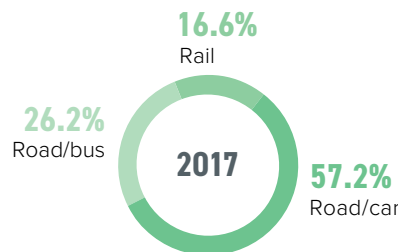
Market share of electric vehicles in new car sales (%)



Source: IEA, 2019a

Passenger transport

(modal split in % of passenger-km)



Data for 2017. Source: Korea Transport Database, 2017

Freight transport

(modal split in % of tonne-km)



Data for 2017. Source: Ministry of Land, Infrastructure and Transport, 2017

POLICY ASSESSMENT

Phase out fossil fuel cars



While there is no policy for the phase-out of fossil fuelled cars, South Korea has a goal of having 430,000 EVs on the road by 2022, which it is driving through subsidies and tax rebates. The Green New Deal pledges to have 1.13 million electric vehicles and 200,000 hydrogen vehicles on the road by 2025. The 2030 GHG roadmap has recently been revised and aims to expand the supply of eco-friendly vehicles, including the supply of 3 million EVs, by 2030. In 2014, South Korea strengthened its light-duty vehicle emissions standard to 97 gCO₂/km by 2020 which is comparable to the EU's new standards of 95 gCO₂/km.

Reference: own evaluation, based on Climate Action Tracker, 2020

Phase out fossil fuel heavy-duty vehicles



The South Korean Government announced in January 2019 a roadmap for hydrogen economy, which sets goals of producing 6.2 million fuel cell electric vehicles and building 1,200 fuelling stations across the country by 2040. This will include both passenger and heavy-duty vehicles. South Korea has set goals for fuel efficiency for freight transport by gradually strengthening the standard, starting from 2022

Reference: own evaluation, based on Climate Action Tracker, 2020

Modal shift in (ground) transport



South Korea aims to promote increased uptake of public transport through a range of measures including railway infrastructure expansion, encouraging shared transport, and building pedestrian and bicycle-friendly public spaces. There is, however, no long-term strategy for modal shift.

Reference: own evaluation, based on Seoul Metropolitan Government, n.d.



BUILDING SECTOR

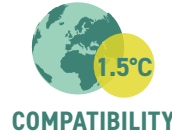
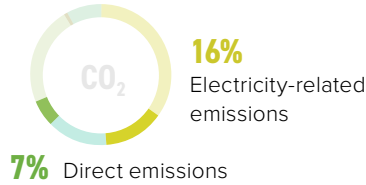
Emissions from energy used to build, heat and cool buildings

South Korea's building emissions – counting heating, cooking but also electricity use – make up nearly a quarter (23%) of total CO₂ emissions. **Per capita, building-related emissions are more than double the G20 average.**

Source: Enerdata, 2020

Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc).

Source: Enerdata, 2020



Global emissions from buildings need to be halved by 2030, and be 80-85% below 2010 levels by 2050, mostly through increased efficiency, reduced energy demand and electrification in conjunction with complete decarbonisation of the power sector.

Source: Rogelj et al., 2018

STATUS OF DECARBONISATION

Building emissions per capita

(incl. indirect emissions) (tCO₂/capita)



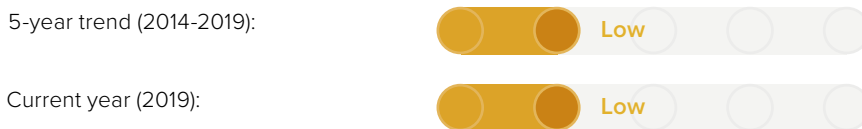
Source: Enerdata, 2020

Building-related emissions per capita are more than double the G20 average. South Korea's emissions rate has increased by 9.10% (2014-2019) compared to the G20 increase of 1.8% over the same period.

Building emissions: 5-year trend (2014-2019)



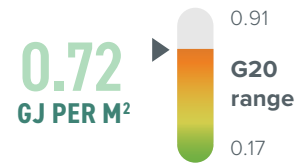
Decarbonisation rating: building emissions compared to other G20 countries



Source: own evaluation

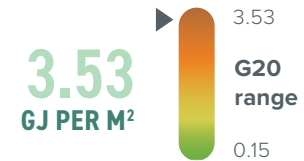
Residential buildings

Energy use per m²



Commercial and public buildings

Energy use per m²



Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. In South Korea, energy use per m₂ is in the middle range of the G20 countries for residential buildings, and at the high range for commercial buildings.

Different data year for each country
Sources: ACEEE 2018, CAT 2019

POLICY ASSESSMENT

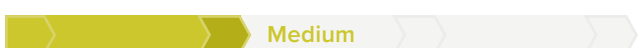
Near zero energy new buildings



In 2017, South Korea implemented a Zero Energy Building Certification System. Mandatory energy codes apply to both residential and commercial buildings. South Korea is gradually applying stricter energy conservation designs to meet zero energy buildings standards for all new buildings by 2025 and starting in 2020, new public buildings of 1,000m² or greater will be required to have zero net energy consumption.

References: own evaluation, based on Tae-gyu Kim, 2020 Climate Action Tracker, 2020

Renovation of existing buildings



The recently-adopted revised 2030 GHG roadmap mentions strengthening permit standards for new buildings and promoting green renovation. For renovations of large commercial and residential buildings, mandatory national building energy codes apply. There is, however, no strategy for reaching deep renovation rates.

Reference: own evaluation, based on Climate Action Tracker, 2020

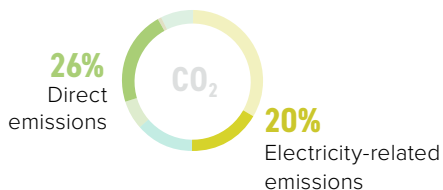


INDUSTRY SECTOR

Emissions from energy in the industrial sector

Industry-related emissions make up just over a quarter of CO₂ emissions in South Korea. South Korea has only managed to reduce emissions from this sector slightly.

Share in energy-related CO₂ emissions from industrial sector



Source: Enerdata, 2020



COMPATIBILITY

Industrial emissions need to be reduced by 65-90% from 2010 levels by 2050.

Source: Rogelj et al., 2018

STATUS OF DECARBONISATION

Industry emissions intensity⁷

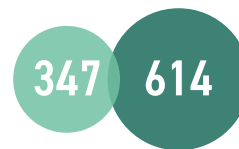
(tCO₂e/USD2015 GVA)



Sources: Enerdata, 2020; Gütschow et al., 2019

Carbon intensity of cement production⁸

(kgCO₂/tonne product)



South Korea World average

Data for 2016. Sources: Korea Energy Economics Institute, 2018; CAT Decarbonisation Data Portal, 2020

Industry emissions: 5-year trend (2011-2016)



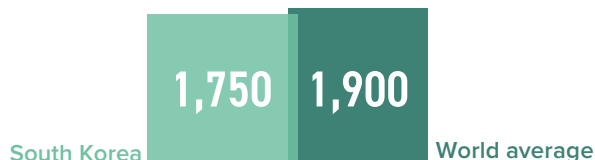
Decarbonisation rating: emissions intensity of industry compared to other G20 countries



Source: own evaluation

Carbon intensity of steel production⁸

(kgCO₂/tonne product)



Steel production and steelmaking are significant GHG emission sources, and challenging to decarbonise.

Data for 2016. Source: Korea Energy Economics Institute, 2018; World Steel Association, 2018.

POLICY ASSESSMENT

Energy Efficiency



South Korea's energy per capita is expected to continue to rise as industrial energy use increases and population declines. While energy efficiency is stated as one of the main targets for the industry sector under the 2030 GHG Reduction roadmap, energy efficiency has not been a focus of recent policy.

Reference: own evaluation, based on Climate Action Tracker, 2020



LAND USE SECTOR

Emissions from changes in the use of the land



For staying within the 1.5°C limit, South Korea needs to make the land use and forest sector a net sink of emissions, e.g. by halting tree-cover loss, discontinuing the degradation of peatlands and use of moor soils, converting cropland into wetlands, and by creating new forests.

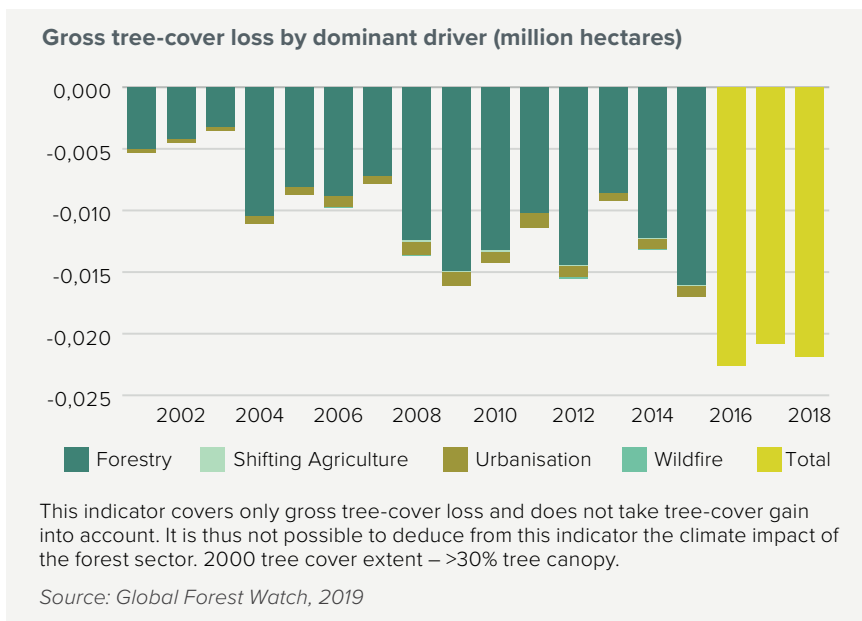


COMPATIBILITY

Global deforestation needs to be halted and changed to net CO₂ removals by around 2030.

Source: Rogelj et al., 2018

Global tree-cover loss



From 2001 to 2018, **South Korea lost 230 Mha of tree cover, equivalent to a 4.3% decrease since 2000.** This does not take tree-cover gain into account. Forest loss is mainly driven by forest industries.

POLICY ASSESSMENT

Target for net-zero deforestation



In January 2020, South Korea submitted its strategic plan for forests (2017-2030) to the UN. The plan includes policies to increase sustainable timber use, forest conservation, enhance forest education and the expansion of afforestation. In addition to this, the Carbon Sinks Improvement Master Plan has recently been revised (2018-2022).

Reference: own evaluation, based on Korea Forest Service, 2020



AGRICULTURE SECTOR

Emissions from agriculture



South Korea's agricultural emissions are mainly from digestive processes in animals, livestock manure and rice cultivation. A 1.5°C 'fair-share' pathway requires dietary shifts, increased organic farming and less fertiliser use.

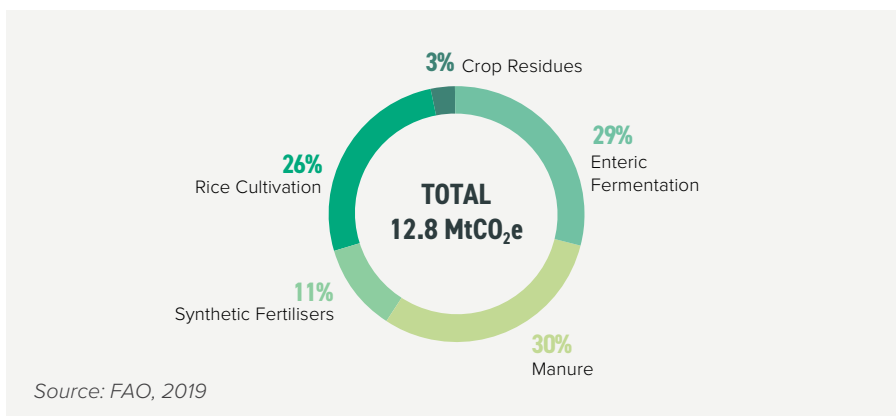


COMPATIBILITY

Methane emissions (mainly enteric fermentation) need to decline to 10% by 2030 and to 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels).

Source: Rogelj et al., 2018

Emissions from agriculture (excluding energy)



In South Korea, the largest sources of GHG emissions in the agricultural sector are digestive processes in animals (enteric fermentation), livestock manure and rice cultivation. A shift to organic farming, more efficient use of fertilisers and dietary changes can help reduce emissions.

Due to rounding, some graphs may sum to slightly above or below 100%.

MITIGATION: TARGETS AND AMBITION

The combined mitigation effect of nationally determined contributions (NDC) submitted by September 2020 is not sufficient and will lead to a warming of 2.7°C by the end of the century. This highlights the urgent need for all countries to submit more ambitious targets by 2020, as they agreed in 2015, and to urgently strengthen their climate action to align to the Paris Agreement's temperature goal.

AMBITION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

Targets

37% below BAU by 2030
(78% above 1990 by 2030 excl. LULUCF)
(20% below 2010 by 2030 excl. LULUCF)

Actions

Not specified

Climate Action Tracker (CAT) evaluation of NDC and actions

| |
|------------------------------|
| Critically Insufficient |
| ● Highly Insufficient |
| Insufficient |
| 2°C Compatible |
| 1.5°C Compatible |
| Role Model |

NDCs with this rating fall outside of a country's 'fair-share' range and are not at all consistent with holding warming to below 2°C, let alone with the Paris Agreement's stronger 1.5°C limit. If all government NDCs were in this range, warming would reach between 3°C and 4°C.

South Korea needs to strengthen policy measures and strategies against coal – including establishing a carbon tax, ending the support of coal plant construction domestically, and committing to stop financing coal power plants overseas.

Evaluation as at October 2020, based country's NDC. Source: Climate Action Tracker

TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability.

The NDC Transparency Check has been developed in response to Paris Agreement decision (1/CP.21) and the Annex to decision 4/CMA.1. While the Annex is only binding from the second NDC onwards, countries are "strongly encouraged" to apply it to updated NDCs, due in 2020.



NDC Transparency Check recommendations

For more visit www.climate-transparency.org/ndc-transparency-check

To comply with the Paris Agreement by ensuring clarity, transparency and understanding, it is recommended that South Korea provides the following additional information in the upcoming NDC Update (compared to the existing NDC), including

- Provide timeframe and period of implementation of the stated NDC target
- Provide detailed information on domestic institutional arrangements and the NDC process, incl. public participation and stakeholder consultations
- Provide detailed information on how South Korea will account for its NDC, incl. detailed information on whether / how South Korea will use an inventory approach
- Provide detailed grounds for why the country considers its targets fair and ambitious

AMBITION: LONG-TERM STRATEGIES

| | |
|------------------|----------------|
| Status | In preparation |
| 2050 target | Not available |
| Interim steps | Not available |
| Sectoral targets | Not available |
| Net-zero target | Not available |

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition toward net-zero emissions and climate-resilient economies.

3. FINANCE

MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS



Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.



South Korea spent USD 1.38bn on fossil fuel subsidies in 2019, predominantly on petroleum, but including USD 176m on coal. South Korea has no explicit carbon price.



COMPATIBILITY

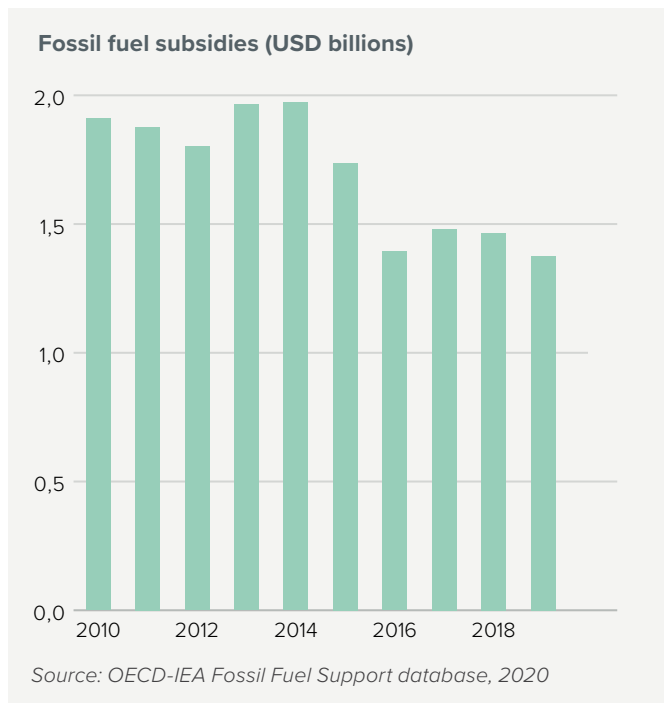
Investment in green energy and infrastructure needs to outweigh fossil fuels investments by 2025.

Source: Rogelj et al., 2018

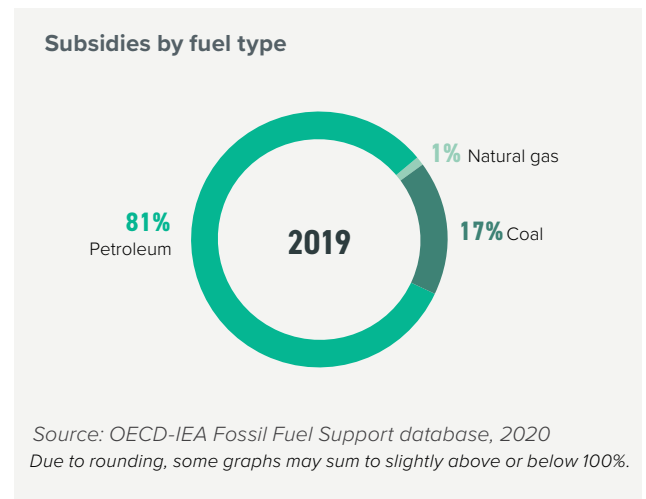
FISCAL POLICY LEVERS

Fiscal policy levers **raise public revenues and direct public resources**. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in the price.

Fossil Fuel Subsidies



Fossil Fuel Subsidies by fuel type

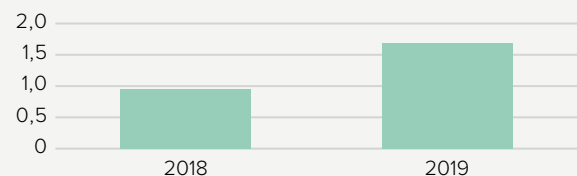


In 2019, South Korea's fossil fuel subsidies totalled USD 1.4bn (compared to USD 1.9bn in 2010 and with relatively small annual fluctuations since then). 86% of the subsidies identified were for the consumption of fossil fuels, with the remainder for their production. The highest amount of quantified subsidies quantified went to petroleum, at USD 1.2bn.

Carbon Pricing and revenues

In 2015, South Korea introduced a national emissions trading scheme. It covers 70% of domestic emissions (in the power, industry, buildings, transport, aviation and waste sectors), with emissions priced at USD 31/tCO₂. The scheme generated USD 169m in revenue in 2019.

Carbon Revenues (USD millions)



Sources: I4CE, 2019; OECD, 2018

CORONAVIRUS RECOVERY

KRW 73.4tn (USD 6bn) will be spent to implement the Korean Green New Deal, through which the South Korean Government intends to reduce 12.29 million tonnes of CO₂ emissions over the next five years.

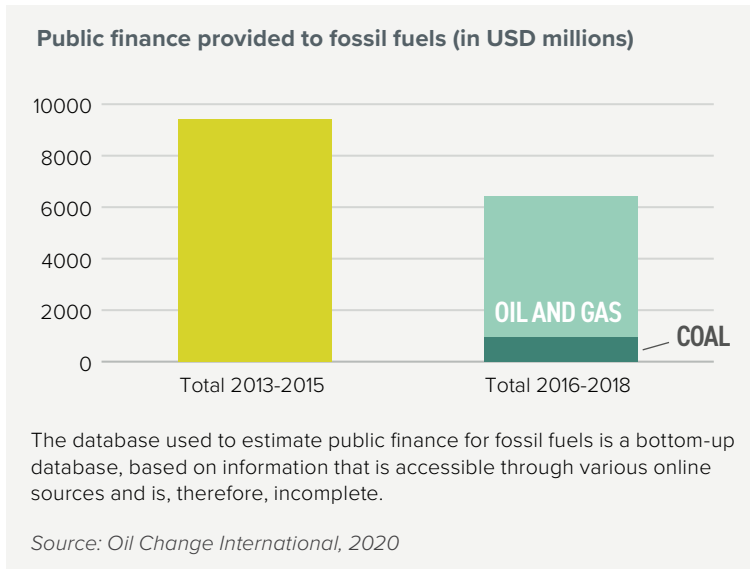
Despite having minimal relevance to COVID-19, Korea Development Bank and Korea Export Import Bank, both banks owned by the South Korean government provided loans of KRW 3.6tn (USD 3bn) to the cash-crunched Doosan Heavy Industry & Constructions, Korea's leading coal power plant equipment manufacturer, between March and June 2020.

References: Ministry of Economy and Finance et al., 2020, Min-ji Jin, 2020

PUBLIC FINANCE

Governments steer investments through their public finance institutions, including via development banks, both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries and public sources are a key aspect of these obligations under the UNFCCC.

Public finance for fossil fuels



Between 2016 and 2018, South Korea provided an average of USD 966m per year in public finance for the coal sector, an average of USD 5.5bn per year in public finance for the oil and gas sector. This represents an overall decrease if compared to the previous period 2013-2015 when an average of USD 9.4bn per year was directed to the fossil fuels sectors from South Korean public finance institutions. However, this is still a huge amount in support to the fossil fuels sector, making South Korea the fourth largest financier of fossil fuels overall. Since international coal financing restrictions for OECD member ECAs went into effect in 2017, South Korean ECAs have provided USD 1.8bn to coal plants projects in Indonesia and Vietnam. In 2020, South Korean government-owned utility KEPCO invested USD 51m in new coal power plants in Indonesia and USD 190m in Vietnam, with which a more than billion USD export credit and government bank loan followed.

Provision of international public support

(annual average 2017 and 2018)

Climate finance contributions are sourced from Party reporting to the UNFCCC.

Bilateral, regional and other channels

No data available

Theme of support:

No data available

Multilateral climate finance contributions

No data available

Theme of support:

No data available

Core / General Contributions

No data available

South Korea is not obligated to provide climate finance under the UNFCCC. Despite this, it pledged USD 100m to the Green Climate Fund's first resource mobilisation, doubling this support to pledge USD 200m to the fund in late 2019, and hosts the fund's headquarters. It has also contributed to a number of multilateral climate change funds spread relatively evenly across themes. Its third Biennial Update Report reports bilateral climate-related finance amounting to USD 152m and climate finance spending on multilateral climate funds as USD 192m. While climate-related spending by multilateral development banks may exist, it has not been included in this report.

FINANCIAL POLICY AND REGULATION

Financial policy and regulation

Through policy and regulation governments can overcome **challenges to mobilising green finance**, including: real and perceived risks, insufficient returns on investment, capacity and information gaps.

| Category | Instruments | Objective | Under Discussion/implementation | | None identified | |
|--|---|---|---------------------------------|-----------|---------------------------------|-----------------|
| | | | Mandatory | Voluntary | Under Discussion/implementation | None identified |
| Green Financial Principles | n/a | This indicates political will and awareness of climate change impacts, showing where there is a general discussion about the need for aligning prudential and climate change objectives in the national financial architecture. | | | | ● |
| Enhanced supervisory review, risk disclosure and market discipline | Climate risk disclosure requirements | Disclose the climate-related risks to which financial institutions are exposed | | | | ● |
| | Climate-related risk assessment and climate stress-test | Evaluate the resilience of the financial sector to climate shocks | | | | ● |
| Enhanced capital and liquidity requirements | Liquidity instruments | Mitigate and prevent market illiquidity and maturity mismatch | ● | | | |
| | Lending limits | Limit the concentration of carbon-intensive exposures | | | | ● |
| | | Incentivise low carbon-intensive exposures | | | | ● |
| | Differentiated reserve requirements | Limit misaligned incentives and channel credit to green sectors | | | | ● |

In April 2017, Shinhan Bank (a major private bank), together with the South Korean Ministry of Environment and KEITI, a UNEP FI Supporting Institution, launched its “Green Management Firm Loan Programme”, which allocated USD 87m to eco-friendly small and medium enterprises, with below-market interest rates. The Bank of Korea has been a member of the NGFS since November 2019. The enVinance system was established by the government to give the financial sector information on companies. Some financial institutions are indeed using the environmental data provided by enVinance to qualify their loans; in which case, companies exhibiting excellent green environmental management performance are provided with loans at prime rates and other preferred services.

In August 2020, Korea Ministry of Economy and Finance launched the Green Finance Task Force to identify climate-related financial risks and establish a monitoring system to manage such risks. Financial Services Commission and Financial Supervisory Service plan to join international networks, such as the NGFS and TCFD.

Nationally Determined Contribution (NDC): Finance

| | |
|---------------------------------|---|
| Conditionality | Not applicable |
| Investment needs | Not specified |
| Actions | Not mentioned |
| International market mechanisms | Korea will partly use carbon credits from international market mechanisms to achieve its 2030 mitigation target, in accordance with relevant rules and standards. |

ENDNOTES

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2020



- 'Land use' emissions is used here to refer to land use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from Land use, land use change and forestry (LULUCF), which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).
- The 1.5°C fair share ranges for 2030 and 2050 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility, capability, and equality. Countries with

1.5°C fair-share ranges reaching below zero, particularly between 2030 and 2050, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. The CAT's evaluation of NDCs shows the resulting temperature outcomes if all other governments were to put forward emissions reduction commitments with the same relative ambition level.

- In order to maintain comparability across all countries, this report utilises the PRIMAP year of 2017. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories.
- The Decarbonisation Ratings assess the current year and average of the most recent five years

(where available) to take account of the different starting points of different G20 countries.

- The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the IPCC's 2018 SR15 and the Climate Action Tracker (2016). The table below displays the criteria used to assess a country's policy performance.
- This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

| On endnote 5. |  Low |  Medium |  High |  Frontrunner |
|--|--|---|---|---|
| Renewable energy in power sector | No policy to increase the share of renewables | Some policies | Policies and longer-term strategy/target to significantly increase the share of renewables | Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place |
| Coal phase-out in power sector | No target or policy in place for reducing coal | Some policies | Policies + coal phase-out decided | Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world) |
| Phase out fossil fuel cars | No policy for reducing emissions from light-duty vehicles | Some policies (e.g. energy/emissions performance standards or bonus/malus support) | Policies + national target to phase out fossil fuel light-duty vehicles | Policies + ban on new fossil-based light-duty vehicles by 2035 worldwide |
| Phase out fossil fuel heavy-duty vehicles | No policy | Some policies (e.g. energy/emissions performance standards or support) | Policies + strategy to reduce absolute emissions from freight transport | Policies + innovation strategy to phase out emissions from freight transport by 2050 |
| Modal shift in (ground) transport | No policies | Some policies (e.g. support programmes to shift to rail or non-motorised transport) | Policies + longer-term strategy | Policies + longer-term strategy consistent with 1.5°C pathway |
| Near zero energy new buildings | No policies | Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options) | Policies + national strategy for near zero energy new buildings | Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non-OECD countries) |
| Energy efficiency in Industry | 0-49% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard | 50-79% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard | 80-89% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard | Over 90% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard |
| Retrofitting existing buildings | No policies | Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options) | Policies + retrofitting strategy | Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020 |
| Net-zero deforestation | No policy or incentive to reduce deforestation in place | Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation / reforestation in place) | Policies + national target for reaching net-zero deforestation | Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage |

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