Climate Transparency

CLIMATE ACTION TRACKER

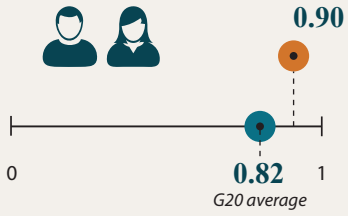
CLIMATE CHANGE PERFORMANCE index 2016

BROWN TO GREEN: G20 TRANSITION TO A LOW CARBON ECONOMY

Republic of Korea

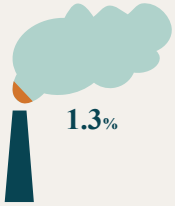
This country profile assesses South Korea's past, present and indications of future performance towards a low-carbon economy by evaluating emissions, decarbonisation, climate policy performance and climate finance. The profile summarises the respective findings from, amongst others, the Climate Change Performance Index (CCPI, operated by Germanwatch and Climate Action Network Europe), the Climate Action Tracker (CAT, operated by Climate Analytics, NewClimate Institute, Ecofys and the Potsdam Institute for Climate Impact Research), and analyses from the Overseas Development Institute (ODI).

Human Development Index



Source: UNDP, data for 2015

Share of global GHG emissions



GHG emissions per capita (tCO_2e/cap)

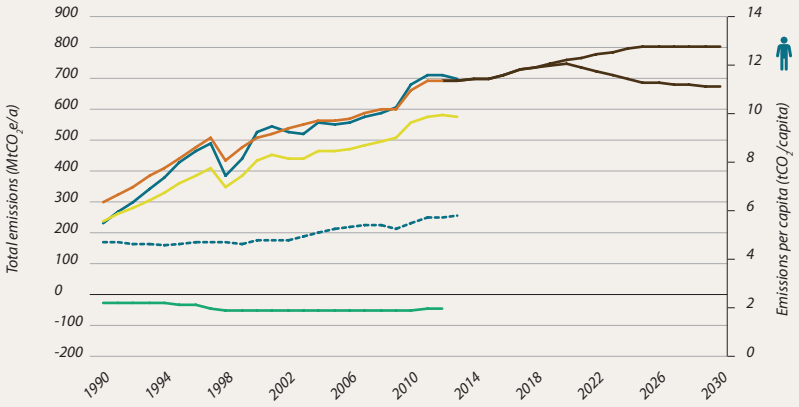
Source: World Bank Indicators, data for 2012

Share of global GDP

GDP per capita

Source: IEA, data for 2013

GREENHOUSE GAS (GHG) EMISSIONS



Historic emissions (excluding forestry)

Energy-related CO_2 emissions

Energy-related CO_2 emissions per capita

Current policy emissions projections (excluding forestry)

Historic forestry emissions/removals

G20 average of energy-related CO_2 emissions per capita

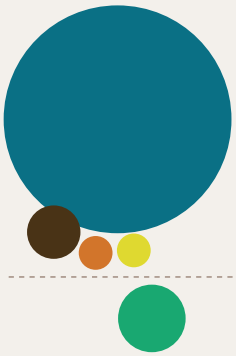
South Korea's GHG emissions grew strongly from 1990, to 686 $MtCO_2e$ in 2012. Projections show an increase until 2020-2025. If emissions peak in 2020, they could drop below 700 $MtCO_2e$ by 2025. Other projections show increasing emissions to 2025, levelling out at 800 $MtCO_2e$. Emissions from land use, land-use change and forestry (LULUCF) are relatively constant, and in the negative range. Energy-related CO_2 emissions have increased rapidly and account for 83% of GHG emissions. Starting at 5.4tCO_2 per capita in 1990, they reached 11.4 tCO_2 per capita in 2012. The CCPI rates South Korea as a very poor performer.

CCPI evaluation of emissions level and trend

Level

Weak trend

Strong trend



Composition of GHG emissions*

CO_2 91%

N_2O 2%

CH_4 5%

F-Gases 2%

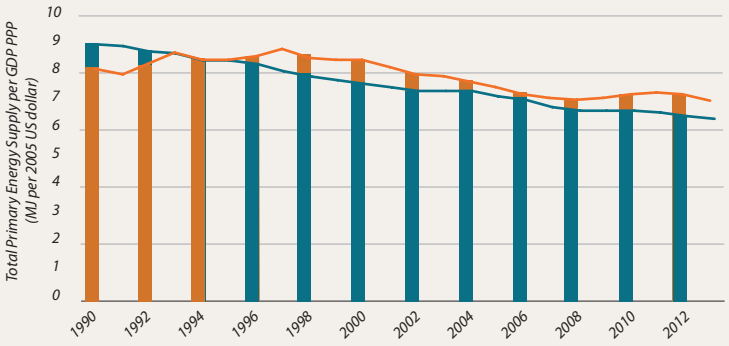
CO_2 emissions from forestry -8%

CO_2 emissions incl. LULUCF
Source: Annex I countries: UNFCCC (2015); Non-Annex I countries: IEA (2014) and CAT (2015)

Sources: Past energy related emissions from the Climate Change Performance Index (CCPI); past non-energy and future emissions projections from the Climate Action Tracker (CAT). CCPI calculations are primary based on the most recent IEA data; CAT calculations are based on national policies and country communications.

DECARBONISATION

Energy intensity of the economy



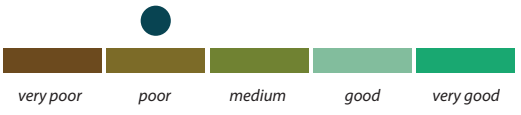
The energy intensity of South Korea's economy (TPES/GDP), although decreasing over the last decades, remains slightly above the G20 average. In comparison with other countries, the CCPI ranks the South Korean economy's level of energy intensity as poor.

Energy intensity

Average energy intensity in G20

Source: CCPI, 2016

CCPI evaluation of energy intensity of GDP

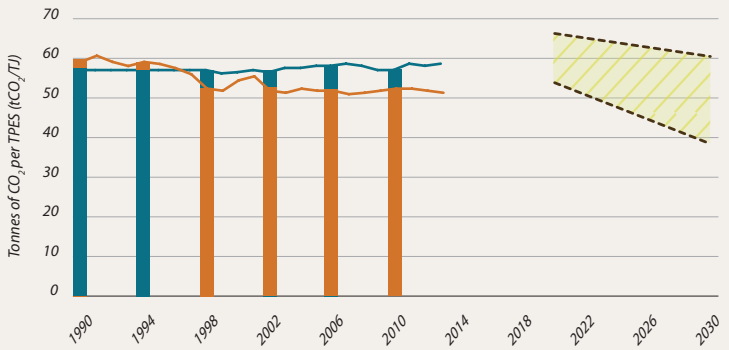


Level

Weak trend

Strong trend

Carbon intensity of the energy sector



There have been only minor changes in South Korea's carbon intensity of primary energy (CO2/TPES). Starting from about 60 tCO_2 per TJ in 1990, carbon intensity dropped in 1998 below the G20 average and has since remained relatively constant. For the CCPI evaluation, this means a rank in the medium category. The assessment also observes a slightly negative trend over the last five years.

Carbon intensity (past trend)

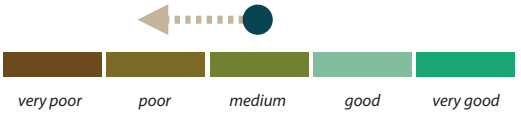
Average carbon intensity in G20

Carbon intensity (current policy projection)

Global benchmark for a 2°C pathway

Sources: Past: CCPI; future projections: CAT

CCPI evaluation of carbon intensity of energy sector

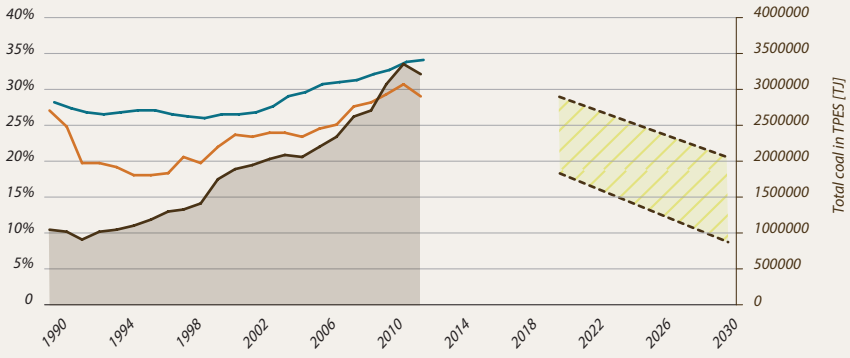


Level

Weak trend

Strong trend

Share of coal in Total Primary Energy Supply (TPES)



The share of coal in South Korea's primary energy supply is increasing. After dropping to a low of around 18% in the mid-1990s, it has since steadily increased, reaching a temporary peak at 31% in 2011. Since then, a minor decline has been observed, leading to a share of 29% in 2012.

% of coal (past trend)

Average % of coal in G20

Total coal consumption (TJ)

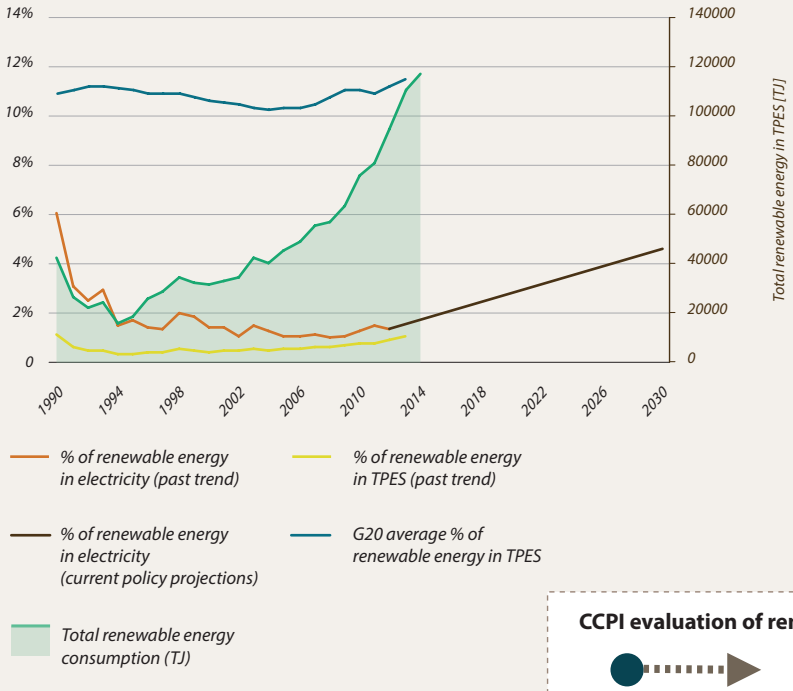
Global benchmark for a 2°C pathway (min & max)

Source: CAT

Evaluation of coal share in TPES

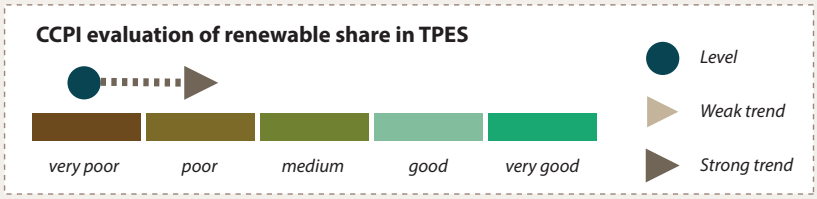
Source: own evaluation

Renewable energy in TPES and electricity sector



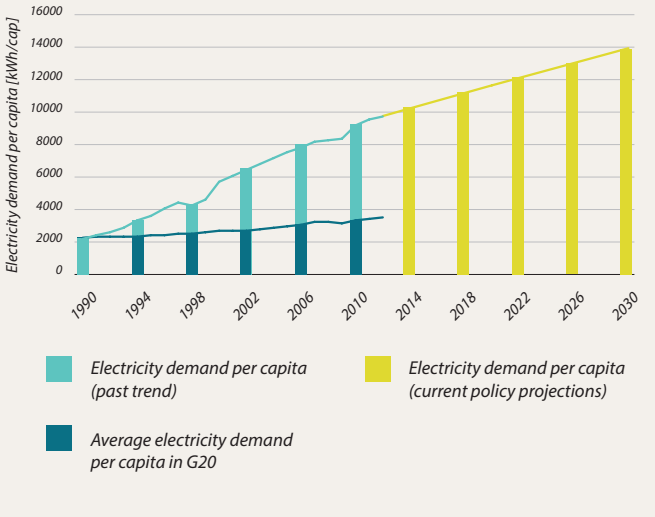
Sources: CCPI and CAT

The share of renewable energy in electricity decreased from 6% in 1990 to 1% in 1994, and has since remained on this level. Future projections see a rise in the coming years but it will be limited to a level of about 5%. While the total amount of renewable energy is increasing, the energy demand is growing and thus, the share of renewables in South Korea's primary energy supply is still only at 1%. The CCPI accordingly rates South Korea's performance in the renewable energy section as very poor compared with other countries. The trend, calculated over the past five years, is positive.



Electricity demand per capita

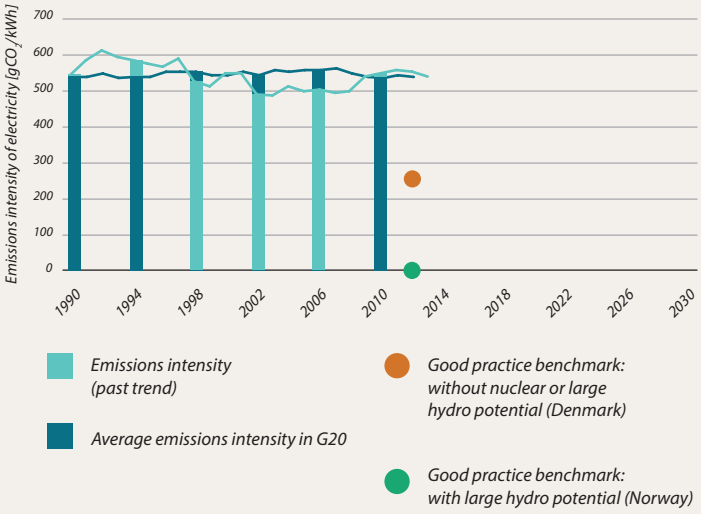
The electricity demand per capita curve confirms South Korea's increasing energy demand. Starting in line with the G20 average at a level of 2000 kWh per capita in 1990, it has vastly increased to almost 10,000 kWh per capita in 2012. Projections predict a further growth in the future.



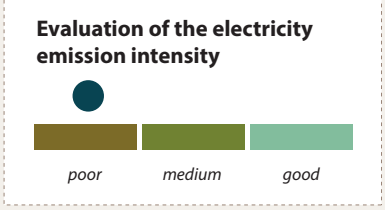
Source: CAT, 2015

Emissions intensity of the electricity sector

The carbon intensity of South Korea's electricity sector hovers around the G20 average. The 2012 intensity level of 540 gCO_2 per kWh is more than twice as high as in Denmark, a country with neither high potential of hydro power, nor nuclear energy.



Source: CAT, 2015



Source: own evaluation

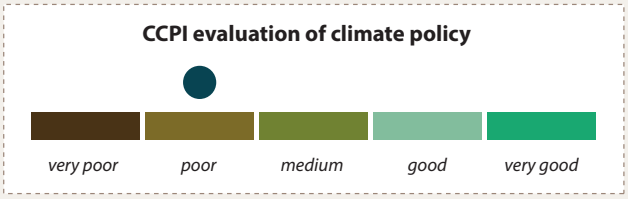
CLIMATE POLICY PERFORMANCE

Checklist of the climate policy framework

*Low emissions development plan for 2050**	✓
2050 GHG emissions target	✗
Building codes, standards and incentives for low-emissions options	✓
Support scheme for renewables in the power sector	✓
Emissions performance standards for cars	✓
Emissions Trading Scheme (ETS)	✓
Carbon tax	✗

** Understood as decarbonisation plans and not specifically as the plans called for in the Paris Agreement*

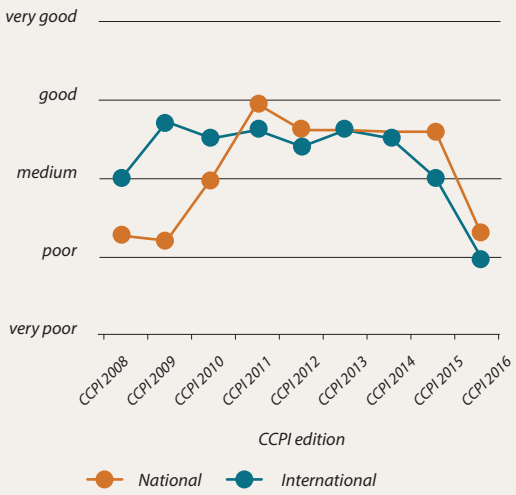
Source: Climate Policy Database, 2016



Climate policy evaluation by experts

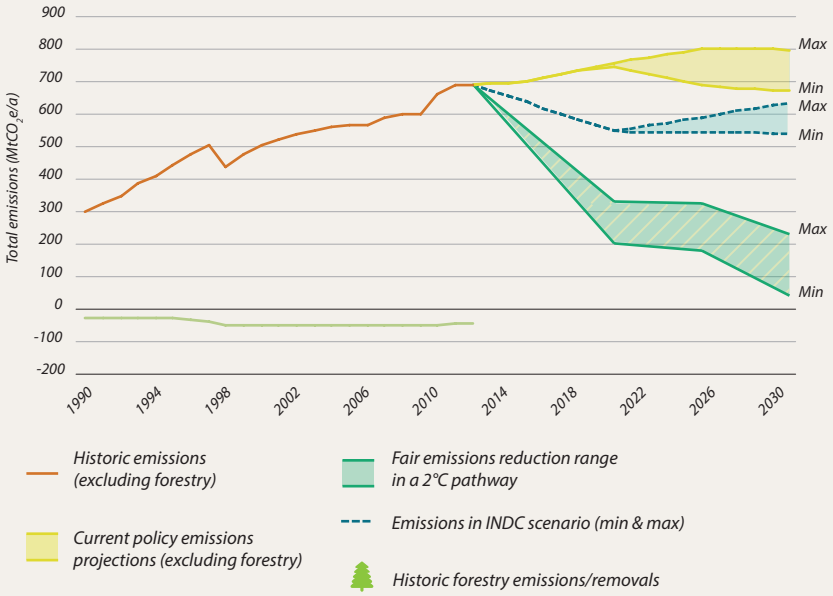
While CCPI experts evaluated South Korea's climate policy performance as relatively good in recent years, its rating has drastically dropped to "poor." The government plans to replace ten ageing coal-fired plants with 20 new ones, instead of working on sustainable solutions to combat air pollution, like promoting renewables.

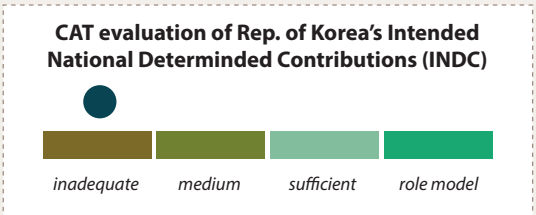
The CCPI evaluates a country's performance in national and international climate policy through feedback from national energy and climate experts.



Source: CCPI, 2016

Compatibility of national climate targets (INDCs) with a 2°C scenario





Source: CAT, 2015

South Korea submitted its Intended Nationally Determined Contribution (INDC) on 30 June 2015 and proposes an economy-wide target to reduce its greenhouse gas (GHG) emissions by 37% below business-as-usual (BAU) levels of 850.6 $MtCO_2e$ by 2030. The target is equivalent to limiting GHG emissions in 2030 to 536 $MtCO_2e$, which is 81% above 1990 emission levels, excluding land-use, land- use change and forestry (LULUCF). Climate Action Tracker (CAT) rates this target "inadequate". If all governments showed such low ambition levels, global average warming would likely exceed 3–4°C this century. To reach a "medium" pathway by 2030, South Korea's annual emissions would need to fall below 500 $MtCO_2e$ in 2030.

South Korea intends to achieve part of this target through "carbon credits from international market mechanisms". Despite some growth in renewable energy technologies, the country is still dependent on coal, implying ample potential for more ambition.

FINANCING THE TRANSITION

Investment attractiveness

Allianz Energy and Climate Monitor	MEDIUM
RECAI (E&Y index) Category (own assessment)*	LOW
*Trend***	↓

**Adapted from RECAI and re-classified in 3 categories (low, medium, high) for comparison purposes with Allianz Monitor.*

***Taken from RECAI issue of May 2016*

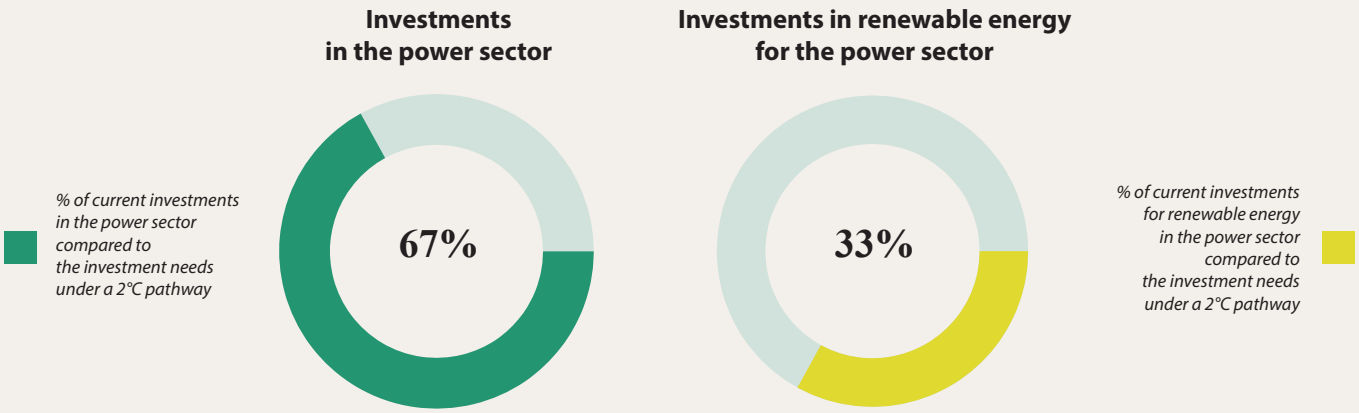
Climate Transparency rates South Korea's investment attractiveness as low to medium, due mainly to its low market absorption capacity (renewables share in total electricity mix is less than 1%), and its limited long-term predictability - due to significant differences between major parties on the transition to a low-carbon economy.

Sources: Allianz Energy and Climate Monitor and RECAI reports

The Allianz Energy & Climate Monitor ranks G20 member states on their relative fitness as potential investment destinations for building low-carbon electricity infrastructure. The investment attractiveness of a country is assessed through four categories: Policy adequacy, Policy reliability of sustained support, Market absorption capacity and the National investment conditions. The Renewable Energy Country Attractiveness Index (RECAI) produces score and rankings for countries' attractiveness based on Macro drivers, Energy market drivers and Technology-specific drivers which together compress a set of 5 drivers, 16 parameters and over 50 datasets.

Historical investments in renewable energy and investment gap

This section shows South Korea's current investments in the overall power sector (including distribution and transmission) as well as in renewable energy expressed as the share of the total annual investments needed to be in line with a 2°C compatible trajectory.



Source: Adapted from WEIO, 2014[1]

[1] WEIO (2014) compares annual average investments from 2000 to 2013 with average annual investments needed from 2015 to 2030 under a 2°C scenario

Carbon pricing mechanisms

Emissions Trading Schemes (ETS)

An ETS caps the total level of GHG emissions and allows industries to trade allowances based on their marginal abatement cost. By creating a supply and demand for allowances, an ETS establishes a market price for GHG emissions.

Carbon Tax

A Carbon tax directly sets a price on carbon by defining a tax rate on GHG emissions or – more commonly – on the carbon content of fossil fuels. Unlike an ETS, a carbon tax is a price-based instrument that pre-defines the carbon price, but not the emissions reduction outcome of a carbon tax.

In January 2015, South Korea launched its national Emissions Trading Scheme (ETS), the second largest cap-and-trade system in the world, covering more than 500 business entities from 23 sectors. As of 2013, South Korea has been considering the implementation of a nationwide carbon tax to supplement the ETS and to ensure that the government's meets its emission reduction targets.

Sources: World Bank and Ecofys, 2016; other national sources

Fossil fuel subsidies

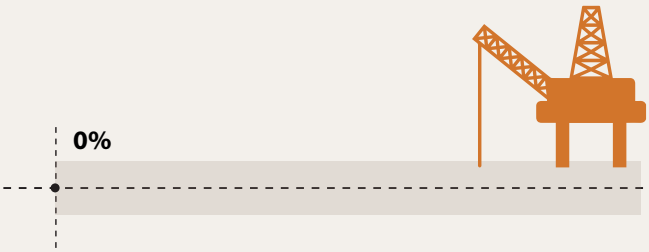
South Korea has limited domestic fossil fuel resources. It provides national production subsidies of about US$217 million, almost all of which supports coal production. The largest subsidy support, of about US$140 million each year, is for production of coal briquettes, which the country has pledged to phase out as part of the G20 fossil fuel subsidy reforms agreed in 2009. South Korea instituted new taxes on coal imports in January 2015. However, it is simultaneously establishing new subsidies for oil refiners importing crude oil from outside the Middle East, and reducing consumption taxes on natural gas, fuel oil and propane.

Average annual national subsidies (2013-14)*

Republic of Korea

G20 total

% of government's income from oil and gas production (2013)*



Source: ODI, 2015

**The indicators above refer only to subsidies for fossil fuel production, and include direct spending (e.g. government budget expenditure on infrastructure that specifically benefits fossil fuels), tax expenditure (e.g. tax deductions for investment in drilling and mining equipment) and other support mechanisms (e.g. capacity mechanisms).*

Public climate finance

South Korea is not obliged to provide climate finance under the UNFCCC. Nevertheless, it has pledged $100 million to the GCF and hosts the fund's headquarters.

Green Climate Fund pledge

$0.1
billion

Source: ODI, 2016