Climate Transparency

BROWN TO GREEN:

THE G20 TRANSITION TO A LOW-CARBON ECONOMY | **2017**

REPUBLIC OF KOREA

This country profile assesses the Republic of Korea's past, present – and indications of future – performance towards a low-carbon economy by evaluating emissions, climate policy performance, climate finance and decarbonisation. The profile summarises the findings of several studies by renowned institutions.

HUMAN DEVELOPMENT INDEX[1]

0.90

0.70 G20 average

Source: UNDP, 2016

GDP PER CAPITA[2] ($ (const. 2011, international))

34,387 South Korea

18,373 G20 average

Source: WB databank, 2017

SHARE OF GLOBAL GDP[2]

1.5 %

Global GDP

South Korea

Source: WB databank, 2017

GHG EMISSIONS PER CAPITA[3] (tCO_2 e/cap)

13.3 South Korea

8.3 G20 average

Source: PRIMAP-hist, 2017

SHARE OF GLOBAL GHG EMISSIONS[3]

1.3 %

South Korea

Source: PRIMAP-hist, 2017

NOTRE DAME GLOBAL ADAPTATION INITIATIVE (ND-GAIN) INDEX[4]

0 – 1

0.31 Vulnerability Subindex

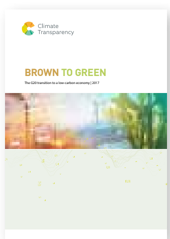
Source: ND-GAIN, 2015

AIR POLLUTION INDEX[5] (PM 2.5)

10 µg/m³ WHO benchmark

28 µg/m³

Source: WB databank, 2017



This country profile is part of the **Brown to Green 2017** report. The full report and other G20 country profiles can be downloaded at:

http://www.climate-transparency.org/g20-climate-performance/g20report2017

CLIMATE ACTION TRACKER | CCPI Climate Change Performance Index | HUMBOLDT-VIADRINA Governance Platform | NEW CLIMATE INSTITUTE | GERMANWATCH | ODI

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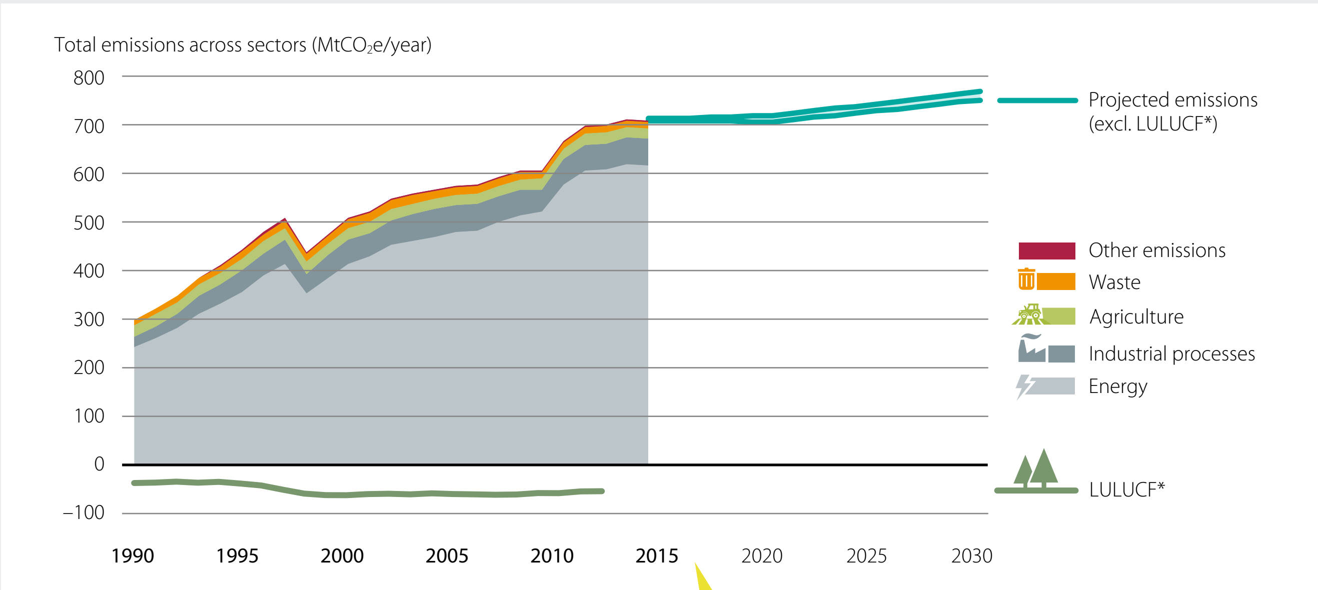
REPUBLIC OF KOREA

GREENHOUSE GAS (GHG) EMISSIONS DEVELOPMENT

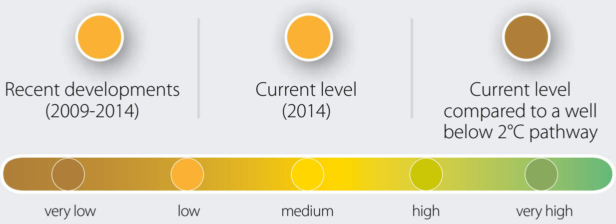


*Land Use, Land Use Change and Forestry emissions according to the Climate Action Tracker

Source: PRIMAP, 2017; CAT, 2017

Since 1990, the Republic of Korea's energy sector emissions have more than doubled. Emissions (excl. LULUCF) have stagnated since 2010, but projections show an increase in emissions again after 2020. LULUCF* emissions have historically been negative.[6]

CCPI PERFORMANCE RATING OF GHG EMISSIONS PER CAPITA[7]

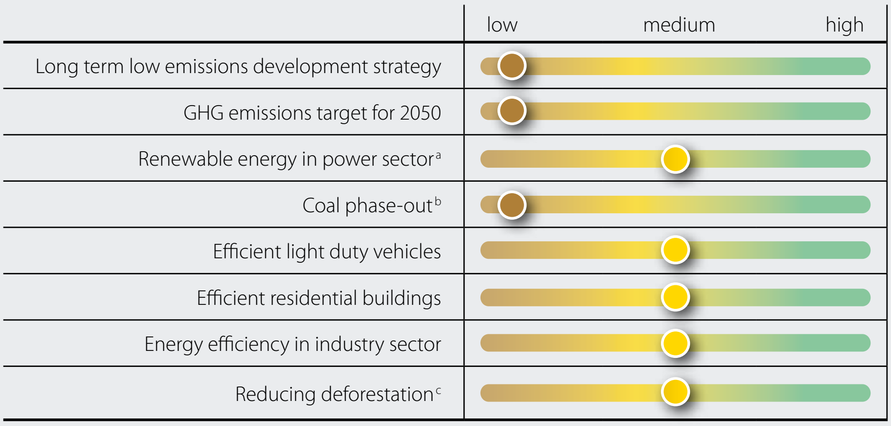


Source: CCPI 2017 – G20 Edition

REPUBLIC OF KOREA

CLIMATE POLICY PERFORMANCE

POLICY EVALUATION [8]



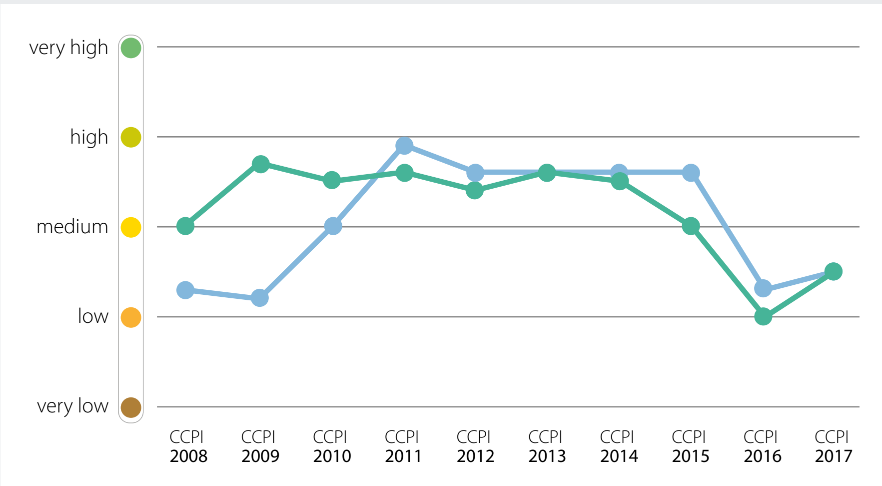
Climate Transparency evaluates sectoral policies and rates them whether they are in line with the Paris Agreement temperature goal. For more detail, see Annex.

a) Share of renewables in the power sector (2014): **1.6%**
b) Share of coal in total primary energy supply (2014): **36%**
c) Forest area compared to 1990 levels (2014): **97%**

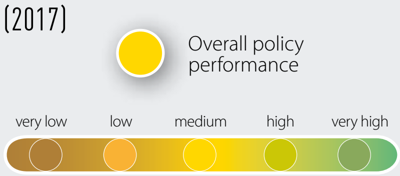
Source: own evaluation

CCPI EXPERTS' POLICY EVALUATION [9]

The Republic of Korea's overall climate policy performance remains medium without significant developments. However, the new president has announced a greater effort on reducing GHG emissions through shutting coal-fired power plants and promoting renewable energy.



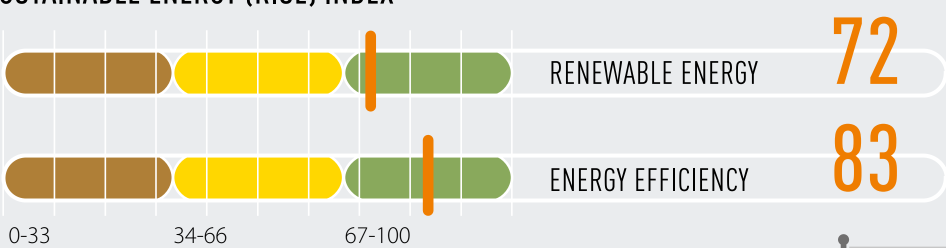
CCPI EVALUATION OF CLIMATE POLICY (2017)



Source: CCPI 2017 – G20 Edition

REGULATORY INDICATORS FOR SUSTAINABLE ENERGY (RISE) INDEX

RISE scores reflect a snapshot of a country's policies and regulations in the energy sector. Here Climate Transparency shows the RISE evaluation for Renewable Energy and Energy Efficiency.

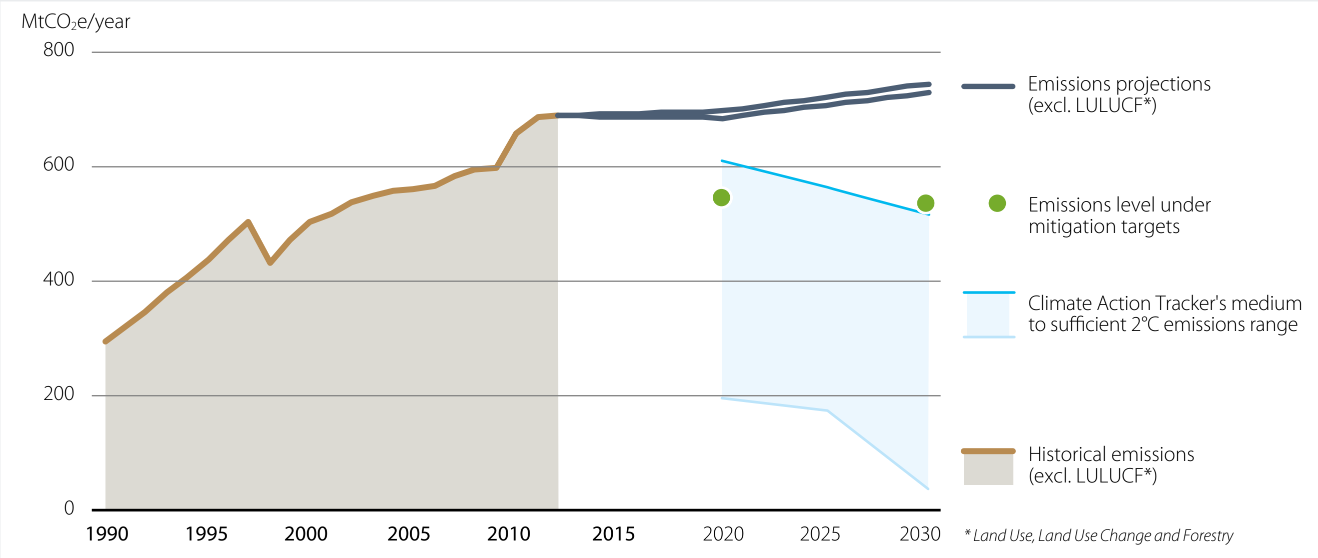


Source: RISE index, 2017

REPUBLIC OF KOREA

CLIMATE POLICY PERFORMANCE

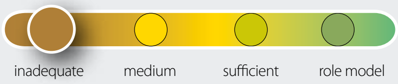
COMPATIBILITY OF CLIMATE TARGETS WITH A 2°C SCENARIO [10]



Source: CAT, 2017

In November 2016, the Republic of Korea ratified the Paris Agreement. Its Nationally Determined Contribution (NDC) target replaces its previous 2020 Copenhagen pledge. Given that its 2020 pledge was more ambitious – aiming for a similar emissions level ten years earlier– the NDC actually represents a weakening of the Republic of Korea's climate plans. Under current policies, the Republic of Korea is unlikely to meet its NDC target, which the CAT rates "inadequate". To reach the NDC target, more stringent policies are required to help the Republic of Korea peak and decline its emissions by 2030.

CLIMATE ACTION TRACKER EVALUATION OF NATIONAL PLEDGES, TARGETS AND NDC [10]



Source: CAT, 2017

REPUBLIC OF KOREA

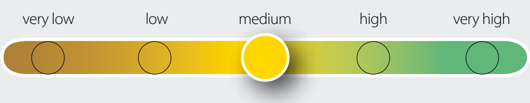
FINANCING THE TRANSITION

INVESTMENTS

INVESTMENT ATTRACTIVENESS

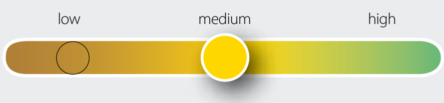
Promising improvements have been made in the market absorption capacity of the Republic of Korea in 2016 as total wind and solar PV capacity increased. Despite these, the Republic of Korea still ranks in the lower half in the G20 for its market capacity and maturity for renewables, with marginal share of renewables in the generation mix and low presence of top renewable energy businesses (Allianz, 2017).

ALLIANZ CLIMATE AND ENERGY MONITOR [11]



Source : Allianz, 2017; EY, 2017

RENEWABLE ENERGY COUNTRY ATTRACTIVENESS INDEX (RECAI) [12]



TREND

REPUBLIC OF KOREA

FINANCING THE TRANSITION

GREEN BONDS

Green bonds are bonds that earmark proceeds for climate or environmental projects and have been labelled as 'green' by the issuer.[13]

Source: Calculations done by Climate Bonds Initiative for Climate Transparency, 2017

GREEN BONDS AS SHARE OF OVERALL DEBT

0.08%

G20 average: 0.16%

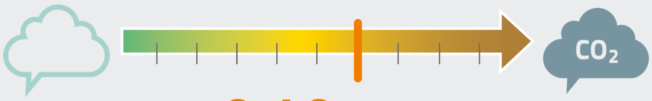
TOTAL VALUE OF GREEN BONDS

1.4 billion US$2017

EMISSIONS OF NEW INVESTMENTS IN THE POWER SECTOR

This indicator shows the emissions per MWh coming from newly-installed capacity in 2016. The smaller the value, the more decarbonised the new installed capacity.

Source: Calculations done by IDDRI for Climate Transparency, 2017



0.60 tCO_2/MWh

FISCAL POLICIES

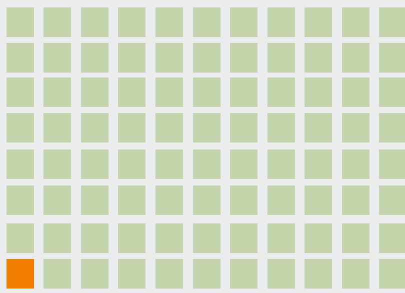
FOSSIL FUEL SUBSIDIES (FOR PRODUCTION AND CONSUMPTION)[14]

The bulk of support for fossil fuel consumption in the Republic of Korea can be attributed to the tax exemptions for fuels used in the agriculture and fisheries sectors, which in 2014 amounted to around US$ 1.1 billion. The Republic of Korea has limited domestic fossil fuel resources. The Government supported domestic coal production for decades (US$ 216 million in 2014), but has pledged to phase out support to coal briquette production by 2020 as part of its G20 commitments, and instituted new taxes on coal imports in January 2015. However, it is simultaneously establishing new subsidies for oil refiners importing crude oil, and reducing consumption taxes on natural gas, fuel oil and propane.

Source: Calculations done by ODI based on OECD inventory, 2017; Doukas, 2015.

G20 total: 230 billion US$2014

1.3 billion US$2014



EFFECTIVE CARBON RATE[16]

In 2012, effective carbon rates in the Republic of Korea consisted of specific taxes on energy use, primarily in the road sector, and permit prices from the ETS, primarily in the industry, residential and commercial, and electricity sectors. Korea priced 92% of carbon emissions from energy use, and 16% were priced above € 30/tCO_2 (~US$ 37). The majority of these emissions were from road transport. Korea started a national emissions trading system in 2015, and is also considering implementing a carbon tax.[17]

Source: OECD, 2016; World Bank, 2016.

EFFECTIVE CARBON RATE IN 2012[17]

for non-road energy, excluding biomass emissions

12.2 US$/$tCO_2$

REPUBLIC OF KOREA

FINANCING THE TRANSITION

PROVISION OF INTERNATIONAL PUBLIC SUPPORT

The Republic of Korea is not listed in Annex II of the UNFCCC, and it is therefore not formally obliged to provide climate finance. While there may be climate-related contributions through bilateral or multilateral development banks, these have not been included in this report. Nevertheless, it has pledged $100 million to the GCF and hosts the fund's headquarters. In addition, it reports bilateral support in its Biennial Update Report (BUR), thought not in common tabular format.

PLEDGE TO THE GREEN CLIMATE FUND (GCF)

Obligation to provide climate finance under the UNFCCC	Signed pledge to the GCF (Million US$)	Pledge per 1000 dollars of GDP (US$ 2011 (constant))
no	100.0	n/a

Source: GCF,2017

CONTRIBUTIONS THROUGH THE MAJOR MULTILATERAL CLIMATE FUNDS [18]

Annual average contribution 2013-2014 (Billion US$)	Annual average contribution 2013-2014 per 1000 dollars of GDP (Billion US$)	Adaptation	Mitigation
n/a	n/a	n/a	n/a

Source: Climate Funds Update, 2017

BILATERAL CLIMATE FINANCE CONTRIBUTIONS [19]

Bilateral finance commitments (2014) (Billion US$)	Bilateral finance commitments per 1000 dollars of GDP (2014) per 1000 dollars of GDP
0.19	0.11

Financial instrument (average 2013-2014)				
Grant	Concessio-nal Loan	Non-Concessional loan	Equity	Other
n/a	n/a	n/a	n/a	n/a

Theme of support (average 2013-14)			
Mitigation	Adaptation	Cross-cutting	Other
n/a	n/a	n/a	n/a

Source: Party reporting to the UNFCCC, 2013-14

CLIMATE FINANCE CONTRIBUTIONS THROUGH MULTILATERAL DEVELOPMENT BANKS (MDBs) [20]

MDBs in aggregate spent $21.2 billion on mitigation and $4.5 billion on adaptation in developing countries in 2014.

No national disaggregation available

Source: MDB report, 2015

FUTURE CLIMATE FINANCE COMMITMENTS

Source: "Roadmap to US$100 Billion" report, 2016

REPUBLIC OF KOREA

DECARBONISATION

SECTOR-SPECIFIC INDICATORS

POWER SECTOR

ELECTRICITY DEMAND PER CAPITA (kWh/capita)
G20: 3,601
Republic of Korea: 9,722
Data from 2014
Source: CAT, 2016

EMISSIONS INTENSITY OF THE POWER SECTOR (gCO_2/kWh)
517
G20 average: 632
Data from 2014
Source: CAT, 2016

SHARE OF RENEWABLES IN POWER GENERATION (incl. large hydro)
1.4 %
G20 average: 22%
Data from 2015
Source: CAT, 2016

SHARE OF POPULATION WITH ACCESS TO ELECTRICITY
100 %
Data from 2016
Source: IEA, 2016

SHARE OF POPULATION WITH BIOMASS DEPENDENCY
0 %
Data from 2014
Source: IEA, 2016

TRANSPORT SECTOR

TRANSPORT EMISSIONS PER CAPITA (tCO_2e/capita)
1.83
G20 average: 1.2
Data from 2014
Source: IEA, 2016

TRANSPORT EMISSIONS INTENSITY ($kgCO_2$/vkm)
0.23
G20 average: 0.22
Data from 2010
Source: CAT, 2016

SHARE OF PRIVATE CARS AND MOTORCYCLES
37 %
G20 average: 64 %
Data from 2010
Source: CAT, 2016

SHARE OF GLOBAL ELECTRIC VEHICLE SALES (%)
0 %
Data from 2015
Source: IEA, 2016

INDUSTRY SECTOR

INDUSTRY EMISSIONS INTENSITY (tCO_2/thousand US\$2012 sectoral GDP (PPP))
0.30
Data from 2014
Source: CAT, 2016

BUILDING SECTOR

BUILDING EMISSIONS PER CAPITA (tCO_2/capita)
3.5
G20 average: 1.4
Data from 2014
Source: CAT, 2016

RESIDENTIAL BUILDINGS EMISSIONS INTENSITY ($kgCO_2/m^2$)
n/a
G20 average: 37
Data from 2010
Source: CAT, 2016

RESIDENTIAL BUILDING SPACE (m^2/capita)
n/a
G20 average: 26
Data from 2010
Source: CAT, 2016

AGRICULTURE SECTOR

AGRICULTURE EMISSIONS INTENSITY (tCO_2e/thousand US\$2010 sectoral GDP (constant))
0.9
Data from 2014
Source: PRIMAP, 2017; WorldBank, 2017

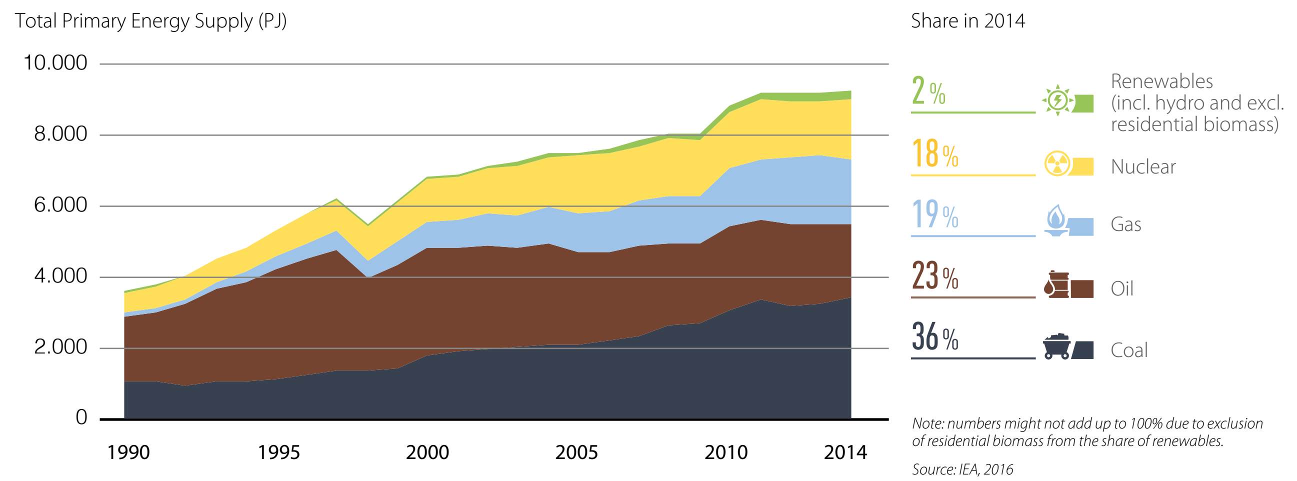
FOREST SECTOR

FOREST AREA COMPARED TO 1990 LEVEL
97 %
Data from 2015
Source: CAT, 2016

REPUBLIC OF KOREA

DECARBONISATION

ENERGY MIX [21]

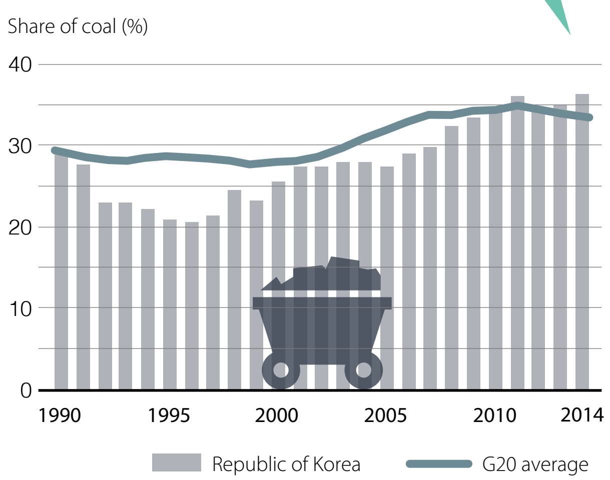


Note: numbers might not add up to 100% due to exclusion of residential biomass from the share of renewables.

Source: IEA, 2016

SHARE OF COAL IN ENERGY SUPPLY [22]

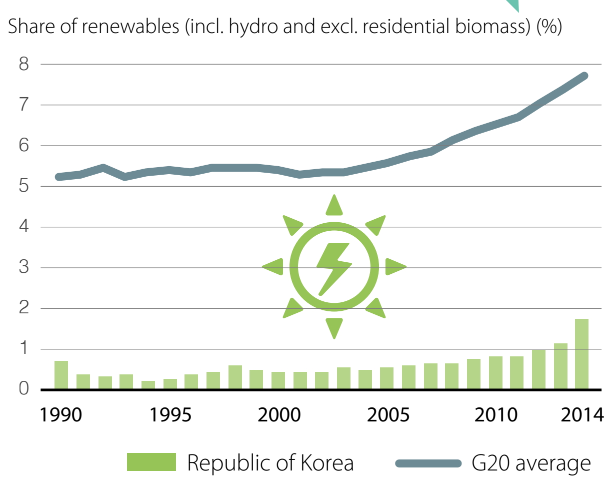
At 36% in 2014 the Republic of Korea has the fourth largest share of coal in the G20.



Source: IEA, 2016

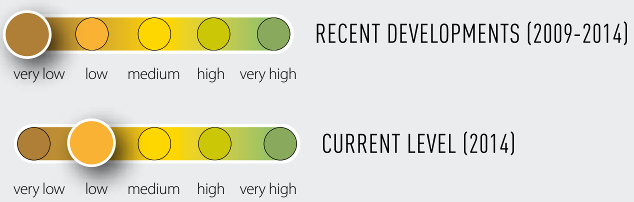
SHARE OF RENEWABLES IN ENERGY SUPPLY [23]

The Republic of Korea's share of renewables has increased in the past decades and more significantly in the last 5 years. However, it is one of the lowest shares in the G20, with less than 2% in 2014.



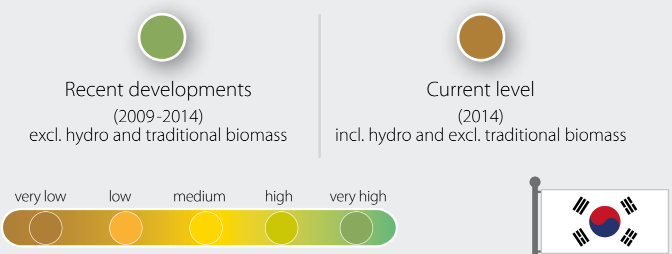
Source: IEA, 2016

PERFORMANCE RATING



Source: own evaluation

CCPI PERFORMANCE RATING OF THE SHARE OF RENEWABLES [7]

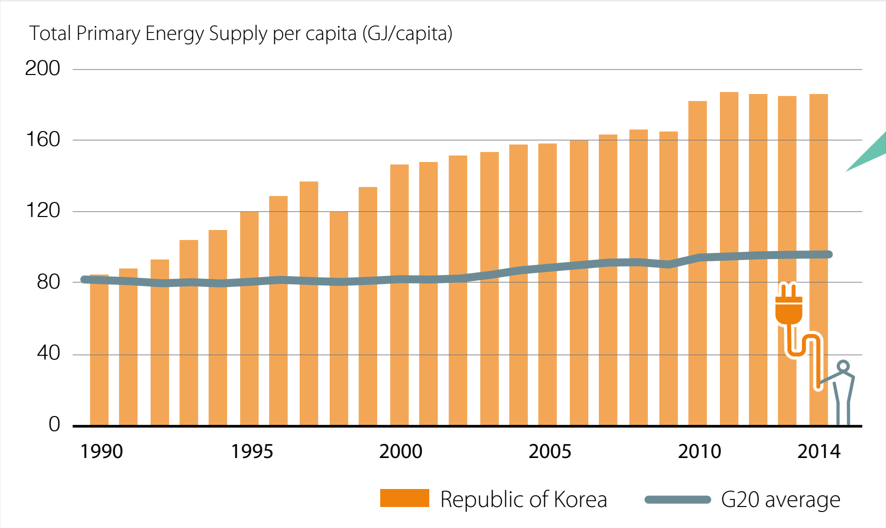


Source: CCPI 2017 – G20 Edition

REPUBLIC OF KOREA

DECARBONISATION

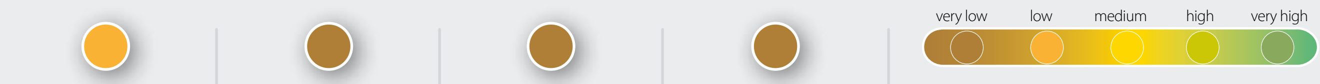
ENERGY USE PER CAPITA[24]



Source: IEA, 2016

With a steep upward trend, the Republic of Korea more than doubled its energy use per capita. In 2014, it was still well above the G20 average.

CCPI PERFORMANCE RATING OF ENERGY USE PER CAPITA[7]



Recent developments (2009-2014)

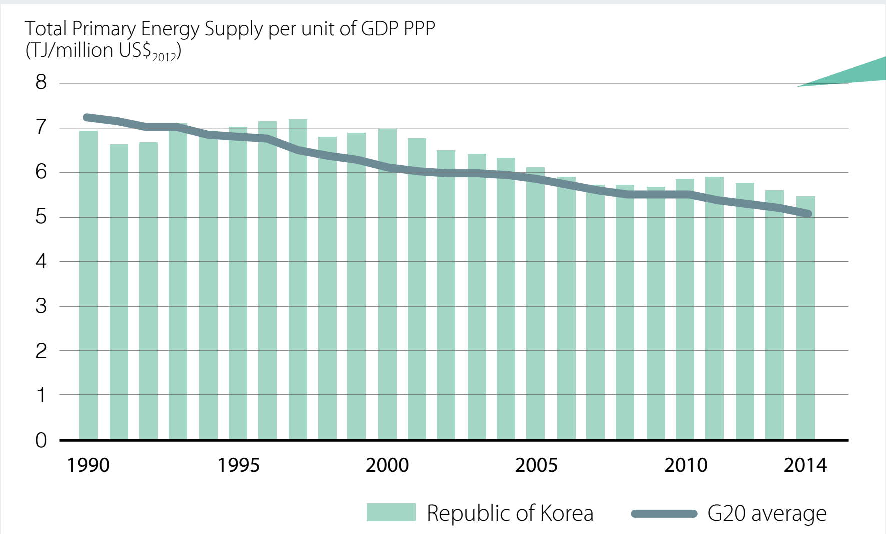
Current level (2014)

Current level compared to a well below 2°C pathway

Future target compared to a well below 2°C pathway

Source: CCPI 2017 – G20 Edition

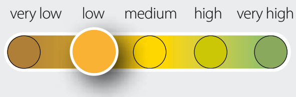
ENERGY INTENSITY OF THE ECONOMY[25]



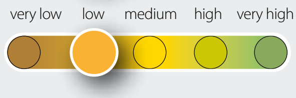
Source: IEA, 2016

The energy intensity of the Republic of Korea's economy has been steadily decreasing alongside the G20 average since the 1990s and was slightly higher than the G20 average in 2014.

PERFORMANCE RATING



RECENT DEVELOPMENTS (2009-2014)



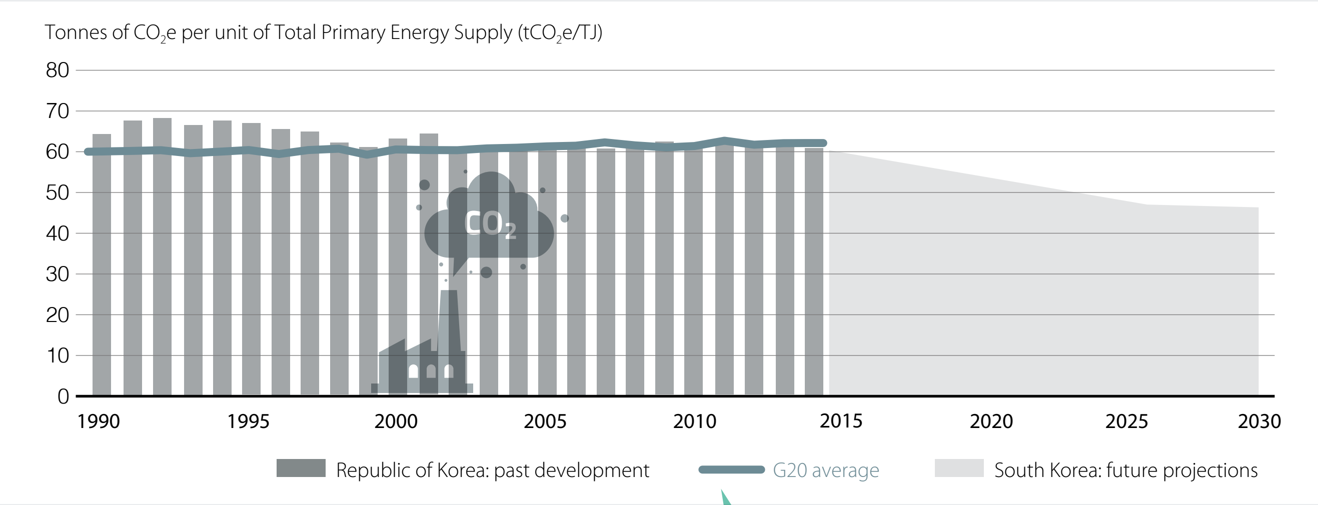
CURRENT LEVEL (2014)

Source: own evaluation

REPUBLIC OF KOREA

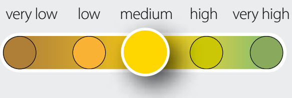
DECARBONISATION

CARBON INTENSITY OF THE ENERGY SECTOR [26]

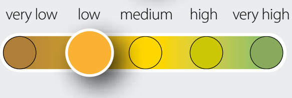


Source: IEA, 2016

PERFORMANCE RATING



RECENT DEVELOPMENTS (2009-2014)



CURRENT LEVEL (2014)

Source: own evaluation

There was a small decrease in the Republic of Korea's CO_2 emissions per total primary energy supply over recent decades. Since 2002 it has been very close to the G20 average, and projections show a significant downward trend until 2030.

ANNEX

G20

KEY INDICATORS

1) The Human Development Index (HDI) is a composite index published by the United Nations Development Programme (UNDP). It is a summary measure of average achievement in key dimensions of human development. A country scores higher when the lifespan is higher, the education level is higher, and GDP per capita is higher. Data for 2016.
2) Gross Domestic Product (GDP) per capita is calculated by dividing GDP with midyear population figures. GDP is the value of all final goods and services produced within a country in a given year. Here GDP figures at purchasing power parity (PPP) are used. Data for 2015.
3) PRIMAP-hist combines several published datasets to create a comprehensive set of greenhouse gas emissions pathways for every country and Kyoto gas covering the years 1850 to 2014 and all UNFCCC member states as well as most non-UNFCCC territories. The data resolves the main IPCC 1996 categories. Data for 2014.
4) The ND-GAIN index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. It is composed of a vulnerability score and a readiness score. In this report, we display the vulnerability score, which measures a country's exposure and sensitivity to the negative impact of climate change in six life-supporting sectors – food, water, health, ecosystem service, human habitat and infrastructure. In this report, we only display the vulnerability score of the index. Data for 2015.
5) Average level of exposure of a nation's population to concentrations of suspended particles measuring less than 2.5 microns in aerodynamic diameter, which are capable of penetrating deep into the respiratory tract and causing severe health damage. Data for 2015.

GREENHOUSE EMISSIONS (GHG)

6) This indicator gives an overview of the country's emissions profile and the direction the country's emissions are taking under current policy scenario.
7) The Climate Change Performance Index (CCPI) aims to enhance transparency in international climate politics. On the basis of standardised criteria, the index evaluates and compares the climate protection performance of countries in the categories GHG emissions, renewable energy and energy use. It assesses the recent developments, current levels, policy progress and the compatibility of the country's current performance and future targets with the international goal of limiting global temperature rise well below 2°C.

CLIMATE POLICY PERFORMANCE:

8) The table below displays the criteria used to assess a country's policy performance. For the sector-specific policy criteria the 'high' rating is informed by the Climate Action Tracker (2016) report on the ten steps needed to limit warming to 1.5°C and the Paris Agreement.
9) The CCPI evaluates a country's performance in national climate policy, meaning the performance in establishing and implementing a sufficient policy framework, as well as international climate diplomacy through feedback from national climate and energy experts.
10) The Climate Action Tracker is an independent, science-based assessment that tracks government emissions reduction commitments and actions. It provides an up-to-date assessment of individual national pledges, targets and NDCs and currently implemented policies to reduce greenhouse gas emissions.

FINANCING THE TRANSITION

11) The Allianz Climate and Energy 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.
12) The Renewable Energy Country Attractiveness Index (RECAI) produces scores 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. For comparability purposes with the Allianz Monitor index, we divided the G20 members included in the latest RECAI ranking (May 2017) in two categories and rate the top half as "high performance" and the lower half as "medium performance".
13) The green bonds country indicator shows which countries are active in the green bond market by showing green bonds per country as a percentage of the overall debt securities market for that country. Green bonds were created to fund projects that have positive environmental and/or climate benefits.
14) The data presented is from the OECD inventory: www.oecd.org/site/tadffss/ except for Argentina and Saudi Arabia for which data from the IEA subsidies database is used. The IEA uses a different methodology for calculating subsidies than the OECD. It uses a 'price-gap' approach and covers a sub-set of consumer subsidies. The price-gap approach compares average end-user prices paid by consumers with reference prices that corresponds to the full cost of supply.

To endnote 8) Rating	Criteria description		
	Low	Medium	High
Long term low emissions development strategy	No long term low emissions strategy	Existing long term low emissions strategy	Long-term low emissions strategy submitted to the UNFCCC in accordance with Article 4, paragraph 19, of the Paris Agreement
GHG emissions target for 2050	No emissions reduction target for 2050 (or beyond)	Existing emissions reduction target for 2050 (or beyond)	Emissions reduction target to bring CO_2 emissions to at least net zero by 2050
Renewable energy in power sector	No policy or support scheme for renewable energy in place	Support scheme for renewables in the power sector in place	Support scheme and target for 100% renewables in the power sector by 2050 in place
Coal phase-out	No consideration or policy in place for phasing out coal	Significant action to reduce coal use implemented or coal phase-out under consideration	Coal phase-out in place
Efficient light duty vehicles	No policy or emissions performance standards for LDVs in place	Energy/emissions performance standards or support for LDVs	National target to phase out fossil fuel cars in place
Efficient residential buildings	No policy or low-emissions building codes and standards in place	Building codes, standards and fiscal/financial incentives for low-emissions options in place	National strategy for near-zero energy buildings (at least for all new buildings)
Energy efficiency in industry sector	No policy or support for energy efficiency in industrial production in place	Support for energy efficiency in industrial production (covering at least two of the country's subsectors (e.g. cement and steel production))	Target for new installations in emissions-intensive sectors to be low-carbon after 2020, maximising efficiency
Reducing deforestation	No policy or incentive to reduce deforestation in place	Incentives to reduce deforestation or support schemes for afforestation /reforestation in place	National target for reaching zero deforestation by 2020s

ANNEX (continued)

G20

15) This footnote had to be deleted as the data for the corresponding indicator was not available at the time of publication of this report.

16) In addition to carbon pricing mechanisms, emissions trading schemes and various energy taxes also act as prices on carbon, although they are generally not developed with the aim or reducing emissions. The OECD report presents calculations on 'Effective Carbon Rates' as the sum of carbon taxes, specific taxes on energy use, and tradable emission permit prices. The calculations are based on 2012 energy policies and prices, as covered in OECD's Taxing Energy Use database. According to OECD estimates, to tackle climate change emissions should be priced at least EUR 30 (or US$ 37) per tonne of CO_2 revealing a major 'carbon pricing gap' within the G20.

17) The effective carbon rate presented in this country profile does not factor in emissions from biomass, as many countries and the UNFCCC treat them as carbon-neutral. However, in many cases biomass emissions are found to be non-carbon neutral over their lifecycle, especially due to the land use changes they cause.

18) Finance delivered through multilateral climate funds comes from Climate Funds Update, a joint ODI/Heinrich Boell Foundation database that tracks spending through major multilateral climate funds. Figures include: Adaptation for Smallholder Agriculture Programme; Adaptation Fund; Clean Technology Fund; Forest Carbon Partnership Facility; Forest Investment Program; Global Environment Facility (5th and 6th Replenishment, Climate Focal Area only); Least Developed Countries Fund; Partnership for Market Readiness; Pilot Program for Climate Resilience; Scaling-up Renewable Energy Program; and the Special Climate Change Fund.

19) Bilateral finance commitments are sourced from Party reporting to the UNFCCC under the Common Tabular Format. Figures represent commitments of funds to projects or programmes, as opposed to actual disbursements.

20) Data for the MDB spending on climate action includes ADB, AfDB, EBRD, EIB, IDB, IFC and the World Bank. Data is self-reported annually by the MDBs, based on a shared methodology they developed. The reported data includes MDBs own resources and expenditure in EU13, not funding from external sources that are channelled through the MDBs (e.g through bilateral donors and dedicated climate funds that are captured elsewhere). Data reported corresponds to the financing of adaptation or mitigation projects or of those components, sub-components, or elements within projects that provide adaptation or mitigation benefits (rather than the entire project cost). It does not include public or private finance mobilised by MDBs.

DECARBONISATION

21) Total primary energy supply data displayed in this factsheet does not include non-energy use values.

22) The share of coal in total primary energy supply reveals the country's historical and current proportion of coal in the energy mix. As coal is one of the dirtiest of fossil fuels, reducing coal's share in its energy mix is a crucial step for a country's transition to a green economy.

23) The share of renewable energy in total primary energy supply shows a country's historical and current proportion of renewables in the energy mix. The numbers displayed in the graph do not include residential biomass and waste values. Replacing fossil fuels and promoting the expansion of renewable energy is an important step for reducing emissions.

24) TPES per capita displays the historical, current and projected energy supply in relation to a country's population. Alongside the intensity indicators (TPES/GDP and CO_2/TPES), TPES per capita gives an indication on the energy efficiency of a country's economy. In line with a well-below 2°C limits, TPES/capita should not grow above current global average levels. This means that developing countries are still allowed to expand their energy use to the current global average, while developed countries have to simultaneously reduce it to that same number.

25) TPES per GDP describes the energy intensity of a country's economy. This indicator illustrates the efficiency of energy usage by calculating the energy needed to produce one unit of GDP. A decrease in this indicator can mean an increase in efficiency but also reflects structural economic changes.

26) This indicator describes the carbon intensity of a country's energy sector (expressed as the CO_2 emissions per unit of total primary energy supply) and gives an indication on the share of fossil fuels in the energy supply.

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at:

http://www.climate-transparency.org/g20-climate-performance/g20report2017