



BROWN TO GREEN: G20 TRANSITION TO A LOW CARBON ECONOMY

Germany

This country profile assesses Germany'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



Source: World Bank Indicators, data for 2012

GHG emissions per capita (tCO₂e/cap)



Share of global GDP

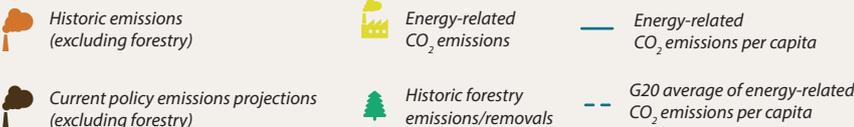
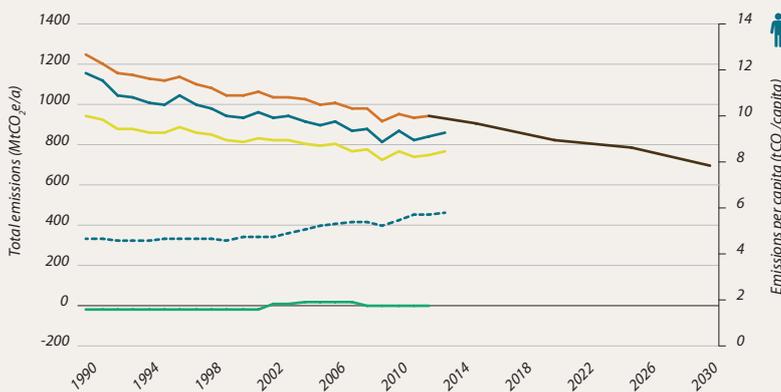


GDP per capita



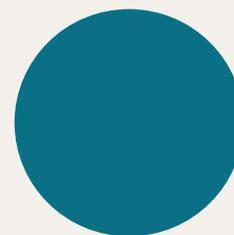
Source: IEA, data for 2013

GREENHOUSE GAS (GHG) EMISSIONS



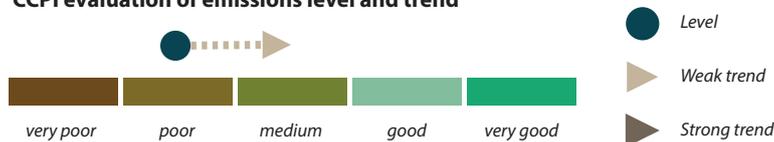
Germany's greenhouse gas (GHG) emissions have dropped from 1248 MtCO₂e in 1990 to 939 MtCO₂e in 2012. It is expected this trend will continue. Energy-related carbon dioxide (CO₂) emission are a major part of total GHG emissions and developed simultaneously. Emissions from land use, land use change and forestry (LULUCF) are close to zero. At 9.3 tCO₂, Germany's energy-related per capita emissions are relatively high. The CCPI evaluates the country's emissions level as poor, but recognises a positive trend.

Composition of GHG emissions



CO₂* **87%**
N₂O **6%**
CH₄ **5%**
F-Gases **1%**
CO₂ emissions from forestry **0%**

CCPI evaluation of emissions level and trend

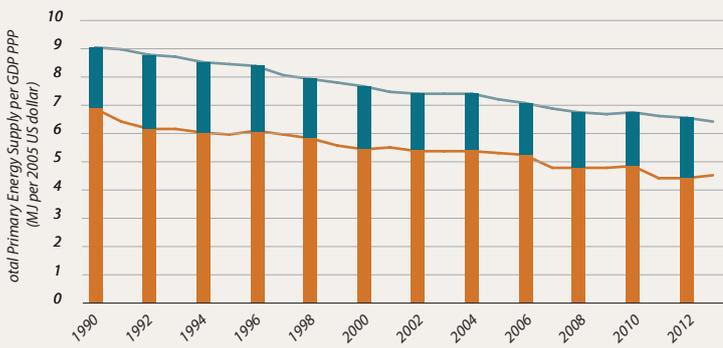


*CO₂ emissions incl. LULUCF
Source: Annex I countries: UNFCCC (2015);
Non-Annex I countries: IEA (2014) and CAT (2015)

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

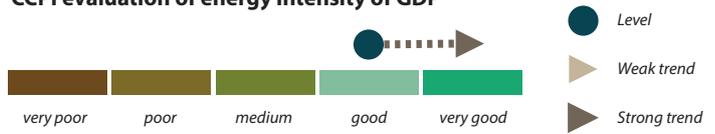
Energy intensity of the economy



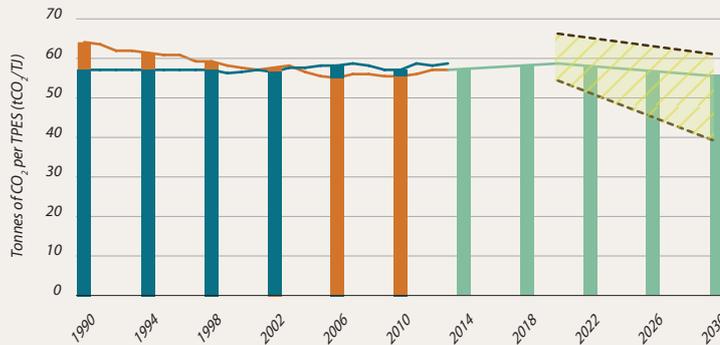
Energy intensity
Average energy intensity in G20

Source: CCPI, 2016

CCPI evaluation of energy intensity of GDP



Carbon intensity of the energy sector

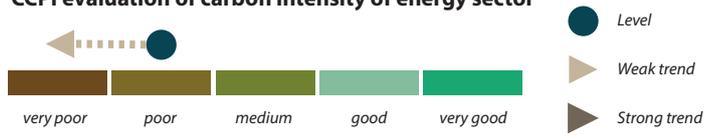


Carbon intensity (past trend) Average carbon intensity in G20
Carbon intensity (current policy projection) Global benchmark for a 2°C pathway

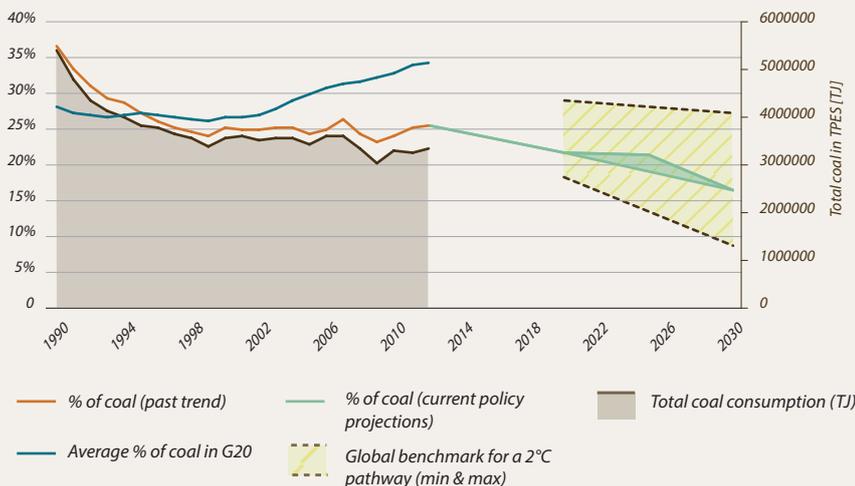
Sources: Past: CCPI; future projections: CAT

The carbon intensity of Germany's energy supply (CO₂/TPES) decreased from 1990 to 2006 and remains at a level just below the G20 average. Projections show carbon intensity will stay relatively constant for the next ten years and within the 2°C benchmark corridor, although lacking the necessary downward trend. The CCPI evaluates Germany's carbon intensity level as relatively poor compared to other countries, with a worsening trend.

CCPI evaluation of carbon intensity of energy sector



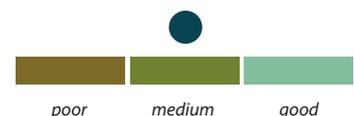
Share of coal in Total Primary Energy Supply (TPES)



Source: CAT

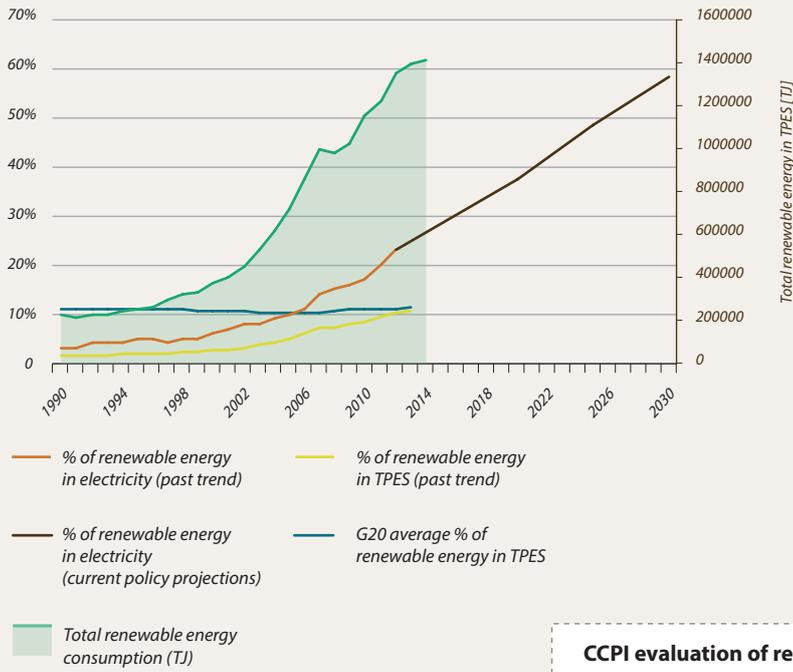
Since 1990, the share of coal in TPES has decreased. Starting at 37%, it dropped until 1999 and remained relatively constant around 24-26% until 2012. Projections assume the share of coal will further decrease in the future, but will still exceed the minimum value of a 2°C-compatible development.

Evaluation of coal share in TPES



Source: own evaluation

Renewable energy in TPES and electricity sector



The share of renewable energy in electricity was relatively low in the 1990's, but has steadily increased since. In 2005 it reached a share of 10% and grew to 23% in 2012. Future projections expect a strong increase up to a level of 58% in 2030. By comparison, the share of renewables in total primary energy supply increased more slowly, reaching a level of about 10% in 2013, close to the average of the G20 countries. The CCPI evaluates Germany as being a medium performer on its level of renewable energy but recognises a positive trend.

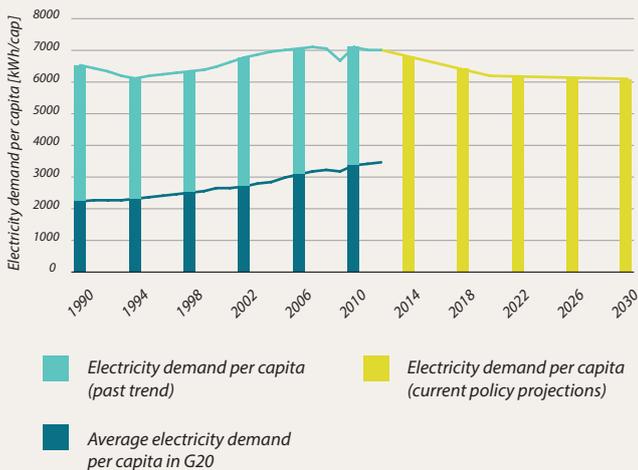
Sources: CCPI and CAT

CCPI evaluation of renewable share in TPES



Electricity demand per capita

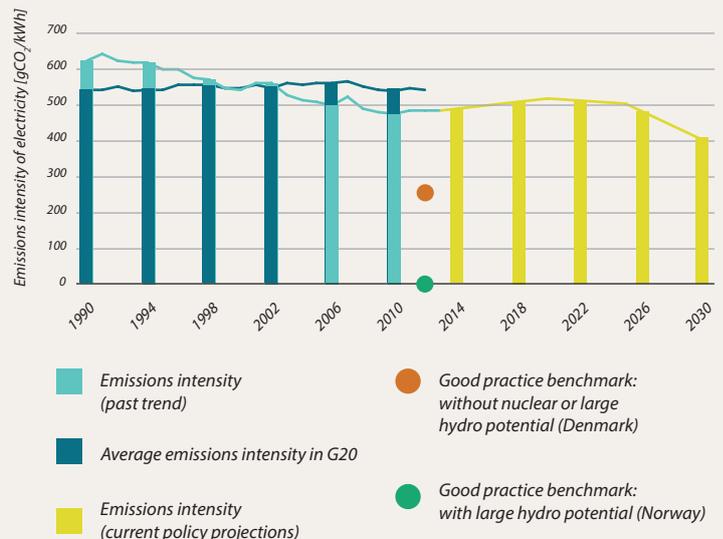
The electricity demand per capita steadily increased at the rate of the G20 average but at a much higher level. In 2012, it reached a level of 7062 kWh per capita, which is twice as high as the G20 average. It is expected that electricity demand will drop in the future, yet remain on a high level.



Source: CAT, 2015

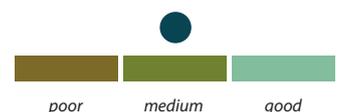
Emissions intensity of the electricity sector

Germany's electricity emissions intensity has continuously decreased since 1990. Since 2004 it has been below the G20 average and is expected to further decrease in the future.



Source: CAT, 2015

Evaluation of the electricity emission intensity



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	✗

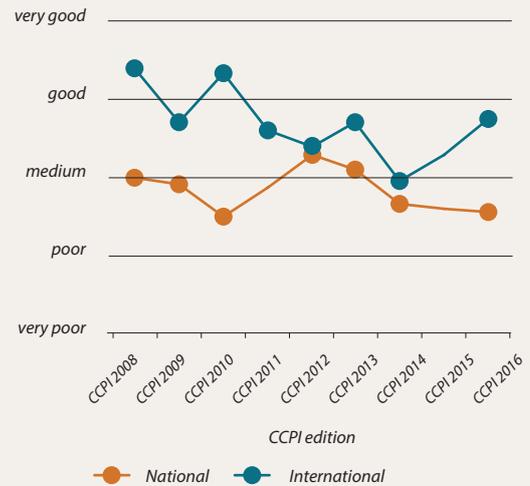
* Understood as decarbonisation plans and not specifically as the plans called for in the Paris Agreement

Source: Climate Policy Database, 2016

Climate policy evaluation by experts

CCPI experts praise Germany's efforts for pushing a decarbonisation agenda in the G7, along with its commitment to climate finance, leading to some progress on last year's international policy evaluation. Germany's national performance remains below average. Despite a target of 80% renewables in the electricity mix by 2050, Germany still relies on a stable use of lignite, after deciding to phase out nuclear power. Experts criticise the influence of the energy lobby. In the CCPI 2016 Germany received a relatively good ranking.

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

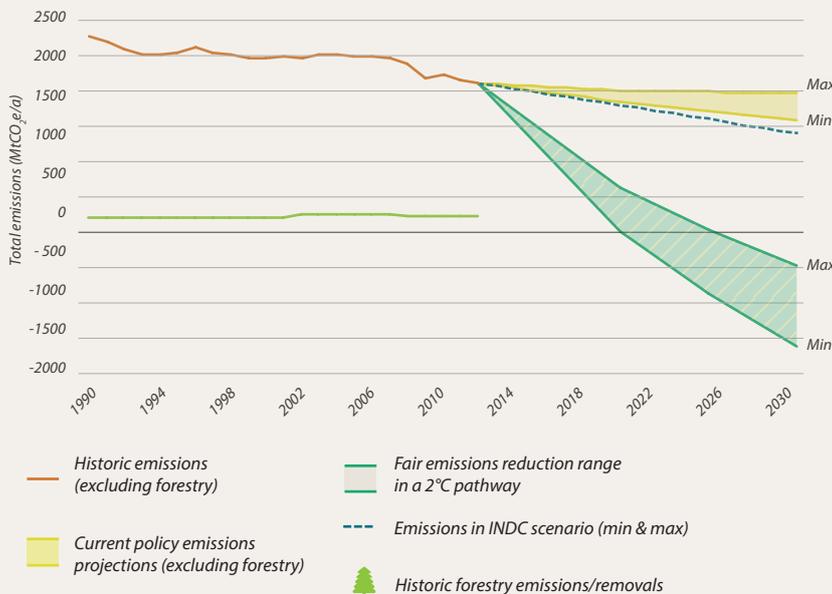


Source: CCPI, 2016

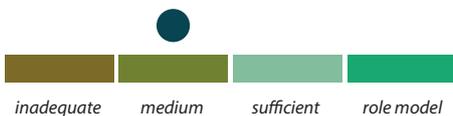
CCPI evaluation of climate policy



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



CAT evaluation of the EUs Intended National Determined Contributions (INDC)



Source: CAT, 2015

As an EU member state, Germany did not submit its own Intended Nationally Determined Contribution (INDC) or emissions reduction target for COP21.

Under its INDC, on 6 March 2015 the EU proposed a binding, economy-wide target to cut domestic greenhouse gas emissions by at least 40% below 1990 levels in 2030. No individual EU member state has its own INDC.

The Climate Action Tracker (CAT) rates the EU emissions target as "medium", meaning the INDC is inconsistent with limiting warming below 2°C. It would require other countries to make a comparably greater effort, and much deeper emissions reductions.

The overall level of GHG emissions reductions proposed in the EU28 INDC does not fall within the range of approaches for fair and equitable emission reductions. Current policies are projected to reduce domestic emissions by 23–35% below 1990 levels in 2030, and do not put the EU on a trajectory towards meeting either its 2030 or 2050 targets. The EU's Emissions Trading Scheme is an important instrument to achieve its 2020 and 2030 targets. However, an accumulated surplus of emissions allowances could dilute the 40% GHG target by 7% in 2030. It is therefore important that the EU creates a robust market reserve for eliminating that surplus, to keep in line with the 40% GHG target.

FINANCING THE TRANSITION

Investment attractiveness



Allianz Energy and Climate Monitor

HIGH

RECAI* (E&Y index) Category (own assessment)

HiGH

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 Germany's investment attractiveness as high, due to good performance in most parameters that contribute to a stable investment environment. However, recent uncertainty around the provisions of the renewables law with a newly proposed cap of 40% to 45% power generation from renewables by 2025 has been flagged as a concern for future investment attractiveness in most indices.

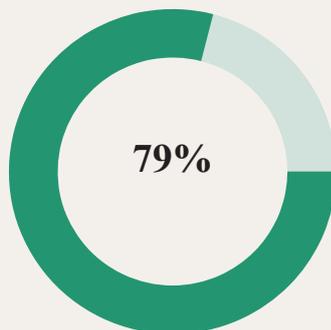
Sources: Allianz Energy and Climate Monitor and RECAI reports

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

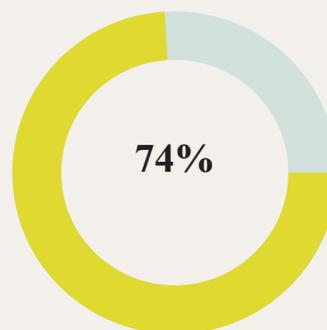
This section shows Germany's current investments in the overall power sector (including distribution and transmission) as well as in renewable energy expressed as the share of the total annual investments needed to be in line with a 2°C compatible trajectory.

Investments in the power sector



% of current investments in the power sector compared to the investment needs under a 2°C pathway

Investments in renewable energy for the power sector



% of current investments for renewable energy in the power sector compared to the investment needs under a 2°C pathway

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.

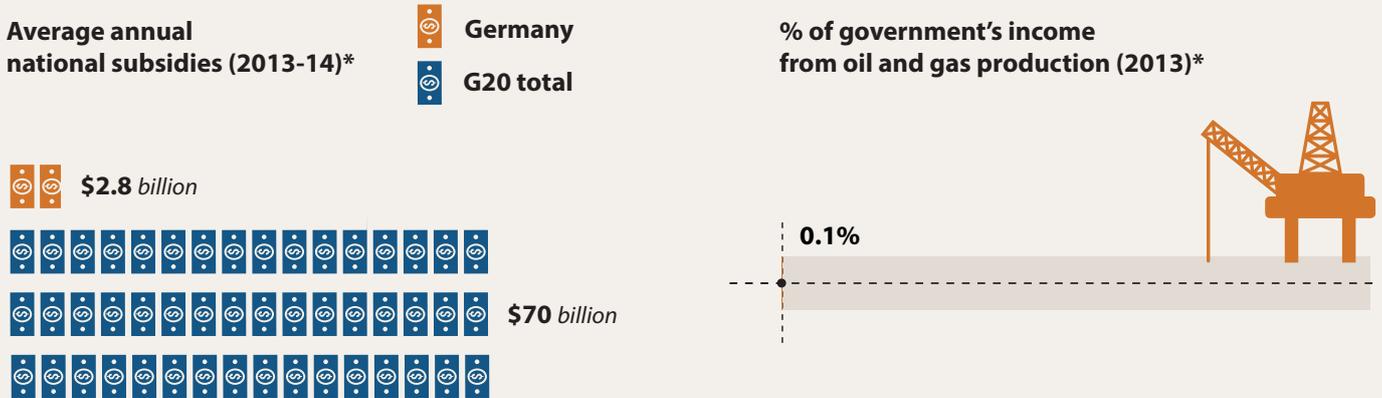
While Germany has neither implemented nor considers a carbon tax, it is lobbying for a ETS-EU carbon price floor in order to strengthen the carbon pricing signals and boost the effectiveness of the existing EU-ETS.



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

Fossil fuel subsidies

Germany, Europe's second largest coal producer, provides a significant level of subsidies to hard coal. In recent years, dwindling domestic reserves of oil and gas have led to increased reliance on imported fossil fuels and a rapid increase in renewable energy deployment to meet energy demand. As part of the G20 initiative to phase out inefficient fossil fuel subsidies, Germany agreed to discontinue hard coal subsidies for mining by the end of 2018, aiming to reduce mining production from 12.4 million tce in 2011 to 4 million tce by 2018. However, government budgetary support for research, development and deployment for oil, gas and coal has increased in the last few years.

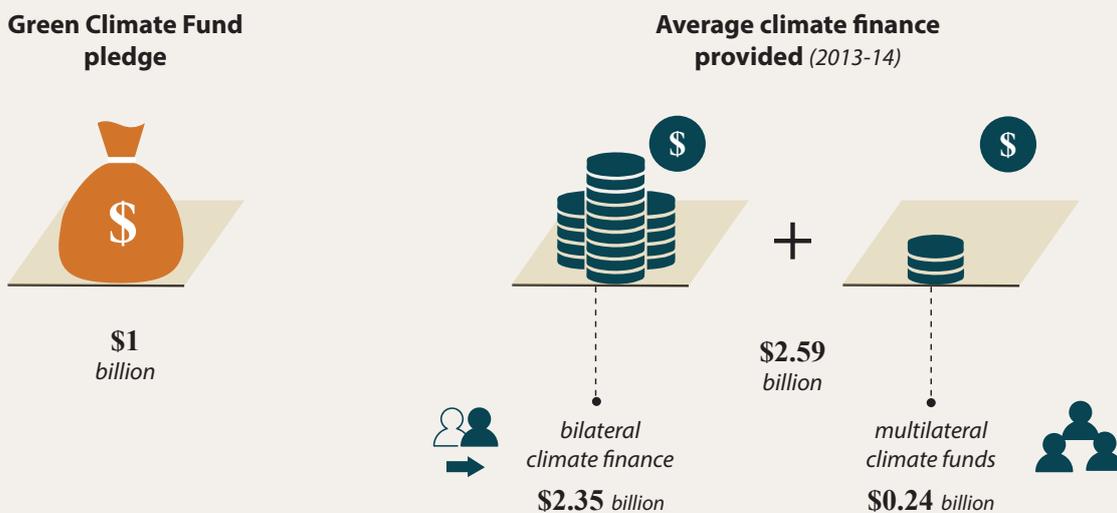


Source: ODI, 2015

*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

Germany has provided the third largest amount of climate finance relative to GDP, and has pledged the fourth highest amount to the GCF of any G20 donor. In its reported climate finance contribution, Germany only includes funding additional to a 2009 ODA baseline, or generated from new sources such as the EU ETS. German bilateral agencies including KfW and GIZ play a prominent role in the delivery of its climate finance, which is jointly managed by the Ministry of Environment (BMU) and the Ministry of Economic Cooperation and Development (BMZ). Germany's contribution includes export credits to support German companies to invest in developing countries.



Source: ODI, 2016