

GERMANY

2020

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



After remaining stable since 2014, Germany's emissions started to decrease in 2017.

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

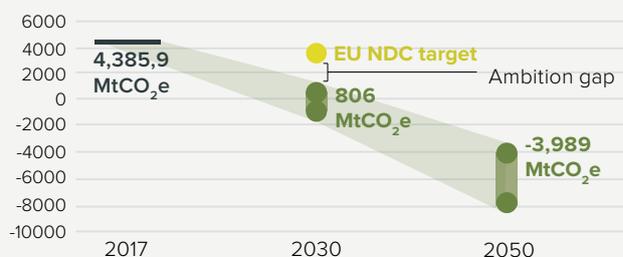
NOT YET ON TRACK FOR A 1.5°C WORLD



As an EU member state, **Germany committed to contributing to the EU NDC**. The EU's 'at least 40%' reduction target is not consistent with EU's 1.5 'fair-share' range of **below 806 MtCO₂e by 2030 and below -3,989 MtCO₂e by 2050**. The European Commission and Parliament have separately proposed increasing the EU27's goal to "at least 55%" and "60%" below 1990 levels, respectively. These could move the EU closer to its 'fair-share' range. EU member states have yet to agree to either proposal.

'Fair-share' pathways and ratings for individual EU member states are not provided due to the intricacies and inter-linkages of the internal burden sharing system.

EU28 1.5°C 'fair share' pathway (MtCO₂e/year)^{1&2}



Source: Climate Action Tracker, 2020

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



Decarbonisation of the transport sector with investment in the railways, public transport, and electromobility and bicycle infrastructure.



BAN INSTALLING OIL & GAS HEATING

Implement the ban on the installation of oil heating sooner. In a second step, broaden the ban to include gas heating.



INVEST IN RENEWABLES

Accelerate coal phase-out to earlier than 2030. Complement with favourable conditions for investment in renewables and creation of a carbon floor price for the EU ETS.

RECENT DEVELOPMENTS



The December 2019 Climate Action Plan is a small step in the right direction. The plan includes carbon pricing for transport and buildings starting in 2021, and reinvestment of part of the proceeds for energy efficiency measures in the building sector.



The adoption of the Coal Exit Law, which aims to phase out coal by 2038, with the option of bringing this date back to 2035, is not only not compatible with the Paris Agreement, but also much less ambitious than the majority of the EU member states, some of which are planning to phase out coal well before 2030.



The share of renewables in the power sector **increased by more than 5% in 2019**. However, the collapse of onshore wind energy industry makes it unlikely that such an increase will continue in the coming years if no comprehensive legal reforms are undertaken.

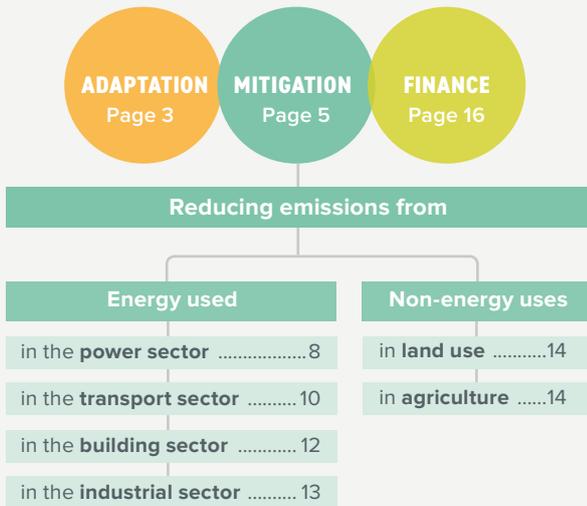
CORONAVIRUS RECOVERY

Germany proposed one of the most generous support schemes to industries affected by the COVID-19-induced economic crisis (EUR 130bn), including a future package of EUR 50bn of which approx. a half is dedicated to climate protection. However, the allocation criteria for economic aid should be more climate proof, based on the EU taxonomy and an operationalising of the do-no-harm principle. Germany's EU presidency was instrumental in the European Council's agreement of the Multiannual Financial Framework (MFF) and the NextGenerationEU Recovery Fund. Both streams of funding are subject to climate-related spending targets. Countries are to spend 30% of their allotment of the MFF funds, and 37% of the Next GenerationEU funds, on measures aimed at achieving the EU's new 2030 emissions reduction goal.

References: Federal Ministry of Finance, 2020

CONTENTS

We unpack Germany'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. Germany ranks amongst the highest countries.

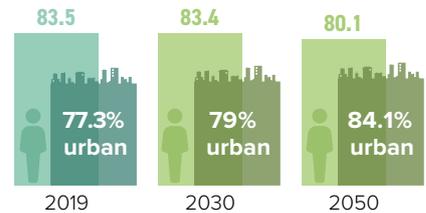


Data for 2018. Source: UNDP, 2019

Population and urbanisation projections

(in millions)

Germany's population is expected to decrease by about 3.8% by 2050 while simultaneously becoming more urbanised.



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

Gross Domestic Product (GDP) per capita (PPP constant 2015 international \$)



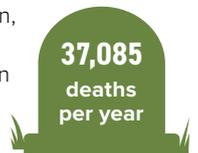
Sources: The World Bank, 2020

Death rate attributable to air pollution

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



Over 37,085 people die in Germany 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 among the lower levels in the G20.



Data for 2016. Source: WHO, 2018

JUST TRANSITION



The adopted Structural Strengthening Act allocates EUR 40bn in structural aid to German coal regions for sustainable development. The focus is on new company settlements and jobs. So-called future agencies could be used to shape participation processes of the local population in the journey towards a just transition and climate-neutral development.

So far, however, public debate has been dominated by emissions-intensive project ideas from business and state governments, like the over-sized freeway extension in the Lausitz region.

References: German Government, 2020; Matthes et al., 2020; Öko-Institut Berlin, 2018

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

Germany is vulnerable to climate change and **adaptation actions are needed.**



HIGH COST OF EXTREME WEATHER

On average, 537 fatalities and almost USD 4,162bn 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

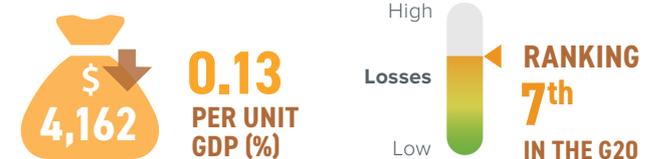
Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

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	Low	Medium	High	
	% of time in drought conditions	Low	Medium	High	
HEAT AND HEALTH	Heatwave frequency	Very low	Low	Medium	
	Days above 35°C	Very low	Low	Medium	
AGRICULTURE	Maize	Reduction in crop duration	Medium	High	
		Hot spell frequency	Very low	Very low	Low
		Reduction in rainfall	Low	Low	Very low
	Wheat	Reduction in crop duration	Low	Medium	High
		Hot spell frequency	Very low	Very low	Very low
		Reduction in rainfall	Medium	Medium	High

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.

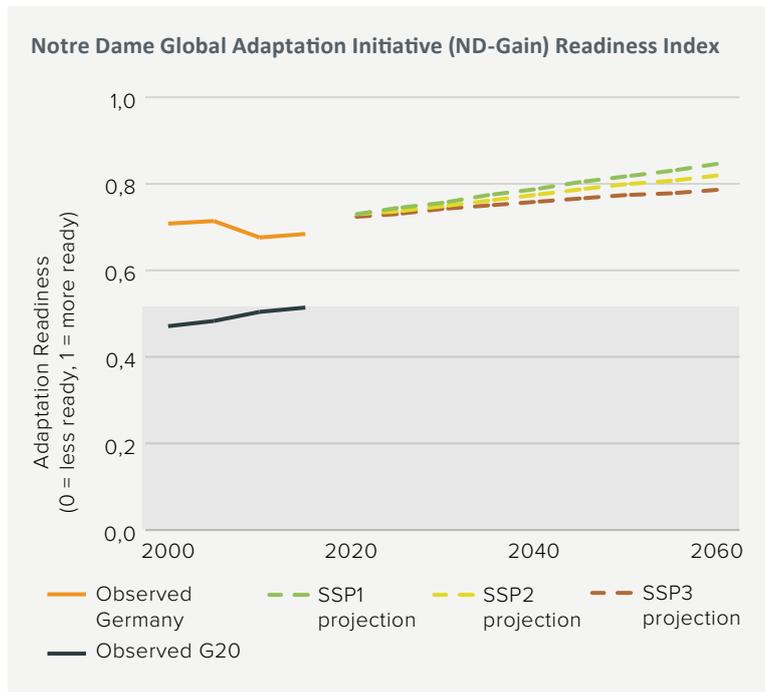
CORONAVIRUS RECOVERY

The German COVID-19 recovery package was mainly aimed at providing a short-term boost in demand and stabilisation on the job market. Adaptation to climate change did not play any meaningful role.

Source: Federal Ministry of Finance, 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.



Germany was well above the G20 average in 2015 in terms of adaptation readiness. Adaptation challenges still exist, but the country is well positioned to adapt. Implementing measures compatible with SSP1 would increase Germany’s adaptation readiness sooner and better than measures compatible with SSP2 and SSP3.

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
German Strategy for Adaptation to Climate Change (DAS)	2008		●	●		●	●	●	●	●	●			●	
Adaptation Action Plan APA I	2011														Updated every 5 years with “progress reports”
Progress report to the DAS	2015	●	●				●		●	●			●	●	

Nationally Determined Contribution (NDC): Adaptation



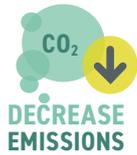
2. MITIGATION

REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE



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



Germany's GHG emissions have dropped by only 24.5% (1990-2017) and the government's climate targets for 2030 (-55%) and 2050 (-80 to -95%) are **not in line with a 1.5°C 'fair-share' pathway**.

Source: CAT, 2020

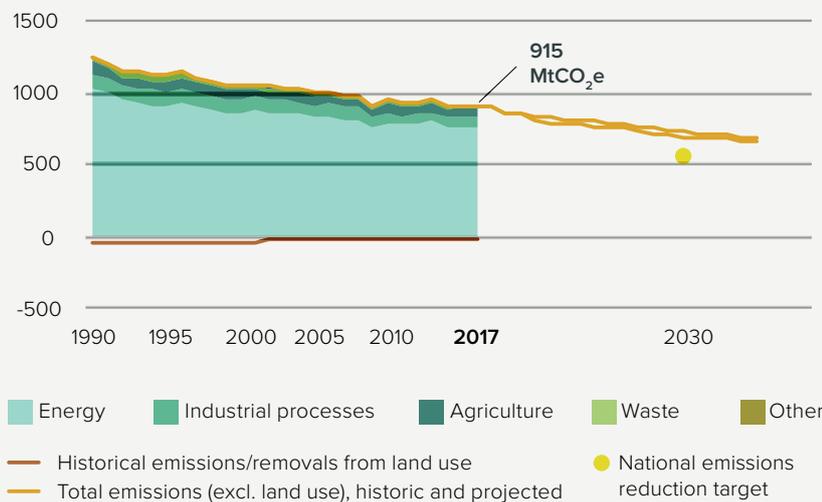


In 2030, global CO₂ emissions need to be **45% below 2010 levels and reach net-zero by 2050**. Global energy-related CO₂ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

Source: Rogelj et al., 2018

GHG emissions across sectors and national emissions reduction target (MtCO₂e/year)

Total GHG emissions across sectors (MtCO₂e/year)



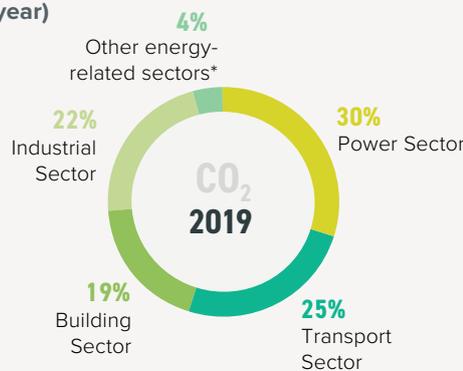
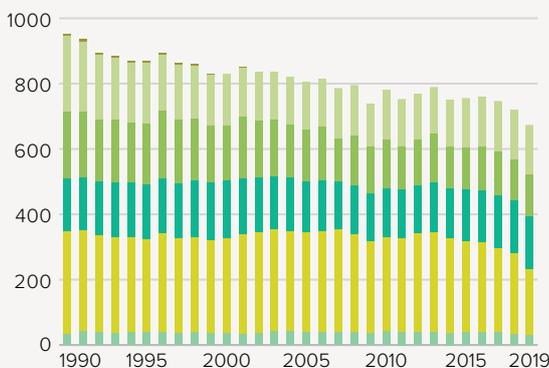
Sources: Gütschow et al., 2019; Climate Action Tracker 2020

Germany's emissions (excl. land use) decreased by 24.5% between 1990 and 2017 to 915MtCO₂e. Between 2017 and 2019 emissions dropped a further 11.2% (i.e. a reduction of 35.7% from 1990 levels by 2019). When considered by category, reductions are seen in all sectors – with the exception of transport. The most recent emissions projections show that under current policies, emissions will continue to decline up to 2030, but not at a sufficient pace to meet its national emissions reduction target of 562MtCO₂e, which is not compatible with the Paris Agreement. **Germany will need to scale up climate action to meet its national target**, with even more effort required to become 'Paris Agreement-compatible'.

Reference: Umweltbundesamt, 2020

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)



The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion. After remaining relatively stable over the last decade, emissions from the electricity sector decreased by 18% in 2019. However, with 30%, the electricity sector is the largest contributor, followed by transport and industries with 25% and 22%, respectively.

* 'Other energy-related sectors' covers energy-related CO₂ emissions from extracting and processing fossil fuels. Due to rounding, some graphs may sum to slightly above or below 100%.

CORONAVIRUS RECOVERY

The target of spending at least 30% of the Recovery and Resilience Facility on climate action provides some of the resources needed to achieve a much more ambitious emissions-reduction goal for 2030, and the climate neutrality goal by 2050. At time of writing, however, the definition of what kinds of measures would be considered as fulfilling the mandatory 30% target has not been clarified, remains open to interpretation and, therefore, possible misuse.

ENERGY OVERVIEW



Fossil fuels still make up 79% in 2019 of Germany's energy mix (counting power, heat, transport fuels etc). Despite the increase in renewable energy over the last two decades, **the carbon intensity of the energy mix has hardly changed.**

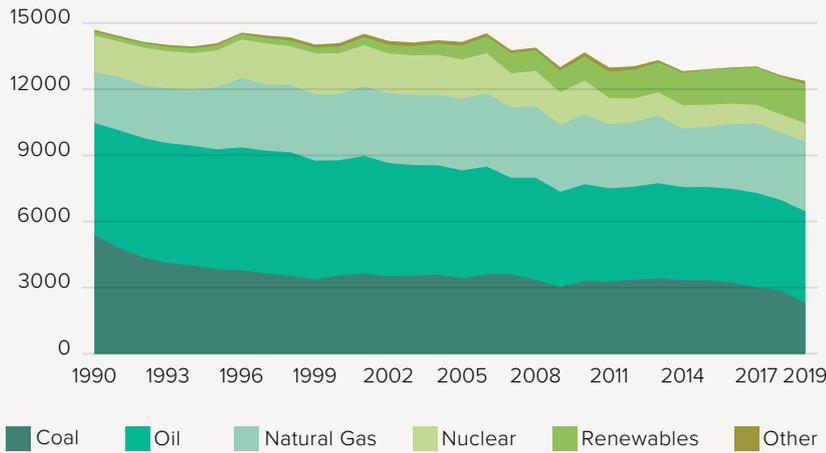


The share of **fossil fuels in the global primary energy mix needs to fall to 67% by 2030 and to 33% by 2050** (and to substantially lower levels without Carbon Capture and Storage).

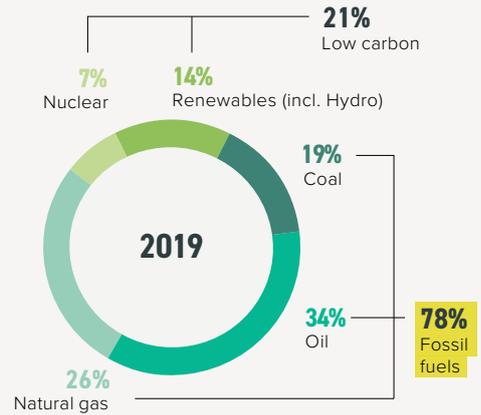
Source: Rogelj et al., 2018

Energy Mix

Total primary energy supply (PJ)



Source: Enerdata, 2020

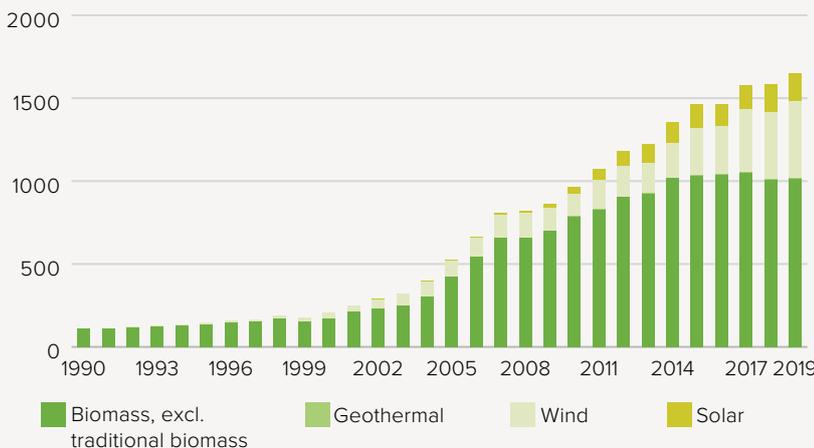


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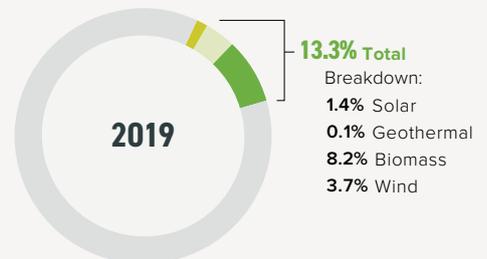
This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, cooking, but also for transport fuels. Fossil fuels (oil, coal and gas) still make up 78% of Germany's energy mix, which is lower than the G20 average (81%). While the share of renewables in the energy mix increased, it has mainly replaced nuclear energy.

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 13.3% of Germany'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, geothermal and biomass account for 13.3 % of Germany's energy supply – the G20 average is only 6.4%. The share in total energy supply has increased by around 24.7% in the last five years in Germany (2014-2019). Bioenergy (for electricity and heat) makes up the largest share.

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



Source: Enerdata, 2020

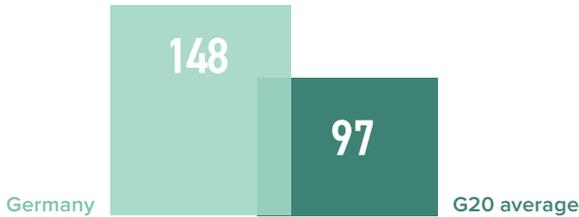
Carbon intensity shows how much CO₂ is emitted per unit of energy supply.

In Germany, carbon intensity has remained almost constant at around 58-59 tCO₂ until 2018 but dropped to 54.39 in 2019 and is lower than the G20 average. The decrease in 2019 is mainly the result of shutting down old coal power plants. This still relatively high level reflects the continuously high share of fossil fuels in the energy mix.

Source: own evaluation

Energy supply per capita

(GJ/capita)



Source: Enerdata, 2020

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 Germany is 148 GJ/capita, well above the G20 average, but is decreasing (-5.8%, 2014-2019) in contrast to the increasing 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)



Source: Enerdata, 2020

Energy intensity of the economy: 5-year trend (2013-2018)



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.

Germany's energy intensity is **one of lowest in the G20** and it is decreasing at a similar speed (-12.2%, 2013-2018) as the G20.

Decarbonisation rating: energy intensity compared to other G20 countries



Source: own evaluation



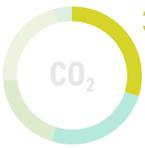
POWER SECTOR

Emissions from energy used to make electricity and heat

Germany produced 29% of electricity from coal in 2019, a share that fell to around 20% in the first half of 2020.

The decision to phase out coal power by 2038 is not in line with a 1.5°C limit, given that Germany as an industrialised country needs to move faster.

Source: Fraunhofer ISE, 2020



30% Share in energy-related CO₂ emissions from electricity and heat production

Source: Enerdata, 2020



COMPATIBILITY

Coal and decarbonisation

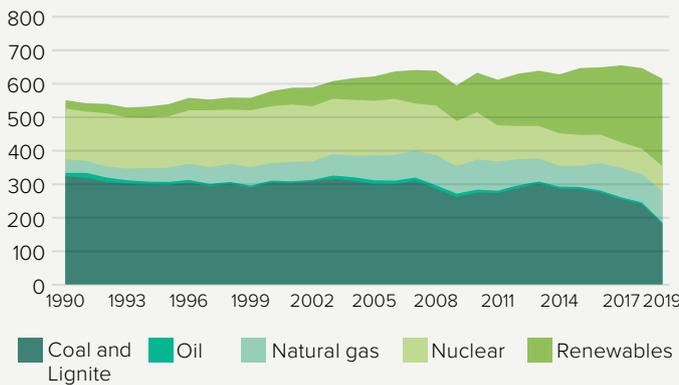
Worldwide, **coal use for power generation needs to peak by 2020**, and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. **Electricity generation has to be decarbonised before 2050**, with renewable energy the most promising alternative.

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

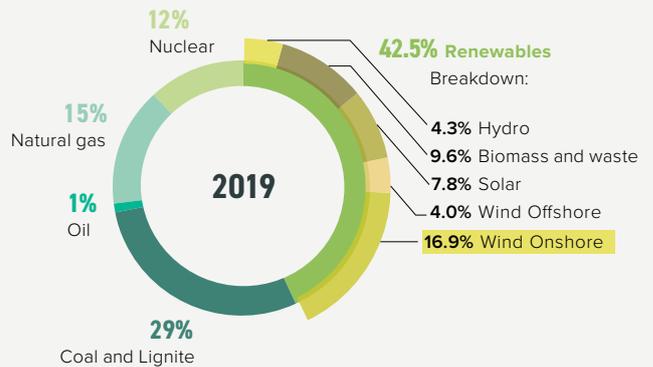
STATUS OF DECARBONISATION

Electricity mix

Gross power generation (TWh)



Source: Enerdata, 2020

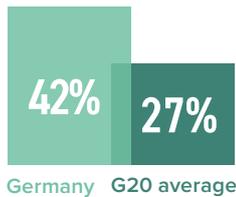


Due to rounding, some graphs may sum to slightly above or below 100%.

Germany is increasingly producing power from renewables. Its share increased in 2019 to 42% and exceeded 50% in 2020. Whereas onshore wind development is stagnating, solar photovoltaic energy has been accelerating. Especially in new buildings, installation of solar panels has become standard.

Share of renewables in power generation

(incl. large hydro)



Source: Enerdata, 2020

Decarbonisation rating: share of renewables compared to other G20 countries



Source: own evaluation

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



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, 331gCO₂ were emitted in Germany in 2019. This is slightly below the G20 average but still high.

Decarbonisation rating: emissions intensity compared to other G20 countries



Source: own evaluation

POLICY ASSESSMENT

Renewable energy in the power sector



Germany aims to increase the share of renewables in the power mix to 65% by 2030. Expansion of renewables has slowed down recently due to a change from feed-in tariffs to an auctioning scheme, a cap on new installations, and growing resistance against onshore wind.

Reference: own evaluation

Coal phase-out in the power sector



In January 2019 a multi-stakeholder commission recommended decommissioning approximately 25% of current coal capacity by 2022, another 25% by 2030 and with a complete coal phase-out by 2038 at the latest. The law was adopted in July 2020. However, a coal phase-out by 2038 is not in line with the Paris Agreement which requires OECD countries to phase out coal from the power sector by 2030.

Reference: own evaluation



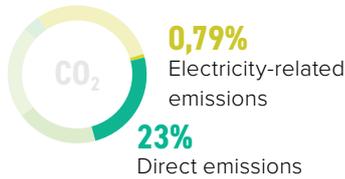
TRANSPORT SECTOR

Emissions from energy used to transport people and goods

Emissions from transport stayed mostly constant over the last three decades, with a few minor fluctuations. In 2019 84% of passenger transport was by private car, and 62% of freight transport was by road. Both sectors are still dominated by fossil fuels, and electric vehicles make up only 2% of car sales. For staying within a 1.5°C limit, passenger and freight transport need to be decarbonised.

Share in energy-related CO₂ emissions from transport sector

Source: Enerdata, 2020



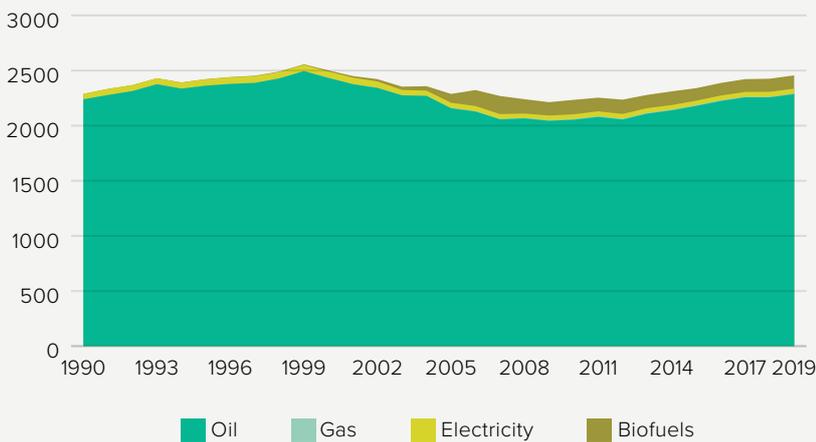
The share of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

Source: Rogelj et al., 2018

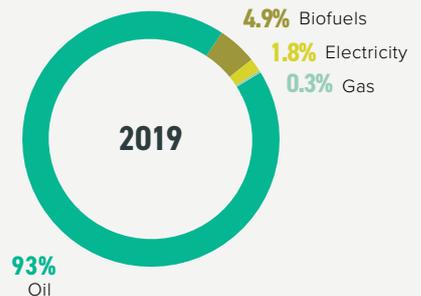
STATUS OF DECARBONISATION

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 6.7% of the energy mix in transport.

Transport emissions per capita

excl. aviation (tCO₂/capita)



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

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

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



Decarbonisation rating: aviation emissions compared to other G20 countries



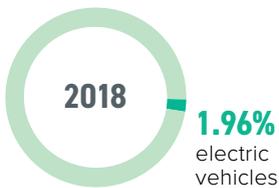
Source: own evaluation

Motorisation rate

685 VEHICLES PER 1,000 INHABITANTS (2016)

Source: Vieweg et al., 2018

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



Data for 2018. Source: IEA, 2019

Passenger transport

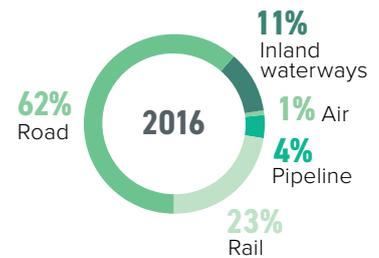
(modal split in % of passenger-km)



Data for 2016. Source: Vieweg et al., 2018

Freight transport

(modal split in % of tonne-km)



Data for 2016. Source: Vieweg et al., 2018

POLICY ASSESSMENT

Phase out fossil fuel cars



In 2019 Germany set up a task force to reduce emissions from transport, but its recommendations have not been accepted. The government has also not yet adopted a plan to phase out fossil fuel cars, and is expected to fail its target of 1 million EVs by 2020 (beginning 2020: 308,000). CO₂ standards are set at the EU level, with targets for 2025 and 2030.

Reference: VDA, 2020

Phase out fossil fuel heavy-duty vehicles



Solutions suggested by a task force for reducing emissions from transport have not been taken into consideration. HDVs above 7.5 tonnes pay a toll on long-distance roads but the level still does not reflect all externalities. Germany is also piloting motorways with overhead power lines. CO₂ emission standards at the EU level were introduced in 2019, with targets for 2025 and 2030.

Reference: own evaluation

Modal shift in (ground) transport



The 2013 Mobility Strategy is Germany's main instrument for promoting the energy transition in the transport sector but the priority is rather set on fuel diversification than on modal shift. The 2017 Masterplan for rail freight transport aims to increase rail capacities and promote digitalisation.

Reference: own evaluation

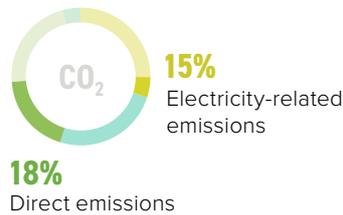


BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings

Germany's building emissions – counting heating, cooking and also electricity use – make up a third of total CO₂ emissions. **Per capita, building-related emissions are more than double the G20 average.**

Building emissions occur directly (burning fuels for heating, cooking etc) and indirectly (grid-electricity for air-condition, 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. This reflects partly climatic conditions, insufficient renovation rates, but also the high level of floor area per person. In contrast to the G20 average, Germany has managed to decrease these emissions by 17.1% (2014-2019).

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



-17.1%
Germany



+1.82%
G20 average

Decarbonisation rating: building emissions compared to other G20 countries

5-year trend (2014-2019):



Current year (2019):



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 Germany, **energy use per m² is in the middle range of the G20 countries.**

Different data year for each country
Source: Castro-Alvarez et al., 2018

POLICY ASSESSMENT

Near zero energy new buildings



The 2015 Energy Efficiency Strategy provides a pathway for how to make the building stock virtually climate-neutral by 2050 **Germany plans to make all new buildings near zero energy by 2020**, and offers various support programmes to this end. However, it still allows installation of oil heating in new buildings.

Reference: own evaluation

Renovation of existing buildings



Germany's Climate Action Plan 2050 aims to make the entire building stock virtually climate-neutral by 2050 (80% energy reduction from 2008 levels). This would require at least doubling current annual renovation rates (currently 1%). A renovation rate of 3.5% would be 1.5°C compatible.

Reference: own evaluation

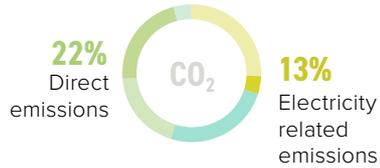


INDUSTRY SECTOR

Emissions from energy in the industrial sector

Industry-related emissions make up more than a third of CO₂ emissions in Germany. Germany has only managed to reduce emissions from this sector slightly.

Share in energy-related CO₂ emissions from industrial sector



Source: Enerdata, 2020



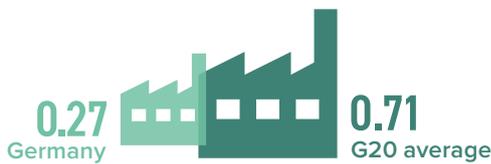
Industrial emissions need to be reduced by 65-90% from 2010 levels by 2050.

Source: Rogelj et al., 2018

STATUS OF DECARBONISATION

Industry emissions intensity⁷

(tCO₂e/USD2015 GVA)



Data for 2016. Sources: Gütschow et al., 2019; Enerdata, 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 cement production⁸

(kgCO₂/tonne product)



Germany's cement industry is over twice as emissions-intensive than the world average, while Germany's steel production is approximately 30% of the carbon intensity of the world average.

Data for 2016. Sources: CAT decarbonisation data portal, 2020; Climate Action Tracker, 2019

Carbon intensity of steel production⁸

(kgCO₂/tonne product)



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

Data for 2016. Sources: World Steel Association, 2018; CAT Decarbonisation Data Portal, 2020

POLICY ASSESSMENT

Energy Efficiency



Germany forms part of the **EU Emissions Trading Scheme** which creates an incentive to reduce emissions (and thus also energy consumption) in the industry sector. Since 2015 large companies are obliged to conduct energy audits.

Reference: own evaluation



LAND USE SECTOR

Emissions from changes in the use of the land



For staying within the 1.5°C limit, Germany **needs to make the land use and forest sector a net sink of emissions**, e.g. by halting the expansion of residential areas, discontinuing the degradation of peatlands and use of moor soils, converting cropland into wetlands, and by creating new forests.

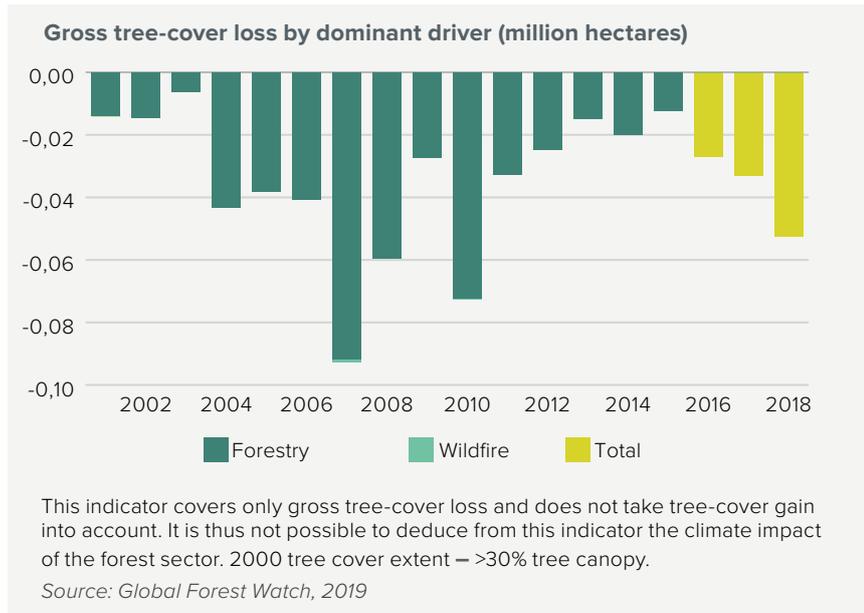


COMPATIBILITY

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, **Germany lost 646 Mha of tree cover, equivalent to a 5.2% decrease since 2000**. This does not take tree-cover gain into account.

POLICY ASSESSMENT

Target for **net-zero deforestation**



According to its 2050 Climate Plan, Germany aims to increase its forest area over the next few decades and to reduce the expansion of settlements and transport infrastructure to zero hectares by 2050.

Reference: own evaluation



AGRICULTURE SECTOR

Emissions from agriculture



Germany's agricultural emissions are mainly **from digestive processes in animals, livestock manure and the use of synthetic fertilisers**. A 1.5°C pathway requires dietary shifts, increased organic farming and less fertiliser use.

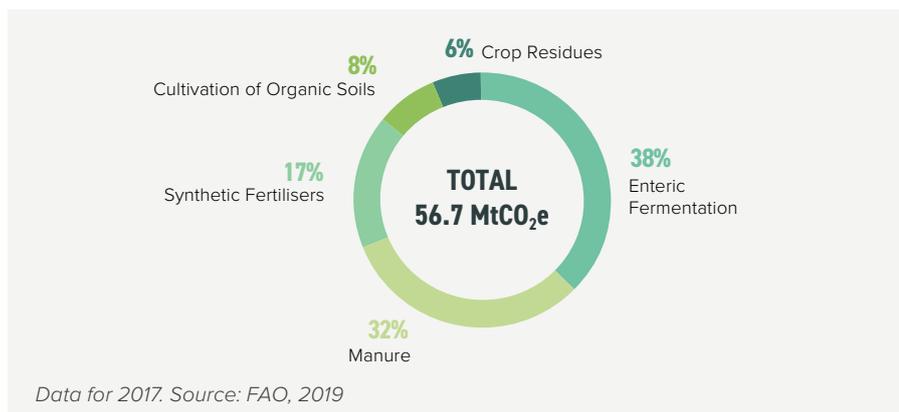


COMPATIBILITY

Methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 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 Germany, the largest sources of GHG emissions in the agricultural sector are digestive processes in animals (enteric fermentation), livestock manure and the use of synthetic fertilisers. 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

Germany contributes to the EU-wide target of reducing emissions by "at least 40%" compared to 1990 levels.

Actions

Not mentioned

Germany's national emissions reduction target is a 55% reduction in emissions from 1990 levels.

Climate Action Tracker (CAT) evaluation of EU 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.

As Germany is an EU member state, the EU's NDC has been rated by CAT. While the EU is currently discussing increasing its emissions reduction goal to "at least 55%" from 1990 levels, this still does not go far enough. An increase of this goal – to 65% – accompanied with funding climate action abroad, would make the EU the first region with commitments compatible with the Paris Agreement.

Note: 'fair-share' ratings for EU member states are not provided due to the intricacies and inter-linkages of the EU's internal burden sharing system.

Evaluation as at October 2020, based on European Union'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 the EU provides the following additional information in the upcoming NDC Update (compared to the existing NDC), including:

- Provide link to the long term temperature goal of the Paris Agreement.
- Include grounds on why the NDC target is fair and why it constitutes the EU's "highest possible ambition".
- Expressly cover the land sector and explain how the land sector is included in the EU target.
- State source of data for quantifying the reference point as well as provide information under which the EU would update the value of the reference indicators.

AMBITION: LONG-TERM STRATEGIES

Status	Climate Action Plan 2050, published in November 2016.
2050 target	"near" net-zero
Interim steps	Yes: 55% below 1990 levels in 2030
Sectoral targets	Yes
Net-zero target	Yes

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.



Germany spent USD 5.076bn on fossil fuel subsidies in 2017, almost completely on petroleum. Germany's power and industry sectors has been covered by the EU ETS since 2005. Starting in 2021, emissions in transport and building sector will also be covered with carbon price starting at EUR 25 and increasing to EUR 55 by 2025.



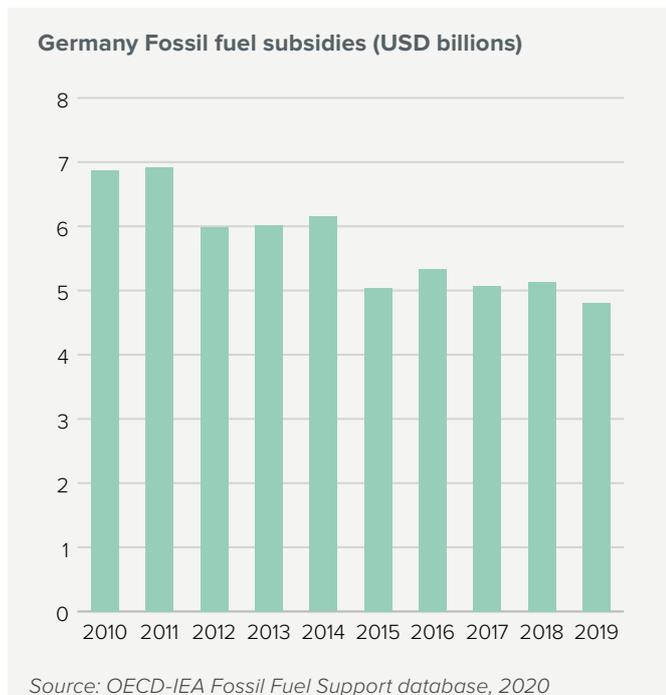
Investment in green energy and infrastructure needs to outweigh fossil fuel investments by 2025.

Source: Rogelj et al., 2018

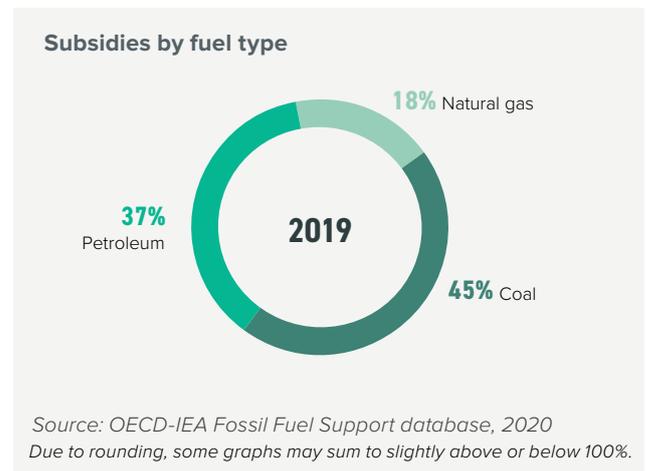
FISCAL POLICY LEVERS

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



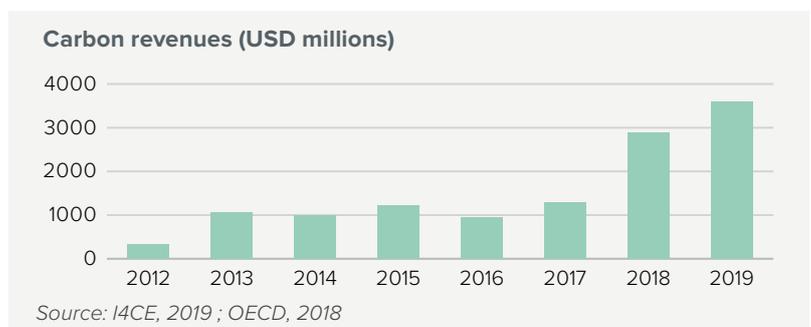
Fossil Fuel Subsidies by fuel type



In 2019, Germany's fossil fuel subsidies totalled USD 4.8bn (gradually declining since last decade's peak of USD 6.9bn in 2010/11). Around half of the subsidies identified were for the consumption of fossil fuels, and 49% for their production. The highest quantified subsidies were for coal, at USD 2.1bn, followed by natural gas at USD 1.9bn. The largest subsidy is the tax exemption for fuels used in commercial aviation (USD 0.6bn).

Carbon Pricing and Revenue

In 2019, the German government established a national level explicit carbon price in the heating and road transport sectors (which are currently not covered by the EU ETS) to start in 2021 and with a view to coordinate CO₂ pricing with other European countries. Around half of Germany's emissions are covered under the EU Emissions Trading Scheme, which generated USD 3.6bn of revenues in 2019 in Germany alone.



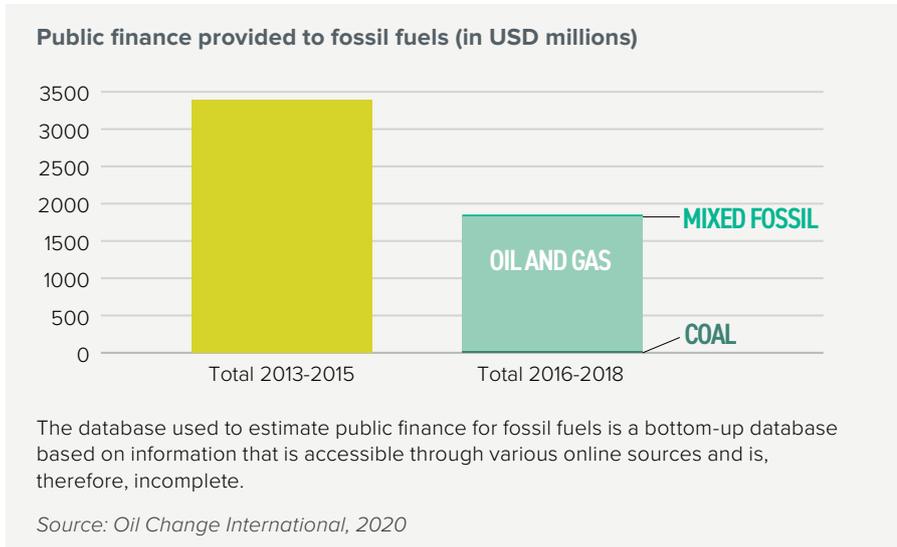
CORONAVIRUS RECOVERY

By July 2020 the government had not implemented climate-related financing measures in response to the COVID-19-related economic slowdown. Instead, reports surfaced of the possibility of state-owned fossil fuel companies being permitted to delay the payment of dividends to alleviate their financial burden in the face of low oil and gas prices (Radio Free Europe, 2020). The development of the national green finance system, currently underway, could be fast-tracked to allow financing of climate-related projects in response to the economic effects of the COVID-19 crisis.

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, Germany provided an average of USD 1.8bn per year in public finance for fossil fuels, the large majority of which was directed to the oil and gas sector. This marked a substantial decrease in public finance for fossil fuels if compared to the previous period 2013-2015, when almost double that amount of public finance (an average of USD 3.4bn per year) is estimated to have been provided to fossil fuels.

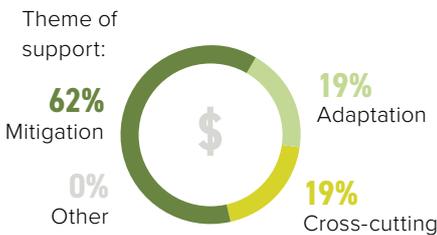
Provision of international public support

(annual average 2017 and 2018)

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

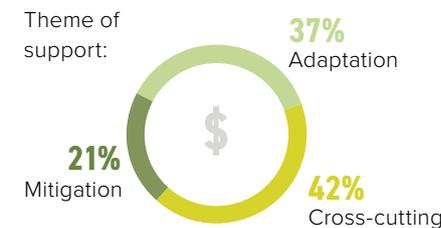
Bilateral, regional and other channels

Annual average contribution: **7,025.94 MN USD**



Multilateral climate finance contributions

Annual average contribution: **393.8 MN USD**



Core / General Contributions

Annual average contribution: **978.48 MN USD**

Germany provided the second largest amount of climate finance bilaterally, in absolute and GDP relative terms, and fourth largest through multilateral climate funds, in absolute terms. Since the 2015/16 period, both bilateral and multilateral flows have increased. Climate finance channelled through KfW accounts for around half of its bilateral finance. In late 2019, Germany (alongside Norway) led the way in first announcing intent to double their original contributions to the Green Climate Fund during its first replenishment, amounting to EUR 1.5bn.

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				●

Deutsche Bundesbank is a founding member of the Network for Greening the Financial System (NGFS), and has endorsed the principles of the TCFD, while Deutsche Börse launched its Accelerating Sustainable Finance Initiative in 2017, setting out voluntary guidelines for sustainable finance. Some green financial policy and regulation has taken place at subnational level. The federal state of Berlin introduced a sustainability index in 2017 to reallocate pension fund investments, while the state of Hesse plans to make Frankfurt a green finance hub. **In 2019, the government launched a sustainable finance advisory committee to assist in the development of a national sustainable finance strategy** and in September 2019, Germany's Federal Financial Supervisory Authority (BaFin) published a compendium of best practices relating to sustainability risks for credit institutions, insurance undertakings, and asset management companies. It defines the term sustainability based on ESG criteria and illustrates physical and transition risks that may unfold with increasing intensity through existing risk types. BaFin expects entities to ensure adequate consideration of the relevant climate-related risks. BaFin and the Deutsche Bundesbank are both members of the NGFS.

Nationally Determined Contribution (NDC): Finance

Conditionality	Not applicable
Investment needs	Not specified
Actions	Not mentioned
International market mechanisms	No contribution from international credits for the achievement of the target

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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ABOUT CLIMATE TRANSPARENCY



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