

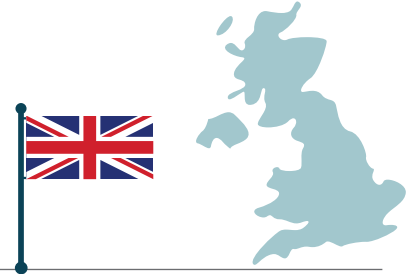


## BROWN TO GREEN:

2019

## THE G20 TRANSITION TOWARDS A NET-ZERO EMISSIONS ECONOMY

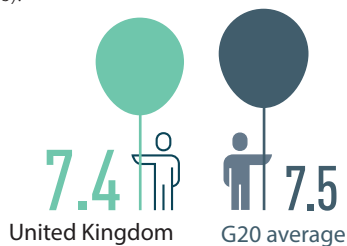
# UNITED KINGDOM



**The United Kingdom (UK) greenhouse gas (GHG) emissions are – per capita – about the same as the G20 average.**

Total GHG emissions (excl. land use) have decreased by almost 40% (1990-2016).

**Greenhouse gas (GHG) emissions (incl. land use) per capita<sup>1</sup>**  
(tCO<sub>2</sub>e/capita)



Data for 2016  
Source: CAT 2019;  
PRIMAP 2018;  
World Bank 2019

**Trend**  
(2011-2016)

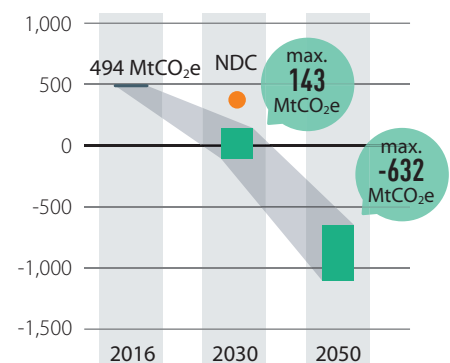
United Kingdom	-19%
G20 average	-1%



**The UK is not on track for a 1.5°C world.**

The UK's fair-share range is below 143 MtCO<sub>2</sub>e by 2030 and below -632 MtCO<sub>2</sub>e by 2050. Under the UK's 2030 NDC target, emissions would only be limited to 352 MtCO<sub>2</sub>e. 1.5°C-compatibility can be achieved via strong domestic emissions reductions, supplemented with contributions to global emissions-reduction efforts. All figures are drawn from the Climate Action Tracker and exclude land use.

**1.5°C compatible pathway<sup>2</sup>**  
(MtCO<sub>2</sub>e/year)



Source: CAT 2019

### Recent developments<sup>3</sup>



In June 2019, the UK government legislated a target of net zero GHG emissions by 2050.



The Committee on Climate Change 2019 report expects the government to miss its 2025 and 2030 emission targets (only 7 out of 24 indicators were on track).



In July 2019, the UK released its green finance strategy defining the role of its finance sector in combating climate change.

### Key opportunities for enhancing climate ambition<sup>3</sup>

In 2016, the UK provided US\$8.4bn in fossil fuel subsidies (from US\$4.9bn in 2007).

→ **Establish a moratorium on current and new permits for North Sea oil and gas exploration and extraction.**



#1

The transport sector represents the largest share of CO<sub>2</sub> emissions in the UK (33% of emissions).

→ **Adopt a goal of 100% sales of zero-emission cars by 2030 and ban further airport expansions.**



#2

The UK's emissions per capita in the building sector are above the G20 average.

→ **Develop a strategy to achieve deep renovation rates of 5% annually and future-proof construction of new social housing and government buildings.**



#3

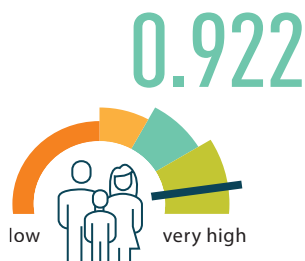
# UNITED KINGDOM – SOCIO-ECONOMIC CONTEXT



## Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. The UK ranks among the highest countries.

Data for 2017 | Source: UNDP 2018



## Gross Domestic Product (GDP) per capita

(PPP US\$ const. 2018, international)

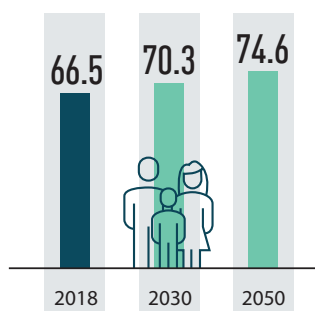
Data for 2018 | Source: World Bank 2019



## Population projections

(millions)

The World Bank expects the UK's population to increase by about 12% by 2050.



Source: World Bank 2019

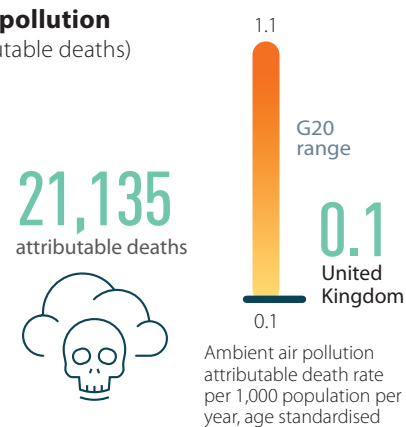
## Death through ambient air pollution

(total ambient air pollution attributable deaths)

According to the World Health Organization, over 21,000 people die in the UK every year as a result of outdoor air pollution, due to stroke, heart disease, lung cancer and chronic respiratory diseases. (Note: The UK Royal College of Physicians estimates as many as 40,000.) Compared to the total population, this is one of the lowest levels in the G20.

Data for 2016

Source: World Health Organization 2018



# JUST TRANSITION<sup>3</sup>

In spite of the recent commitment to net zero by 2050 having implications for jobs and communities associated with high-carbon industries, there has been little progress on institutionalising 'just transition' goals in the UK. No national body is responsible for ensuring that the achievement of climate goals is equitable, and both the 2017 Industrial Strategy White Paper and 2018 Clean Growth Strategy fail to mention just transition. The Environment Audit Committee has stated that UK Export Finance (a major supporter of fossil fuel projects) should state how its strategy would support a just transition for workers who currently benefit from its support. The Trades Unions Congress continues to push for dialogue, via the Ministerial Advisory Group on Manufacturing and the Trade Union Sustainable Development Advisory Committee.

At subnational level, the Scottish Government has established an independent Just Transition Commission, made up of civil society, utilities and union representatives. The Commission released its initial report in April 2019, which brought together publicly available data on (among other things) the labour market, skills and development landscape, and sectoral emissions, and will provide recommendations within two years. In March 2019, the Welsh Government proposed the establishment of a 'Climate Just Advisory Group on the transition to a low carbon society' in the Prosperity for All report.



## Legend for all country profiles

### Trends

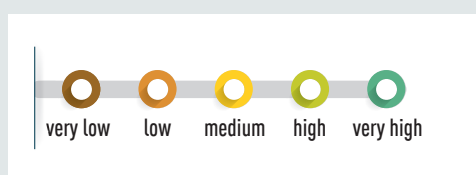


The trends show developments over the past five years for which data are available.

The thumbs indicate assessment from a climate protection perspective.

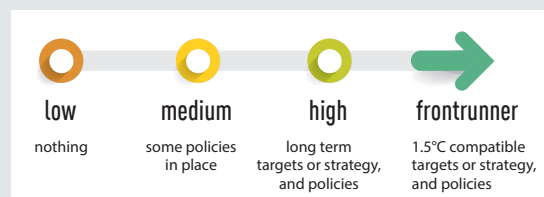
## Decarbonisation Ratings<sup>4</sup>

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



## Policy Ratings<sup>5</sup>

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



For more information see the Annex and Technical Note

# MITIGATION BIG PICTURE

## UNITED KINGDOM

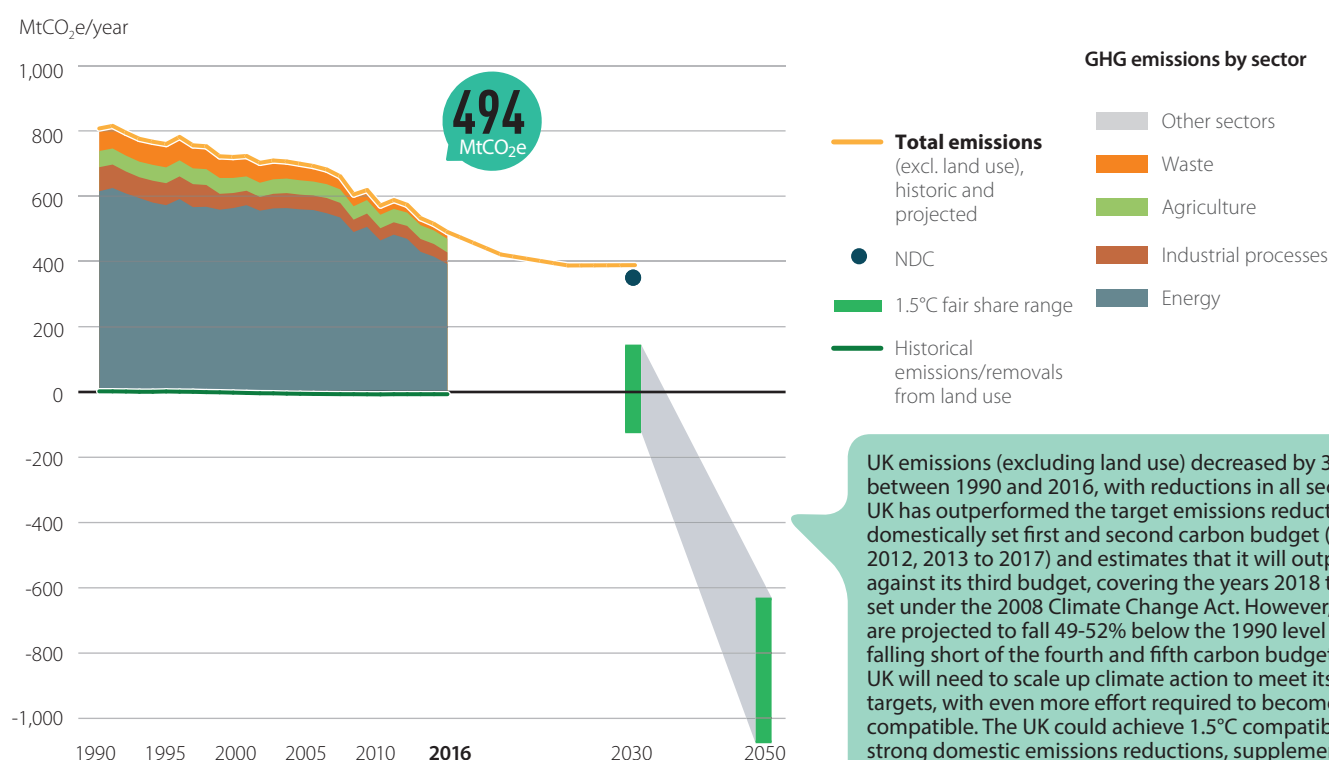
**!** The UK's GHG emissions have dropped by 39% (1990-2016) and the government's climate targets for 2030 (-57%) are not yet in line with a 1.5°C pathway.

In 2030, global GHG emissions need to be 45% below 2010 levels and reach net zero by 2070.

**1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018

### Total GHG emissions across sectors<sup>2</sup>



Source: PRIMAP 2018; CAT 2019

### Nationally-determined contribution (NDC): Mitigation

<b>Targets</b>	EU wide target: At least 40% domestic GHG emissions reduction compared to 1990 by 2030 [National 2030 target not included in NDC: -57%]
<b>Actions</b>	Not mentioned

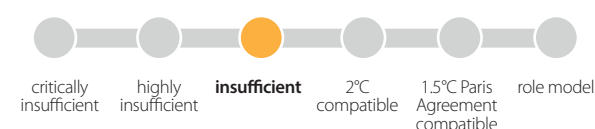
Source: UNFCCC, NDC of respective country

### Long-term strategy (LTS) to be submitted to the UNFCCC by 2020

<b>Status</b>	Submitted to UNFCCC in 2018
<b>2050 target</b>	Submitted strategy requires 80% reduction from 1990 levels
<b>Interim steps</b>	Yes
<b>Sectoral targets</b>	Yes

Source: UNFCCC, LTS of respective country

### Climate action tracker (CAT) evaluation of NDC<sup>2</sup>



Source: CAT 2019

In 2019, the UK government adopted a 100% emission reduction target for 2050, including international aviation and shipping.

## MITIGATION ENERGY



## UNITED KINGDOM

**!** Fossil fuels still make up around 78% of the UK's energy mix (including power, heat, transport fuels, etc). Over the last decade, the share of coal and gas has significantly declined and renewables are increasing.

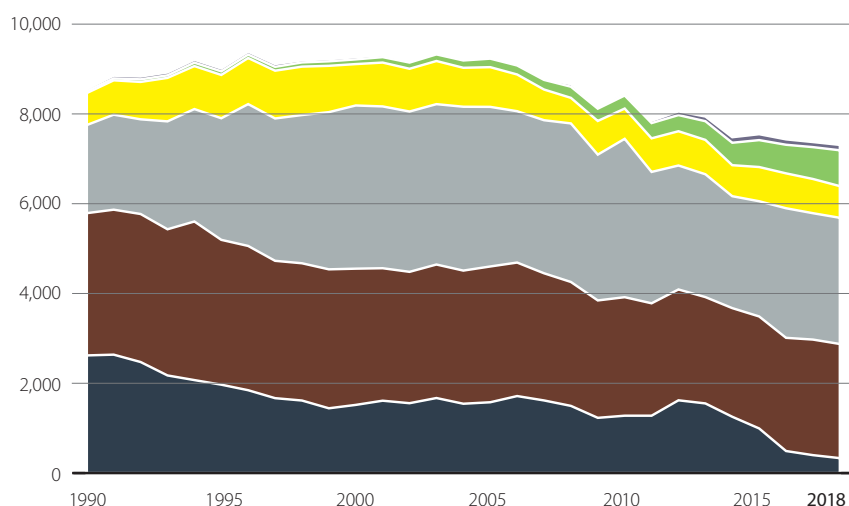
The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050 and to substantially lower levels without Carbon Capture and Storage.

**1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018

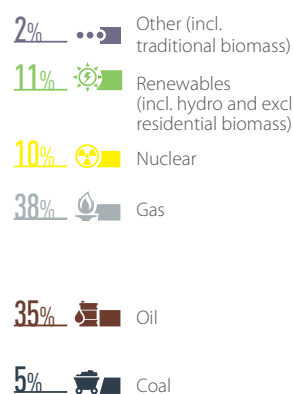
Energy mix<sup>7</sup>

Total primary energy supply (PJ)



Source: Enerdata 2019

Share in 2018



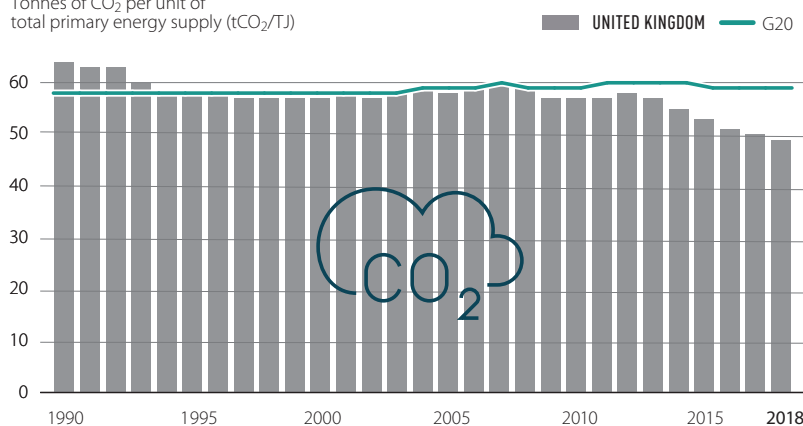
21%  
zero carbon

78%  
fossil

This graph shows the fuel mix for all energy supply, including energy used for electricity generation, space and water heating, cooking, and transport fuels. Total primary energy supply has been reduced considerably since the 2000s. The share of coal has significantly decreased over the last decade, and to a lesser extent also gas, while renewable energy has become more prominent in the energy mix. This change towards renewables is almost entirely due to changes in the power sector. However, fossil fuels (oil, coal and gas) still make up 78% of the UK's energy mix, which is around the G20 average (82%).

## Carbon intensity of the energy sector

Tonnes of CO<sub>2</sub> per unit of total primary energy supply (tCO<sub>2</sub>/TJ)



Source: Enerdata 2019

Rating of carbon intensity compared to other G20 countries<sup>4</sup>

Rating trend (2013-2018)

very high

Rating current level (2018)

high

Source: own evaluation

Carbon intensity shows how much CO<sub>2</sub> is emitted per unit of energy supply. The carbon intensity of the UK's energy mix has decreased to a level of 49 tCO<sub>2</sub>/TJ over the last decade and is below the G20 average now. This reflects the declining share of coal.

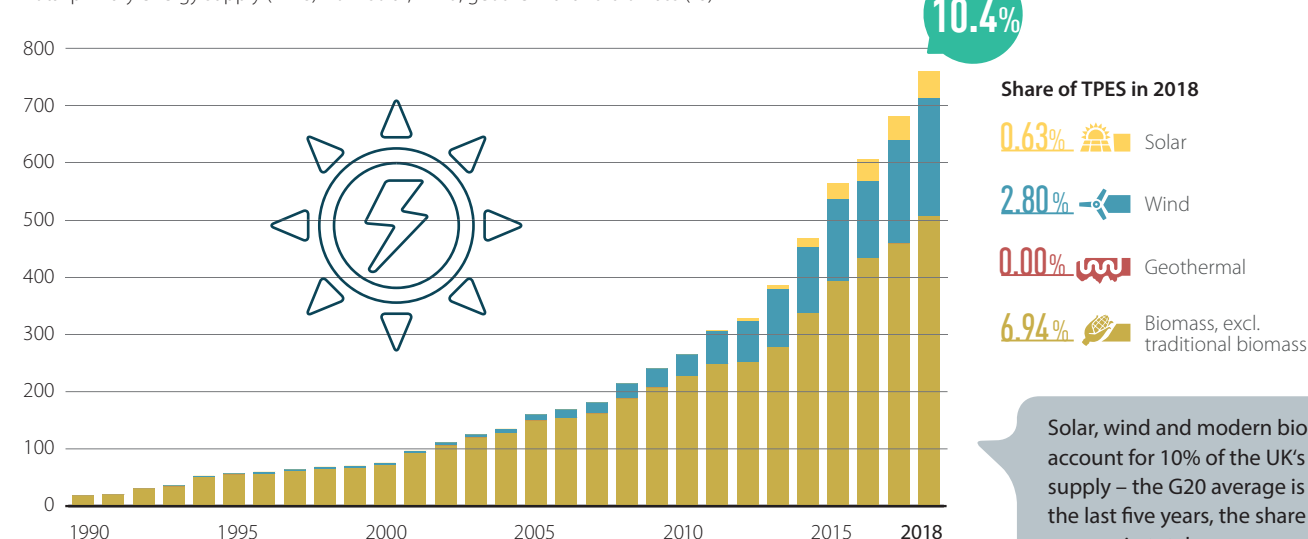
## MITIGATION ENERGY



## UNITED KINGDOM

Solar, wind, geothermal and biomass development<sup>8</sup>

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



Source: Enerdata 2019

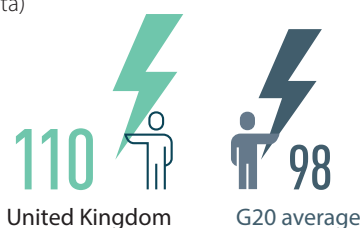
Solar, wind and modern biomass account for 10% of the UK's energy supply – the G20 average is 6%. In the last five years, the share of these sources in total energy supply has grown by around 105%, much more than the G20 average (+29% 2013-2018). Bioenergy (for electricity, biofuels for transportation and heat) makes up the largest share.

Rating of share in TPES compared to other G20 countries<sup>4</sup>

Source: own evaluation

## Energy supply per capita

Total primary energy supply per capita (GJ/capita)

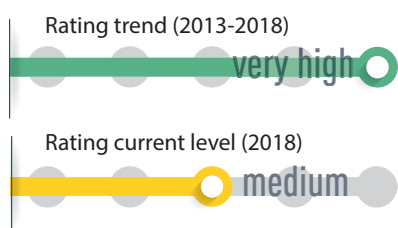


The level of energy supply per capita is closely related to economic development, climatic conditions and the price of energy.

At 110 GJ/capita, energy supply per capita in the UK is above the G20 average, but has decreased significantly (-10%, 2013-2018) in contrast to the increasing G20 average (+1%).

**Trend** (2013-2018) -10% +1%

Data for 2018 |  
Source: Enerdata 2019;  
World Bank 2019

Rating of energy supply per capita compared to other G20 countries<sup>4</sup>

Source: own evaluation



## MITIGATION ENERGY



## UNITED KINGDOM



The UK has the least energy-intensive economy in the G20 and energy supply per capita is decreasing. However, energy-related CO<sub>2</sub> emissions need to drop further to be on a 1.5°C compatible pathway.

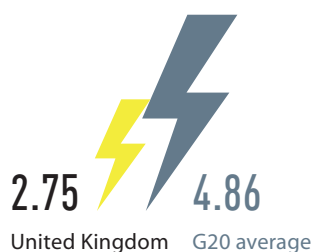
Global energy and process-related CO<sub>2</sub> emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

1.5°C<sup>6</sup>

Source: IPCC SR1.5 2018

## Energy intensity of the economy

(TJ/PPP US\$2015 million)



## Trend

(2013-2018)



-16%



-12%

Data for 2018 | Source: Enerdata 2019; World Bank 2019

This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of industrialisation, efficiency achievements, climatic conditions or geography. The UK economy has the lowest energy intensity in the G20 and the level has declined more (-16%, 2013-2018) than the G20. Note, however, that this indicator does not consider energy used for overseas production of imported goods.

Rating of energy intensity compared to other G20 countries<sup>4</sup>

Rating trend (2013-2018)



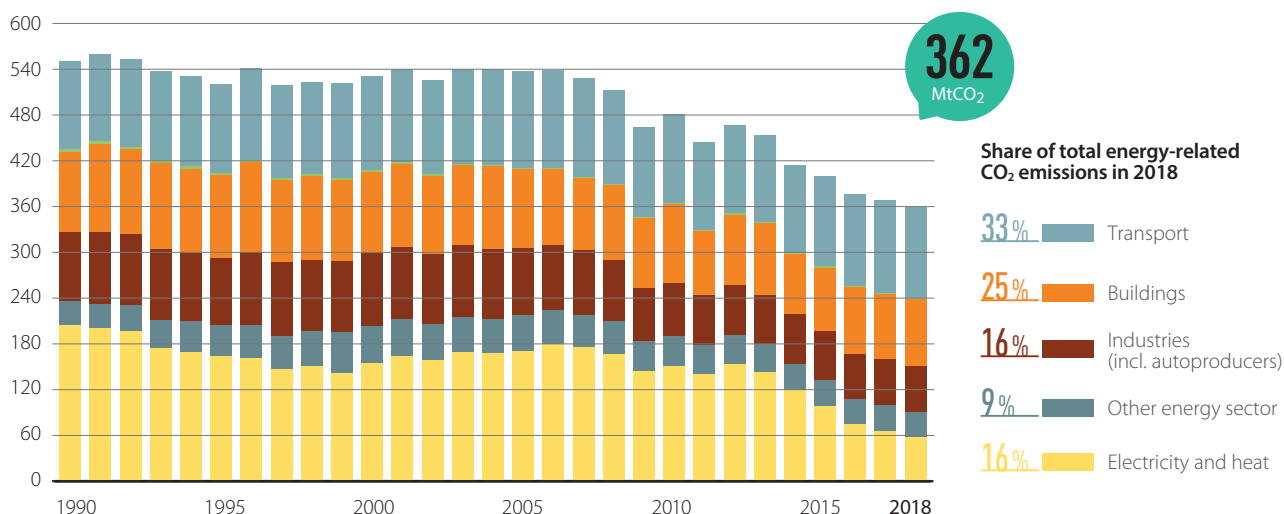
Rating current level (2018)



Source: own evaluation

Energy-related CO<sub>2</sub> emissions<sup>9</sup>

CO<sub>2</sub> emissions from fuel combustion (MtCO<sub>2</sub>/year)



Source: Enerdata 2019

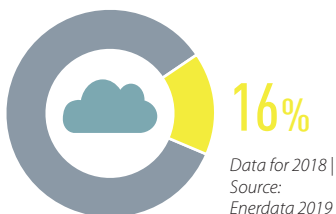
The largest driver of overall GHG emissions are CO<sub>2</sub> emissions associated with the production of energy. In the UK, they have decreased in the past decade. Within these energy-related emissions, the transport sector is the largest contributor at 33%, followed by buildings at 25%.

## MITIGATION POWER SECTOR



## UNITED KINGDOM

**!** The UK produces only 5% of electricity from coal. The decision to phase-out coal power by 2025 is in line with a 1.5°C limit. Renewables already make up a third of the power mix but there is no strategy for bringing the share up to 100%.

Share in energy-related CO<sub>2</sub> emissions

Coal must be phased out in the EU/OECD no later than 2030, in the rest of the world no later than 2040. Electricity generation needs to be decarbonised before 2050, with renewable energy the most promising option.<sup>5</sup>

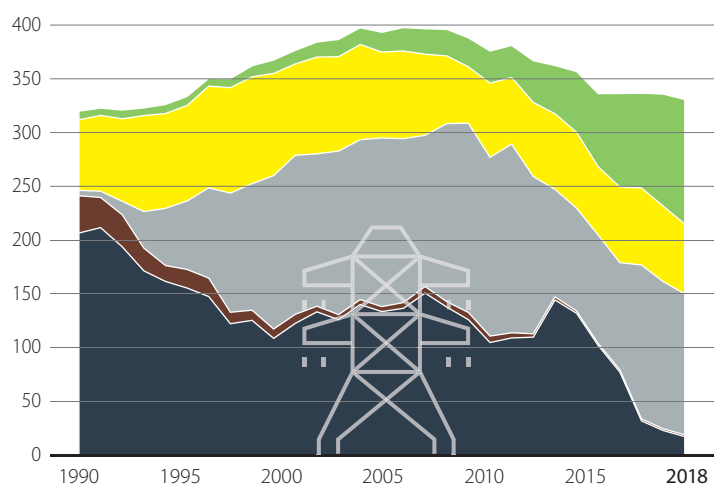
1.5°C<sup>6</sup>

Source: IPCC SR1.5 2018; Climate Analytics 2016; Climate Analytics 2019

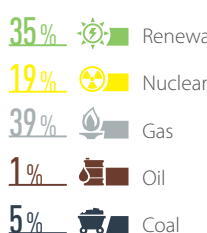
## STATUS OF DECARBONISATION

## Power mix

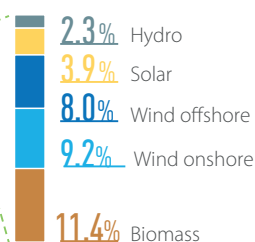
Gross power generation (TWh)



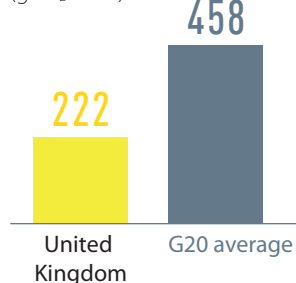
## Shares in 2018



## Renewables shares



The UK is increasingly producing power from renewables. They make up more than a third of the power mix, with wind and biomass having the largest share. The level of coal power has significantly decreased and accounts for only 5% of the power mix in 2018, compared to 28% in 2010.

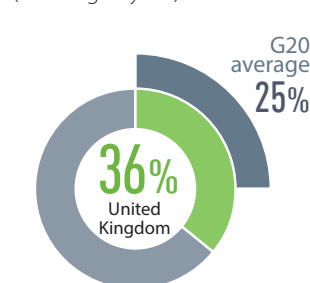
Emissions intensity of the power sector (gCO<sub>2</sub>/kWh)

## Trend (2013-2018)

Rating of emissions intensity compared to other G20 countries<sup>4</sup>

Source: own evaluation

## Share of renewables in power generation (incl. large hydro)



## Trend (2013-2018)

Rating of share of renewables compared to other G20 countries<sup>4</sup>

Source: own evaluation

For each kilowatt hour of electricity, 222 gCO<sub>2</sub> are emitted in the UK. This is less than half of the G20 average. Emission intensity has dropped by 55% in the past five years due to a vast reduction of coal power.

## MITIGATION POWER SECTOR



## UNITED KINGDOM

POLICIES<sup>5</sup>

## Renewable energy in the power sector



The UK has no long-term strategy beyond 2020 for renewable energy. The auction system Contract for Difference (CfD) supports the deployment of largescale renewables and in 2019 the government committed to subsidise offshore wind to possibly provide 30% of the UK's electricity by 2030. Support is no longer provided for new solar photovoltaic or onshore wind projects under the CfD scheme.

Source: own evaluation

## Coal phase-out in the power sector



In early 2018, the government announced that all coal power plants not fitted with carbon capture technology would be shut down by 2025 at the latest. Together with Canada, it launched the Powering Past Coal Alliance in 2017.



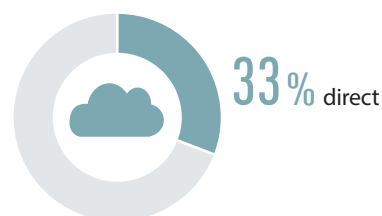
The UK is still working on respective legislation.

Source: own evaluation

## MITIGATION TRANSPORT SECTOR



**!** In the UK, emissions from aviation per capita are among the highest in the G20 and overall transport emissions are growing even more. The decision to phase out fossil fuel cars by 2040 is a first step but not yet sufficient for staying within a 1.5°C limit.

Share in energy-related CO<sub>2</sub> emissions

Data for 2018 | Source: Enerdata 2019

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

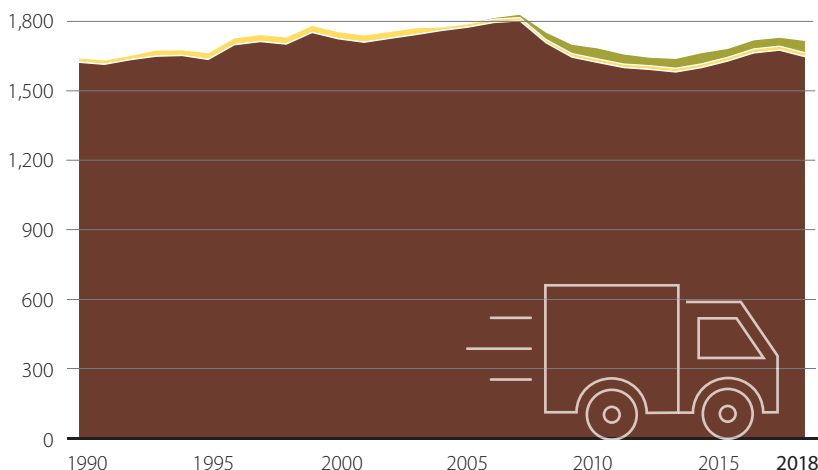


Source: IPCC SR1.5 2018

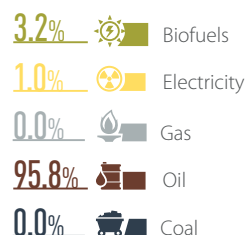
## STATUS OF DECARBONISATION

## Transport energy mix

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



## Share in 2018



Electricity and biofuels make up only 4% of the energy mix in transport.

Source: Enerdata 2019



## MITIGATION TRANSPORT SECTOR

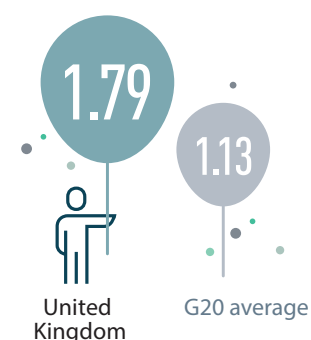


## UNITED KINGDOM

## STATUS OF DECARBONISATION (continued)

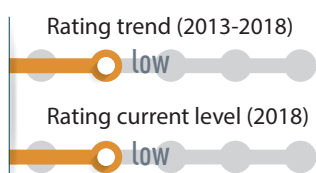
Transport emissions per capita<sup>10</sup>

(tCO<sub>2</sub>/capita,  
excl. aviation emissions)



Data for 2018  
Source: Enerdata 2019; World Bank 2019

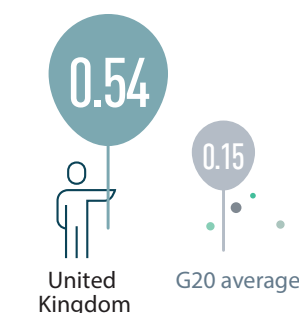
## Trend (2013-2018)

Rating of transport emissions compared to other G20 countries<sup>4</sup>

Source: own evaluation

Aviation emissions per capita<sup>11</sup>

(tCO<sub>2</sub>/capita)



Data for 2016  
Source: Enerdata 2019; IEA 2018

## Trend (2011-2016)

Rating of aviation emissions compared to other G20 countries<sup>4</sup>

Source: own evaluation

## Motorisation rate

(vehicles per 1,000 inhabitants)



Data for 2016 | Source: Agora 2018

## Market share of electric vehicles in new car sales

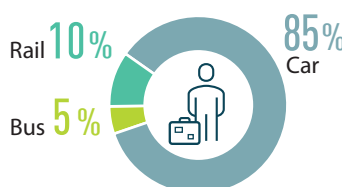
(%)



Data for 2018 | Source: IEA 2019

## Passenger transport

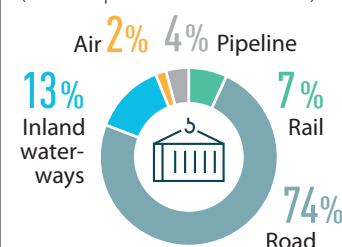
(modal split in % of passenger km)



Data for 2017 | Source: ITF 2019

## Freight transport

(modal split in % of tonne-km)



Data for 2016 | Source: Agora 2018

POLICIES<sup>5</sup>

## Phase out fossil fuel cars



The UK has pledged to phase out 'conventional' diesel and petrol cars by 2040 (2035 would be 1.5°C compatible), and that at least half of the cars sold and 40% of new vans sold will be hybrid or electric by 2030. The UK has emission standards, sets up Clean Air Zones and supports electric vehicle (EV) deployment through subsidies, reduced taxation, and finance for charging infrastructure.

Source: own evaluation

## Phase out fossil fuel heavy-duty vehicles



According to 2019 EU legislation, manufacturers will be required to cut CO<sub>2</sub> emissions from new trucks on average by 15% from 2025 and by 30% from 2030 (from 2019 levels). Since 2018, the UK Heavy Road User levy changed to ensure that the cleanest trucks pay less on UK roads. The UK has conducted trials of heavy goods vehicle platoons and provided GB£20 million funding for low-emission freight and logistical trial competition.

Source: own evaluation

## Modal shift in (ground) transport



The government has no long-term strategy to support a shift to public transport. A Local Sustainable Transport Fund promotes public transport; support for cycling and walking is provided.

⚠ More than 3,000 bus routes in England have been axed or reduced since 2010. Bus use has continued to decline.

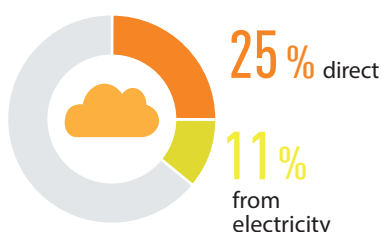
Source: own evaluation

## MITIGATION BUILDINGS SECTOR



## UNITED KINGDOM

**!** The UK's building emissions – including heating, cooking and electricity use – make up over a third of total CO<sub>2</sub> emissions. Per capita, building-related emissions are well above the G20 average, but are declining significantly.

Share in energy-related CO<sub>2</sub> emissions

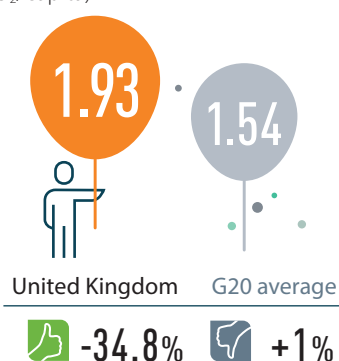
Data for 2018 | Source: Enerdata 2019

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

1.5°C<sup>6</sup>

Source: IEA ETP B2DS scenario assessed in IPCC SR1.5 2018

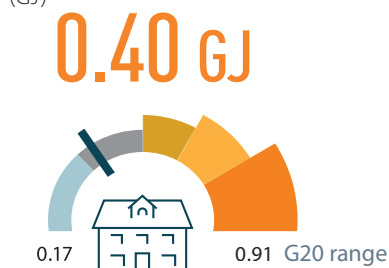
## STATUS OF DECARBONISATION

Building emissions per capita  
(incl. indirect emissions)  
(tCO<sub>2</sub>/capita)

Trend (2013-2018)

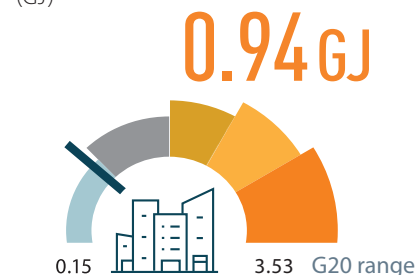
Rating of building emissions compared to other G20 countries<sup>4</sup>

Source: own evaluation

Residential buildings:  
energy use per m<sup>2</sup>  
(GJ)

Data: year different per country | Source: ACEEE 2018

Building-related emissions per capita are above the G20 average. In contrast to the G20 average, the UK has reduced that level by 35% (2013-2018), the biggest improvement in the G20.

Commercial and public buildings:  
energy use per m<sup>2</sup>  
(GJ)

Data: year different per country | Source: ACEEE 2018

Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. In the UK, energy use per m<sup>2</sup> is in the middle range of the G20 countries, reflecting its temperate climate.

POLICIES<sup>5</sup>

## Near-zero energy new buildings



According to EU law, all new buildings will need to be near zero-energy by 2020. However, the UK has abandoned plans for all new homes to be zero-carbon. Comprehensive residential and commercial building codes and energy labelling programmes exist. The 2019 review of energy requirements in building regulations might tighten standards from 2020 onwards.

**!** The UK Climate Change Committee warned about a lack of compliance with building regulations.

Source: own evaluation

## Renovation of existing buildings



The UK has no long-term retrofitting strategy. Mandatory national building energy codes apply to renovations of both commercial and residential buildings. In 2019, the UK government is reviewing the energy requirements in building regulations with a view to potentially tightening standards for 2020.

Source: own evaluation

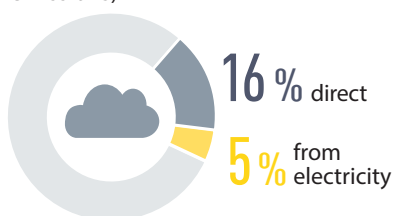
## MITIGATION INDUSTRY SECTOR



## UNITED KINGDOM

**!** Industry-related emissions make up 21% of CO<sub>2</sub> emissions in the UK. They have dropped significantly since the 1990s but this is partly due to offshoring production. The UK needs to reduce them significantly to get in line with a 1.5°C pathway, partly through energy efficiency measures.

### Share in energy-related CO<sub>2</sub> emissions (not including process emissions)



Data for 2018 | Source: Enerdata 2019

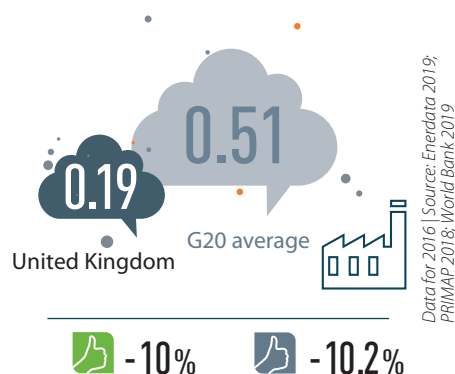
Global industrial CO<sub>2</sub> emissions need to be reduced by 65–90% from 2010 levels by 2050.

1.5°C<sup>6</sup>

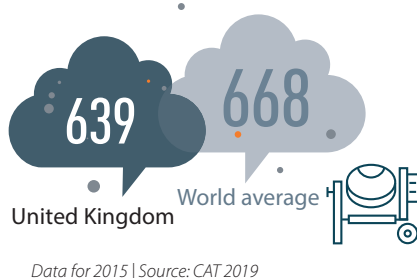
Source: IPCC SR1.5 2018

## STATUS OF DECARBONISATION

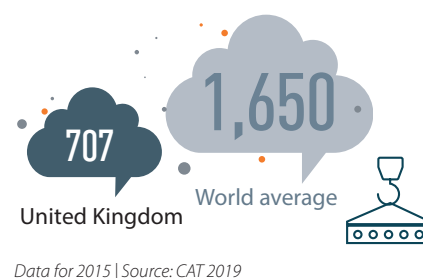
### Industry emissions intensity<sup>12</sup> (tCO<sub>2</sub>e/US\$2015 GVA)



### Carbon intensity of cement production<sup>13</sup> (kgCO<sub>2</sub>/tonne product)



### Carbon intensity of steel production<sup>13</sup> (kgCO<sub>2</sub>/tonne product)



### Trend (2011–2016)

### Rating of emissions intensity compared to other G20 countries<sup>4</sup>



Source: own evaluation

When comparing industrial emissions with the gross value added (GVA) from the industry sector, the UK performs comparatively well within the G20.

Steel production and steelmaking are significant GHG emission sources, and are challenging to decarbonise. The UK steel industry is far less emission intensive than the world average, its cement industry only slightly so.

POLICIES<sup>5</sup>

### Energy efficiency



Mandatory energy efficiency policies in the UK cover only 0–10% of industrial total energy use in 2017. However, there have been several policy initiatives, eg in 2018 the government declared a mission to establish the world's first net-zero carbon industrial cluster by 2040 and since 2019 Environmental Reporting Guidelines are in force.

Source: own evaluation



## MITIGATION LAND USE



## UNITED KINGDOM

**!** In order to stay within the 1.5°C limit, the UK needs to make the land use and forest sector a net sink of emissions, eg by halting the expansion of residential areas, through better land management (peatlands and wetlands), and by creating new forests.

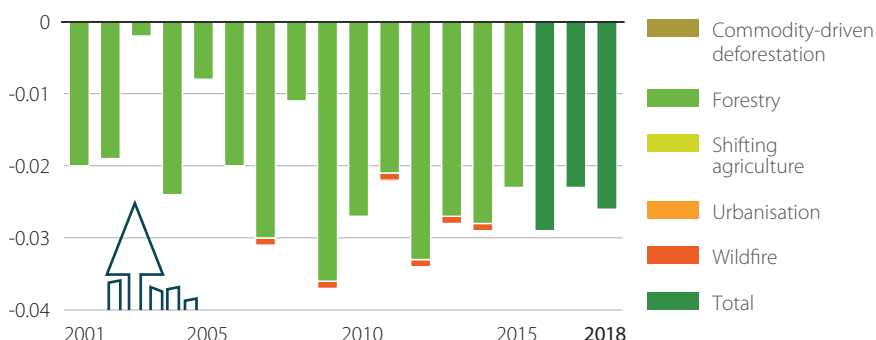
Global deforestation needs to be halted and changed to net CO<sub>2</sub> removals by around 2030.

**1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018

Gross tree cover loss by dominant driver<sup>14</sup>

Tree cover loss  
(million hectares)



Source: Global Forest Watch 2019

Note: 2000 tree cover extent | >30% tree canopy | these estimates do not take tree cover gain into account

From 2001 to 2018, the UK lost 429kha of tree cover, equivalent to a **12% decrease since 2000**. Forestry is the main driver. This does not take tree-cover gain into account.

POLICIES<sup>5</sup>

## (Net) zero deforestation



Forests cover only 13% of the UK. The government committed to an afforestation target of 20,000 hectares/year across the four UK nations (due to increase to 27,000 by 2025).

**!** Over the last five years, only 10,000 hectares have been planted annually, on average.

Source: own evaluation

## MITIGATION AGRICULTURE



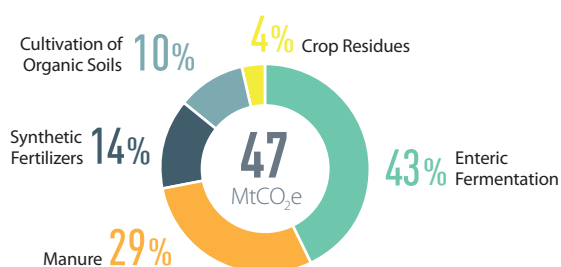
**!** The UK's non-energy agricultural emissions come mainly from digestive processes in animals, livestock manure, and the use of synthetic fertilizers. A 1.5°C pathway requires dietary shifts, reduction of food waste, increased organic farming, and less fertilizer use.

Global 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 fertilizers and manure) need to be reduced by 10% by 2030 and by 20% by 2050.

**1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018

## GHG emissions from agriculture (not including energy)



Data for 2016 | Source: FAOSTAT 2019

In the UK, the largest sources of non-energy GHG emissions in the agricultural sector are digestive processes in animals (enteric fermentation), livestock manure, and the use of synthetic fertilizers. A shift to organic farming, more efficient use of fertilizers, and diet changes could help reduce emissions.

## ADAPTATION

## UNITED KINGDOM

- The UK is vulnerable to climate change and adaptation actions are needed.
- On average, 152 fatalities and losses amounting to US\$1.5 billion occur yearly due to extreme weather events.
- With global warming, society and its supporting sectors are increasingly exposed to the impacts of severe climate events, eg a reduction in crop duration for wheat.



## ADAPTATION POLICIES

## Nationally-determined contribution: Adaptation

Targets	Not mentioned
Actions	Not mentioned

Source: UNFCCC, NDC of respective country

## National adaptation strategies

Document name	Publication year	Fields of action (sectors)													M&E process (reporting frequency)
		Agriculture	Biodiversity	Coastal areas & fishing	Education & research	Energy & industry	Finance & insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism	Water	
National Adaptation Programme and the third strategy for climate adaptation reporting	2018	X	X	X	X	X	X	X	X		X	X	X	X	Adaptation Reporting Power (ARP) introduced under the Climate Change Act 2008 (last report from 2018)

Source: own research

The UK's Climate Change Committee strongly criticised the government for a lack of adaptation policy and planning.

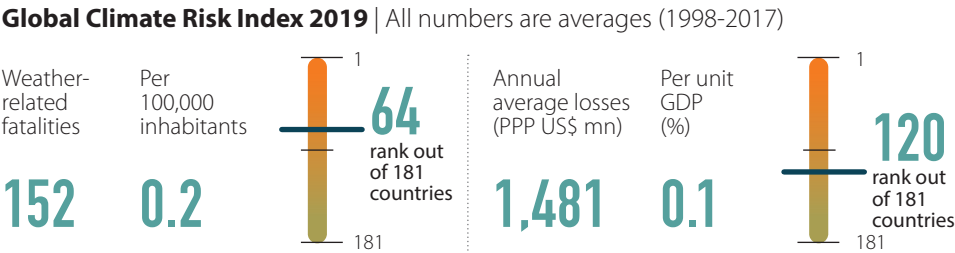


UNITED KINGDOM

ADAPTATION NEEDS

**Climate Risk Index for 1998-2017**

Impacts of extreme weather events in terms of fatalities and economic losses that occurred



The UK has already been struck by extreme weather events such as storms, heat waves, floods and heavy rain. As highlighted by the numbers from the Climate Risk Index, such extreme weather events result in fatalities and economic losses. Climate change is expected to worsen the intensity, frequency and impacts of such events.

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

		1.5°C	2°C	3°C
Water	% of area with increase in water scarcity			
	% of time in drought conditions			
Heat & Health	Heatwave frequency			
	Days above 35°C			

Source: own research

Overall, with rising temperatures, all sectors are adversely affected. In the water sector, water scarcity increases and time spent in drought conditions slightly increases. Heat wave frequency increases, together with a slight increase in the number of days when temperatures reach higher than 35°C.

Agriculture	Wheat		1.5°C	2°C	3°C
		Reduction in crop duration			
		Reduction in rainfall			

Source: Based on Arnell et al 2019

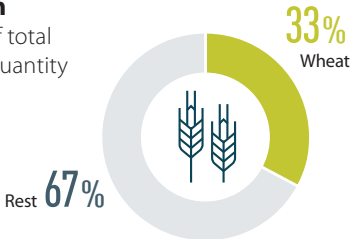
Impact ranking scale

- Very low
- Low
- Medium
- High
- Very high

Blank cells signify that there is no data available

**National crop production**

(share in % of total production quantity in tonnes)



Wheat has the largest share of crop production out of the four crops analysed (maize, rice, soybeans, wheat) and is impacted by a drastic reduction in crop duration and a reduction in rainfall.

Data for 2017 | Source: FAOSTAT 2019

## FINANCE

## UNITED KINGDOM



The UK's fossil fuel subsidies totalled US\$14 billion in 2017, mainly on natural gas and petroleum. But the UK government refuses to recognise fossil fuel subsidies. The carbon tax generates, in contrast, only US\$1-2 billion annually in revenues.

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

**1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018

## Nationally-determined contribution: 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

Source: UNFCCC, NDC of respective country

## Financial policy and regulation supporting a brown to green transition

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		Not 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.	X			
			Mandatory	Voluntary	Under discussion	Not identified
Enhanced supervisory review, risk disclosure and market discipline	Climate risk disclosure requirements	Disclose the climate-related risks to which financial institutions are exposed			X	
	Climate-related risk assessment and climate stress-test	Evaluate the resilience of the financial sector to climate shocks				X
Enhanced capital and liquidity requirements	Liquidity instruments	Mitigate and prevent market illiquidity and maturity mismatch				X
	Lending limits	Limit the concentration of carbon-intensive exposures				X
		Incentivise low carbon-intensive exposures				X
	Differentiated Reserve Requirements	Limit misaligned incentives and canalise credit to green sectors				X

Source: own research



The Bank of England Prudential Review Authority has reviewed climate-related risks to UK banks and the insurance sector, and is a founding member of the Network for Greening the Financial System (NGFS). In 2017 the UK government launched a Green Finance Taskforce encouraging implementation of the Taskforce on Climate-related Financial Disclosure (TCFD) initiative. In 2019 it launched a Green Finance Strategy clarifying remits of regulators around climate change and setting mandatory TCFD alignment for all listed companies by 2022, with the Financial Conduct Authority, Prudential Regulation Authority, Pensions Regulator and Financial Reporting Council welcoming the recommendations.

## FINANCE

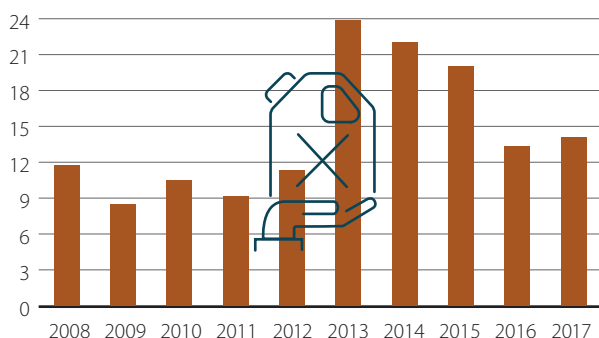
## UNITED KINGDOM

## 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 prices.

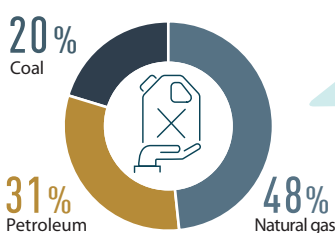
## Fossil fuel subsidies

US\$ billions



Source: OECD-IEA 2019

## Subsidies by fuel type

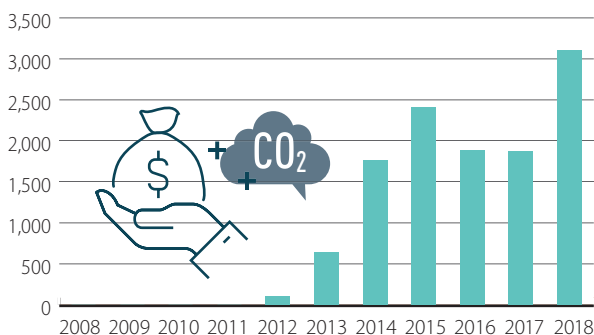


Data for 2017 | Source: OECD-IEA 2019

In 2017, UK's fossil fuel subsidies totalled US\$14.1bn (compared to US\$11.7bn in 2008 and the last decade's peak of US\$23.9 in 2013). Of the subsidies identified, 54% were for the consumption of fossil fuels, and 46% were for their production. The highest amount of subsidies quantified were for petroleum at US\$6.8bn, followed by natural gas at US\$4.4bn. The largest subsidy is the reduced rate of value added tax (VAT) applied to domestic fuels and power (coal, petroleum and natural gas) (US\$6bn).

## Carbon revenues

Carbon revenues (US\$ millions)  
from explicit carbon pricing schemes

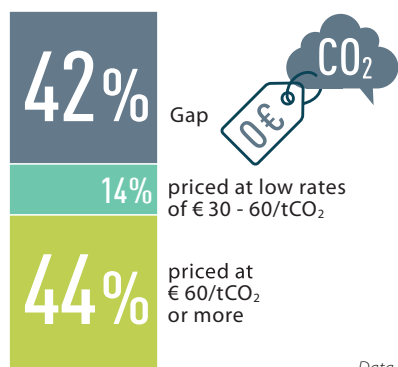


Source: IACE 2019

In 2013, the UK introduced a national carbon tax that generated US\$1.2bn in 2018. The Carbon Price Floor covers 23% of power sector emissions, at US\$24/tCO<sub>2</sub>. The UK is also party to the European Emissions Trading Scheme that generated US\$1.9bn in the UK alone in 2018.

Carbon pricing gap<sup>15</sup>

% of energy-related CO<sub>2</sub> emissions



Data for 2015 | Source: OECD 2018

58% of the United Kingdom CO<sub>2</sub> emissions are priced at EUR30 or higher (the low-end benchmark), creating a carbon pricing gap of 42%. This gap is much smaller than the G20 average of 71%. The price covers not only explicit carbon taxes but also specific taxes on energy use and the price of tradable emission permits.



## FINANCE

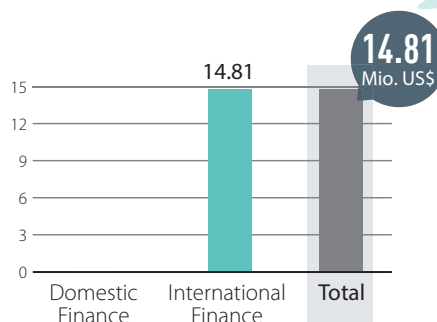
## UNITED KINGDOM

## 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 coal<sup>16</sup>

(million US\$)



In 2016, United Kingdom Export Finance (UKEF) provided a \$29.6 million guarantee for a coal mining project in Russia.

● Domestic Finance  
● International Finance



Data year: 2016-2017 average  
Source: Oil Change International 2019

Commitments to restrict public finance to coal and coal-fired power<sup>17</sup>

MDB level	National development agencies and banks	Domestic export credit agencies	Export credit restriction in OECD	Comment
X	X	—	X	The UK issued a policy statement similar to the US and Nordic joint statement restricting coal finance overseas (excluding the world's lowest-income nations), but it did not apply to export credits.

X yes

— no

■ not applicable

Source: own research

Provision of international public support<sup>18</sup>

The UK ranks 6<sup>th</sup> for its bilateral climate finance commitments, but made the highest contribution to multilateral climate funds in 2015/16, both in absolute terms. There has been a rise in bilateral spending between 2013/14 and 2015/16, with flows through multilateral climate funds remaining stable. The UK has avoided a mitigation bias, but currently more than half of its bilateral and multilateral climate fund flows are targeted at cross-cutting objectives. The UK has announced a doubling of its initial contribution to the Green Climate Fund during this replenishment round, amounting to US\$1.9 billion.

## Obligation to provide climate finance under UNFCCC

YES

NO



United Nations  
Framework Convention on  
Climate Change

## Bilateral climate finance contributions

Annual average contribution  
(mn US\$, 2015-2016)

1,111.88

Source: Country reporting to UNFCCC

## Theme of support

Mitigation	Adaptation	Cross-cutting	Other
20%	29%	1%	51%

## Multilateral climate finance contributions

Annual average contribution  
(mn US\$, 2015-2016)

553.85

See Technical Note for  
multilateral climate funds  
included and method to  
attribute amounts to countries

Source: Country reporting to UNFCCC

## Theme of support

Mitigation	Adaptation	Cross-cutting	Other
28%	4%	68%	0%

## Core/General Contributions

Annual average contribution  
(mn US\$, 2015-2016)

2,170.71

Source: Country reporting to UNFCCC

## ENDNOTES



1) '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).





2) 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 emission 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.

The 2030 projections of GHG emissions are from the CAT's June 2019 update and are based on implemented policies, expected economic growth or trends in activity and energy consumption.

The CAT methodology does not consider GHG emissions from LULUCF due to the large degree of uncertainty inherent in this type of data, and also to ensure consistency and comparability across countries.

- 3) See the Brown to Green 2019 Technical Note for the sources used for this assessment.
- 4) The Decarbonisation Ratings assess the relative performance across the G20. A high scoring reflects a relatively good efforts from a climate protection perspective but is not necessarily 1.5°C compatible. The ratings assess both the 'current level' and 'recent developments' to take account of the different starting points of different G20 countries. The 'recent developments' ratings compare developments over the last five available years (often 2013 to 2018).
- 5) The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the Special Report on 1.5°C of the International Panel on Climate Change (2018), and the Climate Action Tracker (2016): 'The ten most important short-term steps to limit warming to 1.5°C'. The table below displays the criteria used to assess a country's policy performance. See the Brown to Green Report 2019 Technical Note for the sources used for this assessment.

On endnote 5)	 low	 medium	 high	 frontrunner
<b>Renewable energy in power sector</b>	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
<b>Coal phase-out in power sector</b>	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)
<b>Phase out fossil fuel cars</b>	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
<b>Phase out fossil fuel heavy-duty vehicles</b>	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
<b>Modal shift in (ground) transport</b>	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
<b>Near zero-energy new buildings</b>	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)
<b>Retrofitting existing buildings</b>	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
<b>Energy efficiency in industry</b>	No policies	Mandatory energy efficiency policies cover more than 26-50% of industrial energy use	Mandatory energy efficiency policies cover 51-100% of industrial energy use	Policies + strategy to reduce industrial emissions by 75%-90% from 2010 levels by 2050
<b>(Net) zero deforestation</b>	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

## ENDNOTES (continued)

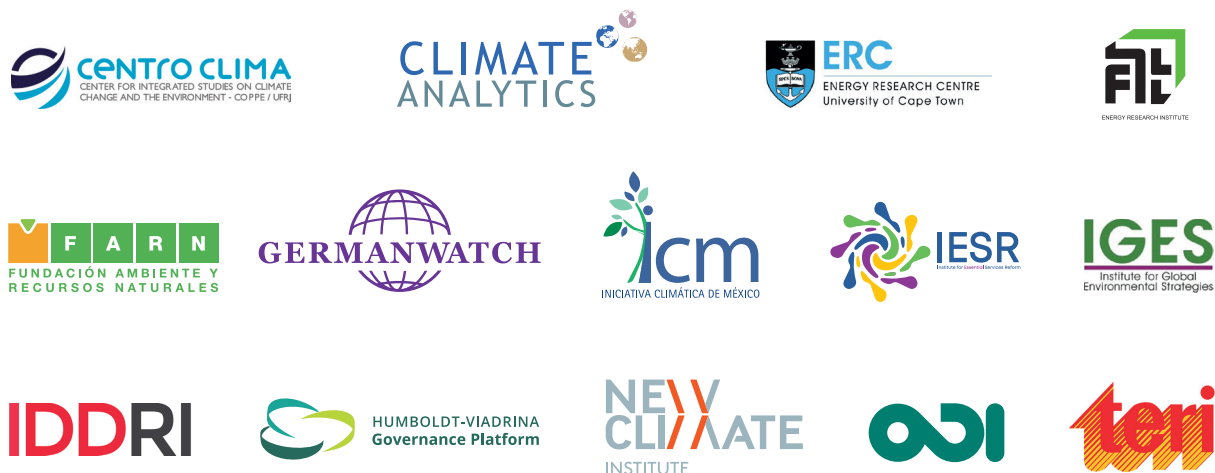


- 6) The 1.5°C benchmarks are based on the Special Report on 1.5°C of the International Panel on Climate Change (2018). See the Brown to Green 2019 Technical Note for the specific sources used for this assessment.
- 7) Total primary energy supply data displayed in this Country Profile does not include non-energy use values. Solid fuel biomass in residential use has negative environmental and social impacts and is shown in the category 'other'.
- 8) Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.
- 9) The category 'electricity and heat' covers CO<sub>2</sub> emissions from power generation and from waste heat generated in the power sector. The category 'other energy use' covers energy-related CO<sub>2</sub> emissions from extracting and processing fossil fuels (e.g. drying lignite).
- 10) This indicator shows transport emissions per capita, not including aviation emissions.
- 11) This indicator adds up emissions from domestic aviation and emissions from international aviation bunkers in the respective country. Emissions by aircrafts in the higher atmosphere lead to a contribution to climate change greater than emissions from burning fossil fuels. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- 12) This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- 13) This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).
- 14) This indicator covers only gross tree-cover loss and does not take tree-cover gain into account. It is thus not possible to deduce from this indicator the climate impact of the forest sector. The definition of 'forest' used for this indicator is also not identical with the definition used for the indicator on page 3.
- 15) 'Effective carbon rates' are the total price that applies to CO<sub>2</sub> emissions, and are made up of carbon taxes, specific taxes on energy use and the price of tradable emission permits. The carbon pricing gap is based on 2015 energy taxes and is therefore likely to be an underestimate, as taxation has tended to increase in countries over time.
- 16) The database used to estimate public finance for coal is a bottom-up database, based on information that is accessible through various online sources, and is therefore incomplete. For more information, see to the Brown to Green 2019 Technical Note.
- 17) See the Brown to Green 2019 Technical Note for the sources used for this assessment.
- 18) Climate finance contributions are sourced from Biennial Party reporting to the UNFCCC. Refer to the Brown to Green Report 2019 Technical Note for more detail.

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/g20report2019>

# CLIMATE TRANSPARENCY

## Partners:



## Funders:



## Data Partners:



<http://www.climate-transparency.org/g20-climate-performance/g20report2019>

