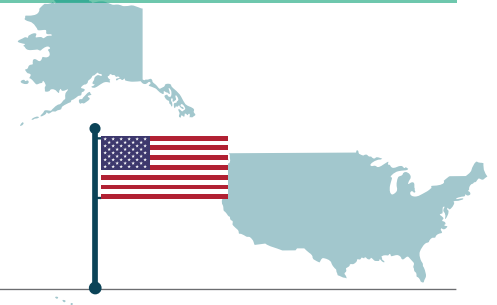## Climate Transparency

BROWN TO GREEN:

2019

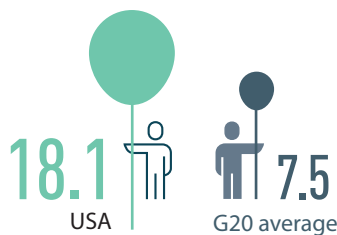## THE G20 TRANSITION TOWARDS A NET-ZERO EMISSIONS ECONOMY

UNITED STATES

The United States (US) greenhouse gas (GHG) emissions are – per capita – more than double the G20 average.

The level of total GHG emissions (excl. land use) has basically not decreased (1990-2016).

Greenhouse gas (GHG) emissions (incl. land use) per capita[1]
(tCO$_2$e/capita)

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

18.1 USA

7.5 G20 average
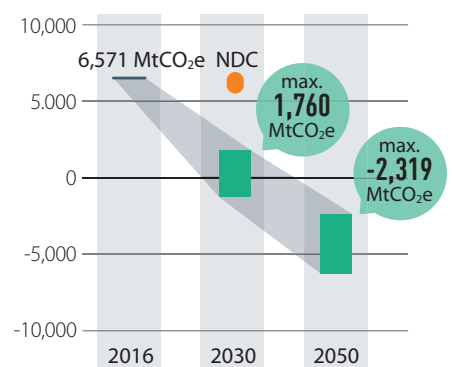
Trend (2011-2016)   **-6%**   **-1%**

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

The US's fair-share range is below 1,760 MtCO$_2$e by 2030 and below -2,319 MtCO$_2$e by 2050. Under current policies, emissions would only be limited to 6,252-6,406 MtCO$_2$e by 2030; the US's NDC would limit its emissions to 5,284-5,760 MtCO$_2$e by 2025. 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[2]
(MtCO$_2$e/year)

6,571 MtCO$_2$e   NDC

max. **1,760** MtCO$_2$e

max. **-2,319** MtCO$_2$e

10,000
5.000
0
-5,000
-10,000

2016   2030   2050

Source: CAT 2019

Recent developments[3]

The 2019 Affordable Clean Energy rule cancelled specific emissions reduction targets in the power sector for individual states.

Until April 2019, the US has offered about 378m acres of public area for fossil fuel drill leasing.

The US Climate Alliance is growing, with, in July 2019, the Montana governor being the 25th governor to join.

Key opportunities for enhancing climate ambition[3]

The US has the fourth highest per capita emissions in the G20.

→ **Adopt a goal of climate neutrality by 2050 at the latest.**

#1

US transport emissions per capita are four times the G20 average and have increased by 3% from 2013-2018.

→ **Adopt a goal of 100% sales of emission free cars by 2035.**
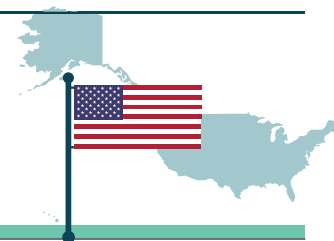
#2

The US generates only 17% of its electricity from renewables.

→ **Aggressively support the growth of renewable generation capacity, using best practice from several states, such as California and Texas.**

**#3**

This country profile is part of the **Brown to Green 2019** report. The full report and other G20 country profiles can be downloaded at: *http://www.climate-transparency.org/g20-climate-performance/g20report2019*

UNITED STATES – SOCIO-ECONOMIC CONTEXT

Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. The US ranks among the highest countries.
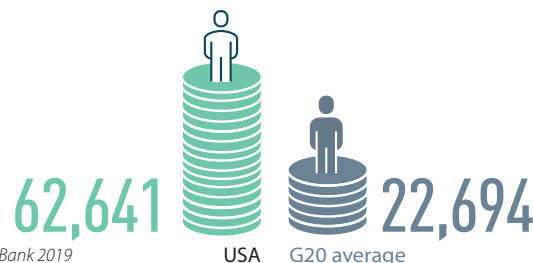
Data for 2017 | Source: UNDP 2018

0.924

low   very high
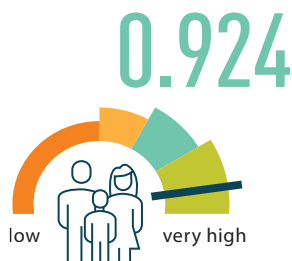
Gross Domestic Product (GDP) per capita
(PPP US$ const. 2018, international)

Data for 2018 | Source: World Bank 2019

62,641 USA

22,694 G20 average

Population projections
(millions)

The US population is expected to increase by about 18% by 2050.

327.2 — 2018
354.4 — 2030
387.0 — 2050
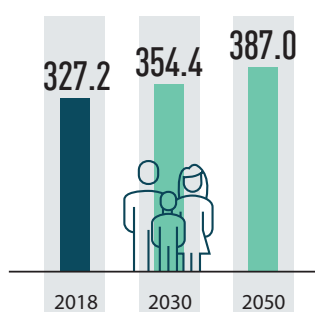
Source: World Bank 2019

Death through ambient air pollution
(total ambient air pollution attributable deaths)

Almost 78,000 people die in the US 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 one of the lowest levels in the G20.

77,550 attributable deaths

1.1
G20 range
0.1 USA
0.1

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

Data for 2016
Source: World Health Organization 2018
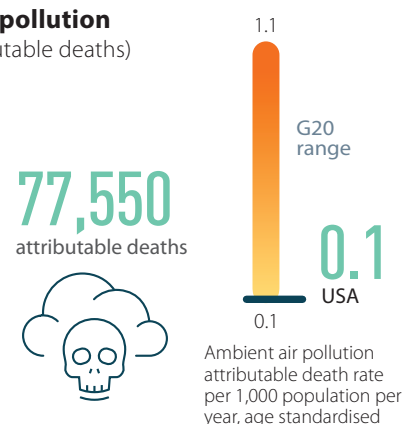
JUST TRANSITION[3]

In June 2019 the US EPA formally replaced the Obama-era Clean Power Plan with the 'Affordable Clean Energy Rule', ostensibly aiming to "continue to reduce emissions while providing affordable and reliable energy for all Americans".

Contrary to President Trump's rhetoric, there has been little evidence of the promised resurgence in coal employment. Coal power sector employment declined by 7.2% in 2018, although solar power employment also declined by 3.2%, despite 11 GW capacity increase; however, this was partially offset by job growth in wind and other renewables.

Much of the US 'just transition' discourse has focused on proposals for a 'Green New Deal', which broadly aims to address climate change and

economic inequality. A Green New Deal resolution was released in congress in February, which included calls for 100% of power supply from "clean, renewable, and zero-emission energy sources", in addition to greater mitigation action in the energy efficiency and transport sectors, and a range of social reforms in line with the broader principles of a just transition. The resolution was poorly received by the AFL-CIO labour union, and was ultimately voted down in the senate. However, the underlying concept remains widely supported, in varying form and fervour, among climate justice activists, general civil society, and some political actors.

Legend for all country profiles

Trends

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

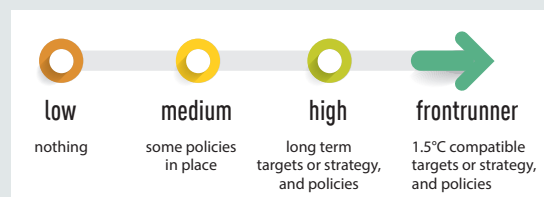The thumbs indicate assessment from a climate protection perspective.

Decarbonisation Ratings[4]

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.

very low   low   medium   high   very high
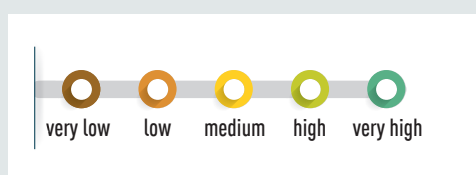
Policy Ratings[5]

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.

low — nothing

medium — some policies in place

high — long term targets or strategy, and policies

frontrunner — 1.5°C compatible targets or strategy, and policies

For more information see the Annex and Technical Note
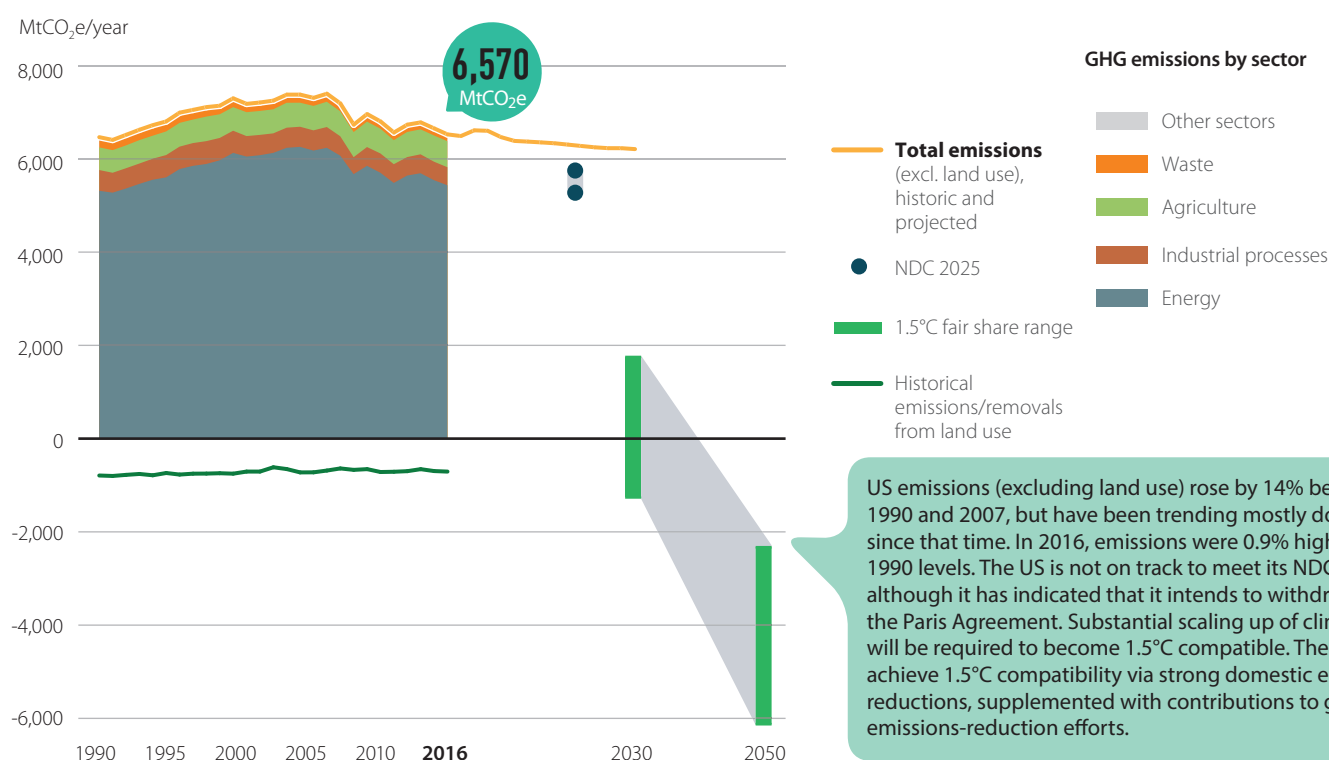
MITIGATION   BIG PICTURE

UNITED STATES

> **!** US GHG emissions have increased by 1% (1990-2016) and the government's climate targets are not 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 [6]

Source: IPCC SR1.5 2018

Total GHG emissions across sectors [2]

MtCO$_2$e/year

6,570
MtCO$_2$e

GHG emissions by sector

- Other sectors
- Waste
- Agriculture
- Industrial processes
- Energy

— **Total emissions** (excl. land use), historic and projected

● NDC 2025

▬ 1.5°C fair share range

— Historical emissions/removals from land use

1990 1995 2000 2005 2010 **2016** 2030 2050

Source: PRIMAP 2018; CAT 2019

> US emissions (excluding land use) rose by 14% between 1990 and 2007, but have been trending mostly downwards since that time. In 2016, emissions were 0.9% higher than 1990 levels. The US is not on track to meet its NDC in 2025, although it has indicated that it intends to withdraw from the Paris Agreement. Substantial scaling up of climate action will be required to become 1.5°C compatible. The US could achieve 1.5°C compatibility via strong domestic emissions reductions, supplemented with contributions to global emissions-reduction efforts.

Nationally-determined contribution (NDC): Mitigation

Targets	Intends to achieve an economy-wide target of reducing its GHG emissions by 26%-28% below its 2005 level by 2025, and to make best efforts to reduce its emissions by 28%
Actions	Actions specified (sectors: energy, transport, buildings, waste)

Source: UNFCCC, NDC of respective country

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

Status	Submitted to UNFCCC
2050 target	No 2050 target; exploring options for -80% or more below 2005 levels
Interim steps	-17% in 2020 and -26-28% in 2025 compared to 2005 levels
Sectoral targets	–

Climate action tracker (CAT) evaluation of NDC [2]

● — ○ — ○ — ○ — ○ — ○

critically insufficient | highly insufficient | insufficient | 2°C compatible | 1.5°C Paris Agreement compatible | role model
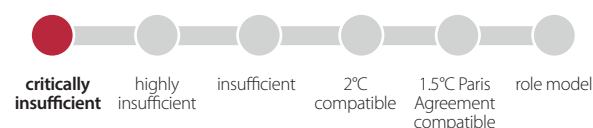
Source: CAT 2019

> The US administration has signalled its intent to withdraw from the Paris Agreement and has stalled implementation of its NDC.

Source: UNFCCC, LTS of respective country

MITIGATION ENERGY

UNITED STATES

! **Fossil fuels still make up around 82% of the US energy mix (counting power, heat, transport fuels, etc). The proportion of coal in the energy mix has decreased in the last decade, but replaced with gas rather than renewables.**
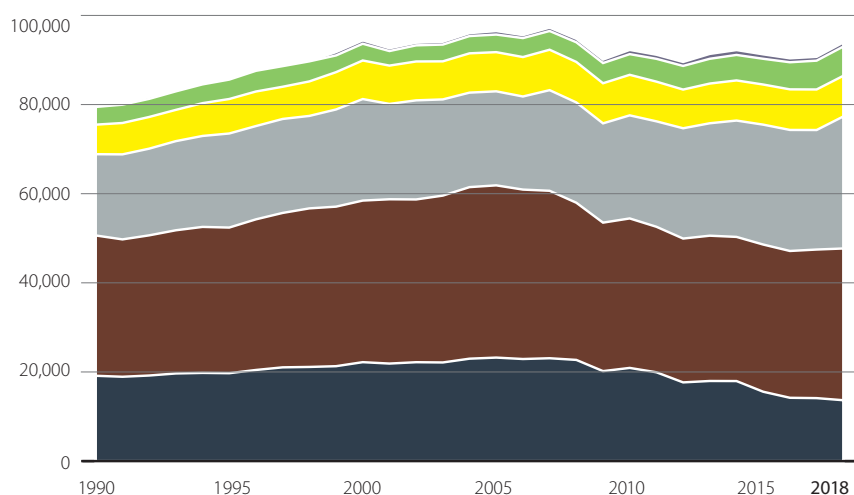
The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050 and to substantially lower levels without Carbon Capture and Storage. **1.5°C** [6]
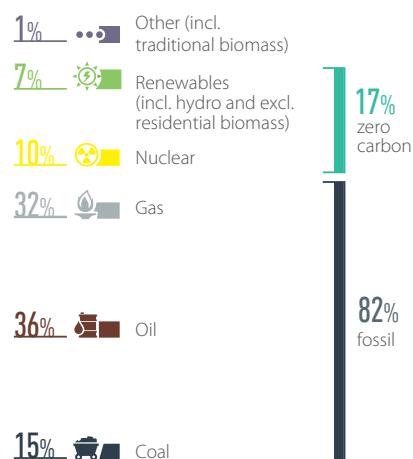
Source: IPCC SR1.5 2018

Energy mix[7]

Total primary energy supply (PJ)

Source: Enerdata 2019

Share in 2018

1% Other (incl. traditional biomass)

7% Renewables (incl. hydro and excl. residential biomass)

10% Nuclear

17% zero carbon

32% Gas

36% Oil

82% fossil

15% Coal

This graph shows the fuel mix for all energy supply, including energy used for electricity generation, heating, cooking, and transport fuels. Fossil fuels (oil, coal and gas) still make up 82% of the US energy mix, which is also the G20 average. Coal energy has declined slightly but has been replaced with other fossil fuels. The share of renewables has barely changed over the last decades.

Carbon intensity of the energy sector

Tonnes of CO_2 per unit of total primary energy supply (tCO_2/TJ)

USA — G20

54 tCO_2

CO_2
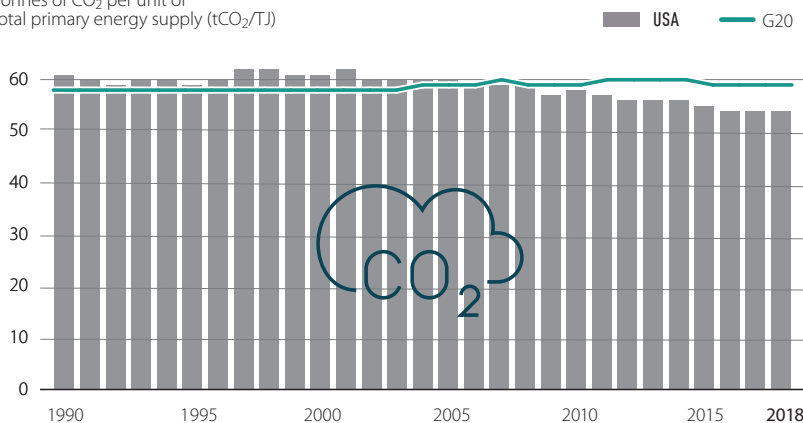
Source: Enerdata 2019

Rating of carbon intensity compared to other G20 countries[4]

Rating trend (2013-2018) **medium**

Rating current level (2018) **medium**

Source: own evaluation

Carbon intensity shows how much CO_2 is emitted per unit of energy supply. The carbon intensity of the US energy sector has slightly decreased over the past 15 years to 54tCO_2/TJ, reflecting the declining proportion of coal in the energy mix. The level is slightly below the G20 average.
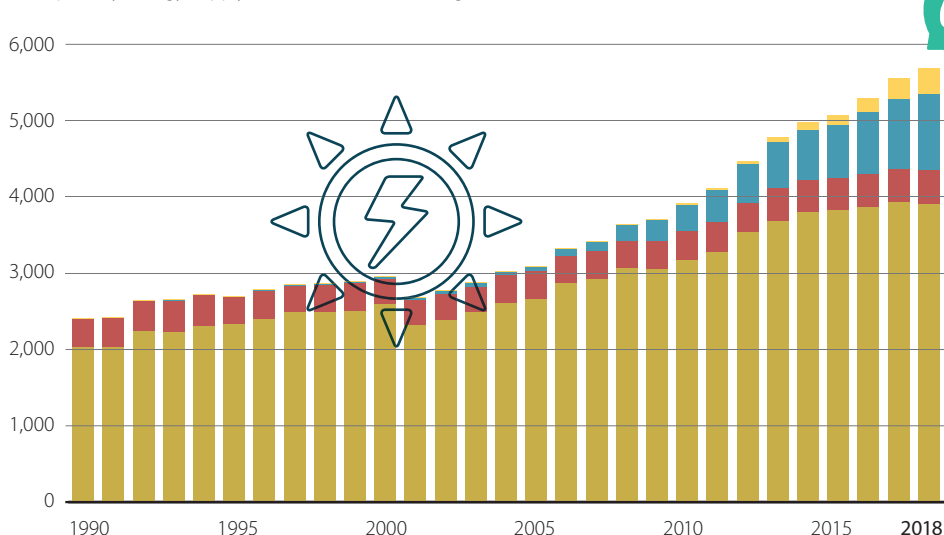
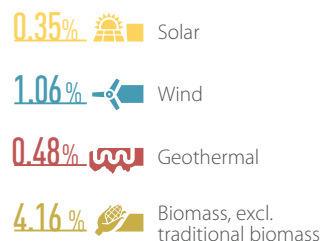| **MITIGATION**	ENERGY		**UNITED STATES**

Solar, wind, geothermal and biomass development[8]

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

6.1%

Source: Enerdata 2019

Share of TPES in 2018

0.35% Solar

1.06% Wind

0.48% Geothermal

4.16% Biomass, excl. traditional biomass

Solar, wind, geothermal and biomass account for 6% of US energy supply – the G20 average is 6%. In the last five years, the share of these sources in total energy supply has increased by around 18%, much less 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[4]

Rating trend (2013-2018) — **medium**

Rating current level (2018) — **medium**

Source: own evaluation

Energy supply per capita

Total primary energy supply per capita (GJ/capita)

288 USA
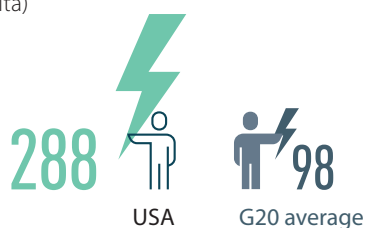
98 G20 average

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

At 288 GJ/capita, energy supply per capita in the US is almost three times the G20 average, and is declining only slightly (-2%, 2013-2018).

Trend (2013-2018) **-2%** **+1%**

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

Rating of energy supply per capita compared to other G20 countries[4]

Rating trend (2013-2018) — **medium**

Rating current level (2018) — **very low**
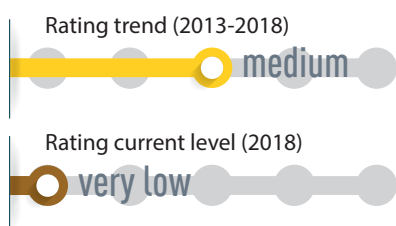
Source: own evaluation

MITIGATION ENERGY

UNITED STATES

> **!** The US has one of the highest levels of energy use per capita in the G20, and energy-related CO_2 emissions decreased only by 1% in the past five years. They need to drop significantly to get on a 1.5°C pathway.
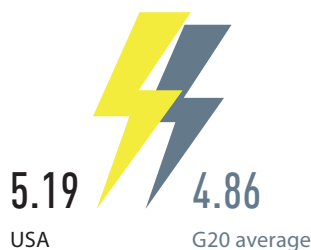
Global energy and process-related CO_2 emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

1.5°C [6]

Source: IPCC SR1.5 2018

## Energy intensity of the economy
(TJ/PPP US$2015 million)

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 US energy intensity is above the G20 average and has decreased slightly less (-10%, 2013-2018).

5.19
USA

4.86
G20 average

Trend
(2013-2018) 👍 -10%   👎 -12%

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

Rating of energy intensity compared to other G20 countries[4]

Rating trend (2013-2018)

○━━━━●━━━━○ **medium**

Rating current level (2018)

○━━●━━○━━○ **low**
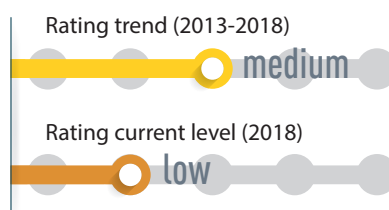
Source: own evaluation

Energy-related CO_2 emissions[9]

CO_2 emissions from fuel combustion (MtCO₂/year)

5,118
MtCO₂
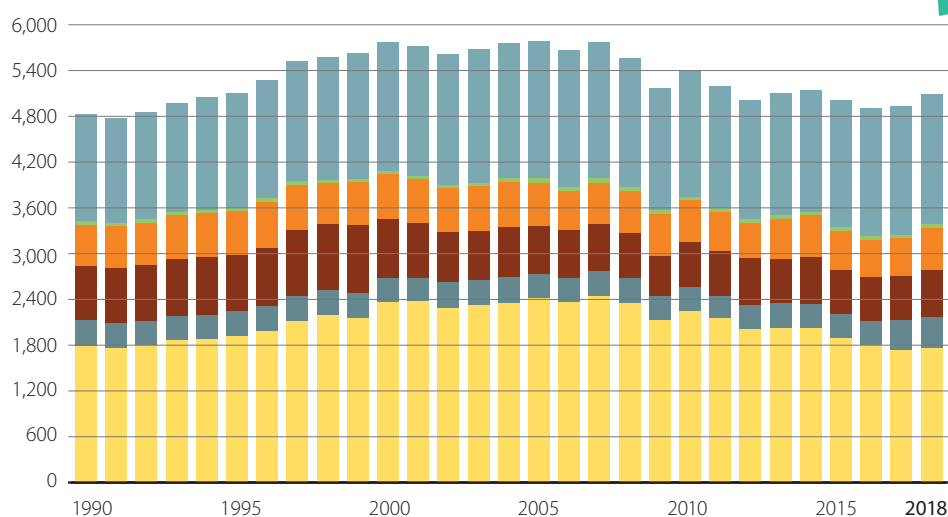
Source: Enerdata 2019

Share of TPES in 2018

Share of total energy-related CO_2 emissions in 2018

- **33%** Transport
- **1%** Agriculture
- **11%** Buildings
- **12%** Industries (incl. autoproducers)
- **8%** Other energy sector
- **35%** Electricity and heat
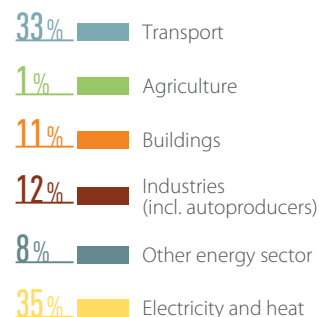
> The largest driver of overall GHG emissions are CO_2 emissions from fuel combustion. In the US, they have remained stable in the past decade with only small ups and downs. The electricity and heat sector is the largest contributor (at 35%), followed by transport at 33%.

MITIGATION | POWER SECTOR

UNITED STATES

! **The US still produces 28% of electricity from coal. There are no plans for a coal phase-out, which is not in line with a 1.5°C limit. Also, long-term policies for renewables are lacking.**

Share in energy-related CO_2 emissions

35%

Data for 2018 | Source: Enerdata 2019
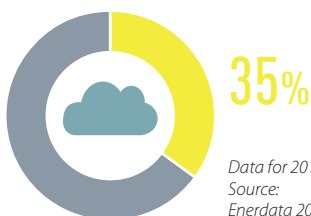
Coal must be phased out in the EU/OECD no later than 2030, in the rest of the world no later than 2040. Electricity generation needs to be decarbonised before 2050, with renewable energy the most promising option.[5]
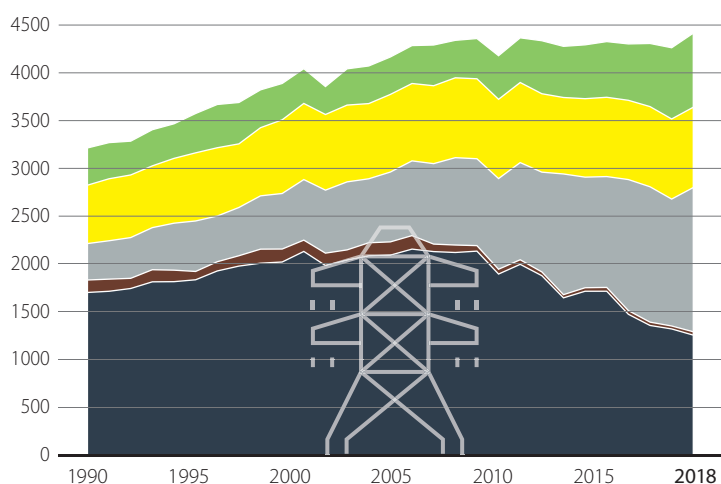
1.5°C[6]

Source: IPCC SR1.5 2018; Climate Analytics 2016; Climate Analytics 2019
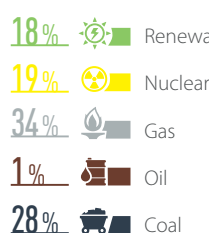
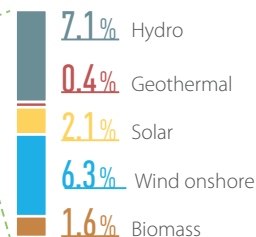## STATUS OF DECARBONISATION

**Power mix**

Gross power generation (TWh)

Source: Enerdata 2019

Shares in 2018

18%	⚡	Renewables
19%	☢	Nuclear
34%	🛢	Gas
1%	🛢	Oil
28%	⛏	Coal

Renewables shares

|	
7.1%	Hydro
0.4%	Geothermal
2.1%	Solar
6.3%	Wind onshore
1.6%	Biomass

The US is increasingly producing power from renewables. They make up 17.5% of the power mix (G20 average is 25%), with large hydro having the largest share (7%), followed by wind (6%). The share of coal in the power mix has dropped to 28%. However, it has mostly been replaced by gas, which now accounts for 34% of the power mix.

Emissions intensity of the power sector
(gCO_2/kWh)
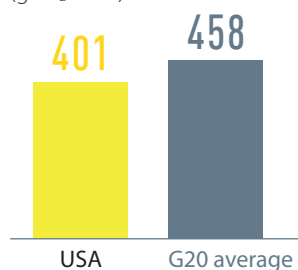
401 USA
458 G20 average

Data for 2018 | Source: Enerdata 2019

Trend (2013-2018)

-18% USA
-11% G20 average

Rating of emissions intensity compared to other G20 countries[4]

Rating trend (2013-2018) — **high**
Rating current level (2018) — **medium**
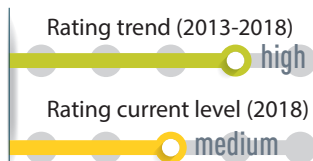
Source: own evaluation

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

25% G20 average
18% USA

Data for 2018 | Source: Enerdata 2019

Trend (2013-2018)

+40% USA
+20% G20 average
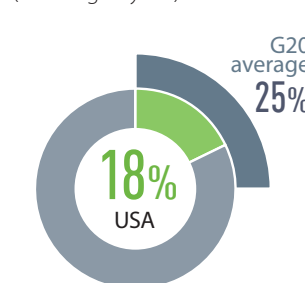
Rating of share of renewables compared to other G20 countries[4]

Rating trend (2013-2018) — **high**
Rating current level (2018) — **low**
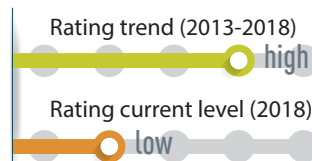
Source: own evaluation

For each kilowatt hour of electricity, 401 gCO_2 are emitted in the US. This is slightly below the G20 average, but still high. Emission intensity has dropped by 18% in the past five years (2013-2018), reflecting the declining share of coal power.

MITIGATION POWER SECTOR

UNITED STATES

POLICIES[5]

Renewable energy in the power sector

low   medium   high   frontrunner

low

The US has no 2050 target for renewable energy, and the 2019 Affordable Clean Energy rule repealing the Clean Power Plan does not include specific emissions reduction targets in the power sector for states any longer. Federal clean energy tax credits and support policies at state level are in place.

Source: own evaluation

Coal phase-out in the power sector

low   medium   high   frontrunner

low

The US does not have a coal phase-out plan. Under the 2019 Affordable Clean Energy Rule, states have three years to develop plans to limit CO_2 at their coal-fired power plants. Despite government support, the coal industry is declining, mostly in the face of lower costs and abundant natural gas and renewable energy.

Source: own evaluation

MITIGATION TRANSPORT SECTOR

! **In the US, emissions from transport per capita are among the highest in the G20 and are on the rise. The transport sector accounts for a third of CO_2 emissions and is still dominated by fossil fuels. In order to stay within a 1.5°C limit, passenger and freight transport need to be decarbonised.**

Share in energy-related CO_2 emissions

33% direct

0% from electricity
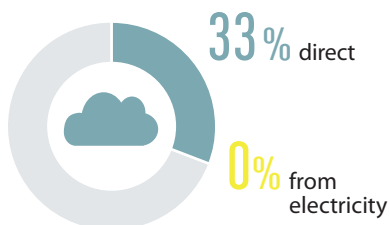
Data for 2018 | Source: Enerdata 2019

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

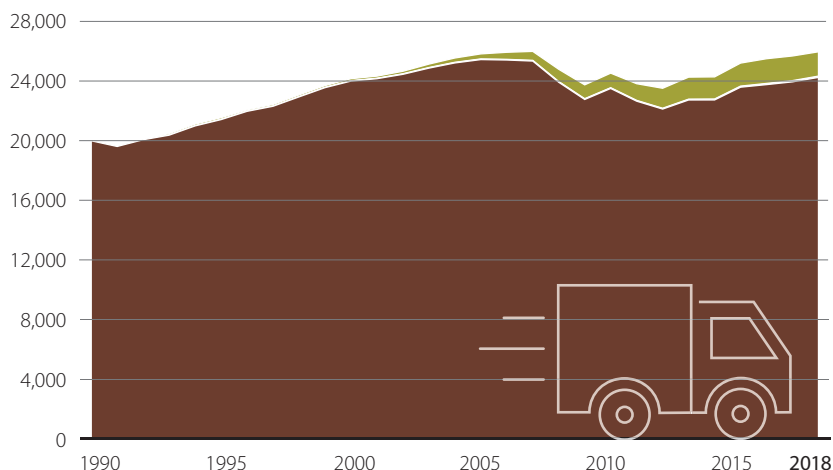**1.5°C**[6]

Source: IPCC SR1.5 2018

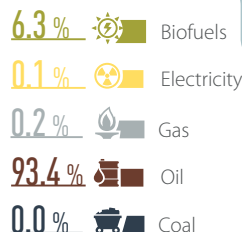## STATUS OF DECARBONISATION

Transport energy mix

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

Electricity and biofuels make up only 6.5% of the energy mix in transport – the G20 average is equally low at 6%.

Share in 2018

- **6.3**% Biofuels
- **0.1**% Electricity
- **0.2**% Gas
- **93.4**% Oil
- **0.0**% Coal
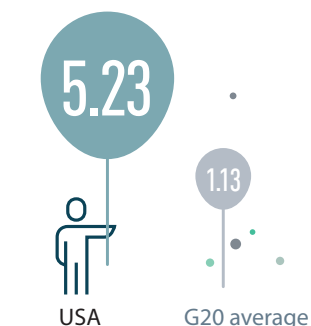
Source: Enerdata 2019

MITIGATION | TRANSPORT SECTOR

UNITED STATES

STATUS OF DECARBONISATION (continued)

Transport emissions per capita[10]
(tCO$_2$/capita,
excl. aviation emissions)

Trend (2013-2018)

+4% USA

+5% G20 average

5.23 USA

1.13 G20 average

Data for 2018
Source: Enerdata 2019; World Bank 2019

Rating of transport emissions compared to other G20 countries[4]

Rating trend (2013-2018)
low

Rating current level (2018)
very low
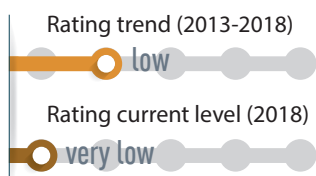
Source: own evaluation

Aviation emissions per capita[11]
(tCO$_2$/capita)

Per capita emissions from aviation are almost five times the G20 average and continue to rise.

Trend (2011-2016)

+9% USA

+10% G20 average

0.74 USA

0.15 G20 average
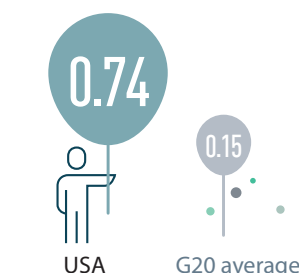
Data for 2016
Source: Enerdata 2019; IEA 2018

Rating of aviation emissions compared to other G20 countries[4]

Rating trend (2011-2016)
low

Rating current level (2016)
very low
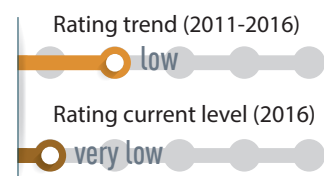
Source: own evaluation

Motorisation rate
(vehicles per 1,000 inhabitants)

89% of the kilometres that people travel are by car, and almost 90% of people in the US have a car.

891

Data for 2016 | Source: Agora 2018

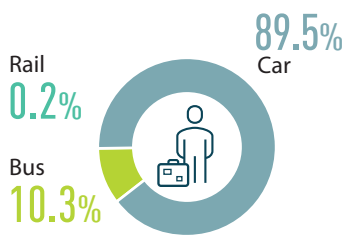### Market share of electric vehicles in new car sales
(%)

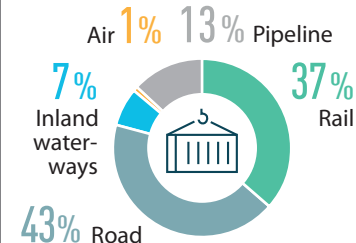**2.5%**

Data for 2018 | Source: IEA 2019

Passenger transport
(modal split in % of passenger km)

Rail **0.2%**

89.5% Car

Bus **10.3%**

Data for 2015 | Source: Agora 2018

Freight transport
(modal split in % of tonne-km)

Air **1%**   **13%** Pipeline

7% Inland water-ways

37% Rail

43% Road

Data for 2015 | Source: Agora 2018

POLICIES[5]

Phase out fossil fuel cars

low — medium — high — frontrunner
medium

The US has no target to phase out fossil fuel cars. In August 2018, the government proposed freezing Obama-era fuel efficiency rules instead of raising them each year between 2020 and 2026. It is currently working on a revised plan. There are tax credits for electric vehicles (EVs), but 24 states have imposed EV fees, eg higher annual registration costs.

Source: own evaluation

Phase out fossil fuel heavy-duty vehicles

low — medium — high — frontrunner
medium

The US does not have a strategy for reducing emissions from freight transport, but has energy efficiency standards for heavy-duty vehicles (HDVs) in place. The US, together with Canada, are the first in the world to extend emission regulations of trucks to the trailers they pull, although in 2017 the US Court of Appeals stayed the implementation after legal challenges filed by the trailer industry.

Source: own evaluation

Modal shift in (ground) transport

low — medium — high — frontrunner
medium

The US has no long-term strategy for a modal shift. It developed several programmes to shift to public and non-motorised transport for passengers, eg investments in transit rail and bus or support for pedestrian and bicycles. Its SmartWay Initiative supports companies to move goods more cleanly and efficiently.

⚠ The president's budget proposal for 2020 would eliminate federal funding for Amtrak long-distance trains.

Source: own evaluation

MITIGATION | BUILDINGS SECTOR

UNITED STATES

(!) **US building emissions – including heating, cooking and electricity use – make up over a third of total CO_2 emissions. Per capita, building-related emissions are by far the highest in the G20. Strategies for reducing energy use in the building sector are largely missing.**

Share in energy-related CO_2 emissions

11% direct

26% from electricity
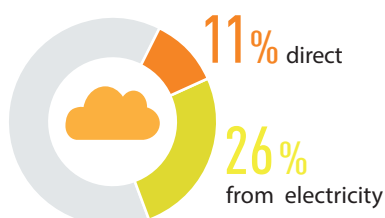
Data for 2018 | Source: Enerdata 2019

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.
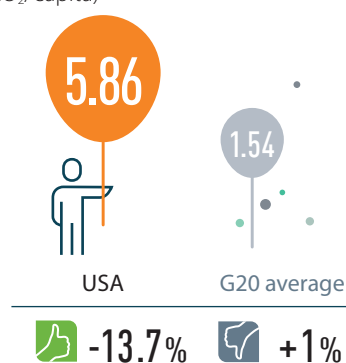
1.5°C[6]

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

STATUS OF DECARBONISATION

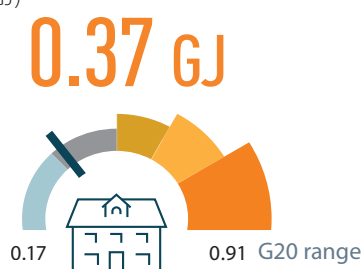### Building emissions per capita
(incl. indirect emissions)
(tCO_2/capita)

5.86
1.54

USA — G20 average

👍 **-13.7**%   👎 **+1**%

Trend (2013-2018)

Rating of building emissions compared to other G20 countries[4]

Rating trend (2013-2018) — **high**

Rating current level (2018) — **very low**

Source: own evaluation

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

Residential buildings: energy use per m²
(GJ)

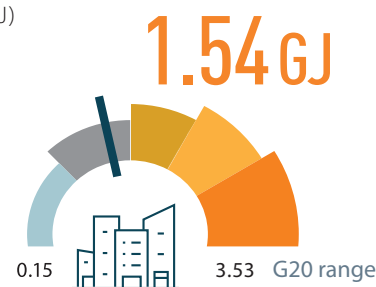**0.37** GJ

0.17 ——— 0.91 G20 range

Data: year different per country | Source: ACEEE 2018

The US has by far the highest level of building-related emissions per capita in the G20. In contrast to the G20 average, the US has reduced the level by 14% (2013-2018).

Commercial and public buildings: energy use per m²
(GJ)

1.54 GJ

0.15 ——— 3.53 G20 range

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

POLICIES[5]

Near-zero energy new buildings

medium

low   medium   high   frontrunner

The US has no strategy for making new buildings near zero energy. The US Better Building Initiative aims to make buildings 20% more energy efficient by the 2020s. Building codes exist in the majority of states. In California, nearly all new homes are required to have solar panels and high-efficiency design from 2020.

⚠ Compliance with building codes and standards is voluntary.

Source: own evaluation

Renovation of existing buildings

medium

low   medium   high   frontrunner

The US has no long-term strategy for energy retrofitting of existing buildings. State or provincial codes apply to two-thirds of the population.

Source: own evaluation

MITIGATION | INDUSTRY SECTOR

UNITED STATES

! **Industry-related emissions make up almost a fifth of CO_2 emissions in the US. The level has not dropped in the last decade and policies to promote energy efficiency in the sector are so far insufficient.**

Share in energy-related CO_2 emissions (not including process emissions)

12% direct

7% from electricity
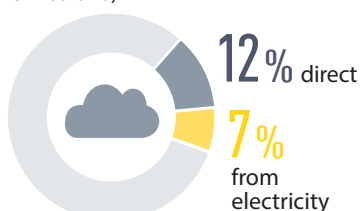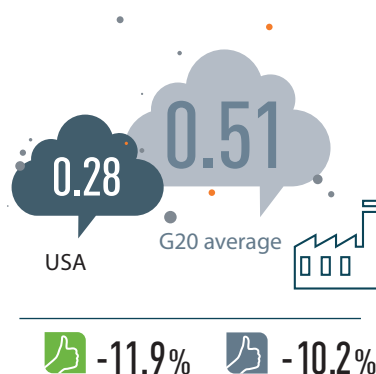
Data for 2018 | Source: Enerdata 2019

Global industrial CO_2 emissions need to be reduced by 65–90% from 2010 levels by 2050.
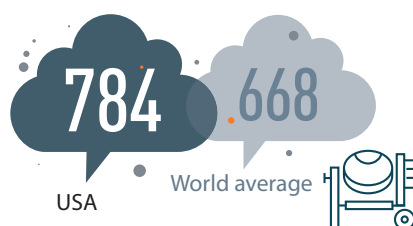
1.5°C[6]

Source: IPCC SR1.5 2018

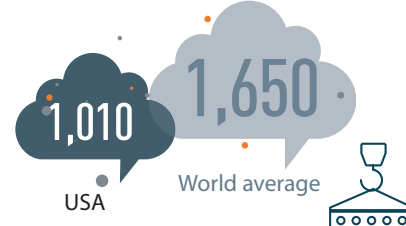## STATUS OF DECARBONISATION

Industry emissions intensity[12]
(tCO_2e/US$2015 GVA)

0.28 USA

0.51 G20 average

Data for 2016 | Source: Enerdata 2019; PRIMAP 2018; World Bank 2019

👍 **-11.9**% 👎 **-10.2**%

Trend (2011-2016)

Rating of emissions intensity compared to other G20 countries[4]

Rating trend (2011-2016) — **high**

Rating current level (2016) — **high**

Source: own evaluation

Carbon intensity of cement production[13]
($kgCO_2$/tonne product)

784 USA

668 World average

Data for 2015 | Source: CAT 2019

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

Carbon intensity of steel production[13]
($kgCO_2$/tonne product)

1,010 USA

1,650 World average

Data for 2015 | Source: CAT 2019

Steel production and steelmaking are significant GHG emission sources, and are challenging to decarbonise. The US steel industry is less emission intensive than the world average, while the cement industry lies above the world average.

POLICIES[5]

Energy efficiency

low

| low | medium | high | frontrunner |

Mandatory energy efficiency policies in the US cover only 11-25% of industrial total energy use in 2017. At federal level, voluntary energy efficiency certification for industry exists but there are no mandatory standards. Several states have emission trading schemes in place.

Source: own evaluation
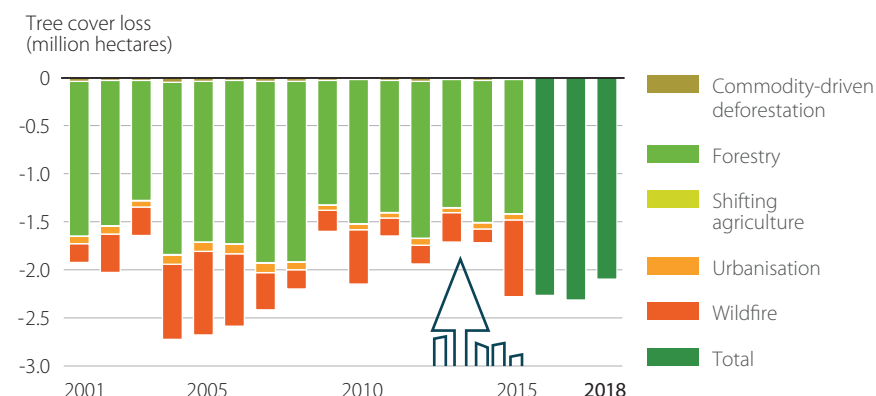
MITIGATION LAND USE

UNITED STATES

! In order to stay within the 1.5°C limit, the US needs to make the land use and forest sector a net sink of emissions, eg by halting the expansion of residential areas and by creating new forests.

Global deforestation needs to be halted and changed to net CO_2 removals by around 2030. **1.5°C**[6]

Source: IPCC SR1.5 2018

Gross tree cover loss by dominant driver[14]

Tree cover loss
(million hectares)

- Commodity-driven deforestation
- Forestry
- Shifting agriculture
- Urbanisation
- Wildfire
- Total

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 US lost 38.2Mha of tree cover, equivalent to a **14% decrease since 2000**. This does not take tree-cover gain into account. Forestry and wildfires are the main causes of forest loss.

POLICIES[5]

(Net) zero deforestation

low medium **medium** high frontrunner

The 2015-2020 Forest Plan aims to sustain the country's forests but no quantitative national target exists. In March 2019, the president signed a public lands Bill adding 1.3 million acres of new wilderness.

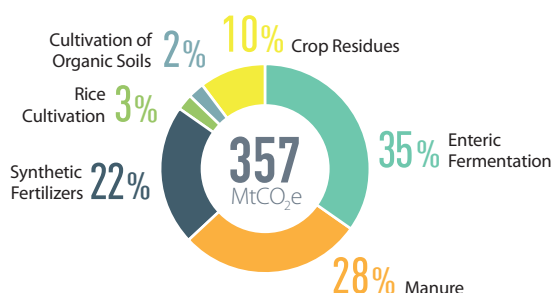*Source: own evaluation*

MITIGATION AGRICULTURE

! US 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, 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 fertilzers and manure) need to be reduced by 10% by 2030 and by 20% by 2050. **1.5°C**[6]

Source: IPCC SR1.5 2018

GHG emissions from agriculture (not including energy)

- Cultivation of Organic Soils 2%
- Crop Residues 10%
- Rice Cultivation 3%
- Synthetic Fertilizers 22%
- Enteric Fermentation 35%
- Manure 28%

357 MtCO₂e

In the US, 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.

Data for 2016 | Source: FAOSTAT 2019

ADAPTATION

UNITED STATES

→ **The US is vulnerable to climate change and adaptation actions are needed.**

→ **On average, 451 fatalities and losses amounting to US$48.7 billion occur yearly due to extreme weather events.**

→ **With global warming, society and its supporting sectors are increasingly exposed to severe climate events, such as an increasing heatwave frequency.**

→ **With a 3°C warming, the US would experience around 40 days per year when temperatures reach higher than 35°C.**

ADAPTATION POLICIES

The US administration has signalled its intent to withdraw from the Paris Agreement and has stalled implementation of its NDC.

Nationally-determined contribution: Adaptation	
Targets	Not mentioned
Actions	Not mentioned

Source: UNFCCC, NDC of respective country

National adaptation strategies

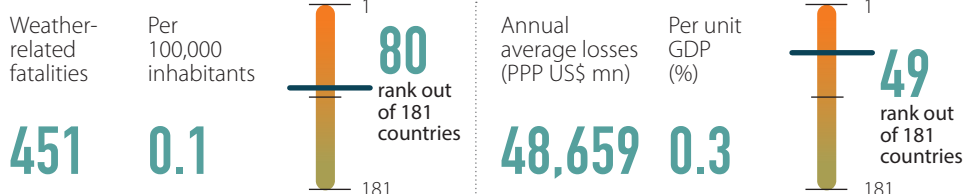| Document name	Publication year	Agriculture	Biodiversity	Coastal areas & fishing	Education & research	Energy & industry	Finance & insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism	Water	M&E process (reporting frequency)
U.S. Environmental Protection Agency Climate Change Adaptation Plan	2014	x		x	x	x		x	x			x		x	Implementation Plan to measure and evaluate effectiveness over time, periodically adjusted

Source: own research

UNITED STATES

ADAPTATION NEEDS

Climate Risk Index for 1998-2017

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

Global Climate Risk Index 2019 | All numbers are averages (1998-2017)

Weather-related fatalities	Per 100,000 inhabitants		Annual average losses (PPP US$ mn)	Per unit GDP (%)	
451	**0.1**	**80** rank out of 181 countries	**48,659**	**0.3**	**49** rank out of 181 countries

Source: Germanwatch 2018

The US has already been struck by extreme weather events such as storms, heat waves, floods, hurricanes 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.
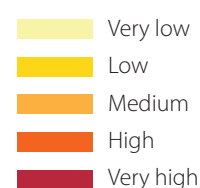
Exposure to future impacts at 1.5°C, 2°C and 3°C

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

Source: own research

Agriculture	Maize	Reduction in crop duration	Low	Medium	Very high
		Hot spell frequency	Very high	Very high	Very high
		Reduction in rainfall	Low	Low	Very low
	Soybean	Reduction in crop duration	Low	Low	High
		Reduction in rainfall	Medium	Medium	Low
	Wheat	Reduction in crop duration	Very low	Medium	High
		Hot spell frequency	Low	High	Very high
		Reduction in rainfall	Medium	Medium	High

Overall, with rising temperatures, all sectors are adversely affected. In the water sector, water scarcity and time spent in drought conditions increases significantly. Heat wave frequency drastically increases together with an increase in the number of days when temperatures are above 35°C.

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)

Rest **24%**
Wheat **7%**
Soybeans **16%**
Rice **1%**
Maize **52%**
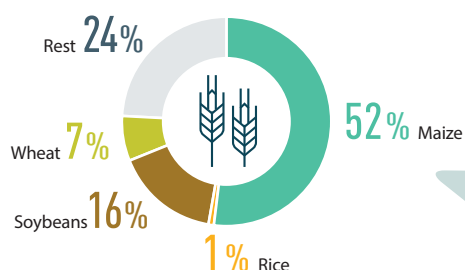
Maize, soybeans and wheat experience a drastic reduction in crop duration. Whereas soybeans and maize are impacted by an increase in rainfall, wheat experiences a reduction. For maize there is a slight increase in hot spell frequency; this increase is more drastic for wheat.

Data for 2017 | Source: FAOSTAT 2019

FINANCE

UNITED STATES

> **!** US fossil fuel subsidies totalled US$7 billion in 2017, mostly for petroleum and gas. Some states have implemented carbon pricing schemes and financial policies for supporting the shift from brown to green.

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

1.5°C [6]

Source: IPCC SR1.5 2018

Nationally-determined contribution: Finance

Conditionality	Not applicable
Investment needs	Not specified
Actions	Not mentioned
International market mechanisms	At this time, the US does not intend to utilise international market mechanisms to implement its 2025 target

Source: UNFCCC, NDC of respective country

The US administration has signalled its intent to withdraw from the Paris Agreement and has stalled implementation of its NDC.

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

> **$** Although no federal-level green financial policy or regulation has been identified, there is some state alignment with TCFD (Task Force on Climate-related Financial Disclosures) recommendations in both California (California Department of Insurance) and Washington state.
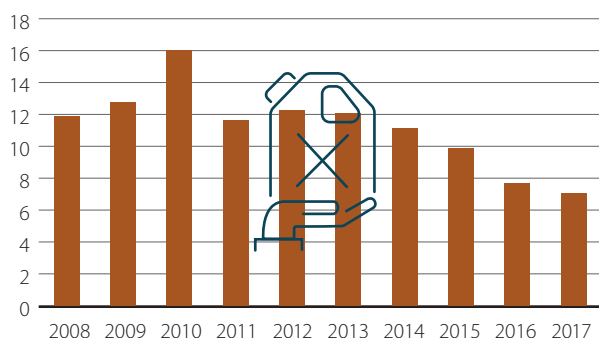
FINANCE

UNITED STATES

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.
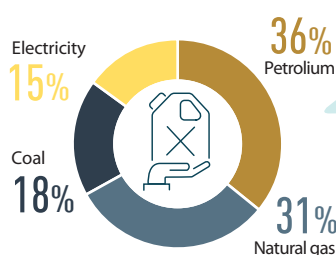
Fossil fuel subsidies
US$ billions

Source: OECD-IEA 2019

Subsidies by fuel type

Electricity **15%**

Coal **18%**

36% Petrolium

31% Natural gas

Data for 2017 | Source: OECD-IEA 2019

In 2017, US fossil fuel subsidies totalled US$7.1bn (compared to US$11.9bn in 2008 and the last decade's peak of US$16 in 2010). Of the subsidies identified, 82% were for the consumption of fossil fuels, with the remainder for production. The highest amount of subsidies quantified were for petroleum, at US$2.5bn, followed by natural gas at US$2.2bn. The largest subsidy is the home energy assistance programme for low-income households (US$1.4bn).

Carbon revenues

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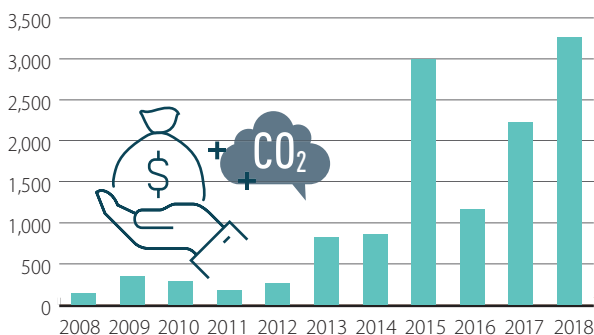

Source: I4CE 2019

From 2008 to 2018, six state and regional emissions trading schemes began operation in California, Connecticut, Massachusetts, New Jersey and Oregon, priced between US$7/tCO$_2$ and US$15/tCO$_2$. In 2018, the schemes generated US$3bn in California, and US$239 million in Connecticut (other estimates are missing).

Carbon pricing gap[15]

% of energy-related CO$_2$ emissions

75% Gap

13% priced at low rates of € 30 - 60/tCO$_2$

12% priced at € 60/tCO$_2$ or more
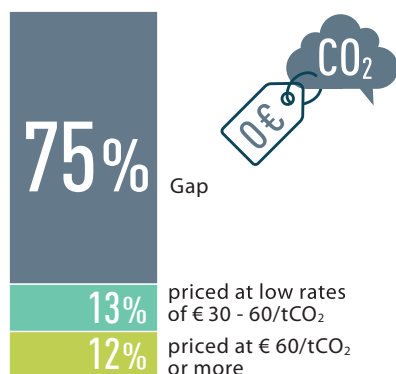
Only 25% of the US CO$_2$ emissions are priced at EUR30 or higher (the low-end benchmark), creating a carbon pricing gap of 75%. This gap is slightly higher than the G20 average of 71%. The price covers not only explicit carbon taxes but also specific taxes on energy use and the price of tradable emission permits.

Data for 2015 | Source: OECD 2018

FINANCE

UNITED STATES

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[16]
(million US$)

11.25
Mio. US$
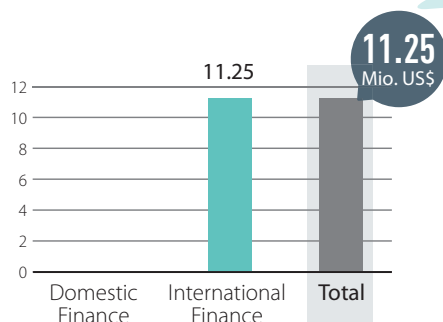
In 2017, the United States Export Import (ExIm) Bank provided a US$22.5 million loan for coal transportation in Ukraine.

● 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[17]

MDB level	National development agencies and banks	Domestic export credit agencies	Export credit restriction in OECD	Comment
—	X	X	X	In September 2013, the United States, together with the Nordic countries, released a policy ending public financing for new coal-fired power plants overseas (through multilateral development banks (MDBs) and bilateral finance) except in rare circumstances. Prior treasury guidance precluding support for coal projects via MDBs has been replaced by Trump administration.

X yes   — no   not applicable

Source: own research

Provision of international public support[18]

The US did not provide a third biennial report to the UNFCCC, but has instead provided provisional data to the UNFCCC. In 2015-2016 this data shows it to be the 5th largest bilateral climate finance contributor and 2nd largest contributor to multilateral climate change funds in absolute terms (although these rankings fall relative to GDP). It also shows a relatively stable contribution since the 2013/14 period. The Trump administration has made it clear it will not contribute to the Green Climate Fund (under the Obama administration US$3 billion was pledged and US$1 billion transferred, but further transfers have since been halted).

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)	Theme of support			
	Mitigation	Adaptation	Cross-cutting	Other
2,200.3	77%	16%	7%	0%

Source: Country reporting to UNFCCC

Multilateral climate finance contributions

Annual average contribution (mn US$, 2015-2016)	Theme of support			
See Technical Note for multilateral climate funds included and method to attribute amounts to countries	Mitigation	Adaptation	Cross-cutting	Other
463.7	n/a	n/a	n/a	n/a

Source: Country reporting to UNFCCC

Core/General Contributions

Annual average contribution (mn US$, 2015-2016)
0

Source: Country reporting to UNFCCC

ENDNOTES

G20

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.

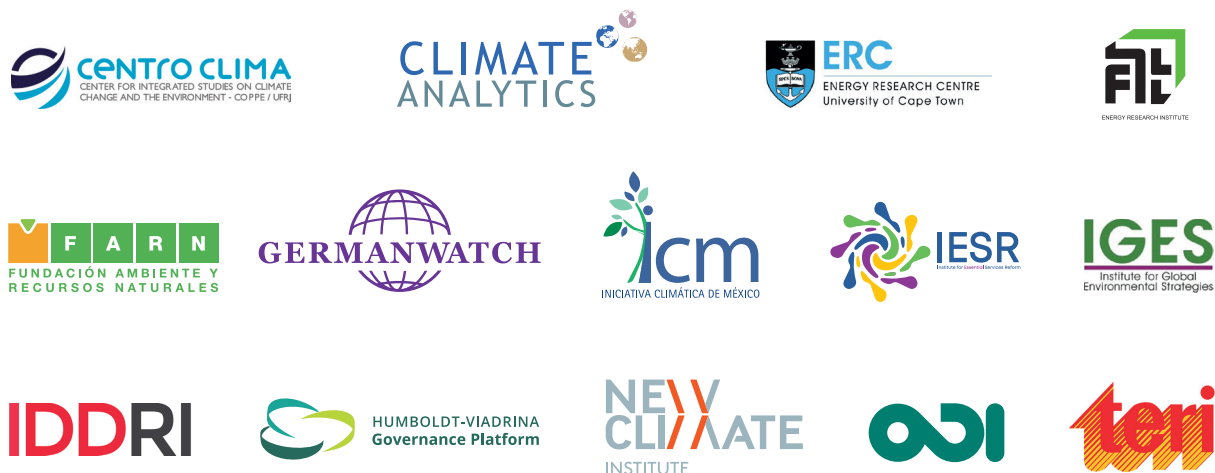| On endnote 5)	▬O low	▬O medium	▬O high	▬O frontrunner
Renewable energy in power sector	No policy to increase the share of renewables	Some policies	Policies and longer-term strategy/target to significantly increase the share of renewables	Short-term policies + long-term strategy for 100% renewables 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)
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
Energy efficiency in industry	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
(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

ENDNOTES (continued)

G20

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_2 emissions from power generation and from waste heat generated in the power sector. The category 'other energy use' covers energy-related CO_2 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_2 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

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