

EUROPEAN UNION



CLIMATE TRANSPARENCY REPORT: COMPARING G20 CLIMATE ACTION TOWARDS NET ZERO

2021

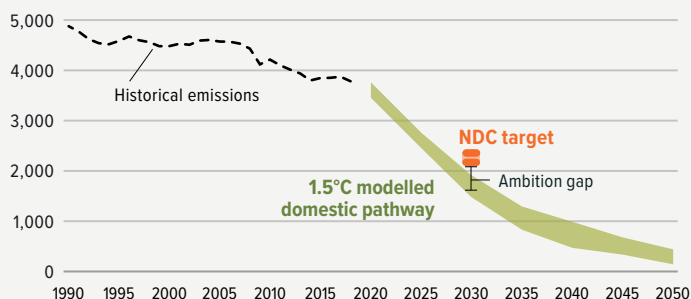
NOT ON TRACK FOR A 1.5°C WORLD

1.5°C

The EU's 2030 NDC target is "at least" 55% below 1990 levels (incl. LULUCF) or 2,325 MtCO₂e, by 2030. To stay below the 1.5°C temperature limit, the EU's 2030 emissions would need to be around 1,639 MtCO₂e (excl. LULUCF) or 66% below 1990 levels, leaving an ambition gap of 686 MtCO₂e (excl. LULUCF). All figures exclude land use emissions.

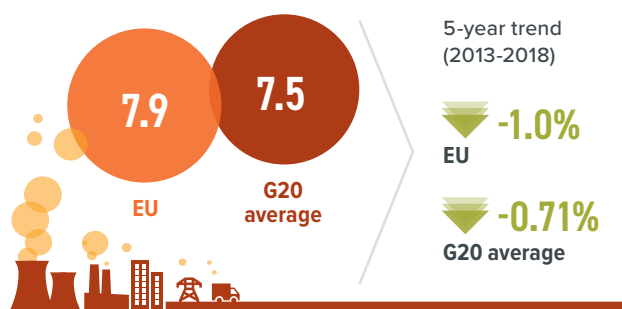
Gütschow et al., 2021; Climate Analytics, 2021

1.5°C compatible emissions pathway (MtCO₂e/year)¹



PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS ABOVE G20 AVERAGE

GHG emissions (incl. land use) per capita (tCO₂e/capita)² in 2018



The EU's per capita emissions are 1.05 times the G20 average. Total per capita emissions have decreased by 1% between 2013 and 2018.

Climate Action Tracker, 2021; Gütschow et al., 2021; United Nations, 2019

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



Increase energy efficiency and increase the building sector renovation rate to 3.5%.



Accelerate decarbonisation of transport by replacing combustion vehicles with battery-only electric vehicles (EVs), hydrogen cars, and promoting clean alternatives, especially railways, cycling and walking.



Further develop green hydrogen for use in the decarbonisation of harder-to-abate sectors, such as chemicals and steel.

RECENT DEVELOPMENTS



While the EU, in December 2020, **submitted a stronger NDC target of at least 55% net reduction below 1990 levels, it is not ambitious enough** to be compatible with a 1.5 °C warming limit.



In July 2021 the European Commission proposed a "Fit for 55" package of proposals that aim to adapt the EU's existing climate policy architecture to the more ambitious goal.



Some EU member states are still investing heavily in natural gas infrastructure and are lobbying strongly to be allowed to use EU resources to deepen their dependency on imported fossil fuels.

European Commission, 2020e; Germany and the European Commission, 2020; European Commission, 2021b; Council of the European Union, 2021



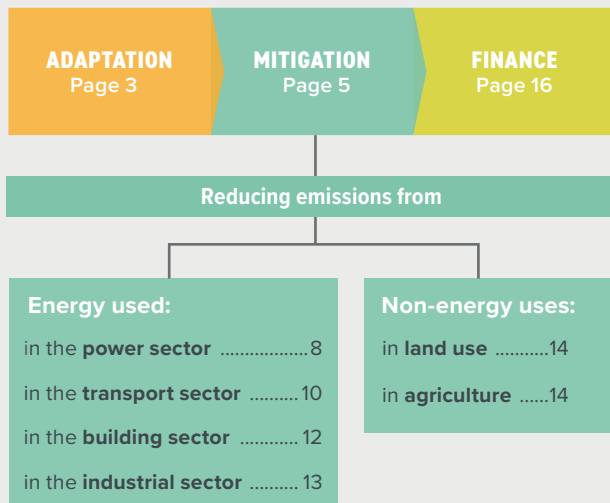
CORONAVIRUS RESPONSE AND RECOVERY

Contrary to the economic crisis of 2008/2009, during the pandemic-driven economic crisis, the EU decided to make climate action part of its economic recovery. At least 37% of the EUR 750bn NextGenerationEU recovery fund must be spent on climate action. The Fund was ratified by all member states in early 2021. In July 2021 the EU Commission approved the first National Recovery and resilience plans submitted by 12 member states as the basis for spending the resources. Those countries applied for a combined EUR 392bn, of which, on average, 39% is to be spent on climate change mitigation.

European Council, 2021; European Parliament Think Tank, 2021

CONTENTS

We unpack the EU's progress and highlight key opportunities to enhance climate action across:



LEGEND

Trends show developments over the past five years for which data are available. The colour-coded arrows indicate assessment from a climate protection perspective: Orange is bad, green is good.



Decarbonisation Ratings³ assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.



Policy Ratings⁴ evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



SOCIO-ECONOMIC CONTEXT

Human Development Index (HDI)

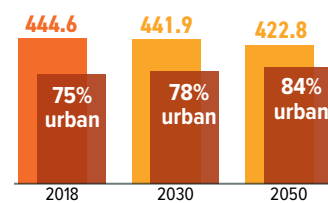


The HDI reflects life expectancy, level of education, and per capita income. The EU ranks very high.

Data for 2019. UNDP, 2020

Population and urbanisation projections

(in millions)

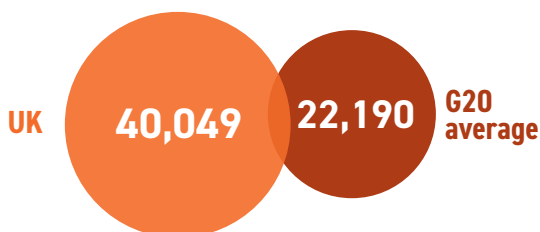


The EU's population is projected to decrease by 5% by 2050 and become more urbanised. As of July 2021, global birth rates are declining and the projected upward trend in the EU birth rate could be reversed due to the impact of the pandemic.

United Nations, 2019; United Nations, 2018

Gross Domestic Product (GDP) per capita

(PPP constant 2015 international \$) in 2019



World Bank, 2021; United Nations, 2019

Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1,000 population per year, age standardised in 2019

No data for EU

Institute for Health Metrics and Evaluation, 2020

This source differs from the source used in last year's profiles and, therefore, the data are not comparable.

A JUST TRANSITION

To mitigate the impacts of a transition away from fossil fuels, the EU developed its Just Transition Mechanism (JTM) consisting of three components. The first, the Just Transition Fund (JTF), has been equipped with EUR 17.5bn (in 2018 prices). EUR 10bn is coming from the NextGenerationEU recovery fund and needs to be used by the end of 2023. The remaining EUR 7.5bn will come from the EU's multi-annual budget for 2021-2027.

The second component consists of a dedicated funding scheme under the InvestEU programme. It will mostly finance energy and transport infrastructure in the regions affected by the transition away from fossil fuels. The third component consists mainly of preferential loans provided by the European Investment Bank.

Combined, the three components are expected to trigger up to EUR 75bn of investment. To be eligible for the funding, member states have to prepare Territorial Just Transition Plans that define the regions affected by a transition away from fossil fuels.

European Commission, 2021h; European Parliament and the Council of the European Union, 2021



ADAPTATION

ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE



PARIS AGREEMENT Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.



The European Environment Agency warned of a rising **risk of forest fires** from climate change, especially in Southern Europe, which materialised in summer 2021 during devastating forest fires in Greece, Italy, and Spain.



Climate change will **increase the frequency and severity of flash flooding**, especially in mountainous areas. Coastal regions will also be affected by flooding driven by rising sea levels.



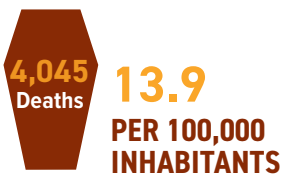
The frequency and severity of **heatwaves will increase significantly** and affect mostly urban areas and southern European countries. Rural areas will be affected by droughts.

ADAPTATION NEEDS

Climate Risk Index

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

Annual weather-related fatalities



Based on Germanwatch, 2019

Annual average losses (US\$ millions PPP)



Based on Germanwatch, 2019

The EU has already been struck by extreme weather events such as floods, droughts, heat waves, storms and wildfires. Similar to 2019, 2020 was another record-breaking year with extreme summer temperatures for several EU countries. 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

Impact ranking scale:



			1.5°C	2°C	3°C
WATER	% of area with increase in water scarcity				
	% of time in drought conditions				
HEAT AND HEALTH	Heatwave frequency				
	Days above 35°C				
AGRICULTURE	Maize	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			
	Wheat	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			

Water, Heat and Health: own research; Agriculture: Arnell et al., 2019

Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and, therefore, entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.



CORONAVIRUS RESPONSE AND RECOVERY

In February 2021, the European Commission presented the EU's Strategy on Adaptation, which made a number of suggestions that aim at mitigating the impacts of climate change. Its recommendations included better coordination between different levels of government to take climate risks into account. The costs of adaptation and recovery following a natural disaster should be reflected in the national financial frameworks. Climate resilience should also be increased by protecting and restoring wetlands, developing urban green spaces, and installing green roofs and walls.

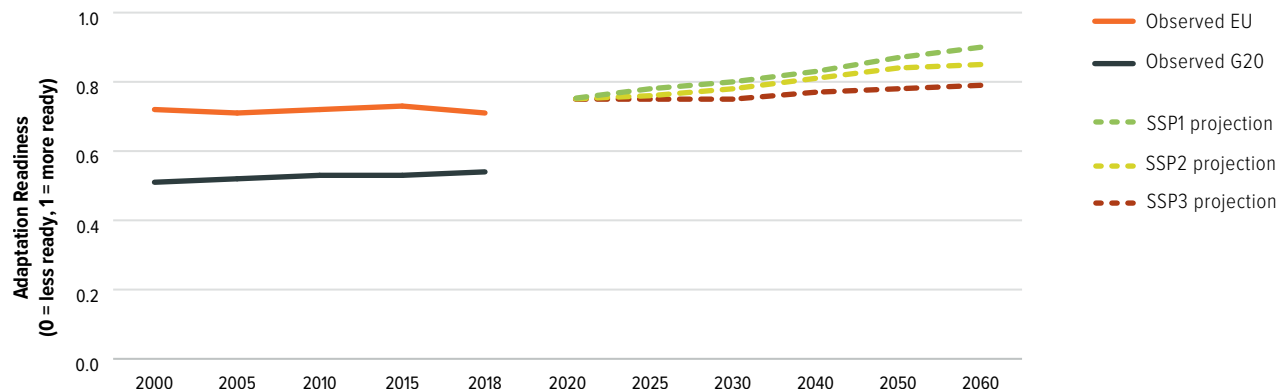
European Commission, 2021

In February 2021, the European Commission presented the EU's Strategy on Adaptation, which made a number of suggestions that

Adaptation Readiness

The figure shows 2000-2018 observed data from the Notre Dame Global Adaptation Initiative (ND-GAIN) Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2020 to 2060.

Notre Dame Global Adaptation Initiative (ND-Gain) Readiness Index



On average, the European Union scored well above the G20 average between 2000 and 2018 and is projected to continue doing so, given its combination of social, economic and governance structures. Adaptation challenges still exist, but the EU is well-positioned to adapt if it puts in place measures compatible with SSP1, and to a lesser extent, SSP2. Other measures, as represented by SSP3, reduce its readiness to adapt in the long term.

The readiness component of the Index created by the ND-GAIN encompasses social (social inequality, information and communications technology infrastructure, education and innovation),

economic, and governance indicators to assess a country's readiness to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of projections of future governance and, therefore, of possible adaptation readiness. The three scenarios shown here in dotted lines are described as a sustainable development-compatible scenario (SSP1), a middle-of-the-road (SSP2), and a 'Regional Rivalry' (SSP3) scenario.

Based on Andrijevic et al., 2020; ND-Gain Index, 2021

ADAPTATION POLICIES

National Adaptation Strategies

Document name	Publication year	Fields of action (sectors)												Monitoring & evaluation process	
		Agriculture	Biodiversity	Coastal areas and fishing	Education and research	Energy and industry	Finance and insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism		Water
EU strategy on adaptation to climate change	2013														Information provided by Member States under the Monitoring Mechanism Regulation (MMR)

Nationally Determined Contribution (NDC): Adaptation

TARGETS

Not mentioned

ACTIONS

Not mentioned

MITIGATION

REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE



Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

EMISSIONS OVERVIEW



The EU's GHG emissions excluding LULUCF have dropped by 26% (1990-2019). The EU's emissions reduction of "at least 55%" (incl LULUCF) is **not in line with a 1.5°C pathway**, unless the EU goes significantly beyond the 55% benchmark. The European Climate Law obliges the EU to reach "climate neutrality" by 2050.

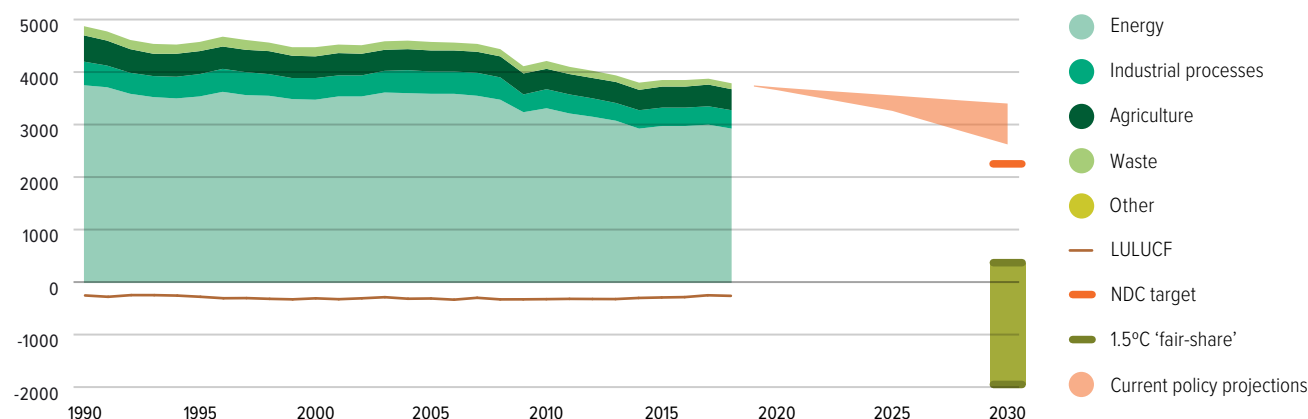


In 2030, global CO₂ emissions need to be 45% below 2010 levels and reach net zero by 2050. Global energy-related CO₂ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

Rogelj et al., 2018

GHG emissions across sectors and CAT 1.5°C 'fair-share' range (MtCO₂e/year)⁵

Total GHG emissions across sectors (MtCO₂e/year)



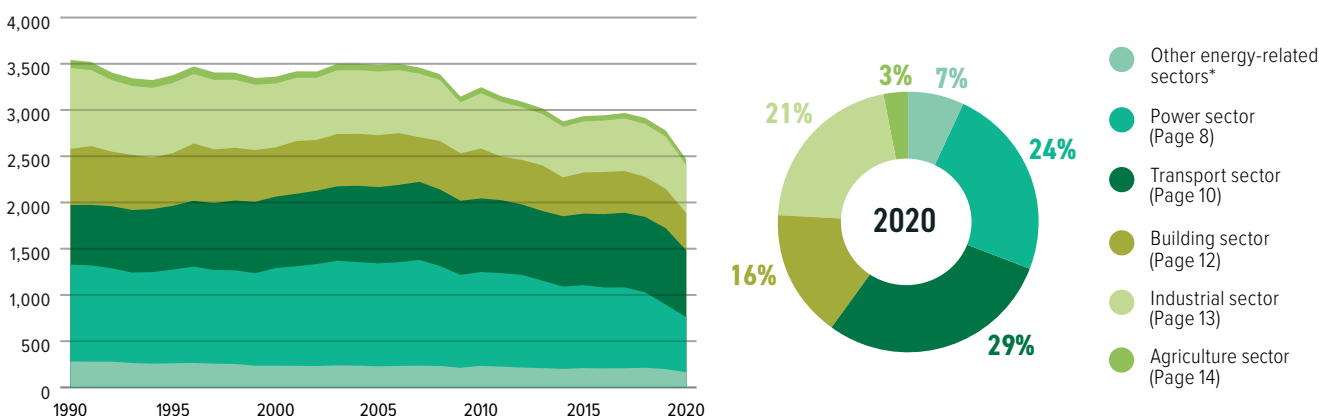
The EU's emissions (excl. land use) decreased by 26% between 1990 and 2019 to 3,610 MtCO₂e.

When considered by category, reductions in energy sector emissions have helped to decrease overall emissions. Emissions from industry and agriculture decreased slower than the total emissions. The EU's 2030 target is not a sufficient 'fair-share' contribution to the Paris Agreement. A 'fair-share' contribution by the EU requires it to strengthen its domestic target to 60-69% below 1990 and, in addition, provide substantial support for emissions reductions in developing countries.

Gütschow et al., 2021; Climate Action Tracker, 2020a, 2021

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)



The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion. Emissions from the power sector have been decreasing the fastest, with its share decreasing to 24% of all CO₂ emissions. It was the opposite case for the transport sector, where emissions have increased by 24% since 1990. As a result, the transport sector is, at 29%, the EU's largest contributor to emissions.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Other energy-related sectors covers energy-related CO₂ emissions from extracting and processing fossil fuels.

ENERGY OVERVIEW



Fossil fuels (oil, coal and gas) make up 68% of the EU energy mix, which is lower than the G20 average. The carbon intensity of the energy mix has **reduced from approximately 60 tCO₂/TJ in 1990 to 45 tCO₂/TJ in 2020**.

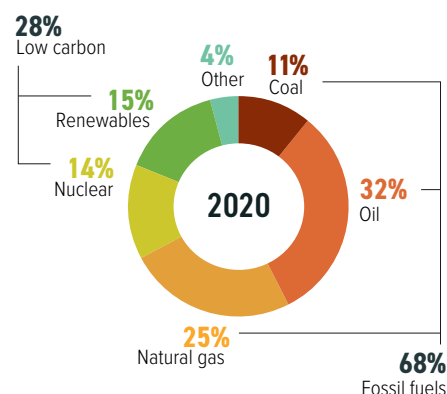
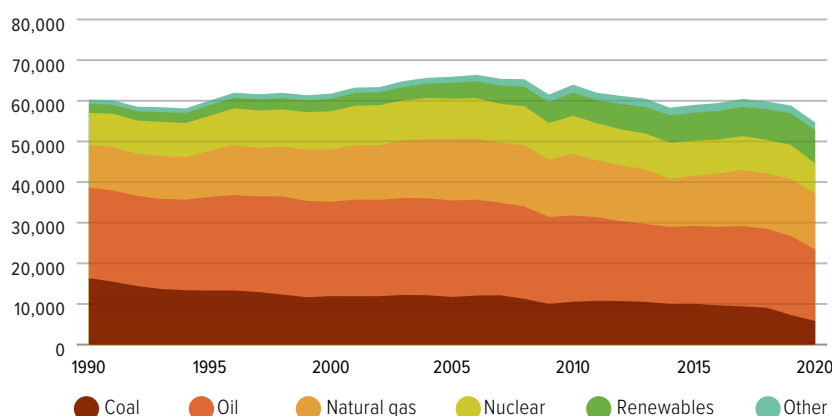


The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050, and to substantially lower levels without carbon capture and storage (CCS).

Rogelj et al., 2018

Energy mix

Total primary energy supply (TPES) (PJ)

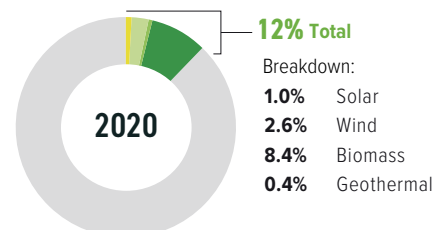
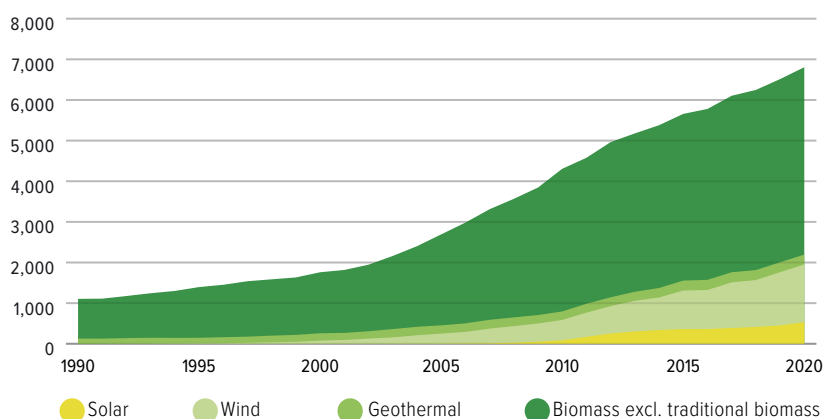


This graph shows the fuel mix for all energy supply, including energy used for electricity generation, heating, cooking, and transport fuels. Fossil fuels make up 68% of the EU's energy mix, lower than the high G20 average of 82%. Since 1990, the share of coal has decreased by almost two thirds, whereas oil continues to dominate the energy sector, driven by a lack of decisive climate action in the transport sector. The share of renewables has increased slightly over the past two decades, but its uptake has largely been limited to the power sector.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Solar, wind, geothermal, and biomass development

TPES from solar, wind, geothermal and biomass (PJ)

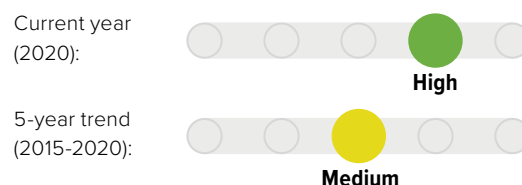


Solar, wind, geothermal and biomass account for 12.5% of The EU's primary energy supply – the G20 average is 7.1%. While biomass dominates the market, mostly for heat generation in the household sectors, the role of wind and solar has been increasing at an accelerated speed especially since 2010.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

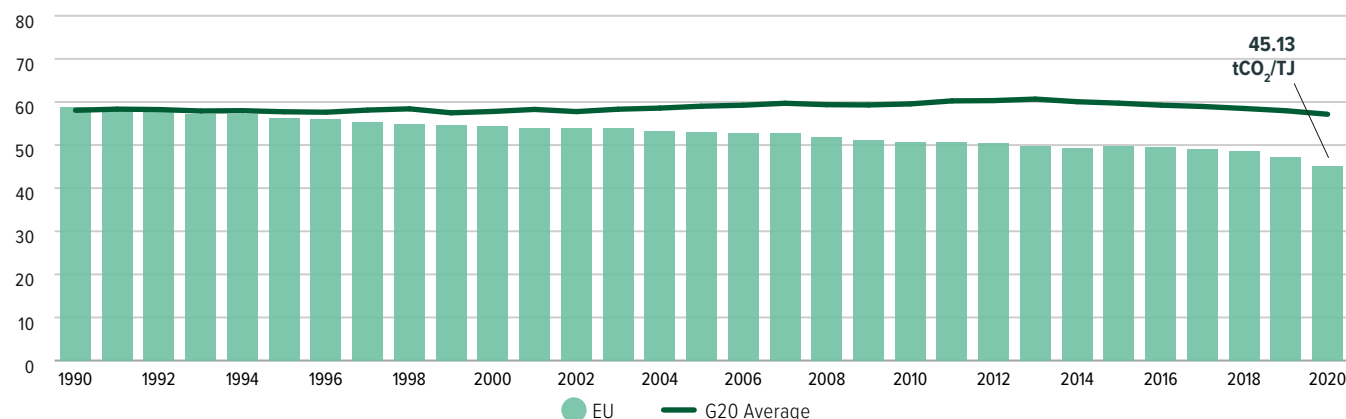
Note: Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.

Decarbonisation rating: Renewable energy share of TPES compared to other G20 countries



Carbon intensity of the energy sector

Tonnes of CO₂ per unit of TPES (tCO₂/TJ)

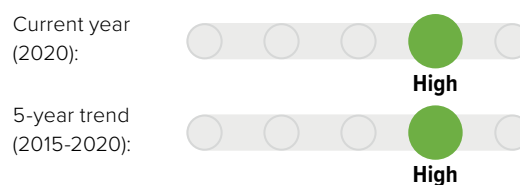


Carbon intensity is a measure of how much CO₂ is emitted per unit of energy supply.

The EU's carbon intensity in 2020 was 45 tCO₂/TJ, one of the lowest among the G20. This reflects the continuously growing share of renewables in the energy mix.

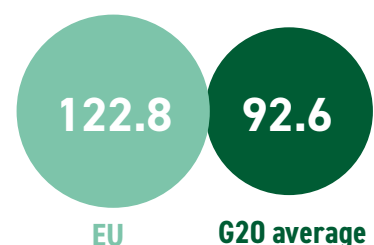
Enerdata, 2021

Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries

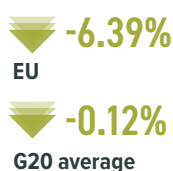


Energy supply per capita

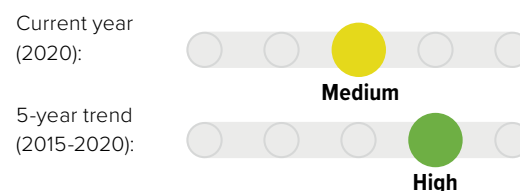
TPES per capita (GJ/capita) in 2020



TPES per capita (GJ/capita): 5-year trend (2015-2020)



Decarbonisation rating: energy supply per capita compared to other G20 countries

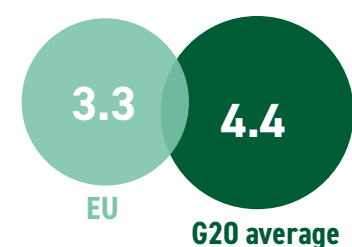


The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy. Energy use per capita in the EU was 122.75 GJ/capita in 2020, well above the G20 average, but has been decreasing at a faster rate of 6.39% between 2015 and 2020, in contrast to the slowly decreasing G20 average of 0.12% over the same period.

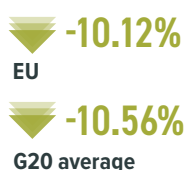
Enerdata 2021, United Nations- World Population Prospects, 2019

Energy intensity of the economy

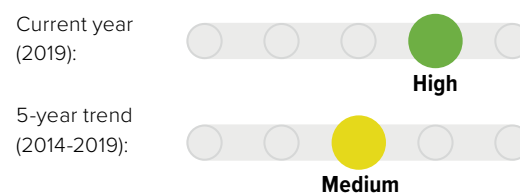
(TJ/million US\$2015 GDP) in 2019



Energy intensity of the economy 5-year trend (2014-2019)



Decarbonisation rating: energy intensity compared to other G20 countries



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 EU's energy intensity is lower than the G20 average and has been decreasing at a slightly lower speed 10.1% (2014-2019) as compared to the G20.

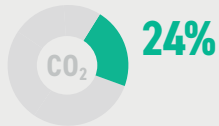
Enerdata, 2021; World Bank, 2021

POWER SECTOR

Emissions from energy used to make electricity and heat



The high price of EU ETS emissions allowances, combined with some states' plans to phase-out coal, high generation from renewables (4% points above 2019), and pandemic-driven recession resulted in a significant (4% points below 2019) **decrease in the share of coal in electricity generation**.



Share of energy-related CO₂ emissions from electricity and heat production in 2020.

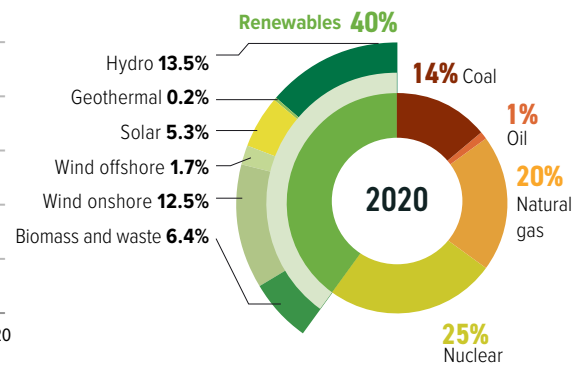
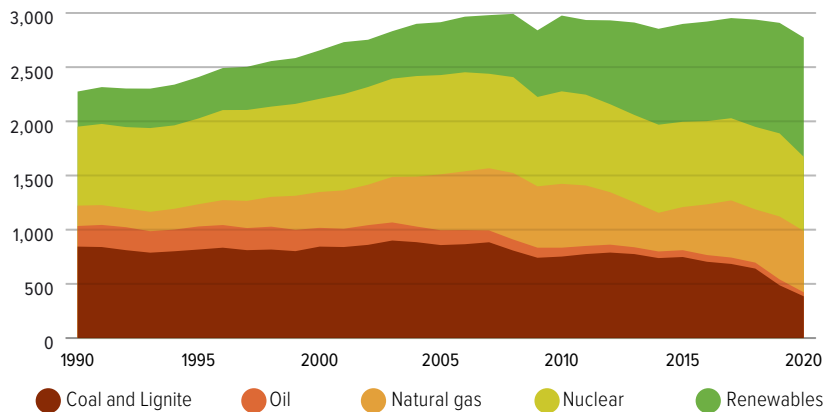


Worldwide, coal use for power generation needs to peak by 2020, and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. By 2040, the share of renewable energy in electricity generation has to be increased to at least 75%, and the share of unabated coal reduced to zero.

Rogelj et al., 2018; Climate Action Tracker, 2020b

Electricity generation mix

Gross power generation (TWh)

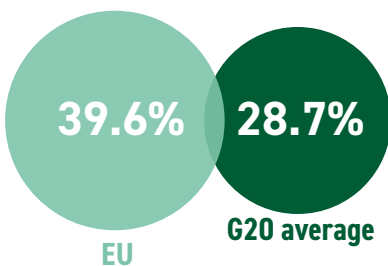


The EU **generated 36% of its electricity from fossil fuels in 2020**. The share of renewable energy in the EU's power sector has been increasing, accounting for approximately 40% of the power mix in 2020.

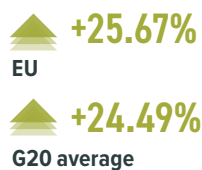
Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Share of renewables in power generation

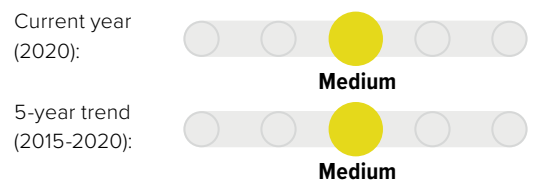
(incl. large hydro) in 2020



Share of renewables in power generation:
5-year trend (2015-2020)



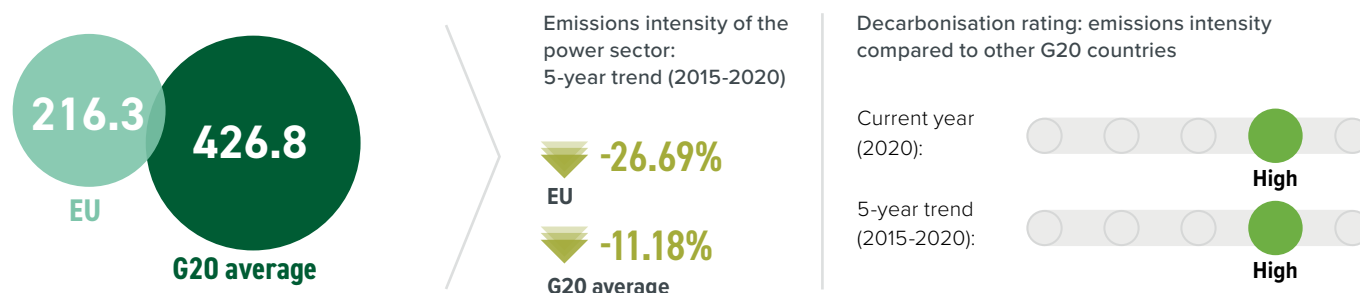
Decarbonisation rating: share of renewables compared to other G20 countries



Enerdata, 2021

Emissions intensity of the power sector

(gCO₂/kWh) in 2020



For each kilowatt hour of electricity, 216.3 g of CO₂ are emitted in the EU. Emissions intensity is decreasing because of the increasing share of renewables (about 40%) in the power mix and the implementation of a coal phase-out from some EU member states.

Enerdata, 2021

POLICY ASSESSMENT

Renewable energy in the power sector



With 10.5 GW of additional wind and 18.2 GW of solar photovoltaics (PV), the deployment of renewables in the EU does not reflect the decreasing costs of these sources of energy. The member states also need to significantly scale up deployment of renewables to take into account an increase in electricity demand resulting from the electrification of transport, buildings, and industry sectors.

The creation of the Renewable Energy Financing Mechanism by the European Commission in September 2020 was a step in the right direction as it allows member states to reach their renewable energy goals by funding development of renewables in other EU member states where it could be more cost competitive.

European Commission, 2020d, 2021k; WindEurope, 2021

Coal phase-out in the power sector



As of August 2021, 18 EU countries have set a coal phase-out date, and three (Belgium, Austria, and Sweden) have already phased out coal in the power sector. In 2020, coal generated 14% of the electricity and heat consumed in the EU, 4% points below 2019 levels. To be Paris Agreement compatible, G20 members need to phase out coal before 2030, but Germany and Czech Republic have phase-out dates after 2030. Some EU member states, especially in Eastern Europe, have no plans yet to phase out coal. Poland's coal plays an important role: with over 30 GW installed, it is responsible for 22% of the EU's total coal capacity, second only to Germany. However, a recent draft of Poland's Energy Policy until 2040 indicates decreasing the share of coal in the electricity mix to as low as 11% from its current 75% share.

The adoption of the higher emissions reduction target, together with the "Fit for 55" package of proposals, creates the opportunity for a much faster decarbonisation of the electricity sector than initially projected. The proposed reform of the EU ETS should result in a much higher price of emissions allowances, which would also accelerate a coal phase-out in countries with late (e.g. 2038) or no phase-out date.

Ministry of Climate, 2020; Europe Beyond Coal, 2021

CORONAVIRUS RESPONSE AND RECOVERY

To fulfill the requirement of spending at least 30% of the multi-annual budget (2021-2027) and NextGenerationEU recovery fund (2021-2023) on climate action, EU member states, combined, need to spend a total of almost EUR 700bn, most of it in the early 2020s.

Some countries aim to spend some of the resources on natural gas infrastructure, which is allowed, for example in the framework of the InvestEU programme. This could, however, result in carbon lock-in and increase the value of stranded assets, instead of driving decarbonisation.

TRANSPORT SECTOR

Emissions from energy used to transport goods and people



In contrast to the EU's overall downward emissions trend, the share of **transport emissions have been increasing from a low of 17% in 2013 to 28% of total emissions in 2019**. Transport emissions in 2020, however, plummeted to 14%, due (primarily) to pandemic-induced lockdowns and subsequent economic slowdowns. Without stronger climate policies, this decrease will only be temporary.



The share of low-carbon fuels in the transport fuel mix globally must increase to **between 40% and 60% by 2040 and 70% to 95% by 2050**.

Rogelj et al., 2018; Climate Action Tracker, 2020b

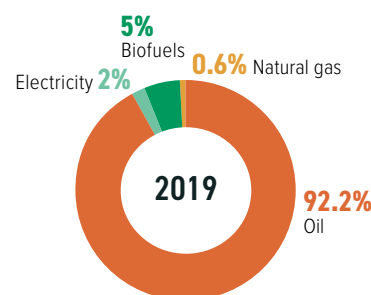
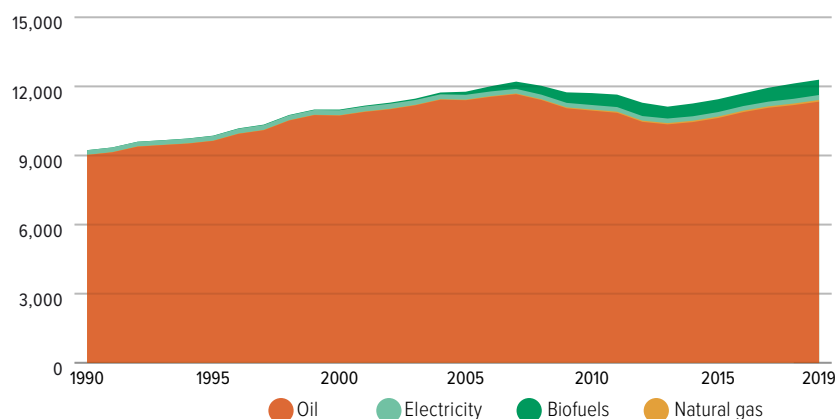


0.56%
Indirect emissions
29.27%
Direct emissions

Share of transport in energy-related CO₂ emissions.

Transport energy mix

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

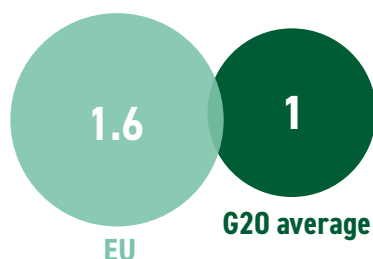


Electricity and biofuels make up only 7% of the energy mix in transport.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Transport emissions per capita

excl. aviation (tCO₂/capita) in 2020



Transport emissions:
5-year trend (2015-2020)

▼ **-3.4%**
EU

▼ **-4.3%**
G20 average

Decarbonisation rating: transport emissions
compared to other G20 countries

Current year
(2020):



5-year trend
(2015-2020):

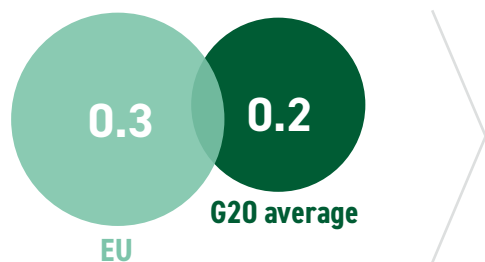


Reductions in transport emissions per capita in 2020, and concomitant changes in the 5-year trends and decarbonisation ratings, reflect widespread economic slowdowns and transport restrictions imposed in response to the COVID-19 pandemic. For a discussion of broader trends in the G20 and the rebound of transport emissions in 2021, please see the Highlights Report at www.climate-transparency.org

Enerdata, 2021; United Nations, 2019

Aviation emissions per capita⁶

(tCO₂/capita) in 2018



Enerdata, 2021; International Energy Agency, 2020; United Nations, 2019

Aviation emissions:
5-year trend (2013-2018)

▲ +23.26
EU

▲ +21.25%
G20 average

Decarbonisation rating: aviation emissions
compared to other G20 countries

Current year
(2018):



5-year trend
(2013-2018):



Motorisation rate



532 VEHICLES

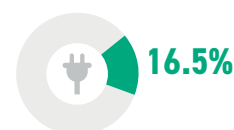
per 1,000 inhabitants in 2019 in the EU*

Enerdata, 2021

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

The EU's share of EV sales
in 2020 was 16.5%.

ACEA, 2021



Passenger transport

(modal split in % of passenger-km) in 2018

No data available for the EU

Freight transport

(modal split in % of tonne-km) in 2018

Not data available for the EU

*Owing to the variety of sources and data years available, these data are not comparable across G20 countries.

POLICY ASSESSMENT

Phase out fossil fuel cars



As part of the "Fit for 55" plan, the European Commission proposed a significant strengthening of the emissions reduction for new vehicles for 2030 and 2035. In the latter case, emissions of new vehicles should decrease by 100%, resulting in a de facto phase-out of the combustion engine. In its assessment of the proposal, the European Commission explained that such a timeline is necessary to reach the "climate neutrality" of the transport sector by 2050. It remains to be seen whether this proposal will be accepted by the Council representing national governments and the European Parliament.

Ahead of the Commission's proposal, some member states had already adopted plans to phase-out the sale of combustion passenger cars by a certain date: Sweden, the Netherlands, and Slovenia by 2030; Denmark by 2035; France and Spain by 2040.

European Commission, 2021a, 2021g; ICCT, 2021; Wappelhorst, 2021

Phase out fossil fuel heavy-duty vehicles



While there is no phase-out date for combustion heavy-duty vehicles, the European Commission set the first EU-wide standard for CO₂ emissions for heavy-duty vehicles in 2019. The regulation mandates emissions from new vehicles should decrease by 15% between 2025-2029 and by 30% from 2030 onwards, in comparison to emissions of the new vehicles sold between July 1, 2019 and June 30, 2020. The regulation also sets a 2% benchmark for the share of zero and low-emission vehicles (ZLEV).

To allow for charging of heavy-duty vehicles, in its "Fit for 55" package of proposals, the Commission also introduced a requirement to significantly increase the density of charging stations. By 2025 there should be a recharging pool with combined capacity of 1,400 kW every 60km along the major routes (TEN-T Network). By 2030 this capacity should increase to 3,500 kW.

European Parliament and the Council of the European Union, 2019; European Commission, 2021j; EU, 2019

Modal shift in (ground) transport



In 2020, the European Commission, in its Sustainable and Smart Mobility Strategy, outlined targets to double high-speed rail traffic by 2030, a step towards a more sustainable modal shift through increased and improved rail connectivity.

The EU continues to discuss an amendment to the 1992 Directive on combined transport that would, for example, broaden its scope to national intermodal operations and extend economic support measures for transshipment terminals. This could facilitate a shift from road to rail, especially for long distances. The Amendment should be adopted by 2022.

Shifting EU investment from road to rail infrastructure offers the potential to increase the attractiveness of low-carbon modes of transport. In their National Recovery Plans, the basis for receiving funding from the EU's post-COVID 19 recovery fund, most member states planned to spend substantial resources on developing or modernising railway connections.

European Commission, 2021i; European Council, 2021

BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings



Direct emissions and indirect emissions from the building sector in the EU account for 15.24% and 12.76% of total energy-related CO₂ emissions, respectively. Per capita emissions from the buildings sector are 1.19 times the G20 average. **The EU's policies are not sufficient for a 1.5°C pathway.**



By 2040, global emissions from buildings need to be reduced by 90% from 2015 levels, and be 95-100% below 2015 levels by 2050, mostly through increased efficiency, reduced energy demand, and electrification in conjunction with complete decarbonisation of the power sector.

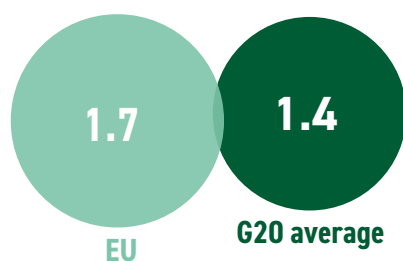
Rogelj et al., 2018; Climate Action Tracker, 2020b



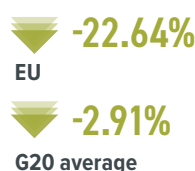
Share of buildings in energy-related CO₂ emissions. Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc.)

Building emissions per capita

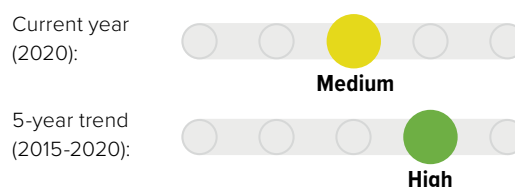
(incl. indirect emissions) (tCO₂/capita) in 2020



Building emissions:
5-year trend (2015-2020)



Decarbonisation rating: building emissions compared to other G20 countries



Buildings-related emissions per capita are nearly 1.19 times the G20 average as of 2020. This reflects the high fossil fuel share of the electricity mix. In contrast to the G20 average, the EU has managed to decrease the level by 22.64% (2015-2020).

Enerdata, 2021; United Nations, 2019

POLICY ASSESSMENT

Near zero energy new buildings



Emissions from the EU buildings sector are covered by the Energy Performance Buildings Directive (EPBD). This directive, amended in 2018, obliges member states to introduce minimum energy performance requirements and ensure that, from 2021, all new buildings are “nearly zero energy buildings” (NZEB). However, the determination of which criteria need to be fulfilled for a building to be considered NZEB have been left to the member states. In its Renovation Wave announced in October 2020, the Commission suggested introducing a “deep renovation” standard when amending EPBD in late 2021. To facilitate emissions reductions from the buildings sector, the proposed amendment of the Renewable Energy Directive also includes the goal of increasing the share of energy from renewable sources to 49% in 2030 – significantly above the average 40% for overall energy consumption.

European Parliament and the Council of the European Union, 2018; European Commission, 2020b, 2021d

Renovation of existing buildings



The EU's EPBD directive amended in 2018 obliges each member state to submit a long-term renovation strategy leading to fully decarbonising its building stock by 2050, with specific milestones for 2030. However, with the current renovation rate at about 1% annually, the EU is far from this goal.

The Renovation Wave tabled by the European Commission in October 2020 included the goal of doubling the renovation rate from 1% to 2%. To meet even this small goal by 2030, at least 35 million buildings are to be renovated. The renovation rate should be accelerated by the creation of a one-stop-shop for the provision of technical, administrative, and financial knowledge about increasing energy efficiency and house renovation. A mechanism should also be introduced to ensure that both tenants and homeowners benefit from the implementation of energy efficiency measures. Governments of the member states are encouraged to set up Energy Efficiency National Funds to facilitate renovation.

A renovation rate of 3.5% would be 1.5°C compatible.

Climate Action Tracker, 2020b; European Commission, 2020b

INDUSTRY SECTOR

Emissions from energy use in industry

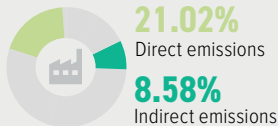


Direct emissions and indirect emissions from industry in the EU make up 21.0% and 8.6% of energy-related CO₂ emissions, respectively. The EU ETS covers this sector. The March 2020 New Industrial Strategy for Europe includes measures for industry to contribute to the “climate neutrality” goal; updated in May 2021 to reflect the impact of the pandemic. **The Strategy is complemented by the Hydrogen Strategy (July 2020), Chemicals Strategy (October 2020), and Commission Staff Working Document focusing on clean steel (May 2021).**



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

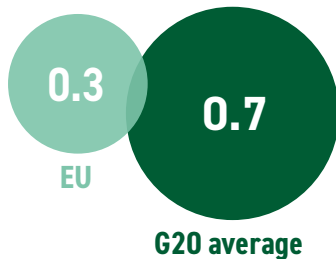
Rogelj et al., 2018



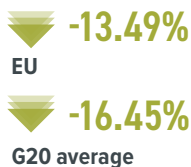
Share of industry in energy-related CO₂ emissions.

Industry emissions intensity⁷

(tCO₂e/USD2015 GVA) in 2017



Industry emissions intensity:
5-year trend (2012-2017)



Decarbonisation rating: industry emissions intensity compared to other G20 countries

Current year (2017):



5-year trend (2012-2017):



Enerdata, 2021; World Bank, 2021

Carbon intensity of steel production⁸

(kgCO₂/tonne product) in 2016

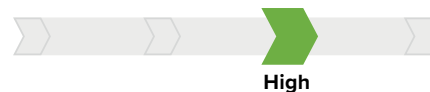


Steel production and steelmaking are significant GHG emissions sources, and challenging to decarbonise.

World Steel Association, 2018; Climate Action Tracker, 2020c

POLICY ASSESSMENT

Energy efficiency



In an effort to meet the new EU 2030 climate target, the European Commission suggested reducing EU's energy consumption to no more than 787 Mtoe of final energy and 1,023 Mtoe of primary energy in its proposal for revising the Energy Efficiency Directive. This means reducing energy consumption by 21% and 25%, respectively. In the industry sector, the Chemical Strategy gives priority to energy efficiency for emissions reduction, whereas the Staff Working Paper on clean steel points towards the potential of digitalisation, predictive maintenance and robotics, as well as steel recycling to reduce energy consumption in this energy-intensive sector.

European Commission, 2020a, 2020c, 2021f, 2021m, 2021n

LAND USE SECTOR

Emissions from changes in the use of the land



To stay within the 1.5°C limit, the **EU needs to make the land use and forest sector a net sink of emissions**, e.g. by discontinuing the degradation of peatlands and use of moor soils, converting cropland into wetlands, and by creating new forests.

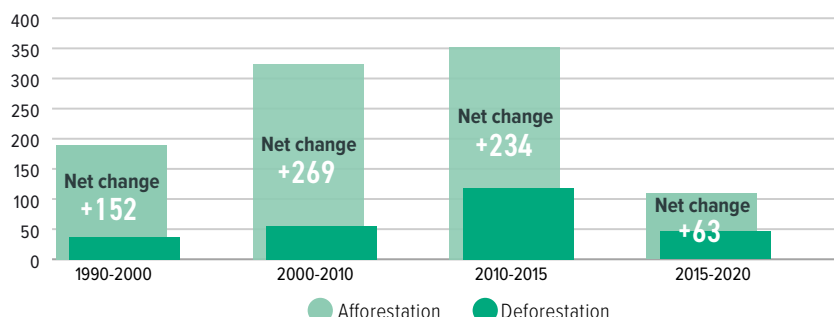


Global deforestation needs to be halted and changed to net CO₂ removals by around 2030.

Rogelj et al., 2018

Annual forest expansion, deforestation and net change

Forest area change in 1,000 ha/year



Between 2015-2020, the EU gained 63 kha of forest area per year on average.

Global Forest Resources Assessment, 2020

Note: There is a change of source and methodology for measuring this indicator from last year's profiles, which means the two years may not be directly comparable.

POLICY ASSESSMENT

Target for net zero deforestation



According to the EU's 2018 land use and forestry regulation, each member state must ensure that GHG emissions from this sector are offset by at least an equivalent removal of CO₂ from the atmosphere in the period 2021 to 2030. The Commission's proposal from July 2021 includes a goal of increasing the sink to 310 MtCO₂e annually between 2026 and 2030, but only 225 MtCO₂e can be used to account for meeting the EU's emissions reduction target. One of the ways to meet this target is by planting three billion additional trees – repeated in the EU's New Forest Strategy published in July 2021.

European Commission, 2021c, 2021i

AGRICULTURE SECTOR

Emissions from agriculture



The EU's agricultural emissions are mainly from **digestive processes (mainly cattle) and livestock manure**, and covered by the Effort Sharing Regulation. Under the Commission's July 2021 proposal, from 2031 non-CO₂ agricultural emissions will be combined with the LULUCF sector, creating a land-use sector where emissions and sinks should balance each other out by, latest, 2035. A 1.5°C compatible pathway requires behavioural and dietary shifts and less fertiliser use.

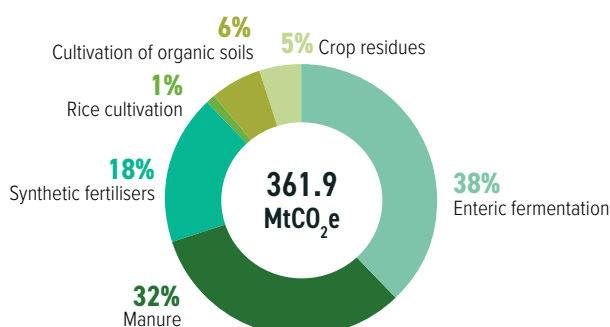


Methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels).

Rogelj et al., 2018

Emissions from agriculture (excluding energy)

Emissions from the agriculture sector in 2018



In the EU, around 57% of GHG emissions in the agriculture sector are from enteric fermentation and manure. Dietary changes and efficient use of fertilisers as well as reductions in food waste could help reduce emissions from this sector.

In its proposal, the Commission suggested increasingly deploying carbon farming schemes and certification for carbon removals. The Carbon Removal Certification mechanism should be adopted by 2023 and promote the creation of new business models that are focused on increasing carbon sequestration in agriculture and other land types.

FAO, 2021

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

MITIGATION: TARGETS AND AMBITION

WARMING OF
2.4°C

The combined mitigation effect of Nationally Determined Contributions (NDCs) assessed by April 2021 is **not sufficient and will lead to a warming of 2.4°C by the end of the century**. This highlights the urgent need for all countries to submit more ambitious targets by COP26, as they agreed in 2015, and to **urgently strengthen their climate action to align to the Paris Agreement's temperature goal**.

Climate Analytics, 2021a

AMBITION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

TARGETS

Reducing emissions by at least 55%, including max 225 MtCO₂e carbon sink from LULUCF

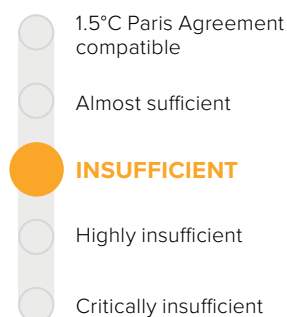
ACTIONS

European Green Deal and "Fit for 55" package of measures that aim to adapt existing policies to the new goal.

In December 2020, the EU submitted an updated NDC with the 2030 goal of reducing emissions by at least 55%, including LULUCF. European Climate Law, adopted in May 2021, specified that only 225 MtCO₂e can be accounted for by LULUCF towards meeting this emissions reduction goal. In July 2021, the Commission presented the "Fit for 55" package of proposals that aims at adapting existing legislation to the higher emissions reduction target.

Climate Action Tracker (CAT) evaluation of targets and actions

EU'S OVERALL RATING



This CAT evaluation is a **new, overall rating**, that combines the several, separately rated elements, of policies and actions, domestic and internationally supported targets, 'fair-share target' and the country's contribution to climate finance. The "Insufficient" rating indicates that the EU's climate policies and commitments need substantial improvements to be consistent with the Paris Agreement's 1.5°C temperature limit. The EU's 2030 emissions reduction target and its policies and action are consistent with 2°C of warming when compared to modelled domestic pathways. The EU is not meeting its 'fair-share' contributions to climate action.

To improve its rating, the EU should strengthen its emissions reduction target to at least 62% below 1990 levels, adopt policies necessary to reach this goal, and significantly increase its support for climate action in developing and least developed countries. For the full assessment of the country's target and actions, and the explication of the methodology see www.climateactiontracker.org

Climate Action Tracker, 2021

TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability. The NDC Transparency Check has been developed in response to Paris Agreement decision 1/CP.21 and the Annex to decision 4/CMA.1, which sets out the "information to facilitate clarity, transparency and understanding" as crucial elements of NDCs.

NDC Transparency Check recommendations

The EU submitted its first NDC to the UNFCCC in March 2015 and updated it on 29 December 2020. In comparison to its first NDC, the EU has added elements that enhance clarity, transparency, and understanding. The additional information includes a comparison between its previous and current 2030 targets and clarifies that the new target includes emissions sinks from the LULUCF sector and international aviation.

Since the submission of its updated NDC, the EU published the "Fit for 55" package of proposals clarifying how existing legislation will be adapted to reflect the new target.

There is still room for improvement to increase comparability, transparency, and understanding in the EU's future NDCs or NDC updates, including:

- Explicitly detailing the circumstances under which the EU will update the values of the reference indicators and the information on sources.
- Information on how the EU plans to include emissions reduction from international aviation and maritime, especially if and how extra-EU aviation will be included in the target.
- Clarity on potential plans to increase the target beyond 55% to reflect the "at least" aspect of the goal.
- Present mitigation potential assessments to sustain the assertion that the EU's NDC target is more ambitious than the previous and aligned with the long-term temperature goal of the Paris Agreement.

AMBITION: LONG-TERM STRATEGIES

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition toward net zero emissions and climate-resilient economies.

Status	Submitted to UNFCCC, last update in 2020
Interim steps	Yes: at least -55% by 2030
Sectoral targets	No
Net zero target	Yes
Net zero year	Climate Neutrality by 2050

FINANCE

MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS



Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.



While on one hand the EU decided to spend almost a third of its Recovery Package and Multiannual Financial Framework on climate action, it also continued with subsidisation of fossil fuels, thus countering the impact of these significant expenditures.



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

Rogelj et al., 2018

FISCAL POLICY LEVERS

Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in the price.

Fossil fuel subsidies

(USD billions)

No data available for the EU

Fossil fuel subsidies by fuel type

USD in 2019

The latest estimates on fossil fuel subsidies being provided through the EU's long-term budget, the Multiannual Financial Framework (MFF), totalled USD 604m (EUR 515m) per year between 2014-2016. The MFF encompasses three mechanisms of support to fossil fuels (mainly to oil and gas infrastructure projects): the European Regional Development Fund, the Connecting Europe Facility, and the Horizon 2020 research and innovation programme.

No monetary commitments to fossil fuel energy are recorded by the Energy Policy Tracker for the EU for 2020.

Energy Policy Tracker, 2021; OECD-IEA Fossil Fuel Support database, 2020; Gençsü et al., 2017

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



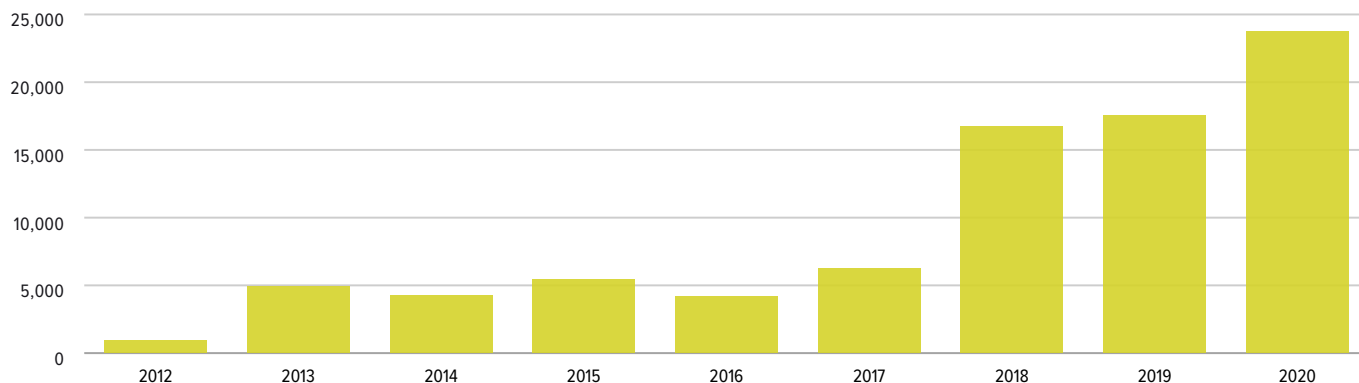
CORONAVIRUS RESPONSE AND RECOVERY

The EU is planning to spend at least 30% of the combined multi-annual budget and NextGenerationEU recovery fund, totalling over EUR 2tn on climate action. Most of these resources – including all the recovery fund – need to be spent in the early 2020s. EU recovery plans have been complemented by national recovery plans, in which the funding for climate action was much lower, with some providing significant support to heavy emitters with no or few climate-action related conditions.

European Council, 2021; European Commission, 2021a

Carbon pricing and revenue

(USD millions)



In 2005, the EU introduced the EU Emissions Trading Scheme (EU ETS). After a long period of low-priced emissions allowances, the mechanism was modified from 2018, resulting in significantly higher prices. In 2021, the price approached EUR 60/tCO₂e – the highest price of any carbon trading scheme in the world. In 2020 it brought in USD 23.8bn of revenue. The accelerated rate of emissions reductions and stricter emissions cap proposed by the Commission by July 2021 may result in even higher prices in the future. Currently, member states have to spend an equivalent of 50% of the income on climate action. The Commission's proposal increases this share to 100%.

The EU ETS covers the power, industry and aviation sectors, but with extra-EU flights temporarily exempted from the scheme. The Commission's proposal for the EU ETS revision also suggests including the intra-EU maritime sector in the scheme. A recent Commission proposal includes a suggestion to create an additional and separate emissions trading mechanism for the transport and building sectors from 2026.

I4CE, 2021; Energy Policy Tracker, 2021

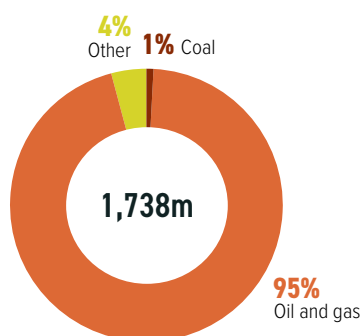
PUBLIC FINANCE

Governments steer investments through their public finance institutions, including via development banks both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries, and public sources are a key aspect of these obligations under the UNFCCC.

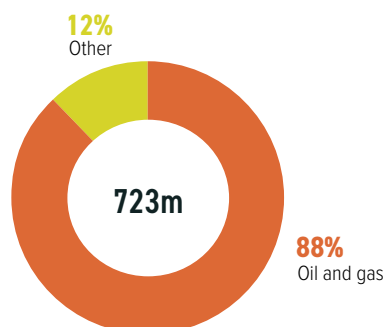
Public finance for fossil fuels

USD per annum (2018-19 average)

European Investment Bank



European Bank for Reconstruction and Development



Oil Change International, 2020

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

Provision of international public support

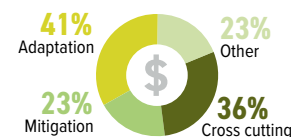
USD millions, annual average 2017 and 2018

Bilateral, regional and other channels

Annual average contribution:

3,157

Theme of support:



Multilateral climate finance contributions

Annual average contribution:

3,243

Theme of support:



The EU is listed in Annex II of the UNFCCC and as a bloc is formally obliged to provide climate finance. It is ranked the fourth largest contributor of bilateral climate finance and the largest for multilateral climate finance. In 2017-2018, it corrected its earlier bias towards mitigation in bilateral climate finance flows, with amounts increasing since the 2015/16 period. The EU includes the EIB in its multilateral funding, accounting for an increase in multilateral spending from the 2015/2016 period. These contributions remain considered by the EU as climate-specific, rather than a core general contribution to a multilateral institution.

FINANCIAL POLICY AND REGULATION

Financial policy and regulation

Through policy and regulation, governments can overcome challenges to mobilising green finance, including real and perceived risks, insufficient returns on investment, capacity and information gaps.



European institutions put in place a series of initiatives to address the risks of climate to the stability of the financial system. In

November 2020, the European Central Bank (ECB) published a guide on climate-related and environmental risks. This will be followed

by a full supervisory review of banks in 2022. In January 2021 the ECB set up a climate change centre to focus specifically on financial stability and prudential policy; macroeconomic analysis and monetary policy; financial market operations and risk; EU policy and financial regulation; and corporate sustainability.

In June 2020, the European Council and European Parliament released an updated regulation on the establishment of a framework

to facilitate sustainable investment (Taxonomy Regulation) and on sustainability-related disclosures in the financial services sector. The proposed regulation establishes an EU-wide 'framework' intended to provide businesses and investors with a common methodology and bring new disclosure requirements for listed large companies. In April 2021, the European Commission adopted a package of measures including the '*EU Taxonomy Climate Delegated Act*' which delivers the first set of technical criteria for defining activities that contribute substantially to climate change mitigation and adaptation. The EU also released a targeted consultation from January-March 2021 on the establishment of a European Single Access Point (ESAP) for companies' financial and sustainable investment-related information made public pursuant to EU legislation.

European Central Bank, 2020, 2021; European Commission, 2021p, 2021q

Nationally Determined Contribution (NDC): Finance

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

ENDNOTES

Where referenced, “Enerdata, 2021” refers to data provided in July 2021. For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2021

- The ‘1.5°C compatible pathway’ is derived from global cost-effective pathways assessed by the IPCC’s SR15, selected based on sustainability criteria, and defined by the 5th-50th percentiles of the distributions of such pathways achieving the long-term temperature goal of the Paris Agreement. Negative emissions from the land sector and novel negative emissions technologies are not included in the assessed models, which consider one primary negative emission technology (BECCS). In addition to domestic 1.5°C compatible emissions pathways, the ‘fair-share’ emissions reduction range would almost always require a developed country to provide enough support through climate finance, or other means of implementation, to bring the total emissions reduction contribution of that country down to the required ‘fair-share’ level.
- ‘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 LULUCF, which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).
- The Decarbonisation Ratings assess the current year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.
- The selection of policies rated and the assessment of 1.5°C compatibility are primarily informed by the Paris Agreement and the IPCC’s 2018 SR15. The table below displays the criteria used to assess a country’s policy performance.
- The 1.5°C ‘fair-share’ ranges for 2030 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, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. In order to maintain comparability across all countries, this report harmonises all data with PRIMAP, 2021 dataset to 2018. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories. Where countries submitted updated NDC targets before August 2021, these have been analysed and included.
- This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

On endnote 4.	Low	Medium	High	Frontrunner
Renewable energy in power sector	No policies 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 targets and policies 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 policies 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 fuel-based light-duty vehicles by 2035 worldwide
Phase out fossil fuel heavy-duty vehicles	No policies	Some policies (e.g. energy/emissions performance standards or support)	Policies + strategy to reduce absolute emissions from freight transport	Policies + innovation strategy to phase out emissions from freight transport by 2050
Modal shift in (ground) transport	No policies	Some policies (e.g. support programmes to shift to rail or non-motorised transport)	Policies + longer-term strategy	Policies + longer-term strategy consistent with 1.5°C pathway
Near zero energy new buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + national strategy for near zero energy new buildings	Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non-OECD countries)
Energy efficiency in industry	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
Retrofitting existing buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + retrofitting strategy	Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020
Net zero deforestation	No policies or incentives to reduce deforestation in place	Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation/ reforestation in place)	Policies + national target for reaching net zero deforestation	Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage

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