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## PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS ABOVE G20 AVERAGE

China's total GHG emissions (excl. land use) have more than tripled since 1990, with the increase slowing down since 2014. Emissions are projected to continue increasing but could peak before 2030.

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



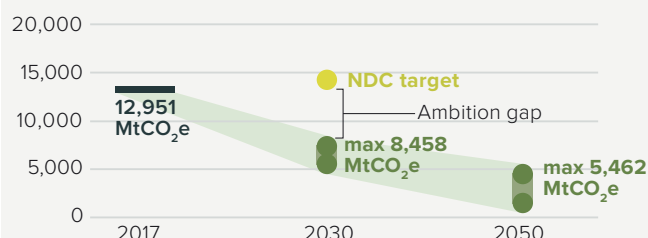
Data for 2017. Sources: Enerdata, 2020; UN Department of Economic and Social Affairs Population Division, 2020; Gütschow et al., 2019

## NOT YET ON TRACK FOR A 1.5°C WORLD



China needs to reduce emissions to below 8,458 MtCO<sub>2</sub>e by 2030 and to below 5,462 MtCO<sub>2</sub>e by 2050 to be within its 'fair-share' range compatible with global 1.5°C IPCC scenarios. China's present 2030 NDC will only limit its emissions to 13,744-15,194 MtCO<sub>2</sub>e. However, in September 2020 President Xi Jinping announced China would increase the ambition of its NDC to peak CO<sub>2</sub> emissions before 2030. In addition, China would set a long-term goal of becoming carbon-neutral before 2060. Depending on the timing and scope this could move China's emissions close to, or within, the 'fair-share' range compatible with 1.5°C. All figures exclude land use emissions and are based on pre-COVID-19 projections.

### China 1.5°C 'fair-share' pathway (MtCO<sub>2</sub>e/year)<sup>1&2</sup>



Source: Climate Action Tracker, 2020

## KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



**EXPAND RENEWABLE ENERGY CONSTRUCTION**

Post-COVID recovery plans should focus on expanding renewable energy construction and transmission as well as distributed renewable energy, and not on coal. China needs to stop developing new coal and phase out coal-fired power by 2040.



**WITHDRAW COAL PIPELINE PROJECTS**

Given falling costs of solar and wind, withdrawal of coal pipeline projects domestically and investments abroad is crucial to limiting global emissions and reducing air quality issues.



**NET-ZERO EMISSIONS STRATEGY**

President Xi Jinping's September 2020 announcement could prompt the development of a net-zero emissions strategy in line with the Paris Agreements. Such a strategy would need to increase energy efficiency and electrification, integrate increasing shares of renewables, and support decarbonising the whole energy system.

Sources: Climate Action Tracker, 2020; Standaert, 2019; Amelang, 2020; Enkhardt, 2020; Ker, 2020; Shaw, 2020

## RECENT DEVELOPMENTS



President Xi Jinping announced that China will enhance its NDC target, aiming to peak CO<sub>2</sub> emissions before 2030, and will aim to achieve carbon neutrality before 2060.



On 31 March 2020, the Chinese government extended purchasing subsidies and 'new energy vehicle' tax exemptions in order to stimulate the market for electric, plug-in hybrid and fuel cell-powered vehicles.



China currently has **249.6 GW of coal-fired power capacity in development, a 21% increase over 2019** (205.9 GW), despite the existing overcapacity. China continues to invest heavily in overseas coal projects.

Sources: Yun, 2020; Gao, 2020; Global Energy Monitor, 2020; Hillbrand and Horowitz, 2020

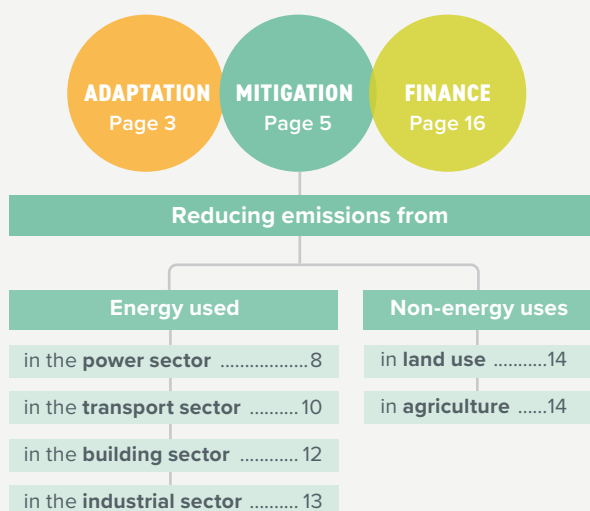
## CORONAVIRUS RECOVERY

The Chinese government has announced a USD 7tn economic stimulus package to combat the impact of COVID-19. The measures have not been targeted at decarbonising the economy. Instead, a further 40.8 GW of new coal plants have been proposed, as the government relaxes restrictions on new coal plant development.

Reference: Global Energy Monitor, 2020

## CONTENTS

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



## LEGEND

**Trends** show developments over the past five years for which data are available. The thumbs indicate assessment from a climate protection perspective.



**Decarbonisation Ratings**<sup>4</sup> 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.



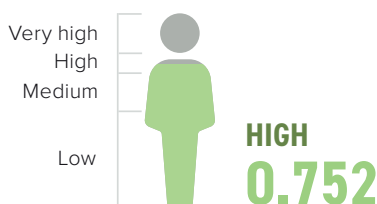
**Policy Ratings**<sup>5</sup> evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



## SOCIO-ECONOMIC CONTEXT

### Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. China ranks high.



Data for 2018. Source: UNDP, 2019

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

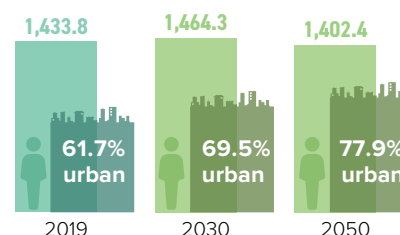


Data for 2019. Sources: World Bank, 2020

### Population and urbanisation projections

(in millions)

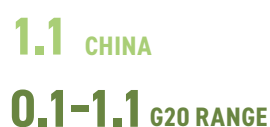
China's population is expected to decrease by about 2.2% by 2050 and become substantially more urbanised.



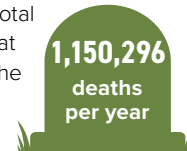
Sources: United Nations, 2018; The World Bank, 2019

### Death rate attributable to air pollution

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



More than 1 million people die in China every year as a result of outdoor air pollution, due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to the total population, this is at the upper end of the G20 range.



Data for 2016. Source: WHO, 2018

## JUST TRANSITION



Coal has been the dominant energy source of China's energy mix for decades. Increasing concerns surrounding coal's impact on domestic air quality and water availability, and growing pressure to reduce greenhouse gas emissions, led to a drop in coal use from 2013. **Yet coal still represents 61% of China's total energy mix and 65% of the electricity generation mix.** While China has measures like its coal cap policy to reduce coal from its energy system, its post-COVID-19 recovery

stimulus includes **proposals for dozens of new coal plants.** Given coal's dominance, reducing its use could negatively impact employment in related sectors. **In 2018, about 5 million people worked in the coal mining industry, with 20% of them having a college education level or above, but most coal workers have very limited job choices and are vulnerable to transition. Supporting re-employment is a long-term policy in China.** The most recent policy includes support for enterprise development, including financial support for new small enterprises, re-employment training, and the unemployed.

References: Enerdata, 2020; Fei, 2018

# 1. ADAPTATION

## ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE



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



China is vulnerable to climate change and adaptation actions are needed.



**HIGH COST OF EXTREME WEATHER**

On average, 1,056 fatalities and over USD 35bn losses occur annually due to extreme weather events.



**SEVERE IMPACTS ON AGRICULTURE SECTOR**

With global warming, society and its supporting sectors are increasingly exposed to severe impacts such as heatwaves, drought and reduction in crop duration in the agricultural sector.

## ADAPTATION NEEDS

### Climate Risk Index

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

#### Annual weather-related fatalities



**0.08**  
PER 100,000  
INHABITANTS

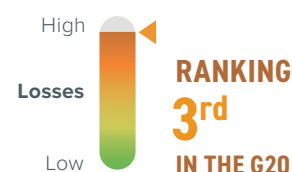


Source: Based on Germanwatch, 2019

#### Annual average losses (USD mn PPP)



**0.25**  
PER UNIT  
GDP (%)



Source: Based on Germanwatch, 2019

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

### Impact ranking scale:

! Very low ! Low ! Medium ! High ! Very high

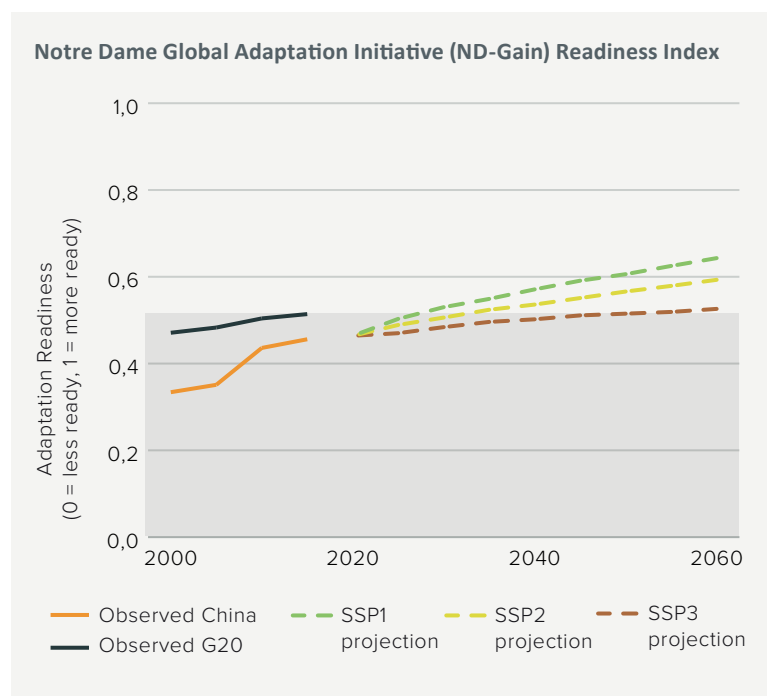
			1.5°C	2°C	3°C
<b>WATER</b>		% of area with increase in water scarcity	!	!	!
		% of time in drought conditions	!	!	!
<b>HEAT AND HEALTH</b>		Heatwave frequency	!	!	!
		Days above 35°C	!	!	!
<b>AGRICULTURE</b>	<b>Maize</b>	Reduction in crop duration	!	!	!
		Hot spell frequency	!	!	!
		Reduction in rainfall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

Source: 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.

## Adaptation readiness

The figure shows 2000-2015 observed data from the ND-GAIN Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2015-2060.



**China's observed adaptation readiness is well below the G20 average. Measures in line with SSP1 would produce improvements in readiness to bring it in line with the 2015 G20 average between 2040 and 2045. Other measures, as represented by SSP2 and SSP3, would continue to undermine its readiness to adapt in the long term.**

The readiness component of the Index created by the Notre Dame Global Adaptation Initiative (ND-GAIN) encompasses social economic and governance indicators to assess a country's readiness to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of possible futures. The three scenarios shown here in dotted lines are qualitatively described as a *sustainable development-compatible scenario (SSP1)*, a *middle-of-the-road (SSP2)* and a *'Regional Rivalry' (SSP3)* scenario. The shaded area delineates the G20 average in 2015 for easy reference.

Source: Andrijevic et al., 2020

## ADAPTATION POLICIES

### National Adaptation Strategies

Document name	Publication year	Fields of action (sectors)												M&E process
		Agriculture	Biodiversity	Coastal areas and fishing	Education and research	Energy and industry	Finance and insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism	
National Strategy for Climate Change Adaptation	2013	●	●	●	●	●	●	●	●	●	●	●	●	Target year 2020; is to be merged with national five-year plan

### Nationally Determined Contribution (NDC): Adaptation

#### Targets

Target year 2020: is to be merged with national five-year plan

#### Actions

See sectors specified in the National Strategy for Climate Change Adaptation (2013)

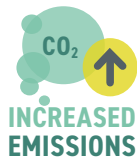
## 2. MITIGATION

### REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE

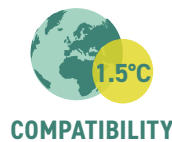


Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

#### EMISSIONS OVERVIEW



China's GHG emissions have more than tripled from 1990-2017 and the **government's climate target for emissions to peak in 2030 are not in line with a 1.5°C pathway.**

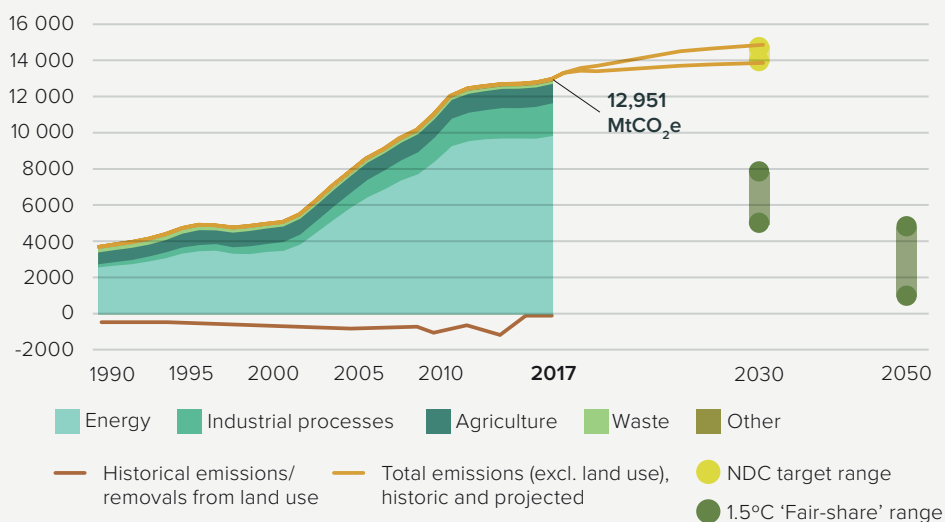


In 2030, global CO<sub>2</sub> emissions need to be 45% below 2010 levels and reach net-zero by 2050. Global energy-related CO<sub>2</sub> emissions must be cut by 40% below 2010 levels by 2030 and reach net-zero by 2060.

Source: Rogelj et al., 2018

#### GHG emissions across sectors and CAT 1.5°C 'fair-share' range (MtCO<sub>2</sub>e/year)

Total GHG emissions across sectors (MtCO<sub>2</sub>e/year)

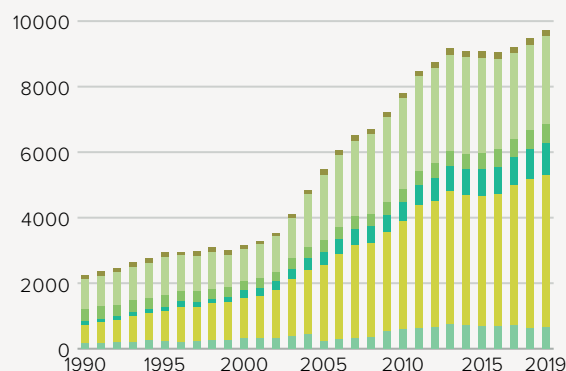


Sources: Gütschow et al., 2019; Climate Action Tracker, 2019

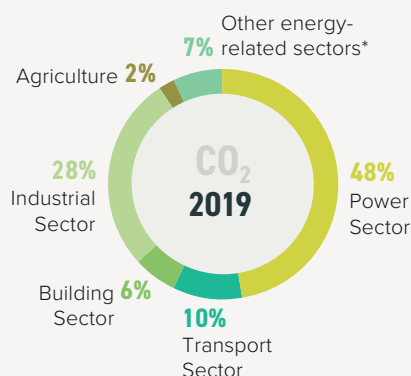
China's GHG emissions (excl. land use) increased by 258% between 1990 and 2017 in all sectors except waste. A range of projections show that, under current policies and projections, emissions will continue to increase up to 2030, at a sufficient pace to meet its national mitigation targets – including peaking before 2030. **China's current targets are far from compatible with the Paris Agreement, having been assessed as 'highly insufficient'.** China will need to scale up climate action and scale up its national targets to become 1.5°C 'fair-share' compatible.

#### Energy-related CO<sub>2</sub> emissions by sector

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



\* 'Other energy-related sectors' covers energy-related CO<sub>2</sub> emissions from extracting and processing fossil fuels. Due to rounding, some graphs may sum to slightly above or below 100%.



**The largest driver of overall GHG emissions are CO<sub>2</sub> emissions from fuel combustion.** In China, they peaked in 2013 and decreased until 2016, but have risen since 2017, driven by increasing emissions from electricity generation. At 48%, the electricity sector is the largest contributor to energy-related CO<sub>2</sub> emissions, followed by the industry sector at 28%.

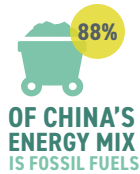
Source: Enerdata, 2020

#### CORONAVIRUS RECOVERY

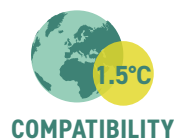
The measures in the USD 7tn economic stimulus package have not been targeted at decarbonising the economy. China's COVID-19 stimulus has focussed heavily on infrastructure, which reportedly will include high-speed rail, smart grids and electric vehicle chargers. However, a further 40.8 GW of new coal plants have been proposed, as the government relaxes restrictions on new coal plant development.

References: Global Energy Monitor, 2020

## ENERGY OVERVIEW



**Fossil fuels still make up 88% of China's energy mix** (including power, heat, transport fuels, etc), and **coal is the predominant resource with a share of 61% in 2019, above the target of 57.5% by 2020**. Renewable energy sources have increased over the last few years at around half of newly-installed capacity of global total 2016 to 2018, but remains at a low share in TPES.

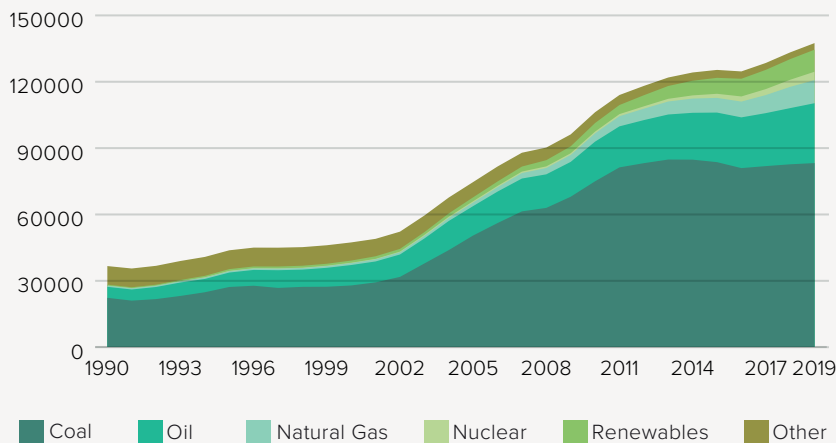


The share of **fossil fuels in the global primary energy mix needs to fall to 67% by 2030 and to 33% by 2050** (and to substantially lower levels without Carbon Capture and Storage).

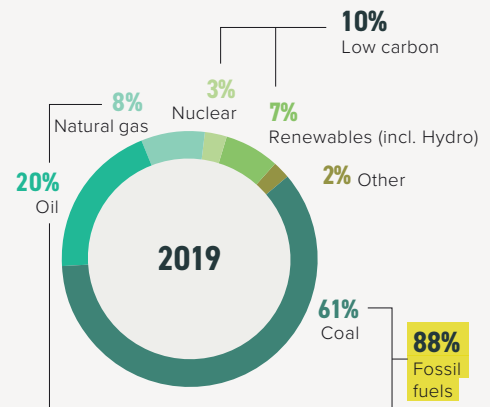
Source: Rogelj et al., 2018

### Energy Mix

Total primary energy supply (PJ)



Source: Enerdata, 2020

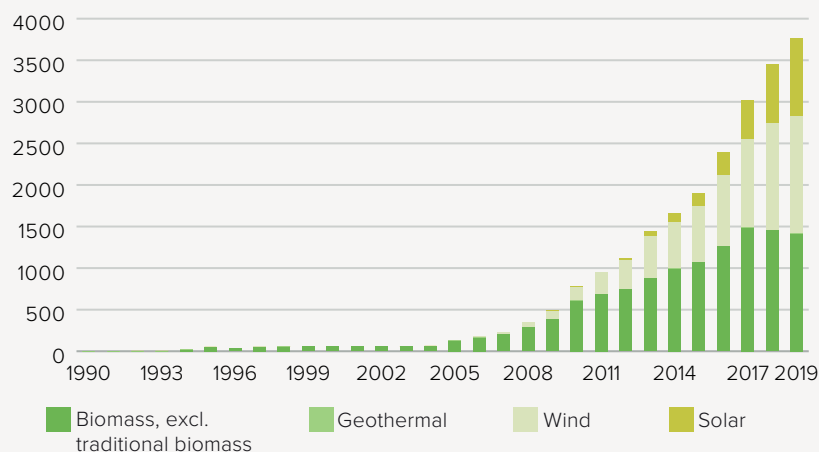


Due to rounding, some graphs may sum to slightly above or below 100%.

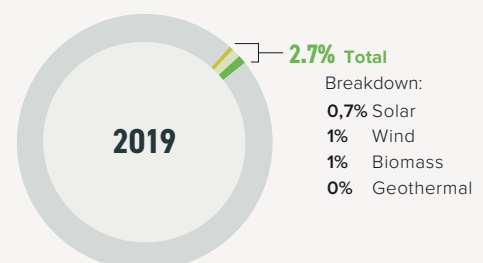
This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, cooking, but also for transport fuels. Fossil fuels still make up 88% of China's energy mix, decreasing from 90% over the past decade, higher than the G20 average of 81%, with coal still contributing 61%. The share of renewables (including modern biomass and hydro) in the energy mix increased (by 158%) from 2010-2019, and in 2019 represents a 7% share. Nuclear energy has more than tripled in that period.

### Solar, Wind, Geothermal, and Biomass Development

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



**Solar, wind, geothermal and biomass account for 2.7% of China's energy supply**



Source: Enerdata, 2020

Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.  
Due to rounding, some graphs may sum to slightly above or below 100%.

### Decarbonisation rating: RE share of TPES compared to other G20 countries

5-year trend (2014-2019):



Current year (2019):

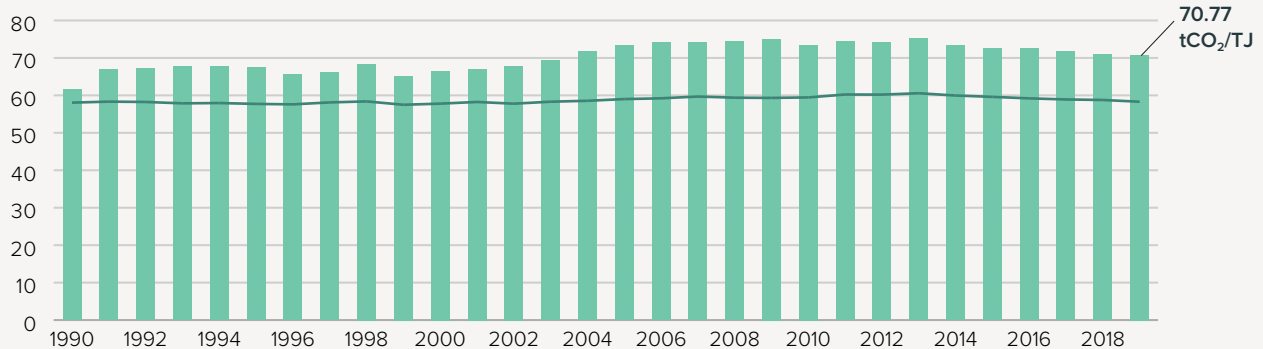


Source: own evaluation

Solar, wind, geothermal and biomass account for only 2.7% of China's energy supply – the G20 average is 6.4%. The share in total energy supply has increased by 114% in the last 5-years (2014-2019), more than the G20 average of 28%. Wind now makes up the largest share, overtaking modern biomass in 2019.

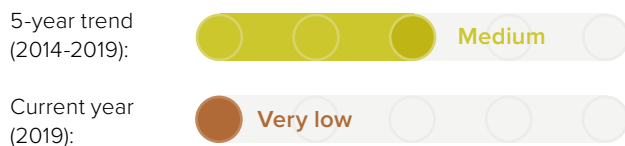
## Carbon Intensity of the Energy Sector

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



Source: Enerdata, 2020

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



Source: own evaluation

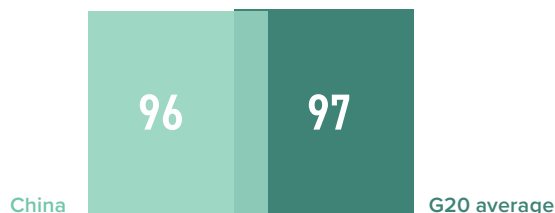
Carbon intensity shows how much CO<sub>2</sub> is emitted per unit of energy supply.

In China, carbon intensity has consistently been above the G20 average, reflecting the high use of fossil fuels in the energy mix. However, there has been a downward trend since 2013.

Source: Enerdata, 2020

## Energy supply per capita

(GJ/capita)



Sources: Enerdata, 2020; The World Bank, 2019b

### TPES per capita (GJ/capita): 5-year trend (2014-2019)



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

Energy use per capita in China is with 96 GJ/capita, on par with the G20 average, but is increasing much faster (8.2%, 2014-2019) compared with the slower rate of increase of the G20 average (2%).

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



Source: own evaluation

## Energy intensity of the economy

(TJ/PPP USD2015 millions)



Data for 2018: Source: Enerdata, 2020

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



This indicator quantifies how much energy is used for each unit of GDP, which is closely related to the level of industrialisation, efficiency, climatic conditions and geography.

China's energy intensity is above the G20 average, but has **decreased by 22% (2013-2018), nearly double the G20 rate of decline (-12%) in that time.**

### Decarbonisation rating: energy intensity compared to other G20 countries



Source: own evaluation



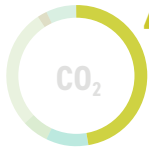


## POWER SECTOR

Emissions from energy used to make electricity and heat

**China still produces 65% of electricity from coal.** A phase out of coal-fired power generation before 2040 is necessary to stay within a 1.5°C limit.

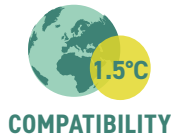
Source: Climate Action Tracker, 2019



48%

Electricity and heat account for 48% of energy-related CO<sub>2</sub> emissions in China in 2019.

Source: Enerdata, 2020



### Coal and decarbonisation

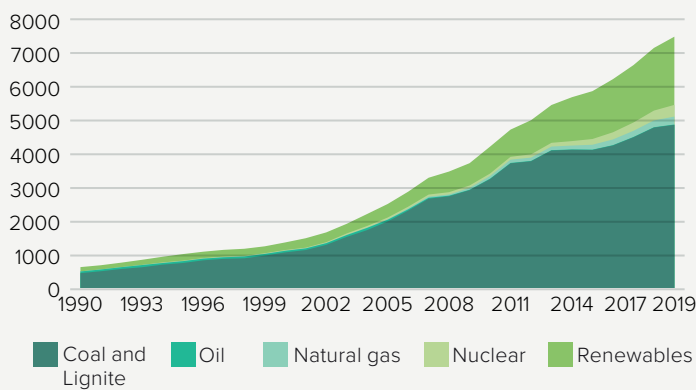
Worldwide, **coal use for power generation needs to peak by 2020**, and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. **Electricity generation has to be decarbonised before 2050**, with renewable energy the most promising alternative.

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

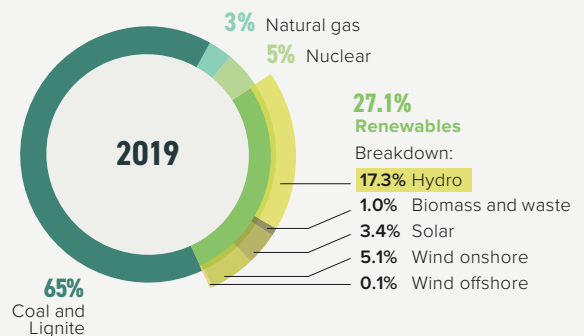
## STATUS OF DECARBONISATION

### Electricity mix

#### Gross power generation (TWh)



Source: Enerdata, 2020

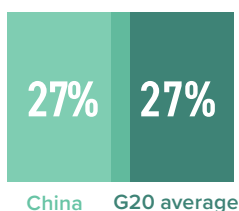


Due to rounding, some graphs may sum to slightly above or below 100%.

China is increasingly producing power from renewables, with solar and wind increasing fastest. Renewables now make up 27% of the power mix – equal to the G20 average. Hydro still contributes the largest share (17% of power generation). However, coal power is still increasing in absolute terms and makes up 65% of the power mix – one of the G20's highest levels.

### Share of renewables in power generation

(incl. large hydro)



Source: Enerdata, 2020

#### Decarbonisation rating: share of renewables compared to other G20 countries

5-year trend (2014-2019):



Current year (2019):



Source: own evaluation

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



+16%  
China

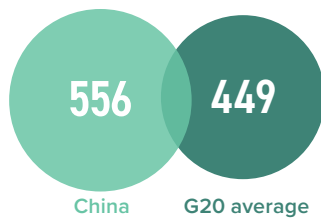


+19.5%  
G20 average



## Emissions intensity of the power sector

Country vs G20 average (gCO<sub>2</sub>/kWh)



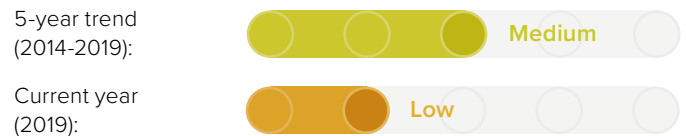
Source: Enerdata 2020

### Emissions intensity: 5-year trend (2014-2019)



For each kilowatt hour of electricity, 556gCO<sub>2</sub> is emitted in China – above the G20 average. The emissions-intensity has reduced at similar rate to the G20 average due to the increase in renewables for power generation (16% over last five years, below the G20 trend of 19.5%).

### Decarbonisation rating: emissions intensity compared to other G20 countries



Source: own evaluation

## POLICY ASSESSMENT

### Renewable energy in the power sector



China continues to lead the world in terms of additions of new wind and solar capacity, but installations have slowed in 2019, with a decline from 66 GW in 2018 to 56 GW in 2019, alongside a winding down and move towards phasing out subsidies and continued addition of coal-fired power capacity. The recently introduced Renewable Energy Obligation only sets targets for three years and is not incentivising the acceleration of investment over the long-term. The recently released draft Energy Law gives priority to renewable energy for development. After the COVID-19 lockdowns, the industry is projecting a 15-30% gain to 35-40 GW installed. Combined total wind and solar capacity additions in 2020 could climb 25% to around 70 GW.

References: own evaluation, based on Standaert, 2019; Global Energy Monitor, 2020; Hove, 2020

### Coal phase-out in the power sector



China has no phase-out plans for coal-fired power generation but aims to reduce its share in the total energy mix to less than 58% by 2020. In addition to lifting a two-year ban on new coal-fired power plant construction in 2018, China eased restrictions for future domestic coal plant construction in 2020. A nationwide carbon trading system is due to start in 2020 – coal power is the first industry to be included.

References: own evaluation, based on Shearer, Yu and Nace, 2019; Global Energy Monitor, 2020



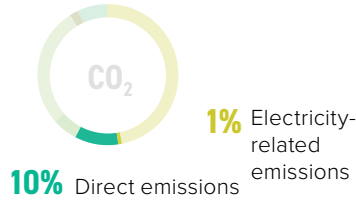
## TRANSPORT SECTOR

Emissions from energy used to transport people and goods

Transport emissions per capita are rising in China (23%, 2013-2018), and to stay within a 1.5°C limit, passenger and freight transport need to be decarbonised. **47% of passenger transport is by private car, and 47% of freight transport is by road,** with both sectors dominated by fossil fuels. Electric vehicle sales are increasing significantly, and public transport and bicycle use are developing fast.

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

Source: Enerdata, 2020



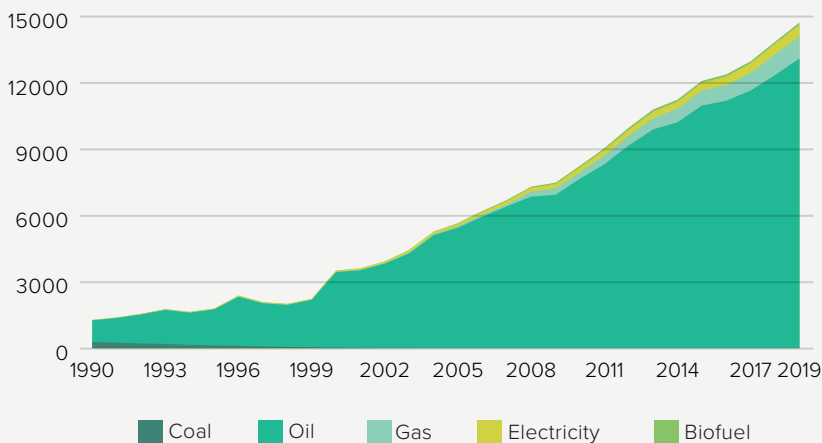
The share of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

Source: Rogelj et al., 2018

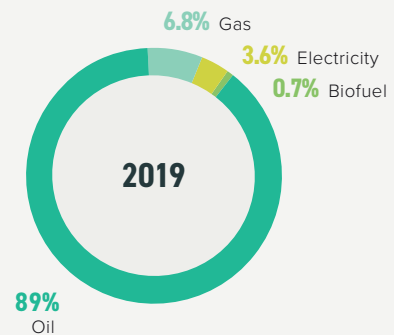
## STATUS OF DECARBONISATION

### Transport energy mix

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



Source: Enerdata, 2020



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

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

### Transport emissions per capita

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



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

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



### Decarbonisation rating: transport emissions compared to other G20 countries

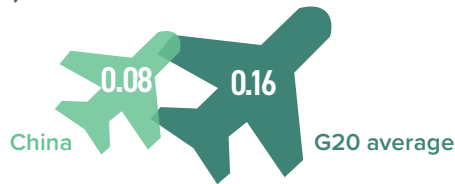
5-year trend (2013-2018):



Current year (2018):



Source: own evaluation

**Aviation emissions per capita<sup>6</sup>**(tCO<sub>2</sub>/capita)

Data for 2017. Source: Enerdata, 2020

**Aviation emissions: 5-year trend (2012-2017)****+59.3%**  
China**+18.7%**  
G20 average**Decarbonisation rating: aviation emissions compared to other G20 countries**5-year trend  
(2012-2017):Current year  
(2017):

Source: own evaluation

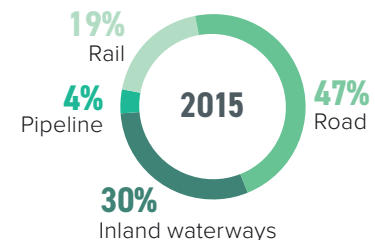
**Motorisation rate****135 VEHICLES PER 1,000 INHABITANTS (2018)**

47% of the kilometres travelled is by car and there are 135 vehicles per 1,000 inhabitants in China.

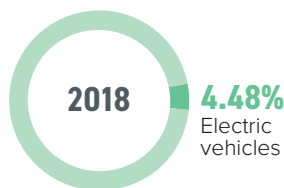
Source: Vieweg et al., 2018

**Freight transport**

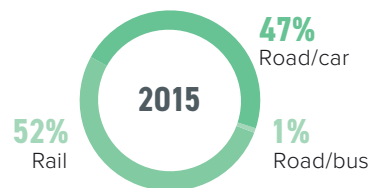
(modal split in % of tonne-km)



Data for 2015. Source: Vieweg et al., 2018

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

Data for 2018. Source: IEA, 2019

**Passenger transport (modal split in % of passenger-km)**

Data for 2015. Source: Vieweg et al., 2018

**POLICY ASSESSMENT****Phase out fossil fuel cars**

The government has no phase-out strategy for fossil fuel cars but a target of 5 million electric vehicles by 2020, and has raised the target from 20-25% new cars sold by 2025. A previously-considered target of 60% sales by 2035 was dropped, but pure electric cars are to become mainstream by 2035. Since 2018, China has required manufacturers to sell a minimum quota of zero-emission vehicles. The Chinese government has recently decided to extend current subsidies and support for electric vehicles (New Energy Vehicles), which were originally going to be phased out by the end of 2020, and has released goals for charging infrastructure support.

References: own evaluation, based on ICCT, 2020; Transport Policy, 2020a; Bloomberg News, 2019; GIZ, 2020; Yun, 2020.

**Phase out fossil fuel heavy-duty vehicles**

As of 2020, Stage 3 fuel consumption reduction thresholds for new tractors, trucks and buses have been increased from the previous Stage 2 Standard. Reductions of 13.8-15.9% compared to the previous standard (2011-2014) will apply by mid 2021. A three-year plan adopted in 2018 aims to reduce the carbon intensity of the freight sector. China has no plan to reduce absolute emissions from the freight sector.

Reference: own evaluation, based on Transport Policy, 2020b

**Modal shift in (ground) transport**

China has no longer-term strategy for a modal shift but aims for public transport to represent 30% of motorised travel in urban centres by 2020. The 2011 Transit Metropolis Programme supports cities in improving their public transport systems, inter-modal integration, and transit-oriented developments. The length of metro lines has doubled since 2012, and more than 6,000 km are under construction. More than 30 cities in China have announced plans to electrify their bus and taxi fleets by 2022.

Reference: own evaluation



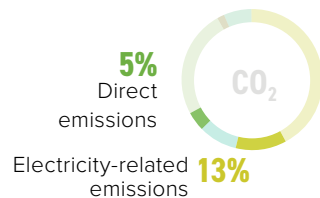
## BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings

China's direct building emissions – including heating, cooking – make up **5% of total CO<sub>2</sub> emissions**. Per capita, building-related emissions are slightly above the G20 average and are increasing at a rapid rate. To stay within the 1.5°C limit, China needs to implement more stringent energy efficiency measures.

Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc).

Source: Enerdata, 2020



Global emissions from buildings need to be halved by 2030, and be 80-85% below 2010 levels by 2050, mostly through increased efficiency, reduced energy demand and electrification in conjunction with complete decarbonisation of the power sector.

Source: Rogelj et al., 2018

## STATUS OF DECARBONISATION

### Building emissions per capita

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



Source: Enerdata, 2020

Building-related emissions per capita are slightly above the G20 average. But in contrast to the G20 average, China's emissions are **increasing rapidly (34% from 2014-2019)** compared with the G20 growth rate of 1.8%.

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



#### Decarbonisation rating: building emissions compared to other G20 countries



Source: own evaluation

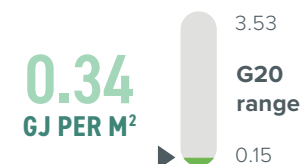
### Residential buildings

Energy use per m<sup>2</sup>



### Commercial and public buildings

Energy use per m<sup>2</sup>



Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. In China, **energy use per m<sup>2</sup> is in the lower range** of the G20 countries.

Source: Castro-Alvarez et al., 2018

## POLICY ASSESSMENT

### Near zero energy new buildings



In 2019, China established the **Zero Energy Buildings Technology Standard**. The aim is to increase the energy efficiency of new buildings by 20% by 2020 and to construct 50% of new buildings as certified green buildings in urban areas. By 2030, 30% of new and renovated buildings are planned to be near zero energy (100% by 2025 would be 1.5°C compatible). China has mandatory energy efficiency codes for urban residential and commercial buildings.

Reference: own evaluation

### Renovation of existing buildings



China has no strategy for retrofitting buildings. However, the central government makes large investments in renovation, provided through different funds, and plans to turn more than 60% of existing residential buildings in urban areas into energy-efficient buildings by 2020. **China's new Zero Energy Buildings Technology Standard focuses on new buildings and does not prioritise the retrofitting of existing buildings.**

Reference: own evaluation



## INDUSTRY SECTOR

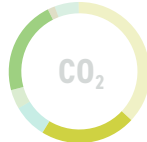
Emissions from energy in the industrial sector

Industry-related direct emissions make up more than a quarter of energy-related CO<sub>2</sub> emissions in China. Emissions from this sector have almost tripled since 2000, but emissions intensity is falling faster than in other G20 countries.

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

Source: Enerdata, 2020

28%  
Direct emissions



28%  
Electricity-related emissions



COMPATIBILITY

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

Source: Rogelj et al., 2018

## STATUS OF DECARBONISATION

### Industry emissions intensity<sup>7</sup>

(tCO<sub>2</sub>e/USD2015 GVA)



Data for 2016. Sources: Gütschow et al., 2019; Enerdata, 2020

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



Decarbonisation rating: emissions intensity of industry compared to other G20 countries

5-year trend (2011-2016):



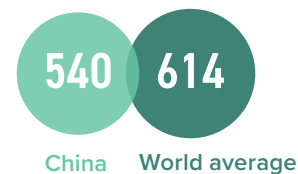
Current year (2016):



Source: own evaluation

### Carbon intensity of cement production<sup>8</sup>

(kgCO<sub>2</sub>/tonne product)



Data for 2016. Source: CAT Decarbonisation Data Portal, 2020

### Carbon intensity of steel production<sup>8</sup>

(kgCO<sub>2</sub>/tonne product)



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

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

## POLICY ASSESSMENT

### Energy Efficiency



China's policies include the 100, 1,000, 10,000 Programme as part of the 13<sup>th</sup> Five-Year Plan (2016-2020) forcing energy efficiency and waste energy recovery. China has mandatory energy audits and a mandate for energy managers, as well as incentives to introduce Energy Management systems.

Reference: own evaluation

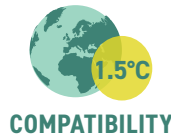


## LAND USE SECTOR

Emissions from changes in the use of the land



In order to stay within the 1.5°C limit, China needs to make the **land use and forest sector a net sink of emissions**, e.g. by halting the expansion of residential areas and infrastructure development, and creating new forests.

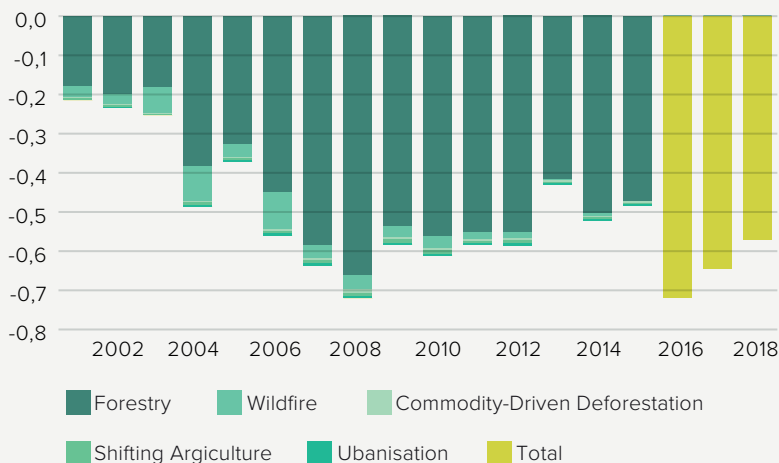


**Global deforestation needs to be halted** and changed to net CO<sub>2</sub> removals by around 2030.

Source: Rogelj et al., 2018

### Global tree-cover loss

Gross tree-cover loss by dominant driver (million hectares)



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. 2000 tree cover extent – >30% tree canopy.

Source: Global Forest Watch, 2019

From 2001 to 2018, **China lost 9.22 Mha of tree cover, equivalent to a 5.8% reduction since 2000**. This does not take tree-cover gain into account.

### POLICY ASSESSMENT

#### Target for net-zero deforestation



China has not established a target of net-zero deforestation but has **pledged to increase forest area by 40 million hectares by 2020** above 2005 levels, and to increase forest stock volume by 4.5 billion cubic metres by 2030 above 2005. China's 1998 Natural Forest Conservation Programme aims to recover native forests and was expanded in **2017 to ban commercial logging in natural forests**.

Reference: own evaluation



## AGRICULTURE SECTOR

Emissions from agriculture



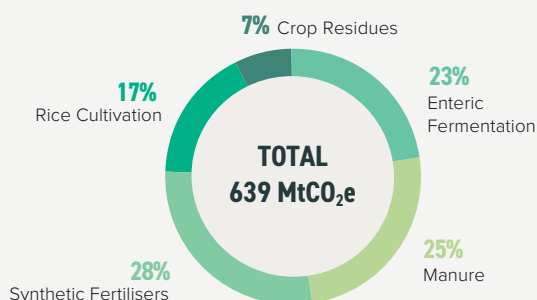
China's agricultural emissions come mainly from the use of **synthetic fertilisers, livestock manure, and digestive processes from livestock** (enteric fermentation). A 1.5°C pathway requires dietary shifts, increased organic farming, and less fertiliser use.



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

Source: Rogelj et al., 2018

### Emissions from agriculture (excluding energy)



Data for 2017. Source: FAO, 2019

In China, the largest sources of GHG emissions in the agricultural sector are the use of synthetic fertilisers, livestock manure, and digestive processes from livestock (enteric fermentation). A shift to organic farming, more efficient use of fertilisers, and dietary changes could help reduce emissions.

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

## MITIGATION: TARGETS AND AMBITION

The combined mitigation effect of nationally determined contributions (NDC) submitted by September 2020 is not sufficient and will lead to a warming of 2.7°C by the end of the century. This highlights the urgent need for all countries to submit more ambitious targets by 2020, as they agreed in 2015, and to urgently strengthen their climate action to align to the Paris Agreement's temperature goal.

## AMBITION: 2030 TARGETS

### Nationally Determined Contribution (NDC): Mitigation

#### Targets

- To achieve the peaking of carbon dioxide emissions before 2030, and making best efforts to peak earlier
- To lower carbon dioxide emissions per unit of GDP by 60% to 65% of the 2005 level by 2030
- To increase non-fossil-fuel share of electricity to 20% by 2030
- To increase forest stock volume by 4.5 billion cubic metres by 2030 compared to 2005

#### Actions

Actions specified in the following sectors: energy, industry, buildings, transport, forestry, waste

### Climate Action Tracker (CAT) evaluation of NDC and actions

	Critically Insufficient
●	Highly Insufficient
	Insufficient
	2°C Compatible
	1.5°C Compatible
	Role Model

NDCs with this rating fall outside of a country's 'fair-share' range and are not at all consistent with holding warming to below 2°C let alone with the Paris Agreement's stronger 1.5°C limit. If all government NDCs were in this range, warming would reach between 3°C and 4°C.

To peak emissions and rapidly decrease levels afterward as required by the Paris Agreement, China will need to strengthen its green policy measures – including furthering commitments to accelerate the penetration of renewable energy systems and electric vehicles, while reversing support for the coal industry. Post-COVID-19 recovery activities need to be less carbon-intensive, as China's energy system is run primarily on fossil fuels.

*Evaluation as at October 2020, based on country's NDC. Source: Climate Action Tracker*

## TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability.

The NDC Transparency Check has been developed in response to Paris Agreement decision (1/CP.21) and the Annex to decision 4/CMA.1. While the Annex is only binding from the second NDC onwards, countries are "strongly encouraged" to apply it to updated NDCs, due in 2020.



### NDC Transparency Check recommendations

For more visit [www.climate-transparency.org/ndc-transparency-check](http://www.climate-transparency.org/ndc-transparency-check)

To ensure clarity, transparency and understanding, it is recommended that China provides additional detailed information in the upcoming NDC Update (compared to the existing NDC), including:

- Include information on sources of data used in quantifying the reference point(s)
- Provide details on domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples, in a gender-responsive manner
- Provide assumptions and methodological approaches used for accounting for anthropogenic greenhouse gas emissions and removals corresponding to NDC
- Provide details on whether the NDC is considered to be fair

## AMBITION: LONG-TERM STRATEGIES

Status	In preparation
2050 target	Not available
Interim steps	Not available
Sectoral targets	Not available
Net-Zero target	Not available

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



### 3. FINANCE

#### MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS



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



China spent USD 21.42bn on fossil fuel subsidies in 2017, almost completely on petroleum. China has no explicit carbon price.



**COMPATIBILITY**

Investment in green energy and infrastructure needs to outweigh fossil fuel investments by 2050.

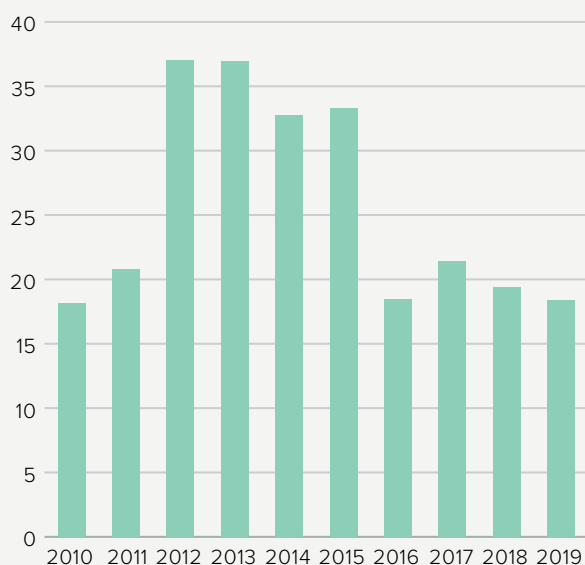
Source: Rogelj et al., 2018

### FISCAL POLICY LEVERS

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

#### Fossil Fuel Subsidies

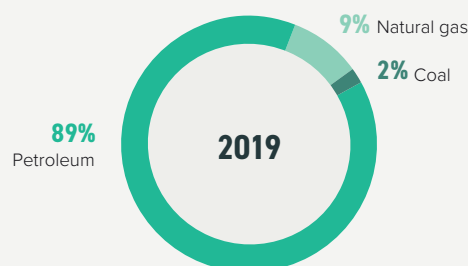
China Fossil fuel subsidies (USD billions)



Source: OECD-IEA Fossil Fuel Support database, 2020

#### Fossil Fuel Subsidies by fuel type

Subsidies by fuel type



Source: OECD-IEA Fossil Fuel Support database, 2020

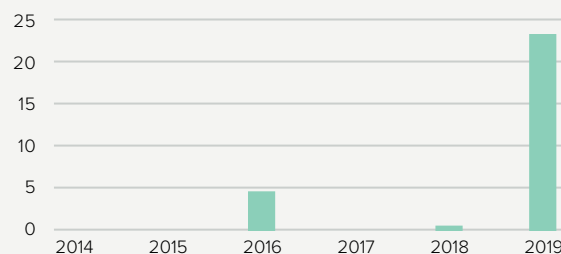
Due to rounding, some graphs may sum to slightly above or below 100%.

In 2019, China's fossil fuel subsidies totalled USD 18.4bn (compared to USD 18.1bn in 2010 and the last decade's peak of USD 37bn in 2012-13). Of the subsidies, 91% identified were for the consumption of fossil fuels, with the remainder for their production. The highest proportion of quantified subsidies was for petroleum, at USD 16.3bn, followed by natural gas at USD 1.7bn. The largest subsidy is comprised of support payments to most vulnerable people, in order to remedy price increases (USD 8.9bn).

#### Carbon Pricing and Revenue

China continues to work on the implementation of its national emissions trading scheme since its official launch in December 2017. The scheme is set to be enforced in 2021 and aims to cover 30% of domestic emissions, limited to the power sector. This follows on from subnational pilot schemes deployed in nine cities and provinces since 2013 covering various sectors. Emissions are priced between USD 1-12/tCO<sub>2</sub>. Revenue estimates resulting from these schemes are available only for a few jurisdictions.

Carbon revenues (USD millions)



Sources: I4CE, 2019; OECD, 2018

#### CORONAVIRUS RECOVERY

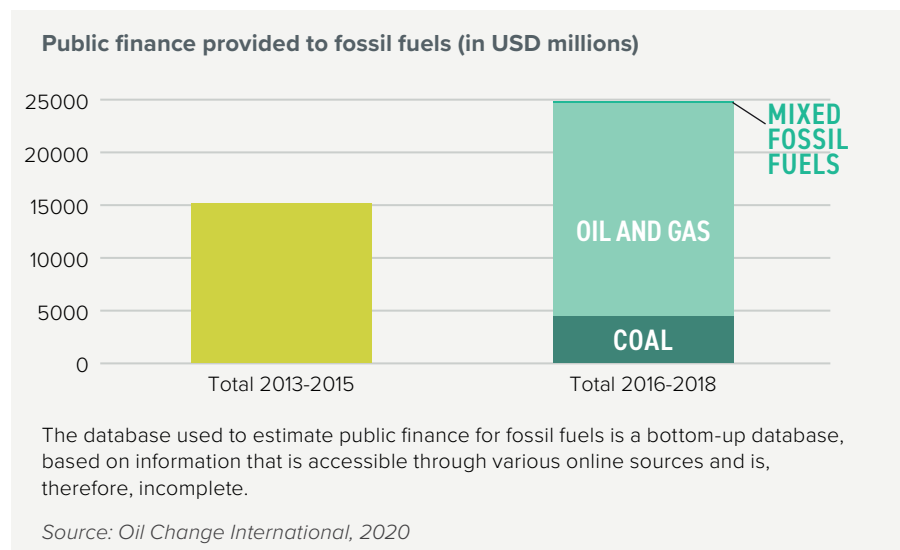
China's USD 7tn COVID-19 economic recovery plan is not focussed on climate change mitigation, but rather on stabilising employment through fossil fuel expansion, even though coal is not included in the package. Given the dominance of coal as an energy generation source, the government has chosen to double-down on coal investment, with a 250 GW of coal capacity currently planned or under development. This is a 21% increase from 2019. Local employment generation from coal plant construction is seen as a means to recover economically from the pandemic.

Reference: Global Energy Monitor, 2020

## PUBLIC FINANCE

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

### Public finance for fossil fuels



Between 2016 and 2018, China was the G20 largest provider of public finance for fossil fuels – for both oil and gas, as well as coal – with USD 20.2bn a year for oil and gas, and USD 4.4bn for coal. This represents a dramatic increase in China's support for fossil fuels compared to the previous period 2013 to 2015, when a yearly average of USD 15.1bn was provided to fossil fuels by Chinese public finance institutions. This increase was mostly driven by six multibillion-dollar loans from the China Development Bank for oil and gas projects in Brazil, Angola, and Russia.

### Provision of international public support

(annual average 2017 and 2018)

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

#### Bilateral, regional and other channels

Annual average contribution

No data available

Theme of support:

No data available

#### Multilateral climate finance contributions

No data available

Theme of support:

No data available

#### Core / General Contributions

Annual average contribution:

No data available

China is not listed in Annex II of the UNFCCC and is, therefore, not formally obliged to provide climate finance. Despite this, China continues to provide international public finance via the Global Environment Facility (GEF) Trust Fund. In its first Biennial Update Report (BUR) to the UNFCCC, China included a chapter on its south-south cooperation, though did not do so in its recent second BUR. While China may channel international public finance towards climate change via multilateral and other development banks, it has not been included in this report.

## FINANCIAL POLICY AND REGULATION

### Financial policy and regulation

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

Category	Instruments	Objective	Under Discussion/ implementation		None identified	
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.				
			Mandatory	Voluntary	Under Discussion/ implementation	None identified
Enhanced supervisory review, risk disclosure and market discipline	Climate risk disclosure requirements	Disclose the climate-related risks to which financial institutions are exposed	●			
	Climate-related risk assessment and climate stress-test	Evaluate the resilience of the financial sector to climate shocks				●
Enhanced capital and liquidity requirements	Liquidity instruments	Mitigate and prevent market illiquidity and maturity mismatch				●
	Lending limits	Limit the concentration of carbon-intensive exposures				●
		Incentivise low carbon-intensive exposures	●			
	Differentiated reserve requirements	Limit misaligned incentives and channel credit to green sectors	●			

The People's Bank of China (PBoC) has released several mandatory and voluntary sustainable finance regulations, including a green credit Monitoring and Evaluation and Key Performance Indicators checklist (2014), green bond rules (2015) and Guidelines for Establishing the Green Financial System (2016), including the establishment of a mandatory environmental information disclosure system for all listed companies and bond issuers. **The China Banking Regulatory Commission (CBRC) has also played a role in green financial policy, launching a green credit statistics system (2014). In 2018, the Guidelines for Establishing the Green Financial System** were made concrete by the Asset Management Association of China's Green Finance Guidelines, which clarify the definition, scope, and purpose of green investment activities in China. The PBoC is a founding member of the NGFS to share and advance practices on climate risk management in the financial sector and is a supporter of both the Sustainable Banking Network (SBN) and the TCFD. Since 2017, the PBoC has incorporated green finance into the macro-prudential assessment system, through positive incentives for commercial banks to increase their stock of green credit and boost green deposits to supplement green credit.

### Nationally Determined Contribution (NDC): Finance

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

## ENDNOTES





For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: [www.climate-transparency.org/g20-climate-performance/g20report2020](http://www.climate-transparency.org/g20-climate-performance/g20report2020)

- 'Land use' emissions is used here to refer to land use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from Land use, land use change and forestry (LULUCF), which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).
- The 1.5°C fair-share ranges for 2030 and 2050 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility,

- capability, and equality. Countries with 1.5°C 'fair-share' ranges reaching below zero, particularly between 2030 and 2050, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. The CAT's evaluation of NDCs shows the resulting temperature outcomes if all other governments were to put forward emissions reduction commitments with the same relative ambition level.
- In order to maintain comparability across all countries, this report utilises the PRIMAP year of 2017. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories.
  - The Decarbonisation Ratings assess the current

year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.

- The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the IPCC's 2018 SR15 and the Climate Action Tracker (2016). The table below displays the criteria used to assess a country's policy performance.
- This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

On endnote 5.	 Low	 Medium	 High	 Frontrunner
<b>Renewable energy in power sector</b>	No policy to increase the share of renewables	Some policies	Policies and longer-term strategy/ target to significantly increase the share of renewables	Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place
<b>Coal phase-out in power sector</b>	No target or policy in place for reducing coal	Some policies	Policies + coal phase-out decided	Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world)
<b>Phase out fossil fuel cars</b>	No policy for reducing emissions from light-duty vehicles	Some policies (e.g. energy/emissions performance standards or bonus/ malus support)	Policies + national target to phase out fossil fuel light-duty vehicles	Policies + ban on new fossil-based light-duty vehicles by 2035 worldwide
<b>Phase out fossil fuel heavy-duty vehicles</b>	No policy	Some policies (e.g. energy/emissions performance standards or support)	Policies + strategy to reduce absolute emissions from freight transport	Policies + innovation strategy to phase out emissions from freight transport by 2050
<b>Modal shift in (ground) transport</b>	No policies	Some policies (e.g. support programmes to shift to rail or non-motorised transport)	Policies + longer-term strategy	Policies + longer-term strategy consistent with 1.5°C pathway
<b>Near zero energy new buildings</b>	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + national strategy for near zero energy new buildings	Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non-OECD countries)
<b>Energy efficiency in Industry</b>	0-49% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	50-79% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	80-89% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	Over 90% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard
<b>Retrofitting existing buildings</b>	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + retrofitting strategy	Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020
<b>Net-zero deforestation</b>	No policy or incentive to reduce deforestation in place	Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation / reforestation in place)	Policies + national target for reaching net-zero deforestation	Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage

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