China’s announced, yet to be officially submitted, updated 2030 NDC target translates to approximately 12,922 MtCO₂e by 2030.

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

China’s NDC target (as of September 2021) would increase emissions to 63-82% above 2005 levels, or approximately 12,921-14,410 MtCO₂e, by 2030. To keep below the 1.5°C temperature limit, China’s 2030 emissions would need to be around 6,578 MtCO₂e (or 17% below 2005 levels), leaving an ambition gap of 6,343 MtCO₂e. All figures exclude land use emissions.

President Xi’s 2060 carbon neutrality announcement and the targets in the recently released 14th Five-Year Plan will spur emission reductions and energy efficiency improvements across China’s economic sectors.

China must phase out unabated, but preferably all, coal before 2040, and significantly scale down its use before 2030.

China has seen significant growth in both wind and solar, but also in solar thermal, geothermal, and renewable electricity for heat since 2012 and is well-positioned to take up renewable district heating.

China’s per capita emissions are 1.15 times greater than the G20 average. Total per capita emissions have increased by 1.2% since 2013-2018.

The economic lockdown due to COVID-19 resulted in a 4.8% year-on-year (YOY) reduction in China’s CO₂e levels during Q1 of 2020, but post pandemic recovery led to a 14.5% YOY growth in Q1 of 2021. By mid 2020, coal capacity in the pipeline had increased by 21%. Overall investment in power utilities had increased by 14% YOY even as overall capital spending fell by 6%. “Green Spending” has been estimated at 12% (or USD 0.05bn) of China’s total recovery spending of USD 407bn.

The economic lockdown due to COVID-19 resulted in a 4.8% year-on-year (YOY) reduction in China’s CO₂e levels during Q1 of 2020, but post pandemic recovery led to a 14.5% YOY growth in Q1 of 2021. By mid 2020, coal capacity in the pipeline had increased by 21%. Overall investment in power utilities had increased by 14% YOY even as overall capital spending fell by 6%. “Green Spending” has been estimated at 12% (or USD 0.05bn) of China’s total recovery spending of USD 407bn.

Cheng, 2020; Myllyvirta, 2021a; Shearer and Myllyvirta, 2020; Xu and Goh, 2020
We unpack China’s progress and highlight key opportunities to enhance climate action across:

- **Power sector** (Page 8)
- **Transport sector** (Page 10)
- **Building sector** (Page 12)
- **Industrial sector** (Page 13)
- **Land use** (Page 14)
- **Agriculture** (Page 14)

### Decarbonisation Ratings
Decarbonisation Ratings 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.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>Low</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

### Socio-Economic Context

#### Human Development Index (HDI)

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

- **Data for 2019**: UNDP, 2020

#### Gross Domestic Product (GDP) per capita

- **PPP constant 2015 international $** in 2019

- **China**: 16,753
- **G20 average**: 22,190

#### Death rate attributable to air pollution

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

- **China**: 1.06
- **G20 average**: 1.64

- Over 1.8 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 total population, this is one of the higher levels in the G20.

- **Data sources**:
  - Hao, 2017; He et al., 2020; IRENA, 2014, 2021b; Li and Zhang, 2021; Zhang et al., 2017

#### A Just Transition

A just transition away from coal would necessitate retraining coal workers for economic activities aligned with lowering emissions and increased renewable energy uptake. Coal jobs in China have declined by roughly half since reaching a peak of 5.3 million in 2013. At the same time, renewable energy jobs increased from 2.6 to 4.4 million over the same period. The decline in coal employment is not unexpected. A transition away from coal also affects China’s rural households, which rely on coal for heating. Policies to restrict coal used for this purpose should consider how to supply affordable heating alternatives to those affected.

- **Data sources**:
  - Hao, 2017; He et al., 2020; IRENA, 2014, 2021b; Li and Zhang, 2021; Zhang et al., 2017
ADAPTATION | ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE

Climate risk-induced fatalities in China stood at an average of 1,056 per year between 2000 and 2019. With global warming, society and its supporting sectors are increasingly exposed to severe impacts, such as heatwaves, droughts, and rainfall variability. Crop yields and food security will likely be much affected by meteorological disasters requiring speedy adaptation of agricultural practices.

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
  - 1,056 deaths
  - 0.08 deaths per 100,000 inhabitants
  - RANKING: 15th in the G20
- Annual average losses (US$ millions PPP)
  - $35,272 losses per unit GDP (%)
  - RANKING: 3rd in the G20

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

<table>
<thead>
<tr>
<th>WATER</th>
<th>1.5°C</th>
<th>2°C</th>
<th>3°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of area with increase in water scarcity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of time in drought conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEAT AND HEALTH</th>
<th>1.5°C</th>
<th>2°C</th>
<th>3°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heatwave frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days above 35°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in crop duration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot spell frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in rainfall</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maize</th>
<th>1.5°C</th>
<th>2°C</th>
<th>3°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in crop duration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot spell frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in rainfall</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGRICULTURE</th>
<th>1.5°C</th>
<th>2°C</th>
<th>3°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in crop duration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot spell frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in rainfall</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wheat</th>
<th>1.5°C</th>
<th>2°C</th>
<th>3°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in crop duration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot spell frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in rainfall</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

As a response to the likely link between wildlife habitat loss and COVID-19 outbreak, China has strengthened enforcement of its existing ecological red line strategy, particularly in Yunnan province. The pandemic has seemingly brought more attention to biodiversity among urban residents and has led to calls to improve wildlife protection laws.

O’Meara, 2021; Stanway, 2021
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

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 2018 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 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

<table>
<thead>
<tr>
<th>Document name</th>
<th>Publication year</th>
<th>Fields of action (sectors)</th>
<th>Monitoring &amp; evaluation process</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Strategy for Climate Change Adaptation</td>
<td>2013</td>
<td>Agriculture, Biodiversity, Coastal areas and fishing, Education and research, Energy and industry, Finance and insurance, Forestry, Health, Infrastructure, Tourism, Transport, Urbanism, Water</td>
<td>Target year 2020 to be merged with national five-year plan</td>
</tr>
</tbody>
</table>

Nationally Determined Contribution (NDC): Adaptation

TARGETS

Improvement of National Emergency Management System and construction of flood control projects under 14th Five-Year Plan.

ACTIONS

EMISSIONS OVERVIEW

China’s GHG emissions, excluding LULUCF, have increased by 269% (1990-2018) and the government’s climate targets for 2030, which translate to a 256-304% increase from 1990 levels are not in line with a 1.5°C pathway.

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)

Energy-related CO₂ emissions by sector

The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion. In China, energy-related emissions increased rapidly in the decade from 2003, saw a slight decline, and, since 2016, have been increasing once again, albeit at a much slower rate. The power sector, with a 48.4% share, is the largest contributor to total CO₂ emissions from fuel combustion, followed by industry and transport with 27.4% and 9.3%, respectively.

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

China’s primary energy mix is dominated by fossil fuels, which make up 88% of the total. Following a decade of rapid growth in coal, renewables (excl. biomass) have met 26% of new supply since 2013. During this time, oil and natural gas have, respectively, contributed 41% and 27% to new supply.

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 not only for electricity generation, heating, and cooking, but also for transport fuels. Fossil fuels (oil, coal, and gas) make up 88% of China’s energy mix, around the G20 average. Coal’s share is significantly larger than the G20 average, while natural gas is significantly less. Renewables (excl. biomass) make up only around 8% of total energy supply. However, supply from renewables has been growing at an average of about 10% per year since 2014, twice as much as the G20 average. Conversely, China’s natural gas supply has also been growing at about 10% per year.

*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 traditional biomass account for 3.3% of China’s energy supply – the G20 average is 7%. The share of renewables in the total energy supply has increased by around 114% in the last five years (2015-2020), much faster than the G20 average of 32%. Bioenergy (for electricity and heat) makes up the largest share, followed closely by wind. Solar has experienced the largest growth among new renewables over the last five years.

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

---

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

Current year (2020):

5-year trend (2015-2020):
Carbon intensity is a measure of how much CO₂ is emitted per unit of energy supply. China’s emissions intensity of primary energy is currently 68.6 tCO₂/TJ, about 20% above the G20 average. China’s emissions intensity of primary energy has been decreasing at a greater rate than the G20 average. However, the country reached a peak of 75 tCO₂/TJ in 2013 while the G20’s peak, which occurred in the same year, was just over 60 tCO₂/TJ. Thus, while China’s current energy emissions intensity level is ranked very low, the decreasing trend is ranked high.

Enerdata, 2021

Energy supply per capita

TPES per capita (GJ/capita) in 2020

- **China**: 98.4 GJ/capita
- **G20 average**: 92.6 GJ/capita

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

- **Current year (2020)**: Medium
- **5-year trend (2015-2020)**: Very low

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, at 98.4 GJ/capita in 2020, slightly above the G20 average, but increased by 12% between 2015 and 2020, in contrast to the 0.12% decreasing trend seen in the G20 average.

Enerdata 2021, United Nations, 2019

Energy intensity of the economy

(TJ/million US$2015 GDP) in 2019

- **China**: 5.8 TJ/million US$2015 GDP
- **G20 average**: 4.4 TJ/million US$2015 GDP

Decarbonisation rating: energy intensity compared to other G20 countries

- **Current year (2019)**: Low
- **5-year trend (2014-2019)**: Very high

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. China’s energy intensity is higher than the G20 average and has been decreasing at a higher rate of 19% (2014-2019) as compared to the G20.

Enerdata, 2021, World Bank, 2021
China produced 63% of its electricity from coal in 2020. However, the government plans to reduce coal consumption by 2026, and wind and solar have accounted for an increasing share of new generation in recent years. Nonetheless, the generation mix is not compatible with a 1.5°C pathway.

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)

China generated 67% of its electricity from fossil fuels in 2020. The share of renewable energy in China's power sector has been increasing, accounting for approximately 29% of the power mix in 2020. While much of this increase has been due to large scale hydro projects, in the last five years the share of renewables in power generation has increased 16%, well under the G20 average increase of 25% over the same time frame.

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

Enerdata, 2021
Emissions intensity of the power sector
(gCO₂/kWh) in 2020

For each kilowatt hour of electricity, 537 g of CO₂ is emitted in China. China’s emissions-intensity has been decreasing, at a five-year trend of around 10%, slightly less than the G20 average. Emissions intensity in China has decreased (-11%) just slightly more slowly between 2015-2020 than the G20 average in the same period (-11%). The share of renewables in power generation in China is almost the same as that of the G20 average in 2020.

Enerdata, 2021

POLICY ASSESSMENT

Renewable energy in the power sector

In December 2020, China announced a proposed update to its NDC which included targets for a 25% share of non-fossil fuels in primary energy and at least 1,200 GW of solar and wind capacity by 2030. Since then, the National Energy Administration (NEA) has set an interim target for renewables to make up 25% installed power capacity, and wind and solar to make up 16.5% of the generation mix by 2025. The NEA has also proposed that the country’s grid companies should purchase 40% of their generation from renewables (25.9% from non-hydro renewables) by 2030.

Climate Action Tracker, 2021; Daiss, 2021; Xu and Stanway, 2021

Coal phase-out in the power sector

In April 2021, President Xi announced that China would strictly control coal consumption over the next five years and begin phasing out coal from 2026. However, this followed a year of post-COVID-19 recovery which saw provinces stimulate their economies through building new coal plants (38.4 GW commissioned in 2020) and increase production in fossil-fuel-intensive industries, such as cement and steel. The country currently has 97 GW of coal plants under construction and another 163 GW under pre-construction development, representing 52% and 55%, respectively, of the world’s total.

On the other hand, China has set a binding target for reducing energy and emissions intensity of GDP in its 14th Five-Year Plan (-13.5% and -18%, respectively), which is the first time the country has implemented such strong policy to decouple GDP growth from coal consumption.

Global Energy Monitor, 2021a, 2021b; Liu et al., 2021; Myllyvirta, 2021a; Xinhua, 2021a

CORONAVIRUS RESPONSE AND RECOVERY

China’s COVID-19 recovery efforts in 2020 relied heavily on fossil-fuel-intensive industry and saw a boom in the development of coal-fired power plants. In total, the country commissioned 38.4 GW of new coal capacity in 2020, surpassing the 37.8 GW retired globally. At the same time, China brought 120 GW of wind and solar capacity online.

Deign, 2021; Global Energy Monitor, 2021a
**TRANSPORT SECTOR**

Emissions from energy used to transport goods and people

Transport emissions continue to rise. In 2019, 25% of passenger and 66% of freight transport was by road. Oil accounts for 89% of passenger-related consumption, and coal transported 42% of freight cargo (tonnes-kilometres). Between 2013 and 2018, heavy-duty vehicles (HDVs) increased, on average, by 4% per year and in Beijing, transport is now the main source of PM2.5. Electric vehicles (EVs) make up only 5.7% of new car sales.

1. **Share of transport in energy-related CO₂ emissions**
   - 1.04% Indirect emissions
   - 9.29% Direct emissions

2. **1.5°C COMPATIBILITY**
   - 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.

**Transport energy mix**

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

Electricity and biofuels make up only 4.6% of the energy mix in transport.

**Transport emissions per capita**

excl. aviation (tCO₂/capita) in 2020

- **China**: 0.7
- **G20 average**: 1


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

- **Current year (2020):**
  - China: High
  - G20 average: Very low

- **5-year trend (2015-2020):**
  - China: +22.6%
  - G20 average: -4.3%

*Enerdata, 2021; United Nations, 2019*

*Due to rounding, some graphs may sum to slightly above or below 100%*
**Aviation emissions per capita**

(tCO2/capita) in 2018

<table>
<thead>
<tr>
<th></th>
<th>Aviation emissions: 5-year trend (2013-2018)</th>
<th>Decarbonisation rating: aviation emissions compared to other G20 countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>▲ +54.39</td>
<td>Low</td>
</tr>
<tr>
<td>G20 average</td>
<td>▲ +21.25%</td>
<td>High</td>
</tr>
</tbody>
</table>


**Motorisation rate**

159 VEHICLES per 1,000 inhabitants in 2019 in China*

Enerdata, 2021

**Passenger transport**

(modal split in % of passenger-km) in 2019*

<table>
<thead>
<tr>
<th></th>
<th>Rail</th>
<th>Road</th>
<th>Aviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>42%</td>
<td>25%</td>
<td>33%</td>
</tr>
<tr>
<td>G20 average</td>
<td>34%</td>
<td>67%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Enerdata, 2021

**Freight transport**

(modal split in % of tonne-km) in 2019*

<table>
<thead>
<tr>
<th></th>
<th>Rail</th>
<th>Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>66.5%</td>
<td>34%</td>
</tr>
<tr>
<td>G20 average</td>
<td>42%</td>
<td>58%</td>
</tr>
</tbody>
</table>

Enerdata, 2021

*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**

China has announced plans to phase out conventional fossil fuel cars by 2035. The country has set targets to raise the share of EVs in new car sales to 20% by 2025. The influential industry body, the China Society of Automotive Engineers (SAE), has released a roadmap suggesting that this share will increase to 50% by 2035. The government’s targets mean that the other 50% of car sales will be conventional (non-plug-in) hybrids, which still rely on fossil fuels. The country cut EV subsidies earlier this year after extending them in April 2020 about concerns over COVID-19’s effect on the EV industry.

Argus, 2021; Lutsey et al., 2021; Tabeta, 2020; Xinhua, 2021b

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

In July 2021, China implemented its Stage 3 fuel consumption standards to all new heavy commercial vehicles. Fuel consumption limits for new tractors (15%), trucks (14%), and buses (16%) have been increased from the previous Stage 2 standard. China currently has no plan to reduce absolute emissions from the freight sector.

Transport Policy, 2018

**Modal shift in (ground) transport**

As part of a broader programme to cut air pollution, China initiated a three-year plan in 2018 to reduce freight transport by diesel-burning trucks and increase freight transport by electric-powered railway system. However, this plan fell behind schedule. Regardless, the country has prioritised a shift from highways to railways and waterways as part of its efforts to develop a green economy under the 14th Five-Year Plan. The Plan also seeks to build intercity railways in metropolitan areas.

Murphy, 2021; Xin, 2020
**BUILDING SECTOR**

Emissions from energy used to build, heat and cool buildings

China’s buildings account for 4.87% of direct CO₂ emissions and 13.36% of indirect CO₂ emissions. Per capita emissions from the building sector are about 7% higher than the G20 average. China’s policies are not sufficient for a 1.5°C pathway.

<table>
<thead>
<tr>
<th>Direct emissions</th>
<th>Indirect emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.87%</td>
<td>13.36%</td>
</tr>
</tbody>
</table>

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.)

**Mitigation Compatibility**

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

**Building emissions per capita**

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

- **China**: 1.5 tCO₂
- **G20 average**: 1.4 tCO₂

Decarbonisation rating: building emissions compared to other G20 countries

- **China**: Current year (2020): Medium
- **G20 average**: 5-year trend (2015-2020): Very low

In contrast to the slight decline in average G20 emissions (3%), China’s levels have increased by 29% (2015-2020). 2020 was the first year that China’s per capita emissions (1.5 tCO₂) exceeded the G20 average (1.4 tCO₂). China’s rapidly increasing building-related emissions reflect the country’s high fossil fuel share in primary energy and rapid urbanisation.

Enerdata, 2021; United Nations, 2019

**Policy Assessment**

**Near zero energy new buildings**

- **High**

In September 2019, China implemented its Technical Standard for Near Zero Energy Buildings. The government had previously set a goal for 20% energy efficiency in new urban buildings by 2020 compared to 2015, and for “green buildings” to account for 50% of new urban buildings. Recently, the Ministry of Housing and Urban-Rural Development (MOHURD) has released a draft 14th Five-Year Development Plan for Green Buildings. The plan also seeks to improve the building electrification rate from its current 30% to 55%. Subsequent Five-Year Plans have placed a growing emphasis on green buildings.

MOHURD, 2021; Zhou et al., 2020

**Renovation of existing buildings**

- **Medium**

China, through MOHURD, has issued guidelines and targets for retrofitting existing buildings. Through the directives in the Five-Year Plans, the ministry has sought to steadily increase the energy performance of existing buildings. The government sees green retrofitting of existing buildings as an important aspect of both urban and rural development.

IEA, 2021a; MOHURD, 2021
**Industry emissions intensity**

Share of industry in energy-related CO₂ emissions.

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

Rogelj et al., 2018

**Industry emissions intensity**

(\(\text{CO}_2/\text{USD2015 GVA}\)) in 2017

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>G20 average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry emissions intensity: 5-year trend (2012-2017)</td>
<td>-29.95%</td>
<td>-16.45%</td>
</tr>
<tr>
<td>Decarbonisation rating: industry emissions intensity compared to other G20 countries</td>
<td>Very low</td>
<td>High</td>
</tr>
</tbody>
</table>

Current year (2017):

5-year trend (2012-2017):

Enerdata, 2021; World Bank, 2021

**Carbon intensity of steel production**

(kg\(\text{CO}_2/\text{tonne product}\)) in 2016

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>World average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel production and steelmaking are significant GHG emissions sources, and challenging to decarbonise.</td>
<td>1,840</td>
<td>1,900</td>
</tr>
</tbody>
</table>

Energy efficiency

In 2018, 75% of China’s industrial sector was covered under mandatory energy efficiency policies, more than double the global amount. China’s 14th Five-Year Plan promotes the “green transformation” of the steel industry, one of the country’s largest sources of emissions. Emissions targets in the Plan have prompted state-run steel and aluminium industries to announce 2025 carbon peaking targets, as well as strategies for emissions reduction thereafter.

EEO, 2021; Finance Sina, 2021; IEA, 2021b

**Indirect emissions**

Direct and indirect emissions from industry in China make up 27.4% and 28.5% of energy-related CO₂ emissions respectively. To align with the emissions-intensity of GDP reduction targets (-18% from 2021-2025) of the 14th Five-Year Plan, China’s aluminium and steel industries plan to peak CO₂ by 2025, and reduce by 40% and 30%, respectively, from that peak by 2040.

**POLICY ASSESSMENT**

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

World Steel Association, 2018; Climate Action Tracker, 2020c
**LAND USE SECTOR**

Emissions from changes in the use of the land

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., discontinuing the degradation of peatlands, converting cropland into wetlands, and by creating new forests.

**1.5°C COMPATIBILITY**

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

Rogelj et al., 2018

---

**AGRICULTURE SECTOR**

Emissions from agriculture

China’s agricultural emissions are mainly from the use of synthetic fertilisers, livestock manure, and digestive processes (enteric fermentation). A 1.5°C compatible pathway requires behavioural and dietary shifts and less fertiliser use.

**1.5°C COMPATIBILITY**

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

Rogelj et al., 2018

---

**Annual forest expansion, deforestation and net change**

<table>
<thead>
<tr>
<th>Year</th>
<th>Afforestation</th>
<th>Deforestation</th>
<th>Net Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-2000</td>
<td>0</td>
<td>0</td>
<td>1986</td>
</tr>
<tr>
<td>2000-2010</td>
<td>2361</td>
<td>0</td>
<td>2361</td>
</tr>
<tr>
<td>2010-2015</td>
<td>1937</td>
<td>0</td>
<td>1937</td>
</tr>
<tr>
<td>2015-2020</td>
<td>1937</td>
<td>0</td>
<td>1937</td>
</tr>
</tbody>
</table>

Between 2015-2020, China gained 1937 kha of forest area per year. In general, China’s rate of afforestation greatly exceeds that of deforestation.

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

China’s current NDC includes a target to increase forest stock by 4.5 billion cubic metres by 2030 compared to 2005. Its proposed update strengthens this target to 6 billion cubic metres. In context, this represents about a third of the country’s current forest stock and represents a quarter of the increase seen in the period 2014-2018. In December 2019, the government revised its Forest Law to ban purchase, processing, and transport of illegal logs. As the country is the world’s largest importer of these logs, its recent policy shift could result in reduced deforestation globally.

Jide et al., 2019; Mukpo, 2020

---

**Emissions from agriculture (excluding energy)**

<table>
<thead>
<tr>
<th>Source of Emission</th>
<th>2018 Emission (MtCO₂e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivation of organic soils</td>
<td>0.1%</td>
</tr>
<tr>
<td>Rice cultivation</td>
<td>17.6%</td>
</tr>
<tr>
<td>Synthetic fertilisers</td>
<td>28.7%</td>
</tr>
<tr>
<td>Manure</td>
<td>24.8%</td>
</tr>
<tr>
<td>Enteric fermentation</td>
<td>21.9%</td>
</tr>
<tr>
<td>Crop residues</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

In China, the largest sources of GHG emissions in the agriculture sector are the use of synthetic fertilisers (29%), livestock manure (25%), and enteric fermentation (22%). Dietary changes and efficient use of fertilisers as well as reductions in food waste could help reduce emissions from this sector.

FAO, 2021

Due to rounding, some graphs may sum to slightly above or below 100%
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 CAT gives China an overall rating of “Highly insufficient”.* China’s climate commitments in 2030 are also rated as “Highly insufficient” as emission levels expected under the peaking and non-fossil share NDC targets are compatible with warming levels of between 3°C and 4°C by the end of the century, if all countries followed this ambition. China’s climate policies and action are rated as “Insufficient”, as current national policies are consistent with domestic pathways associated with 3°C and could lead to rising, rather than falling, emissions. To improve on its rating China would need to peak emissions as early as possible, decrease coal and other fossil fuel consumption at a much faster rate than currently planned, and set clear phase-out timelines.

China’s proposed NDC update is only a slight improvement from its first NDC and does not result in an improvement in the CAT’s rating, even if officially submitted; it would need to adopt more ambitious medium-term climate targets to match its long-term net-zero goal. For the full assessment of the country’s target and actions, and the explication of the methodology see www.climateactiontracker.org

AMBIATION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

**TARGETS**

- Achieve the peaking of CO2 emissions **around 2030**, and make best efforts to peak earlier
- Lower CO₂ emissions per unit of GDP by 60% to 65% of the 2005 level by 2030
- Increase non-fossil-fuel share of primary energy to 20% by 2030
- Increase forest stock volume by 4.5 billion cubic metres by 2030 compared to 2005

China’s proposed updated NDC has not been submitted to the UNFCCC (as of 29 September 2021). The headline assertion contains firmer language about achieving the peaking of CO₂ emissions **before 2030**, as well as more ambitious goals for carbon intensity, non-fossil-fuel share of TPES, forest stock and installed renewable energy.

**AMBIATION: 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.

<table>
<thead>
<tr>
<th>Status</th>
<th>Submitted to UNFCCC, last update in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interim steps</td>
<td>Yes: Peak CO₂ emissions by 2030</td>
</tr>
<tr>
<td>Sectoral targets</td>
<td>Yes</td>
</tr>
<tr>
<td>Net zero target</td>
<td>Yes</td>
</tr>
<tr>
<td>Net zero year</td>
<td>2060</td>
</tr>
</tbody>
</table>

**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

China’s NDC was submitted to the UNFCCC on 9 March 2016. To ensure clarity, transparency, and understanding, it is recommended that China provides additional detailed information in its next NDC or NDC update (compared to the existing NDC), including:

- Provide additional information on how the reference indicators are constructed and quantified.
- Detail the coverage of sectors, sources, and sinks.
- Explicitly state the time frame, period of implementation of the NDC, and how China will account for its mitigation target(s).
- Detail if China’s mitigation targets contain the highest possible ambition aligned to the Paris Agreement’s long-term temperature goals.
- Provide information on considerations of fairness and ambition of the NDC.

* For the purposes of this rating China’s NDC commitment was treated as unconditional, as it has not indicated a level of ambition that would be achieved with international support (conditional NDC target).
China spent USD 18bn on fossil fuel subsidies in 2019, about half of what it spent in 2013. However, in 2019 China had the highest fossil fuel subsidies in the G20. The government is set to implement its national emissions trading scheme in July 2021. This will be limited to the power sector and cover 30% of the country’s emissions.

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**

<table>
<thead>
<tr>
<th>Year</th>
<th>USD billions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2011</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2012</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2013</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2014</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2015</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2016</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2017</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2018</td>
<td>18.4bn</td>
</tr>
<tr>
<td>2019</td>
<td>18.4bn</td>
</tr>
</tbody>
</table>

OECD-IEA Fossil Fuel Support database, 2020

**Fossil fuel subsidies by fuel type**

USD in 2019

- **Natural gas**: 9%
- **Coal**: 2%
- **Petroleum**: 89%

Over the past decade (2010-2019), China’s fossil fuel subsidies were at their highest between 2012 and 2015, reaching a value of USD 18.4bn in 2019. Over this period, most of the subsidies were directed to support the production and consumption of petroleum.

Comparable data is not yet available for 2020. However, according to the Energy Policy Tracker data, during 2020 China has pledged at least USD 18.5bn to fossil fuel energy as part of its energy-related funding commitments and COVID-19 economic response. The biggest funding commitment directed at fossil fuels was a USD 11.3bn investment in a coal indirect liquefaction project in Shaanxi Province. Another big fossil investment was the USD 3.6bn Cathay Pacific bailout by the Hong Kong government.

Energy Policy Tracker, 2021; OECD-IEA Fossil Fuel Support database, 2020

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

Being the first country to record COVID-19 cases, China saw the earliest government-backed economic responses. In February 2020, the central bank made moves to ensure market liquidity and lowered interest rates. In May 2020, the central government released its annual Government Work Report, announcing RMB 5tn in stimulus spending. Provincial governments were given relatively little direction on how monies should be spent, with the result that much spending was directed towards traditional growth industries, emissions-intensive infrastructure projects, and the building of coal-fired power plants.

Gosens and Jotzo, 2020; Myllyvirta and Li, 2021
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)

Between 2018 and 2019, China was the G20’s second largest provider of public finance for fossil fuels – for both oil and gas, as well as coal – with USD 5.5bn a year for oil and gas, USD 2.3bn for coal and USD 252m for ‘other’. This included, most notably, USD 2.4bn of financing from China Export and Credit Insurance Corporation for the construction and development of the Ajaokuta-Kaduna-Kano pipeline in Nigeria, as well as a USD 2.5bn loan from the China Development Bank in 2018 to be used by South Africa’s state-owned utility company Eskom for the financing of its coal-fired Kusile Power Station.

Provision of international public support

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, that has not been included in this report.

Oil Change International, 2020  Due to rounding, some graphs may sum to slightly above or below 100%.

Carbon pricing and revenue

USD millions

China has been working on the implementation of its national emissions trading scheme (ETS) since its official announcement in December 2017. The scheme was launched in July 2021 and covers 40% of domestic emissions, limited to the power sector. The closing price for carbon emission allowances on the first day of trading was USD 7.9 per tonne. This follows subnational pilot schemes deployed in nine cities and provinces since 2013 covering various sectors. Emissions are priced between USD 2/tCO\textsubscript{2e} and USD 12/tCO\textsubscript{2e}. Revenue estimates resulting from these schemes are only available for a few jurisdictions.

I4CE, 2021; Energy Policy Tracker, 2021
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.

There has been some encouraging progress by Chinese authorities on greening the country’s financial system. In June 2020, the People’s Bank of China (PBOC), China Securities & Regulatory Commission (CSRC) and the National Development & Reform Commission (NDRC) announced a unified green bond guideline for the Green Bonds Endorsed Project Catalogue. In April 2021 the Catalogue was updated, removing fossil fuel production and consumption projects and increasing the number of climate-friendly projects through green bonds issuance.

The PBOC has also taken up finance reforms and innovative pilot programmes and has targeted nine cities in six provinces until 2020 (Peoples Bank of China press release, 2020). In June 2021, PBOC also launched a Green Finance Evaluation Programme to grade Chinese banks based on their green bonds holding. The results will inform the PBOC’s policy and prudent management tools.

In January 2021, the China Banking and Insurance Regulatory Commission issued measures for the regulatory rating of asset management companies with additional credits to green and environmental, social, and governance (ESG) investments.

Also, in January 2021, the Bank of China Limited issued its very first Transition Bond in accordance with the International Capital Markets Association Climate Transition Finance Handbook 2020 and the Technical Expert Group Final Report of the EU Taxonomy with inclusion of principles like “avoidance of carbon lock-in” and “do no significant harm”. The bank raised USD 780m in two phases, and the proceeds will be used to finance or refinance eligible projects.

China Banking and Insurance Regulatory Commission, 2021

Nationally Determined Contribution (NDC): Finance

<table>
<thead>
<tr>
<th>Conditionality</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment needs</td>
<td>Not specified</td>
</tr>
<tr>
<td>Actions</td>
<td>A number of actions are listed under “Increasing Financial and Policy Support” that promote a carbon emissions trading market</td>
</tr>
<tr>
<td>International market mechanisms</td>
<td>No contribution from international credits for the achievement of the target</td>
</tr>
</tbody>
</table>
China to Further Cut Electric Vehicle Subsidies

Andrijevic, M. et al. (2020). "Governance in Socioeconomic Domestics: 1.5°C compatible emissions pathways, the 'fair-share' emissions reduction would almost always require a developed country to provide enough support through climate finance, or other means of implementation, to bring the total emission reduction contribution of that country down to the required 'fair-share' level. 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 below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by international climate finance, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges below zero, are expected to achieve such strong reductions by