



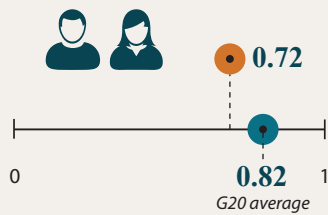
## BROWN TO GREEN: G20 TRANSITION TO A LOW CARBON ECONOMY

# China

This Country Profile assesses China's past, present - and indications of future - performance towards a low-carbon economy by evaluating emissions, decarbonisation, climate policy performance and climate finance. The profile summarises the respective findings from, amongst others, the Climate Change Performance Index (CCPI, operated by Germanwatch and Climate Action Network Europe), the Climate Action Tracker (CAT, operated by Climate Analytics, NewClimate Institute, Ecofys and Potsdam Institute for Climate Impact Research), and analyses from the Overseas Development Institute (ODI).

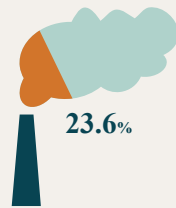


### Human Development Index



Source: UNDP, data for 2015

### Share of global GHG emissions



Source: World Bank Indicators, data for 2012

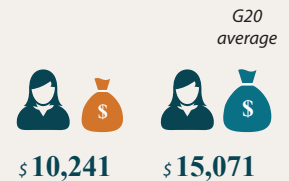
### GHG emissions per capita (tCO<sub>2</sub>e/cap)



### Share of global GDP

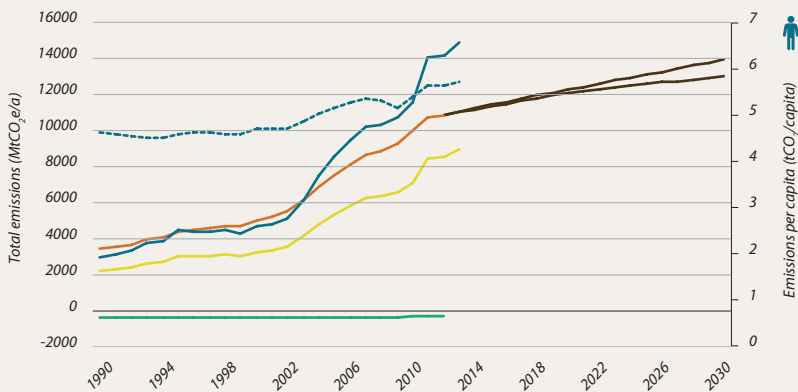


### GDP per capita



Source: IEA, data for 2013

## GREENHOUSE GAS (GHG) EMISSIONS



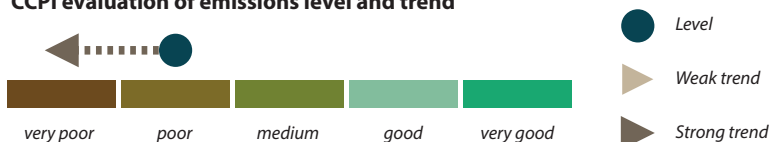
China is the world's largest emitter of greenhouse gases (GHG). Since 1990, emissions have increased threefold and are expected to further surge until 2030. Emissions from land use, land-use change and forestry (LULUCF) are in the negative range. China's energy-related carbon dioxide (CO<sub>2</sub>) emissions account for about three quarters of annual GHG emissions. In 2011, energy-related CO<sub>2</sub> per capita emissions exceeded the G20 average for the first time. The CCPI ranks China's emissions level as relatively poor with a negative trend.

### Composition of GHG emissions

- CO<sub>2</sub>\* 77%
- N<sub>2</sub>O 5%
- CH<sub>4</sub> 15%
- F-Gases 2%
- CO<sub>2</sub> emissions from forestry -4%

\*CO<sub>2</sub> emissions incl. LULUCF  
Source: Annex I countries: UNFCCC (2015); Non-Annex I countries: IEA (2014) and CAT (2015)

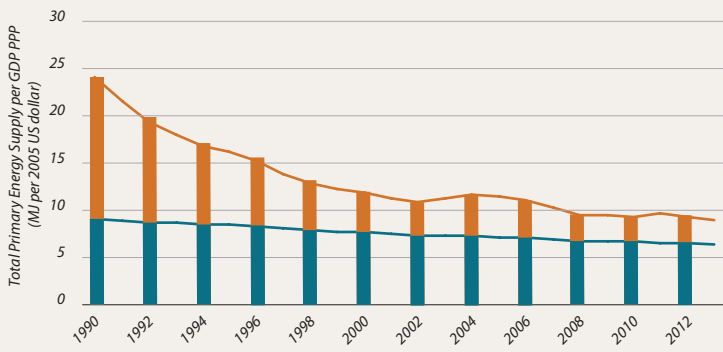
### CCPI evaluation of emissions level and trend



Sources: Past energy related emissions from the Climate Change Performance Index (CCPI); past non-energy and future emissions projections from the Climate Action Tracker (CAT). CCPI calculations are primary based on the most recent IEA data; CAT calculations are based on national policies and country communications.

# DECARBONISATION

## Energy intensity of the economy

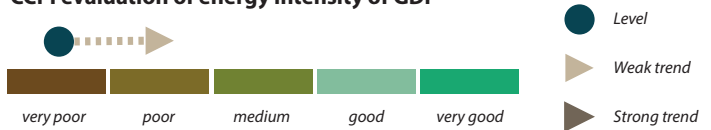


Energy intensity  
Average energy intensity in G20

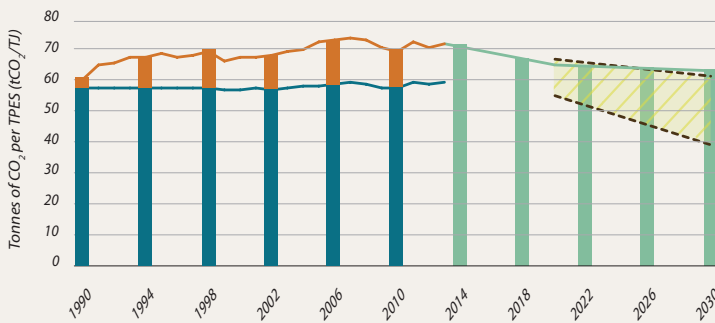
Source: CCPI, 2016

The energy intensity of China's economy (TPES/GDP) is steadily falling, but is still above the G20 average. Despite the country's current position as one of the very poor performers in the CCPI ranking, the CCPI assessment notes a positive trend.

### CCPI evaluation of energy intensity of GDP



## Carbon intensity of the energy sector

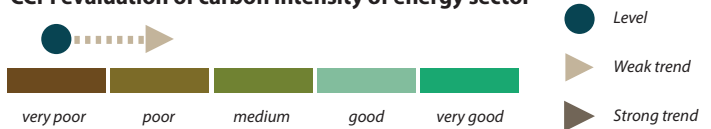


Carbon intensity (past trend) Average carbon intensity in G20  
Carbon intensity (current policy projection) Global benchmark for a 2°C pathway

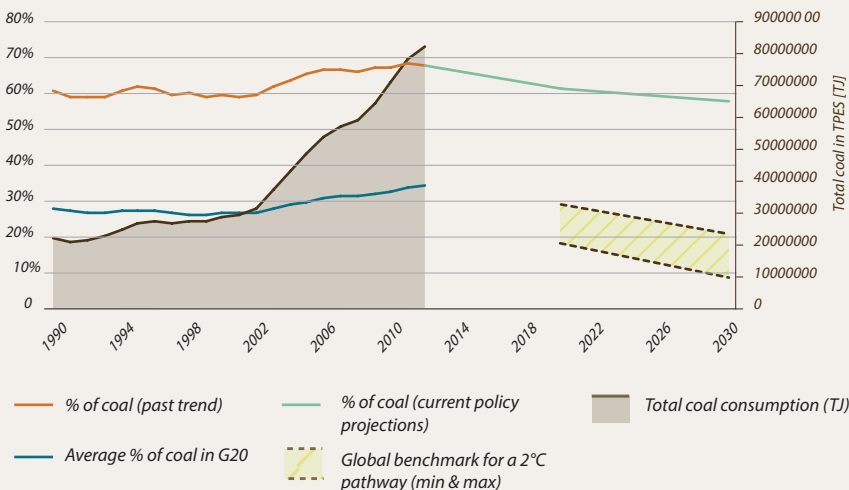
Sources: Past: CCPI; future projections: CAT

The carbon intensity of China's energy sector ( $CO_2/TPES$ ) is relatively high, well above the G20 average. Starting from below 60  $tCO_2$  per TJ, emissions intensity peaked in 2007, slowly dropping since. Projections show this will continue, but not enough to be in line with the 2°C compatibility benchmark corridor. China falls into the very poor category in the CCPI carbon intensity ranking. The five-year trend shows a positive development.

### CCPI evaluation of carbon intensity of energy sector



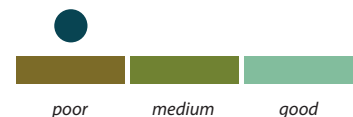
## Share of coal in Total Primary Energy Supply (TPES)



Source: CAT

Coal plays a major role in China's total primary energy supply: 68% of the country's energy supply is from coal. The G20 average is only one third of China's share. Future projections see a reduction, but with an estimated share of 58% in 2030, the decrease will not be compatible with the 2°C threshold.

### Evaluation of coal share in TPES

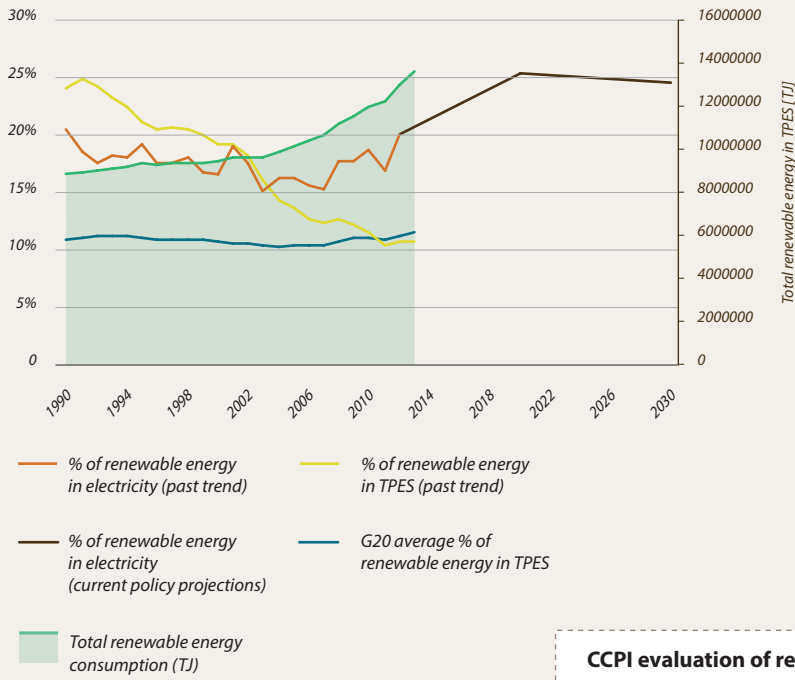


Source: own evaluation

## Renewable energy in TPES and electricity sector

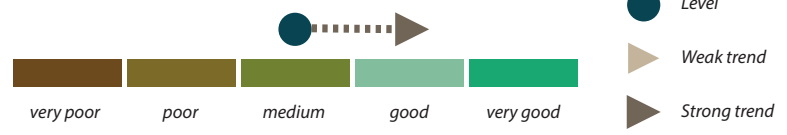


The share of renewable energy in China's electricity supply has varied between 15-20% over recent decades. Future projections show that an increase of up to 25% can be expected. The share of renewables in China's total primary energy supply has fallen since 1992 and is now at the G20 average level of 11%. The CCPI evaluates China's renewable energy level as medium compared to other countries and recognises a positive trend.



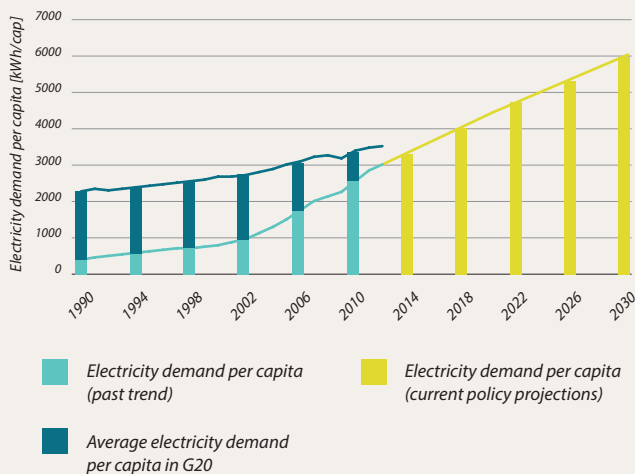
Sources: CCPI and CAT

### CCPI evaluation of renewable share in TPES



## Electricity demand per capita

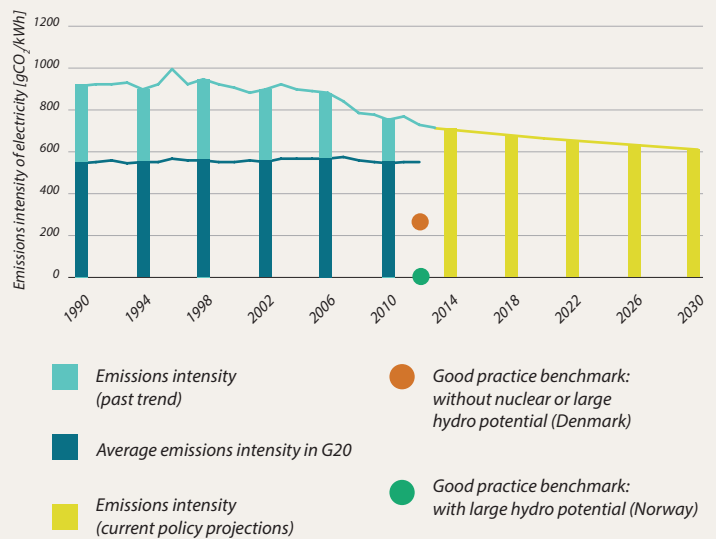
Since 2002, China's electricity demand per capita has been surging and has more than tripled over time. Although it is still below the G20 average, it is expected that this strong rise will continue beyond 2015.



Source: CAT, 2015

## Emissions intensity of the electricity sector

In line with the country's high coal share, China's electricity emissions intensity is far above the G20 average. Despite an observable decrease, future projections show electricity emissions will stay very high in the coming years.



Source: CAT, 2015

### Evaluation of the electricity emission intensity



Source: own evaluation

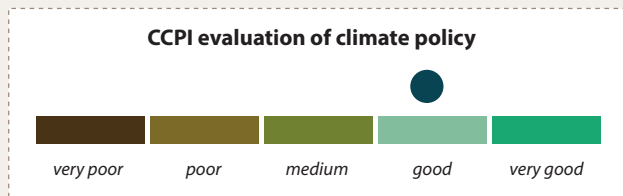
# CLIMATE POLICY PERFORMANCE

## Checklist of the climate policy framework

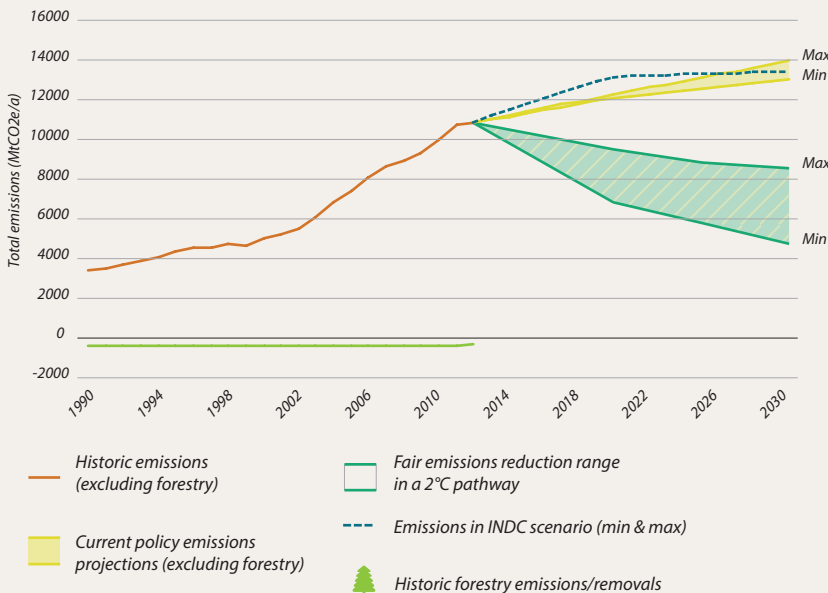
Low emissions development plan for 2050*	✗
2050 GHG emissions target	✗
Building codes, standards and incentives for low-emissions options	✓
Support scheme for renewables in the power sector	✓
Emissions performance standards for cars	✓
Emissions Trading Scheme (ETS)	✓
Carbon tax	✗

\* Understood as decarbonisation plans and not specifically as the plans called for in the Paris Agreement

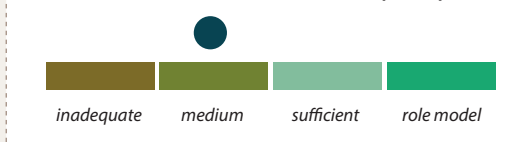
Source: Climate Policy Database, 2016



## Compatibility of national climate targets (INDCs) with a 2°C scenario



## CAT evaluation of China's Intended National Determined Contributions (INDC)

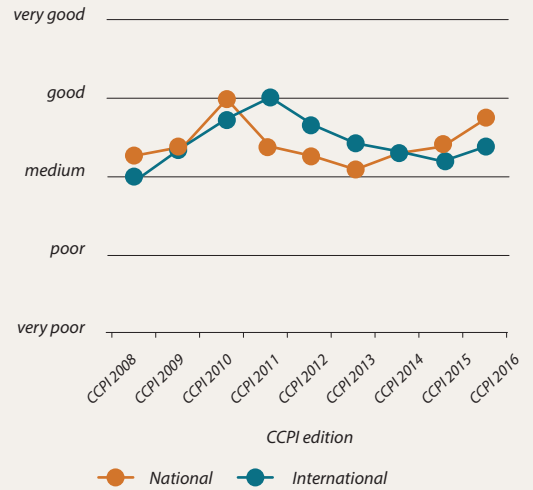


Source: CAT, 2015

## Climate policy evaluation by experts

The CCPI 2016 saw China get a relatively good evaluation by national experts, improving its score from last year. They value China's efforts in reducing its electricity emissions by heavily promoting renewables. To stabilise this trend, experts demand more ambitious structural changes, especially in the energy sector.

The CCPI evaluates a country's performance in national and international climate policy through feedback from national energy and climate experts.



Source: CCPI, 2016

China submitted its INDC on 30 June 2015. It included a target to peak CO<sub>2</sub> emissions by 2030 at the latest, and to reduce the carbon intensity of GDP by 60–65% below 2005 levels by 2030. Other targets included increasing the share of non-fossil energy in total primary energy supply to ~20% by 2030, and to increase forest stock volume to ~4.5 billion cubic metres above 2005 levels.

China's INDC action, with the exception of the carbon intensity target, would reduce emissions in 2025 and 2030 to levels rated as medium by CAT. The emissions resulting from the 2030 carbon intensity targets, taken in isolation, would be significantly higher, and were rated as "inadequate." The CAT analysis shows the carbon intensity targets would only be reached through implementation of ambitious national policies and actions, which at the moment appears unlikely. China therefore gets a hybrid rating "medium with inadequate carbon intensity targets."

Total GHG emissions are likely to continue to increase in 2030, as few specific actions are proposed to address non-CO<sub>2</sub> GHG emissions. The difference between the INDC carbon intensity goal and national actions and goals already implemented is significant, and may reflect a desire by the Chinese government to have a "safe" international goal.

## FINANCING THE TRANSITION

### Investment attractiveness



Allianz Energy and Climate Monitor

MEDIUM

RECAI\* (E&Y index) Category (own assessment)

HIGH

Trend\*\*



\*Adapted from RECAI and re-classified in 3 categories (low, medium, high) for comparison purposes with Allianz Monitor.

\*\*Taken from RECAI issue of May 2016

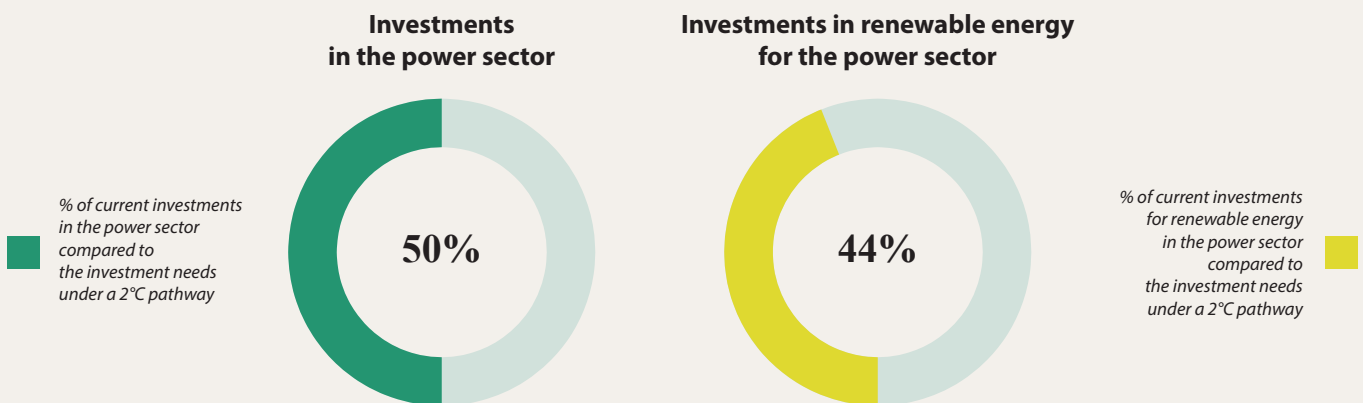
The indices rate China's investment attractiveness medium to high, due to a coherent, reliable green policy environment, good domestic technology experience, value chains and activity in renewables, and consistent investment flows. However, China needs to improve on macroeconomic fundamentals like depth of financial institutions and capital markets, which pulls its score lower than more attractive OECD countries.

Sources: Allianz Energy and Climate Monitor and RECAI reports

The Allianz Energy & Climate Monitor ranks G20 member states on their relative fitness as potential investment destinations for building low-carbon electricity infrastructure. The investment attractiveness of a country is assessed through four categories: Policy adequacy, Policy reliability of sustained support, Market absorption capacity and the National investment conditions. The Renewable Energy Country Attractiveness Index (RECAI) produces score and rankings for countries' attractiveness based on Macro drivers, Energy market drivers and Technology-specific drivers which together compress a set of 5 drivers, 16 parameters and over 50 datasets.

### Historical investments in renewable energy and investment gap

This section shows China's current investments in the overall power sector (including distribution and transmission) as well as in renewable energy expressed as the share of the total annual investments needed to be in line with a 2°C compatible trajectory.



Source: Adapted from WEIO, 2014<sup>(1)</sup>

<sup>(1)</sup> WEIO (2014) compares annual average investments from 2000 to 2013 with average annual investments needed from 2015 to 2030 under a 2°C scenario

### Carbon pricing mechanisms

#### Emissions Trading Schemes (ETS)

An ETS caps the total level of GHG emissions and allows industries to trade allowances based on their marginal abatement cost. By creating a supply and demand for allowances, an ETS establishes a market price for GHG emissions.

#### Carbon Tax

A Carbon tax directly sets a price on carbon by defining a tax rate on GHG emissions or – more commonly – on the carbon content of fossil fuels. Unlike an ETS, a carbon tax is a price-based instrument that pre-defines the carbon price, but not the emissions reduction outcome of a carbon tax.

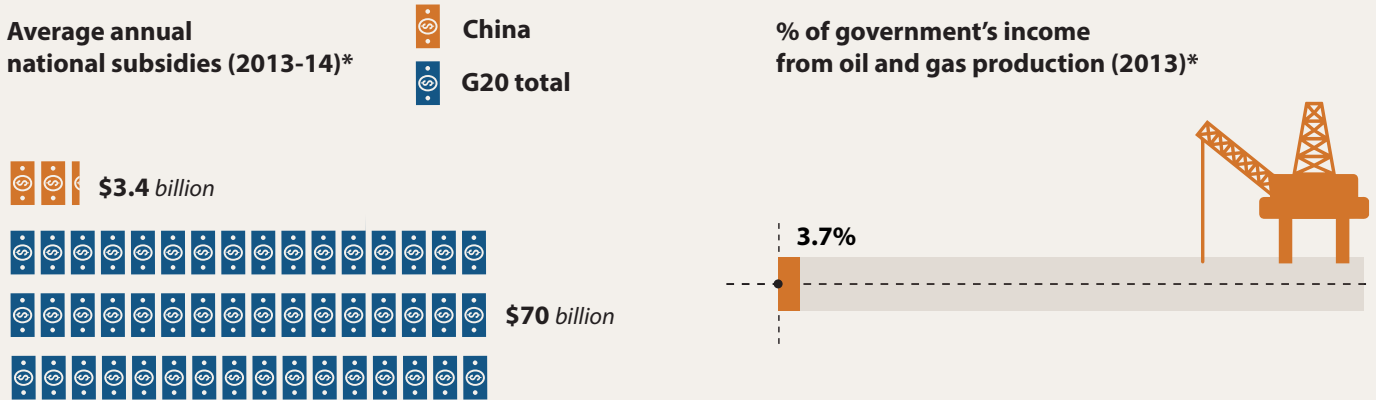
In 2013, China started seven pilot Emissions Trading Schemes at a sub-national level (Beijing, Guangdong, Shanghai, Shenzhen, Tinajin, Chongqing). When combined, the sub-national ETs will cover 1.3 GtCO<sub>2</sub>e, which represents about 12% of the national emissions. Two years later, China announced plans to introduce a national ETS in 2017, which will cover eight sectors and is expected to form the largest national carbon pricing initiative in the world in terms of volume.



Sources: World Bank and Ecofys, 2016; other national sources

## Fossil fuel subsidies

State-owned coal dominates energy production in China. China provides a host of support measures like tax exemptions for fossil fuel production, direct budgetary spending for state-owned fossil fuel producers, R&D support to enhance fossil fuel production, and import duty waivers for fossil fuel equipment. While such support was previously central to China's economic growth model, concerns about air pollution and the impact of fossil fuels have changed the government's development focus, with emerging policies aiming to cap coal use, peak GHG emissions, and increase the non-fossil fuel share. In 2007, China phased out pre-tax subsidies by relaxing coal price controls in favour of market based pricing.



Source: ODI, 2015

\*The indicators above refer only to subsidies for fossil fuel production, and include direct spending (e.g. government budget expenditure on infrastructure that specifically benefits fossil fuels), tax expenditure (e.g. tax deductions for investment in drilling and mining equipment) and other support mechanisms (e.g. capacity mechanisms).

## Public climate finance

China is not a signatory to Annex II of the UNFCCC, and it is therefore not formally obliged to provide climate finance. While climate-related spending by multilateral development banks may exist, it has not been included in this report.