

# Macro Focus: China's green transition

## Climate policy – will China reach its goals?

- Reaching peak emissions by 2030 and carbon neutrality by 2060 might not be enough
- Remarkable achievements are made in areas of clean energy and electric vehicles ...
- ... but the transition away from coal dependency is a challenge

China is the world's largest emitter of carbon dioxide, and despite strong signals from the country's president Xi Jinping to reduce carbon emissions there are hundreds of coal-fired plants under production and emissions are still on the rise. The 2030 goal to reach peak emissions is, according to experts, within reach. However, the higher the peak, the harder it will be to achieve the second goal: carbon neutrality by 2060. A reduction in China's carbon footprint would result in a huge global effect, and remarkable achievements have already been made in areas of clean energy and electric vehicle production.

Without China taking an active role in transitioning their production to greener energy sources, none of the world climate goals can be met. While expert predictions differ regarding the possibility of China achieving their dual carbon goals, there is a general consensus on the fact that the current goals are not enough to be compatible with the Paris Agreement's 1.5 °C limit. For that, China needs to set more ambitious medium-term goals for the long-term goal of net zero emissions.

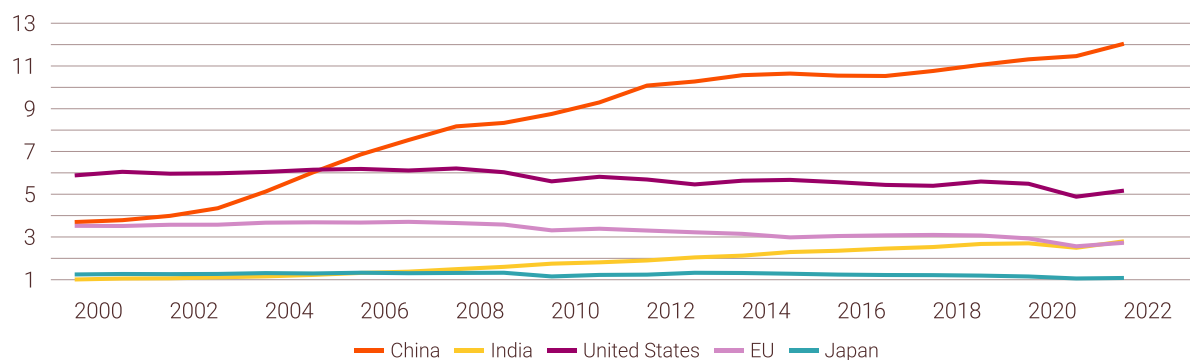
China is dominating in the production of solar and wind power as well as the distribution of electric vehicles, and just last year they launched their own carbon trading market (CN ETS), immediately becoming the largest trading market in the world by volume. However, the ETS needs to be expanded and stricter in order to affect the country's emissions. China currently has control over many minerals and solar panel production, implying that the fate of green transition for the rest of the world will lie in their hands. Repeated delays in several areas of the green transition strategy together with vaguely defined future measures could be a cause for concern, as it is crucially important for China not just to meet but to exceed their targets.

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### Carbon Dioxide Emissions

Bn metric tons



Sources: BP, Swedbank Research & Macrobond

## China is still building hundreds of coal-fired plants

The Chinese president Xi Jinping has pledged that China will peak its carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060<sup>1</sup>. China has come a long way on its journey towards a green transition, such as scaling renewable energy and putting electric vehicles on the road. However, the majority of the country's production still relies on fossil fuels.

China is currently the world's biggest polluter, mainly because of fast industrialization and economic growth. The country supplies a large portion of the world's production, both domestic and foreign-based, and thus needs to generate a substantial amount of energy. This has, historically, largely been done through coal-fired power plants, which can partially explain their leading position in carbon emissions. Additionally, China has gone through an urbanization period more recently than earlier developed EU countries and the US, further explaining a share of the emissions.

Worldwide consumption-based emissions have increased rapidly during the last few decades, where the main driving force seemingly is increased trade with China after the country's entry into the World Trade Organization (WTO) in 2001. Weaker environmental institutions in China have entailed lower production costs and made Chinese firms more competitive, particularly in carbon-intensive industries. Despite strong signals from leadership on measures for cutting emissions, China is still building hundreds of coal-fired plants. This implies that China has some way to go to complete their transition to carbon neutrality before 2060.

## China's transition into a low-carbon economy is crucial for global climate

China emits more than one fourth of global carbon dioxide and a third of the world's greenhouse gases. However, despite carbon emissions in China doubling the amount of the US, and being five times those of the EU, the emissions per capita are only slightly higher than in the EU and roughly half of those in the US, due to China's large population. The country has announced increased support for other countries in developing low-carbon energy and no longer endorse construction of coal-fired power plants abroad. China accounts for over half of global coal demand and its power sector alone accounts for a third of it. Additionally, China produces the majority of the world's steel and cement, hence having a dominant role also in industry coal use. Coal dependency is high and the transition from this will be especially hard in China and other countries with similar reliance on coal production. This makes the announcement of decreased support for coal-fired plants abroad potentially very significant as it could lead to the cancellation of up to 190 GW of coal projects, as suggested by the "Announced Pledges Scenario" formed by the International Energy Agency (IEA)<sup>2</sup>. This could save some 20 Gt in cumulative CO<sub>2</sub> emissions if replaced with low emissions generation, comparable to the total emissions savings from the EU going to net zero emissions by 2050.

## Solar and wind power production is expected to flourish

China began the previous decade with only 1 GW of solar power in 2010 and has increased this capacity to over 300 GW by the end of 2021. During the first half of this year 31 GW has reportedly been added, with expectations for 2022 as a whole adding up to the accumulation of between 75 and 90 GW of new solar to the grid by the end of 2022, which would mean the single year roll-out coming close to matching the total existing solar capacity across the US and surpassing both Germany and Australia (the latter by four times), making China the main driver of solar and wind capacity growth. China currently has a goal to install a total of 1,200 GW of wind and solar generation by 2030, with experts estimating that solar alone could amount to 1,000 GW capacity by that time. During the first half of this year, solar power met 5% of the total electricity demand, and the rise in wind and solar generation was able to meet 92% of its electricity demand rise, thereby avoiding the cost of approximately \$21 bn in fossil fuels imports<sup>3</sup>.

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<sup>1</sup> An important note is the wording, as the long-term goal is carbon neutral, and not climate neutral.

<sup>2</sup> This scenario assumes that countries will follow through on all the pledges they have made to reduce emissions.

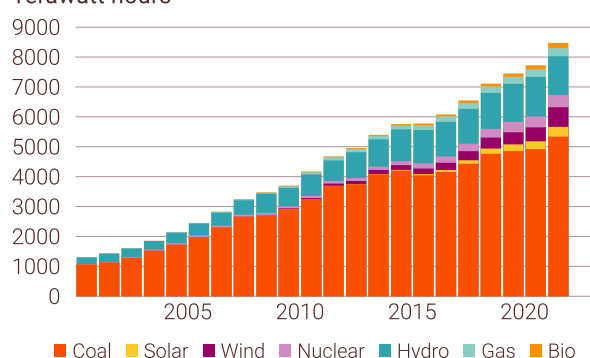
<sup>3</sup> Calculations done by Ember Climate (2022), where they assume that solar power replaced the most expensive fossil-based electricity.

China is reportedly the country best equipped for solar capacity growth, with the combination of an earlier start for clean transition relative to prior developed countries and substantial investments in long-distance transmission lines turning deserted areas into utility solar powerhouses, implying that the country's solar installations are set for continued world dominance. The solar supply chain in the country has grown during the last two decades to dominate every subsector aside from thin film, having been made possible through the combination of government mandates and preferential financing to promote solar investments. Chinese solar power has become so cheap that it remains competitive against coal and gas, even when including onsite storage. China's dominance of the solar panel supply chain could slow the global transition towards cleaner energy, as the rest of the world will almost completely rely on the Chinese supply of key building blocks for solar panel production through 2025. This would be especially prominent if – as some predictions show – China's share in the manufacturing stages for solar panels would reach 95%, a significant rise from the current 80%. This level of concentration in the global supply chain would signify a considerable vulnerability for the rest of the world, as high commodity prices and existing bottlenecks has already led to a rise of 20% in panel prices over the last year and resulted in delayed deliveries worldwide.

Fossil fuels accounted for more than 80% of primary energy production in 2021. The Chinese government has announced the intention of replacing older coal-fired units with low emission technology and allow cities to build clean-coal heating systems. Coal will remain an important fuel in China's power sector in the coming years, although natural gas is replacing some of the coal-fired capacity in the eastern region of the country characterized by higher power demand, as well as in the north-eastern region which has stricter environmental regulations.

### Chinese energy generation by type

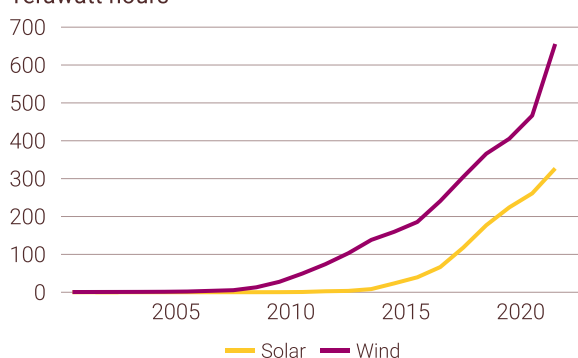
Terawatt hours



Sources: Ember, Swedbank Research & Macrobond

### Energy generation by solar & wind

Terawatt hours



Sources: Ember, Swedbank Research & Macrobond

### A very strong electric vehicle market may slow down... or not.

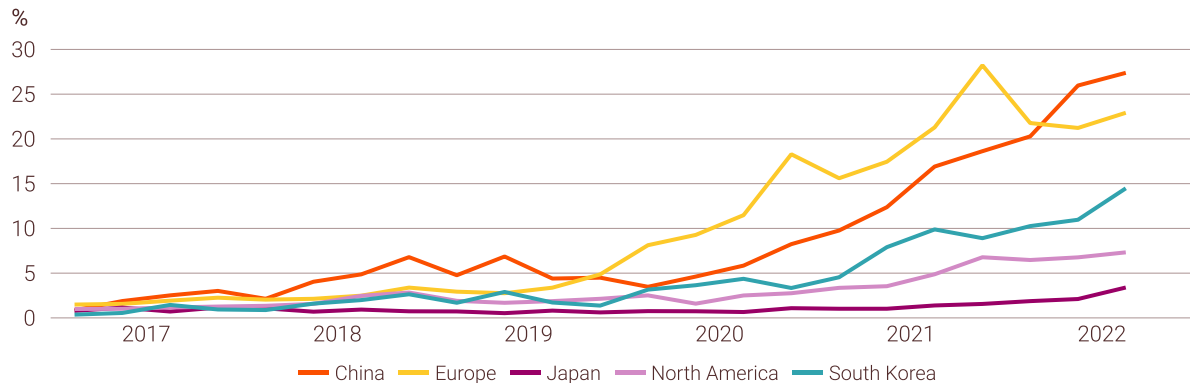
The electric vehicle (EV) market in China now accounts for more than half of EV sales globally, and almost one quarter of all newly registered cars in the country are electric or plug-in hybrid vehicles, positioning them ahead of Europe and the US as well as over their own 2025 goal of 20%. This progress in EV distribution is largely driven, much like solar power production, by government mandates and incentives. For over a decade the Chinese government has subsidized EV purchases, although the value of the subsidies has fallen over time and are meant to end by 2023 (originally set to end in 2015, although the government has prolonged it several times), noting the absence of longer-term targets for EVs. There are however still plenty of incentives for buying an electric car in China, although the demand may level out.

In 2017, China adapted a "dual-credit" policy that punishes the production of fossil fuel cars and rewards the production of EVs, functioning as a quasi-carbon market set up to boost the EV industry's growth.<sup>4</sup>

<sup>4</sup> The functionality of the market is explained in further detail [here](#)

This has resulted in some companies selling EVs below cost, as the revenue generated from the sale of their excess carbon credits make up for the financial shortfall. If this trading market is meant to stay when the subsidies (might) end in 2023, it will perhaps be enough to continue in helping the Chinese automobile industry going fully electric.

### Electric vehicle share of all newly registered cars in selected countries



Sources: BNEF, Swedbank Research & Macrobond

### A carbon trading market coming up somewhat short of expectations...

In February last year, China's carbon trading market came into effect, immediately becoming the largest carbon trading market in the world (by volume), covering over 4 Gt of carbon-dioxide emissions. Unlike the EU Emissions Trading System (ETS), the program does not include a total emissions cap, instead it rates polluters after benchmarks of size, carbon intensity and fuel type. The Chinese ETS has, however, come up somewhat short of expectations. The Carbon Price Leadership Coalition estimates the minimum social cost of carbon (a measure of the damage done to global welfare by increasing emissions) at \$40 a tonne, with some economists placing it even higher, at over \$200. The Chinese ETS in comparison is priced at approximately 60 yuan (\$8) per tonne, hence doing little to reduce emissions. Previous expectations on the trading market were that it could cover more than 70% of the domestic carbon-emitting industries, although the first phase only includes the power generation sector, covering roughly 30% of China's total emissions. Additionally, polluters that exceed their emissions cap are only required to pay for 20% of the overextended emissions, with the maximum value of any fines set at 30,000 yuan, corresponding to roughly \$4,300<sup>5</sup>.

### ... but there is hope, and incentive, for amplified regulations

China's ETS is expected to expand in the future by 70% with plans to include heavy industry and manufacturing, which would cause it to cover more emissions than the rest of the world's carbon markets put together. Drafts from 2016 for the ETS proposed covering emissions from electric power generation and six additional industries: iron and steel, aluminium, cement, chemicals, papermaking, and civil aviation. This could imply a plan for implementing these sectors in the system during later stages. Cement, aluminium, and crude steel are expected to be included in the expansion next year, with trading possibly not beginning until 2024. The expansion previously expected to begin this year has supposedly been delayed due to poor quality of reported data, and the need for closing loopholes in the carbon trading market regulations<sup>6</sup>.

Accelerated climate action may bring substantial benefits for China in promoting its emerging position as a leader in global clean energy technology. As more of the global economy is covered by carbon taxes and emissions trading systems, it will be the early adapters that stay competitive. Additionally, with the EU's Carbon Border Adjustment Mechanism (CBAM) soon to be implemented, aiming to ensure

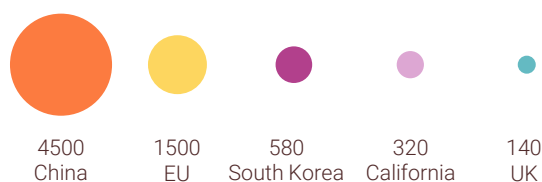
<sup>5</sup> There are, however, newer drafts for increasing these fines up to 1 million yuan.

<sup>6</sup> This information comes from "multiple trustworthy sources" according to the Chinese newspaper Caijing. [Link to English Article](#)

that importers in the bloc pay the difference of the relevant foreign carbon price and the EU's, this ought to encourage bringing Chinese carbon prices closer to the EU's (averaging at \$80 per tonne) in order to stay competitive and reduce the risk of declining exports.

### 2021 coverage of largest ETS programs

Million metric tonnes of CO<sub>2</sub>



Source: Energy Innovation Policy & Technology LLC

### Carbon Emissions Allowance Trading Price

Dollar per tonne CO<sub>2</sub> equivalent



Sources: Swedbank Research & Bloomberg

## China's carbon goals have merit, but are not quite there yet

China has quite recently taken a leading position in the transition to greener production in order to reduce their carbon footprint, with innovative techniques in attempting to deplete the economy of carbon-intensive industries. However, due to the ambiguity of upcoming reforms, not least in their carbon trading market, it is difficult to precisely estimate the future of China's green transition. Discrepancies in the data and the Chinese government's art of keeping things "close to the vest" suggests an uncertainty of China's future in carbon. Follow-ups and increased reliability in data on the country's emissions, and the rest of the world's for that matter, is essential to understand the evolution of carbon-based emissions and the progress towards a greener society.

The Chinese carbon trading market is off to a respectable start, although it is in dire need for stricter regulations. Researchers stress the need for a price collar on the ETS, setting a maximum and minimum price for carbon allowances to avoid carbon price volatility and limit economic risk. Furthermore, the industry coverage needs to expand, which is already set to be implemented in the near future.

While China has made noteworthy achievements in areas like clean energy and EVs, issues still remain in coal-fired power generation and iron and steel production. China may meet their 2030 peak emissions target with relative ease, but the overall volume could still rise significantly over the decade with construction of new coal plants and other carbon-intensive infrastructure. With a higher peak it will be more difficult to meet the 2060 goal of carbon neutrality, and energy consumption is still growing fast.

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