China's Climate Transition: Outlook 2025

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CREA
Centre for Research on Energy and Clean Air

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About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. CREA uses scientific data, research, and evidence to support the efforts of governments, companies, and campaigning organisations worldwide in their efforts to move towards clean energy and clean air, believing that effective research and communication are the keys to successful policies, investment decisions, and advocacy efforts. CREA was founded in Helsinki and has staff in several Asian and European countries.

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Executive summary

In 2025, China's energy and emission trends moved closer to the pathways aligned with the goals of the Paris Agreement to limit global temperature rise: its total CO_2 emissions are projected to stay flat, and the power and transport sectors are set to see their emissions fall year-on-year. Clean energy growth is likely to make new records and grid energy storage has taken off. The EV breakthrough has accelerated, delivering a major reduction in transportation sector emissions.

However, despite coal consumption and related emissions being approximately unchanged this year, the country will miss important energy and emissions targets laid out in its current development plan, the 14th Five-Year Plan (FYP), which runs from 2021 to 2025. Specifically, the country will not achieve the target of reducing carbon emissions per unit of GDP, nor the pledges to "strictly control" coal consumption growth and new coal-fired power plants. The country's determination to meet its 2030 climate targets is unclear, with the commitment to gradually reduce coal consumption in 2026–30, in particular, omitted in the new Nationally Determined Contribution (NDC) and the Central Committee's recommendations for the next FYP. The policy environment and target-setting for the next few years are concerning, raising the risk of an emission rebound after staying stable for two years.

Earlier this year, China released new climate commitments for 2035 under the Paris Agreement, the first update to its internationally pledged targets since 2021. The new NDC includes the country's first absolute emission reduction target and the first emission target covering all greenhouse gases (GHG) and sectors. However, the level of ambition falls well short of what China needs to do to enable the world to meet the goals of the Paris agreement. China intends to reduce its GHG emissions from an undefined 'peak level' instead of a specific year in the past, which allows emissions to still grow in the near term.

On balance, China's clean energy boom has a momentum of its own and has gained high economic significance both nationally and on the provincial level, which makes it more likely that the boom will continue. It's clear that after the impressive growth of the clean energy sectors, China has the capability to keep emissions falling and start making progress towards its carbon neutrality target.

Trends compared to benchmarks

To measure China's progress, we benchmarked the country's emissions and energy trends in key emitting sectors against various transition pathways aligned with the Paris Agreement goals compiled from Chinese and international literature, applying the same

methodology used in our previous Outlook reports[1]. Our assessment found multiple indicators that are on track:

- Clean energy investments and non-fossil energy production.
- Electrification (increase in the share of electricity in final energy use).
- Power sector CO_2 emissions and CO_2 intensity.
- Oil and gas consumption.
- Steel and cement output.
- CO_2 emissions from the production of construction materials.
- Building sector coal use and electricity consumption.
- Transport sector energy consumption, electrification, and CO_2 emissions.
- EV sales.

A new policy was published to control the capacity and output of the iron and steel industry, bringing the sector closer to alignment with the transition pathways, but the very large number of permits for new coal-based steel production capacity issued in the past few years and the lack of progress in retiring capacity remain as obstacles.

While additions of clean power generation are on track in 2025, government clean energy targets for the next few years are much less ambitious than the additions achieved in recent years, allowing for a significant slowdown in deployment.

We also found the following indicators to still be off track:

- Total CO_2 emissions.
- Total energy consumption.
- Coal consumption.
- Commissioning, construction and permitting of coal and gas-fired power capacity.
- Industrial energy consumption and coal consumption.
- Steel sector electrification.

[1] CREA and ISETS (November 2024). China's Climate Transition: Outlook 2024. https://energyandcleanair.org/publication/chinas-climate-transition-outlook-2024/; CREA and Heinrich Boell Foundation (November 2023). China's Climate Transition: Outlook 2023. https://energyandcleanair.org/publication/chinas-climate-transition-outlook-2023/; CREA and Heinrich Boell Foundation (November 2022). China's Climate Transition: Outlook 2022. https://energyandcleanair.org/publication/chinas-climate-transition-outlook-2022/.

- Coal and oil consumption growth in the chemicals sector.
- Building energy consumption.

China is yet to start reporting emissions of non-CO_2 greenhouse gases on an annual basis, and lacks targets that would enable systematic emission reductions and monitoring of progress. A partial exception is hydrofluorocarbons (HFCs), for which the government proposed quantitative emissions targets in a new policy, albeit relatively modest compared to what would be required under the relevant international agreement.

As long as the growth of China's total energy consumption remains significantly faster than in climate transition pathways, even larger clean energy investments will be required to put energy sector CO_2 emissions on track. The alternative is for policymakers to guide the country's economic development in a less energy-intensive direction and increase investment in energy efficiency in various industries, particularly in buildings. Emissions targets, clean energy targets, and other key sectoral targets need to be upgraded to ensure the continuation of the recent clean energy growth and other positive real-world trends listed above. Progress on monitoring, reporting, and controlling greenhouse gas emissions across sectors needs to be accelerated.

Table ES1 — Overview of progress by sector and indicator

Indicators	Progress compared to energy transition pathways			
Assessment year	2022	2023	2024	2025
Total CO_2 emissions				
Non-CO_2 greenhouse gases				
Total energy consumption				
Coal consumption				
Oil consumption				
Gas consumption				
Non-fossil energy production				
Electrification ratio				
CO_2 emissions from the power sector				
CO_2 intensity of the power sector				
Non-fossil power generation				
Thermal power capacity				
New permits for coal power capacity				
Industrial energy consumption				
Coal consumption in the industry				
Electricity consumption in industry				
Electrification ratio in the industry				
New permits for coal-based steelmaking capacity				
Share of low-carbon steel production				
Building energy consumption				
Coal consumption in buildings				
Gas consumption in buildings				
Electricity consumption in buildings				
Electrification ratio in buildings				
Transportation energy consumption				
Oil consumption in transport				
Electricity consumption in transport				
Electrification ratio in transport				
Electric vehicle production and sales				

Note of the colours:

Off track	Lagging	On track	No data

Developments by sector in 2025

Total emissions: China's total CO_2 emissions are projected to stay flat in 2025, a testimony to the massive clean energy boom that China has witnessed. Although China's emissions have fallen in the past, those declines were driven by a slow or negative energy consumption growth. But this year's projected trend points to something different, and significant: it would be the first year that China's emissions stop growing, even though its energy demand is expected to come in above the average rate. This means that clean power will have covered the increase in electricity demand and more. We estimate that China's emissions will increase by 0.2% in 2025, based on data up to September–October, but this means a marginal increase or decrease is essentially equally likely, given uncertainties.

China included a target for reducing emissions of all GHG in its NDC for the first time, but still lacks emission reporting and specific targets for non-CO_2 GHGs.

Electricity: In 2025, China's power sector emissions are set to record their first full-year decline since 2016, as unprecedented clean energy growth offsets rising electricity demand, adding more than Germany's total power generation in just one year.

It's also likely going to be the first drop in coal-fired power generation on record that isn't caused by a slowdown in electricity consumption below average levels, unless solar and wind curtailment increases dramatically in the last two months of the year.

However, a new pricing policy for new solar and wind projects and modest targets for capacity growth have created uncertainty about whether the boom will continue. Under the new policy, new clean power generation has to compete on price against existing coal power in power markets that are heavily tilted against variable renewable energy, while the electricity markets themselves are still being introduced and developed, creating investment uncertainty.

Important steps were taken in 2025 to improve the flexibility of inter-provincial transmission. The renewable portfolio standard was expanded to new industrial sectors, strengthening it as a tool to support renewable energy investments. Capacity payments and ancillary service markets were gradually expanded to cover clean solutions, instead of solely subsidising coal power plants. The rollout of provincial spot markets was accelerated, contributing to increased flexibility of the power system.

The policy of promoting “zero-carbon industrial parks” remained a focus for high-level policymakers, with the potential to support the uptake of clean energy, particularly distributed solar.

At the same time, 2025 will see the largest amount of coal-fired capacity added to China’s grid since 2015, but the country’s progress on retiring older coal plants remains very slow. The coal power boom is a result of a wave of permits handed out for new projects since 2020. It reflects the country’s failure to “strictly control” new coal power, which Chinese President Xi Jinping pledged the country would do between 2021 and 2025. The policymakers now need to decide whether to start reducing coal-fired power or slow down the clean energy boom.

Industry: The industrial sector’s energy consumption and emissions rose in 2025, extending the growth that started in 2023, putting the sector clearly off track to the Paris-aligned pathways and towards carbon neutrality. The emission growth is predominantly driven by the chemical industry, where the output of plastics and other fossil-fuel-intensive chemicals, and the output of highly emission-intensive coal-based chemical industry, have continued rapid growth, resulting in major increases in both coal and oil use.

Another reason for China’s industry increasing emissions is its failure to replace coal-based steelmaking with the electric-arc furnace (EAF) technology, a cleaner method that uses electric energy, on a large scale. While steel output has fallen, the resulting emission reductions have been undermined as the reduction in output has mainly happened in electric arc steelmaking. As a result, the target to increase the share of steel produced by EAF to 15% in 2025 will be missed by a wide margin. This is due to overcapacity in coal-based steel capacity and its entrenched position, as well as a lack of incentives from the carbon market or other policies to shift production to cleaner methods. A new policy to control both the capacity and production volumes of the steel industry and incentivise green steel issued in 2025 provides the government with the framework to put the industry’s decarbonisation on track if it chooses to use it.

In contrast, the cement industry has seen rapid reductions in emissions due to falling output driven by the ongoing contraction of construction activity.

2025 saw the expansion of the national carbon market to cover steel, cement, and aluminium. This has little to no near-term impact on emissions but could support decarbonization if the scheme moves to absolute emission caps in the future.

More detailed and in-depth plans and policies to decarbonise China's heavy industry sectors were issued, but progress remained uneven in 2025. The government is

increasingly balancing the goal of decarbonisation with the aim of boosting the sectors' economic output.

The aim of establishing "zero-carbon industrial parks" is likely to feature strongly in the upcoming FYPs for different provinces and sectors for 2026–30. This is potentially significant for China's emission trends as industrial parks are responsible for around 30% of the country's CO_2 emissions. The use of green hydrogen is another area of industrial decarbonisation where China is making a strong push, as shown by new policies and demonstration projects.

Buildings: The building sector's energy consumption and emission growth has continued above the Paris-aligned pathways, reflecting a need to improve the energy efficiency of buildings.

A major reduction in small-scale coal use in buildings has significantly improved air quality in the wintertime and helped reduce CO_2 emissions. On the flipside, many of the programmes to replace coal use have relied on fossil gas, rather than electricity, as the replacement. Gas consumption in buildings has continued to increase, driving up CO_2 emissions and reliance on gas imports.

There is clear progress in the compliance of new buildings with energy efficiency standards, with near-universal adoption. As new construction slows, the policy focus is shifting from making new buildings more energy efficient toward upgrading existing buildings, expanding clean energy use, and improving efficiency through smarter energy management. Yet, the floor area of buildings undergoing energy efficiency retrofits fell year-on-year in 2025, showing the need to translate high-level policies into implementation.

Transportation: The decarbonisation of the transportation sector progressed in leaps and bounds in 2025. The pace of electrification in the transport sector aligned for the first time with transition pathways. As a result, oil consumption in the transport sector declined for the second consecutive year, maintaining 2023 as the likely peak year.

The share of electric vehicles (EVs) will reach 12% of all vehicles on the road by the end of 2025, up from 9% a year earlier and less than 2% just five years ago. The share of EVs in the sales of new vehicles increased to 48% from 41% in 2024, with passenger cars crossing the 50% threshold. Electric trucks experienced a breakthrough as their market share rose from 8% in the first nine months of 2024 to 23% in the same period in 2025. Policy support for EVs continues, for example, with a new policy aiming to nearly double charging infrastructure in the next three years.

The electrification of transport is not limited to EVs, as rail passenger, freight and investment volumes saw continued growth. The total length of China's high-speed railway network reached 50,000 km in 2025, making up roughly 70% of the global high-speed lines.

1 Introduction

China has a triple role in the global climate effort: it is the world's largest emitter, one of the countries most affected by climate change and the largest investor and producer of key clean-energy technologies needed to shift the world away from fossil fuels. Until recently, it was also the largest source of global emissions growth.

China's fossil CO_2 emissions increased 25% since the Paris Climate Conference, from 2015 to 2024, contributing 75% of the increase in global emissions over the period[2].

The massive investments in clean energy manufacturing and deployment that China has made in recent years have driven down the costs of clean energy globally, leading to booming sales of solar panels and EVs around the world and upending global emissions trends. These investments also constitute a major financial bet on the success of the global energy transition, aligning China's self-interest with higher global ambition.

The clean energy growth at home has caused China's emissions to stabilise over the past two years, raising the prospect of emissions peaking earlier than the government has been prepared to target.

Yet, China will likely miss its key CO_2 emission target for 2025. The recently announced emission targets for 2035 fall well short of what the country needs to do to align with the global goals of the Paris Agreement, while China continues to expand fossil fuel-based power and industrial capacity.

The country's clean energy boom has exceeded the central government's targets by a wide margin, and given China's decision-makers the ability to peak emissions imminently, but they appear undecided on whether they want to start scaling down the coal and fossil fuel industries or to slow down the clean energy boom.

While the clean energy boom means that the country's emission targets could be exceeded in the energy sector, many other sectors will require more determined policy action to reach alignment with the Paris Agreement.

These conflicting trends were apparent when CREA and the International Society for Energy Transition Studies (ISETS) carried out our 2025 survey of experts in China's climate and energy issues. The survey found that the majority of experts think China will exceed its 2035 targets, but expect emissions to peak later, around 2028, a more pessimistic near-term outlook than in earlier surveys.[3]

[2] Global Carbon Budget. (2025). https://globalcarbonbudget.org/datahub/the-latest-gcb-data-2025/.
[3] Shi, X., Schäpe, B., & Qin, Q. (2025, November 6). China's Climate Transition Outlook 2025: Expert Survey. Centre for Research on Energy and Clean Air (CREA) and International Society for Energy Transition Studies (ISETS). https://energyandcleanair.org/publication/chinas-climate-transition-outlook-2025-expert-survey/

In deciding China's eventual policy priorities and emission pathway, domestic economic and political factors will play the primary role. This report tracks progress against targets and benchmarks, as well as developments in domestic policymaking, that show where the country is going.

China faces intensifying climate impacts

Climate change is increasingly amplifying heat extremes, rainfall intensity, drought severity and storm-related hazards across China, heightening risks to public safety, food security and infrastructure. 2025 illustrates this clearly: China experienced record-breaking heatwaves with temperatures exceeding 40°C across multiple provinces[4] and intensifying drought affecting agriculture and wheat harvests in eight provinces, including Hebei, Shanxi, Hubei, Sichuan, and Henan[5]. At the same time, prolonged heat increased wildfire risk, reflected in large fires in Jilin Province[6].

Extreme rainfall and flooding also had widespread impacts in 2025. Torrential monsoonal rains and storm-enhanced downpours triggered floods and landslides across at least ten provinces, killing dozens of people, displacing tens of thousands, and damaging infrastructure[7,8]. Powerful typhoons—most notably Wutip and Matmo—forced mass evacuations in Hainan, Guangdong and Guangxi, disrupted aviation and maritime traffic, and inundated coastal areas[9].

Swiss Re, the world's largest reinsurer, ranks China as one of the 10 countries most affected by climate risks, out of the 48 major economies assessed[10]. As the world's largest greenhouse gas emitter, China's own energy and climate policies have a major bearing on the severity of the climate impacts the country will face.

Are China's efforts aligned with the Paris Agreement?

In September 2025, in his address to the UN General Assembly, President Xi Jinping said that the green and low-carbon transition is the "trend of the time", and emphasised that

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[4] Al Jazeera. (2025, July 23). China experiences record number of hot days since March. https://www.aljazeera.com/news/2025/7/23/china-experiences-record-number-of-hot-days-since-march
[5] People's Daily. (2025, May 12). Major wheat-producing areas fight against drought. https://en.people.cn/n3/2025/0512/c90000-20313536.html
[6] Global Disaster Alert and Coordination System. (2025, March 21). Overall Green Forest fire alert in China: Jilin Province. https://www.gdacs.org/Wildfires/report.aspx?episodeid=1&eventid=1023615&eventtype=WF
[7] Patel, A. (2025). China Briefing 7 August 2025: Deadly floods; 'Industrial Cthulhu'; Higher solar forecast. https://www.carbonbrief.org/china-briefing-7-august-2025-deadly-floods-industrial-cthulhu-higher-solar-forecast/
[8] People's Daily. (2025, June 25). Over 80,000 evacuated amid serious flooding in SW China. Xinhua via People.cn. https://en.people.cn/n3/2025/0625/c90000-20332512.html
[9] Associated Press. (2025, October 5). *Typhoon Matmo strengthens, prompting China to evacuate 347,000 people ahead of landfall*. Retrieved from https://apnews.com/article/b84b1402983dee153e9bfbbd0925b6cc
[10] Swiss Re. (2021). The economics of climate change. https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-economics-of-climate-change.html

China has the resolve and confidence to deliver on its commitments, while calling on all parties to step up actions.[11]

CREA has created a framework to track whether China's green energy efforts are in line with the global goals set in the Paris Agreement. To capture the range of pathways and solutions available for China and the world, we have compiled a suite of climate transition scenarios consistent with the Paris Agreement, prepared by Chinese and international research institutions.

The suite of scenarios is as wide as possible to capture different potential pathways and avoid being prescriptive towards the specific strategy and pathway chosen. The commonalities between the different published scenarios are sufficiently large to draw a picture of what needs to happen in different sectors to align China's emissions trajectory with global temperature goals.

We have identified a set of indicators, such as installed clean energy capacity or transport oil consumption. We compare the actual development of these indicators against the transition pathways, allowing us to measure progress in a much more granular and forward-looking fashion than would be permitted by a simple look at the annual change in emissions. We have converted the scenario data into benchmarks for each indicator that allow us to assess whether that particular indicator is aligned with the climate transition scenarios.

This report assesses China's progress in 2025 against the transition pathways and assesses whether policy changes and new policies are likely to accelerate progress. Chapters 2 to 8 compare China's progress in different aspects of the climate transition with benchmarks developed from the transition pathways, using relevant indicators. Our findings and conclusions are given in Chapter 9.

[11] Ministry of Foreign Affairs of the People's Republic of China. (2025, September 25.) President Xi Jinping Delivers Video Remarks at the U.N. Climate Summit. https://www.fmprc.gov.cn/mfa_eng/xw/zyxw/202509/t20250925_11716513.html

2 Total CO_2 emissions

2.1 Trends compared to benchmarks

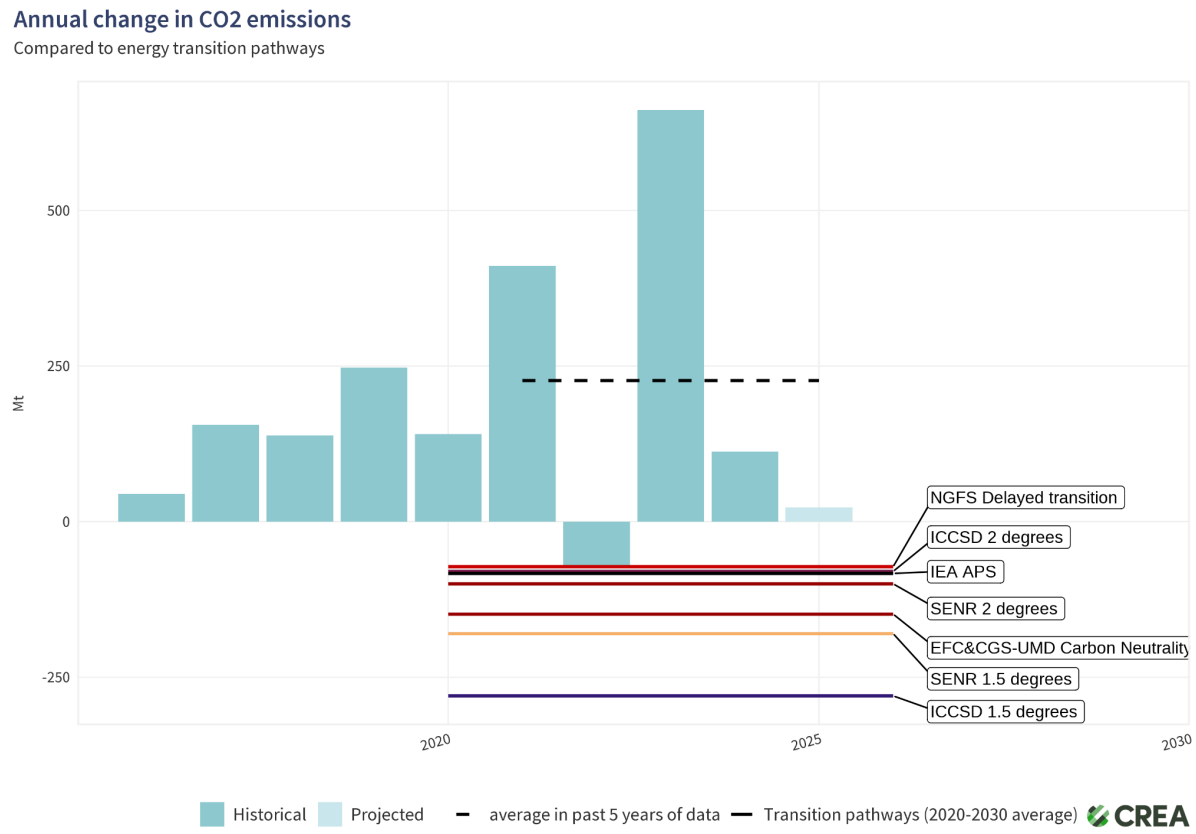

Figure 1 — China's annual change in CO_2 emissions compared to energy transition pathways.

China's CO_2 emissions in 2025 are projected to increase by only 0.2% compared to last year. The figure follows a trend we have observed over the past 18 months, which showed that the country's emission level either stayed flat or declined. China's CO_2 emissions temporarily fell in 2022 due to a dip in economic activities and transport driven by COVID-19 restrictions. But this year marks the first time that its emissions have virtually stopped rising even though its electricity demand has clocked a strong growth.

All transition pathways require China's emissions to fall from 2020 to 2030, which means a peak well before 2030 and emissions reductions thereafter. China's rapid progress in clean energy deployment has driven a substantial reduction in emissions from the power sector, the country's largest source of CO_2. The sector's emissions have been declining since March 2024, and are projected to fall by a further 0.7% in 2025 based on data that run to the end of October. The drop means that China's clean-energy capacity, especially solar, expanded so fast during the period that the growth of clean-energy generation outpaced

that of electricity demand. It essentially means that the additional electricity consumed was met primarily by clean energy sources rather than fossil fuels.

In the first half of 2025, China's clean electricity generation grew rapidly. Record solar capacity additions and rising wind and nuclear generation output pushed the share of low-carbon electricity to 40% of all electricity generated in China. Overall, the power sector may be peaking in emissions, but uncertainty remains due to two factors: there is still a large number of coal power plants waiting to be built in the country, while the central government recently required wind and solar farms to start selling their electricity at market-based prices instead of preferential, state-subsidised prices. On top of that, construction activity and investment declined significantly in the country, so less building materials and metals were needed. This drove down the emissions coming from the heavy industries producing these goods. However, the declines in power and construction-related emissions were partly offset by rising emissions from the chemicals industry, driven by a surge in plastics and other chemical production.

Even if China's total CO_2 emissions decline in 2025 as expected, the country is still set to miss its target for reducing carbon intensity — emissions per unit of gross domestic product (GDP) — set by the 14th Five-Year Plan (FYP), the country's overarching development plan that covers the years between 2021 and 2025. China targeted an 18% reduction between 2021 and 2025, but it is projected to achieve around 12% by the end of this year. If that happens, China will then need to reduce its carbon intensity by 22-24% in the next five years so as to achieve its headline climate commitment for 2030, a 65% carbon-intensity reduction on 2005 levels.

Achieving global temperature goals will require much deeper and faster emissions cuts than those set out under current efforts across all transition pathways. This shortfall suggests that controls on coal consumption and new coal-fired power capacity have not been strictly implemented during the 14th FYP (FYP) period. To deliver on its long-term climate goals, China will need to set more stringent targets in the upcoming 15th FYP in order to speed up the uptake of clean energy in the power and industrial sectors.

2.2 Policies in place

At the UN General Assembly in September 2025, President Xi unveiled China's NDC for 2035. Xi's announcement marks the first time that China has set a medium-term absolute emission target. Under the updated pledge, China aims to reduce economy-wide greenhouse gas emissions by 7-10% from peak levels by 2035[12].

[12] Chinese State Council. (September 2025). China's 2035 NDC Marks a New Chapter in Climate Action. https://www.gov.cn/yaowen/liebiao/202509/content_7042502.htm

The absence of a clearly defined base year, however, reveals lingering uncertainty over whether the country's emissions have peaked. This ambiguity could create incentives for some stakeholders to ramp up emissions-intensive production in the short term. The scenario can potentially hamper China's efforts to achieve its long-term climate goals, even though it is well capable of pushing for an immediate peak of CO_2 emissions and a sustained decline of them afterwards, given the technical capacity it now has. Moreover, the 2035 target remains well below the ambition level consistent with the Paris Agreement. To align with global temperature goals, China would need to cut its CO_2 emissions by at least 30% from 2024 levels by 2035.

Beyond the headline figure, the sectoral targets in China's 2035 NDC highlight solar, wind and EVs as the key solutions for meeting the overall emissions-reduction commitment, underscoring the central role clean energy technologies play in the country's overall development. At the same time, the 2035 target should be viewed as a minimum baseline rather than the upper limit of China's emissions trajectory. Based on the recent rate at which China built solar and wind farms, the renewable target in the NDC, a total of 3,600 GW by 2035, will likely be reached well ahead of schedule. CREA's 2025 expert survey showed that more than two-thirds of the participating climate and energy experts believed that China would significantly or slightly overachieve its targets for 2035[13].

While China appears well positioned to exceed its 2035 targets, the absence of a clear peak year still creates room for short-term emissions growth. The incentive to increase emissions in the short term, before the peak, could be curbed by the creation of the "dual control" system for carbon intensity and total carbon emissions[14]. The Central Committee of the Communist Party – a top decision-making body in China's political system – recently reiterated that this new system would be set up during the next five-year period, without giving a specific timeline[15] [16].

China has made commitments to peak emissions before 2030, gradually reduce coal consumption during the 2026-2030 period, and reduce carbon emissions per unit of GDP by more than 65% by 2030, compared to 2005 levels. Whether or not the targets in China's

[13] Centre for Research on Energy and Clean Air. (November 2025). *China's Climate Transition Outlook 2025: Expert Survey.* https://energyandcleanair.org/wp/wp-content/uploads/2025/11/CREA_2025-China-Climate-Transition-Outlook-Survey-Report-EN.pdf
[14] Carbon Brief. (March 2025). *Dual control of carbon – China glossary.* https://interactive.carbonbrief.org/glossary/china/index.html#section-dual-control-of-carbon
[15] Carbon Brief. (March 2025). *Central Committee of the Communist Party – China glossary.* https://interactive.carbonbrief.org/glossary/china/index.html#section-central-committee-of-the-communist-party
[16] Chinese State Council. (January 2024). *Notice of the General Office of the State Council on Comprehensively Promoting the Construction of Beautiful China*. https://www.gov.cn/zhengce/202401/content_6925405.htm

15th FYP, scheduled to be published in March 2026, are in line with these commitments will be a key indication of China's policymakers' determination to honour their promises.

China announced the last of the three targets mentioned above, the 65% one, as part of its official climate targets for 2030, which in itself is a requirement of the Paris Agreement. If China is to meet the target, its emissions in the year 2030 will need to stay below or equal to their 2024 level. This projection takes into consideration two factors: the progress the country has made to date in cutting its carbon emissions per unit of GDP, a parameter more commonly known as carbon intensity; and how fast its GDP is projected to grow over the next five years[17] [18].

This also means that the carbon intensity target in the next 15th FYP will need to be more ambitious than the one that China is set to miss during the current period, to close the shortfall to the country's 2030 intensity target[19].

Neither China's 2035 NDC nor the recommendations for the 15th FYP made by the Central Committee mention China's pledge to gradually reduce coal consumption. In theory, this doesn't formally change China's stance, but it does send an alarming signal that some of the country's earlier commitments are now being swept under the rug.

[17] Carbon Brief. (December 2021). *Q&A: What does China's new Paris Agreement pledge mean for climate change?*
https://www.carbonbrief.org/qa-what-does-chinas-new-paris-agreement-pledge-mean-for-climate-change/
[18] Dialogue Earth. (April 2025). *Will China fulfil its key climate pledge?*
https://dialogue.earth/en/climate/will-china-fulfil-its-key-climate-pledge/
[19] Carbon Brief. (November 2023). *The Carbon Brief Profile: China.*
https://interactive.carbonbrief.org/the-carbon-brief-profile-china/index.html

3 Non-CO_2 greenhouse gases

It is currently not possible to assess the emissions trends of China's non-CO_2 GHGs due to a lack of official data, as the latest official emissions inventory was in 2014.

3.1 Policies in place

China has pledged to cut emissions of all GHGs by 2035 and set a numerical, overall target for it in its new NDC. This is an important step because its previous emission-reduction targets, announced in 2022 to be achieved by 2030, only covered CO_2. More importantly, the Chinese government has yet to officially clarify in its policies whether its 2060 carbon neutrality target covers all GHGs, even though Beijing's former climate envoy, Xie Zhenhua, repeatedly said in public that it does. China's new NDC also fell short of setting specific emission reduction targets for different types of non-CO_2 GHGs, particularly the so-called "super pollutants", a group of short-lived but potent atmospheric pollutants, such as methane. Bringing super pollutants to the fold will be crucial for the global climate trajectory because China is the world's largest emitter of them.

China has made limited progress in regulating methane emissions over the past five years during the 14th FYP. While a number of new policies have been published, they lack quantitative targets and clear enforcement mechanisms to tackle emissions. Following the announcement of the national methane action plan in 2023[20], strengthened emission standards for coalbed methane in 2024[21], and inclusion of methane utilisation in the voluntary carbon market in 2025[22], the government has yet to establish a functioning system for monitoring, reporting, and verification (MRV) of methane and to incentivise emitters to capture methane emissions. Methane emissions from abandoned coal mines are likely to become a growing problem as abandoned mines are currently not covered under existing regulations. This creates the risk of increased leaks from abandoned mines that are not sealed after closure[23].

In April 2025, China released a plan on how it will manage the emissions of HFCs and hydrochlorofluorocarbons (HCFCs), having published a draft of it several months earlier. The plan aims to strengthen the MRV systems for the gases and reduce the production and

[20] Ministry of Ecology and Environment.(2023). Methane Emissiohighlyns Control Action Plan. https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/202311/W020231107750707766959.pdf.
[21] Ministry of Ecology and Environment. (December 2024). National Coalbed Methane (Coal Mine Gas) Emission Standard. https://www.mee.gov.cn/ywgz/fgbz/bz/bzwb/dqhjbh/dqgdwrywrwpfbz/202412/t20241211_1098417.shtml.
[22] Ministry of Ecology and Environment. (January 2025) Methodology for Voluntary Greenhouse Gas Emission Reduction Projects: Utilisation of Low-Concentration Methane and Ventilation Gas in Coal Mines with Methane Volume Concentration Below 8%. https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202501/t20250103_1099965.html.
[23] Qiang Liu and Teng Fei et al. (April 2024). Large methane mitigation potential through prioritized closure of gas-rich coal mines. https://www.nature.com/articles/s41558-024-02004-3.

use of HCFCs by 97.5% by 2030 and HFCs by 10% by 2029. However, these two targets are far weaker than what is needed to help the world slash emissions of HFCs by more than 80% by 2045, a target set out in the Kigali Amendment, an international agreement on phasing down HFCs, which China has ratified.

In 2025, the Chinese government published a separate plan for controlling industrial emissions of nitrous oxide, a highly potent gas with 273-times the warming effect of CO_2[24]. It aims to reduce China's nitrous oxide emissions to "internationally leading levels" by 2030 through a series of measures. They include establishing an MRV system for the gas, financial incentives through China's voluntary carbon market, supporting the development of technologies that can help mitigate the emissions of the gas, and linking emissions control with other pollutants.

International collaboration on mitigating methane and nitrous oxide emissions has been a key topic in bilateral statements and technical cooperation between China and the EU[25], and China and the UK[26]. These cooperation formats aim to fill the vacuum left by previous collaborations between China and the US, which have been suspended under the current Trump administration.

[24] Ministry of Ecology and Environment.(August 2025). Action Plan for Controlling Industrial-Sector Nitrous Oxide Emissions. https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/202508/t20250829_1126396.html.
[25] European Commission. (July 2025). 25th EU-China summit - EU press release. https://ec.europa.eu/commission/presscorner/detail/en/ip_25_1901?utm.
[26] Ministry of Ecology and Environment. (June 2025). Minister of Ecology and Environment Huang Runqiu led a delegation to the UK to attend the first China-UK Climate Ministerial Dialogue and Environment Ministerial Dialogue. https://www.mee.gov.cn/ywdt/hjywnews/202506/t20250619_1121560.shtml?utm.

4 Total energy supply and demand

China's energy demand has been increasing quickly in the past five years. In fact, the country devoured an average of 4.3% more energy year on year between 2021 and 2025. The figure is nearly twice as much as the growth rate of 2020. This has led to a total of roughly 6% increase in the country's CO_2 emissions over the period because most of its energy still comes from fossil fuels. The surge in energy demand was largely driven by energy-intensive manufacturing[27], which expanded faster than the service sector. Drought-related hydropower shortages boosted coal power generation during[28]. Although electrification and clean-energy deployment have accelerated, the persistence of high overall energy demand could continue to delay a peak in emissions.

4.1 Trends compared to benchmarks

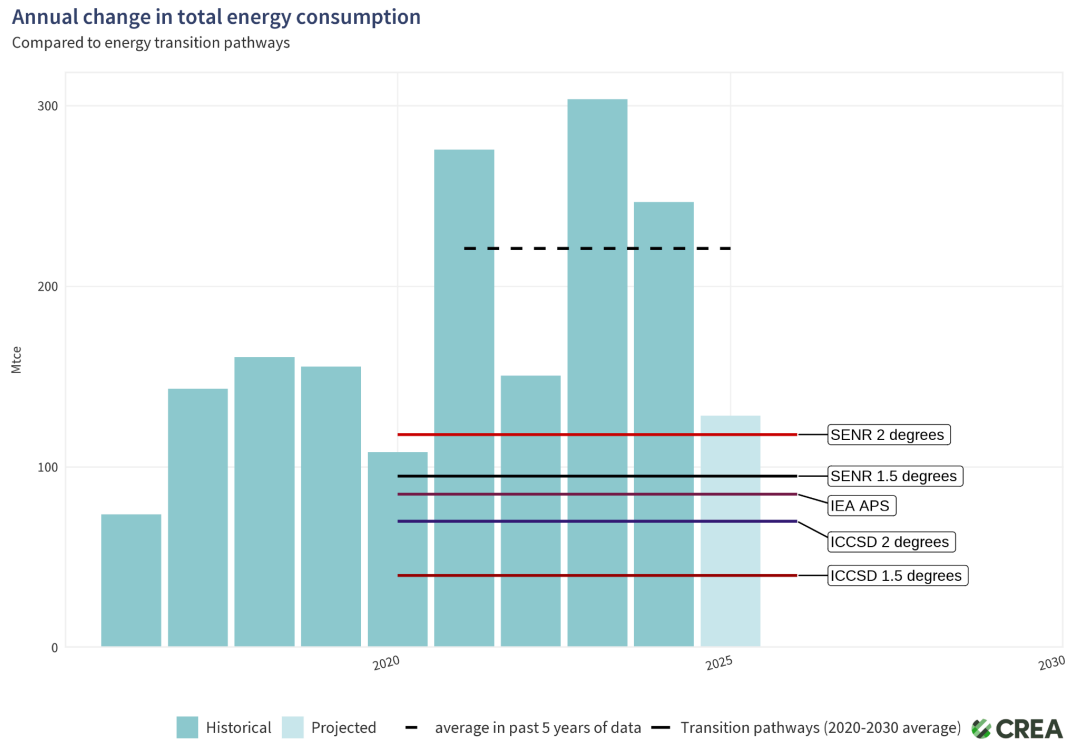

Figure 2 — Annual change in China's total energy consumption compared to energy transition pathways.

[27] Dialogue Earth. (May 2024). China's Manufacturing Pushed Emissions Sky High. What's Next?. https://dialogue.earth/en/climate/chinas-manufacturing-pushed-emissions-sky-high-whats-next/
[28] Carbon Brief. (May 2023). Analysis: China's CO_2 emissions hit Q 1 record high after 4% rise in early 2023. https://www.carbonbrief.org/analysis-chinas-CO2-emissions-hit-q1-record-high-after-4-rise-in-early-2023/

China’s total energy demand rose by 4.2% in 2024 compared to 2023. In the first three quarters of 2025, the growth rate reached 3.7% year-on-year, indicating a modest slowdown from previous years. However, the figure is still higher than what most energy transition scenarios project. As a result, strong energy demand continues to put pressure on emissions to rise, meaning that China’s CO_2 emissions can remain high despite its rapid clean-energy expansion.

China’s slower economic growth, together with the government's shift away from construction-and heavy-industry-led investment, is helping to slow down energy demand. However, the government’s push for high-end manufacturing could keep up the country’s energy consumption. At the same time, China has published various policies to boost household consumption, a move that may spur the growth of sectors that use less energy, such as services. If implemented effectively, these measures could help slow the rise in China’s overall energy demand.

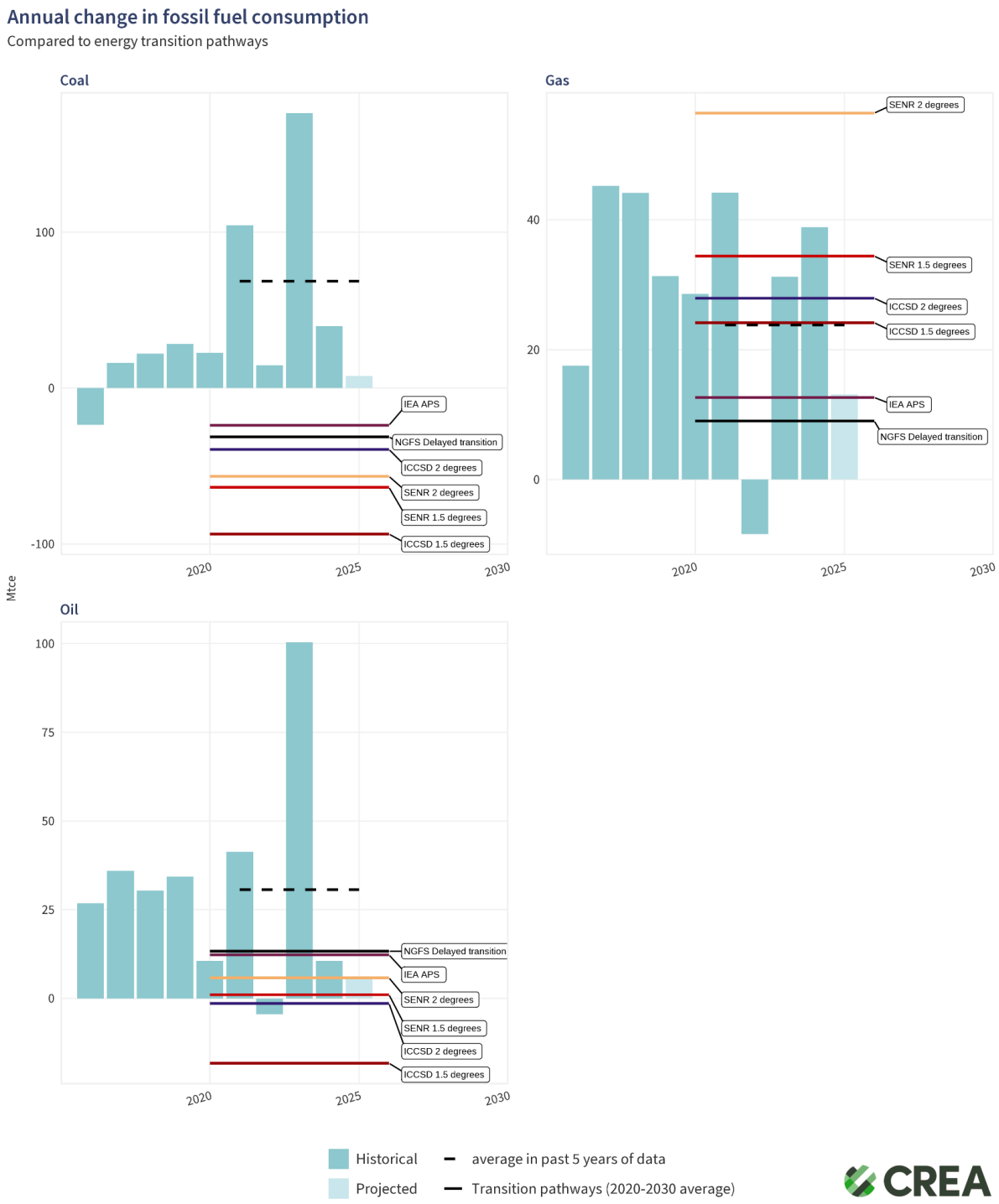

Figure 3 — Annual change in China's fossil fuel consumption compared to energy transition pathways.

The transition pathways require China's coal consumption to drop throughout the 2020s. However, in reality, the gauge has continued to rise, and its jump was particularly notable between 2021 and 2023, although in 2024 the growth rate saw a modest slowdown. A decline is projected for 2025. If the decline materialises and is sustained from this point on, 2025 could mark a turning point (Figure 3). Yet China's coal consumption remains far above levels consistent with transition scenarios. In the first three qaurters of 2025, coal use for

power generation has fallen for the first time in many years, reflecting the impact of rapid renewable expansion. By contrast, the use of coal to produce synthetic fuels and chemicals continues to grow rapidly, up around 20% year-on-year in the first half of 2025. The coal-to-chemicals industry is planning further expansion, which could add another 2% to China's annual CO_2 emissions by 2029. That will make it more difficult for the country to meet its 2030 emissions-peaking deadline[29].

The growth of China's oil consumption slows in all scenarios throughout the 2020s. Some project an absolute decline by 2030. After rebounding sharply in 2023, oil consumption grew more slowly in 2024 amid weaker industrial activity. In 2025, the country's total oil consumption is projected to increase by about 2% (Figure 3), with a 5% decline in transport fuel use offset by a 10% rise in non-transport oil demand, especially by a booming chemical sector. See more about China's transport oil consumption in Section 8 Transport.

All transition pathways project China's gas consumption to grow continuously through 2030 (Figure 3). Over the past five years, China's gas demand has broadly followed these trajectories, even though there were some notable fluctuations. Gas demand picked up again in 2024, when lower gas prices and higher gas-fired generation supported a recovery. In 2025, however, the growth is forecast to slow once more. Industrial demand remained weak, and gas continued to face strong competition from coal and renewable power. As a result, the overall gas consumption growth is expected to remain moderate compared with the rapid increases seen in the late 2010s.

[29] Carbon Brief. (August 2025.) Analysis: Record solar growth keeps China's CO_2 falling in first half of 2025. https://www.carbonbrief.org/analysis-record-solar-growth-keeps-chinas-CO_2-falling-in-first-half-of-2025/

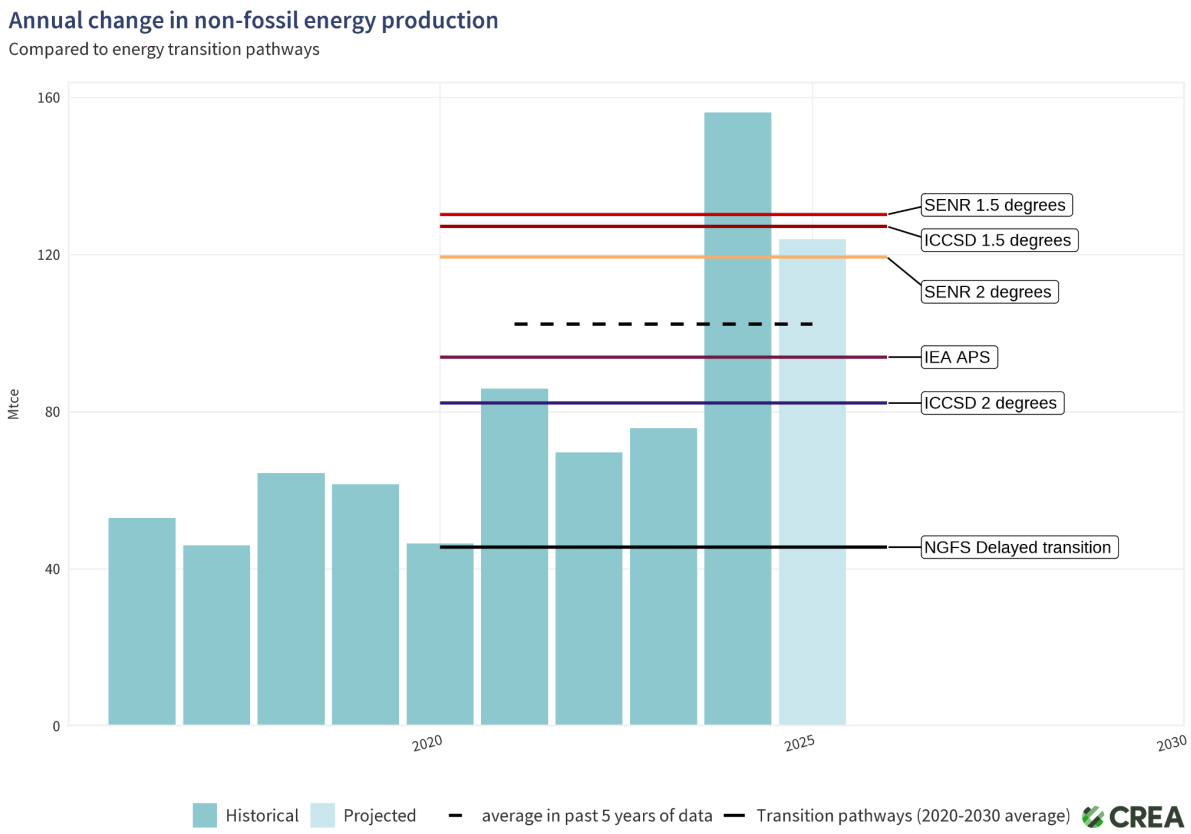

Figure 4 — Annual change in China's non-fossil energy production compared to energy transition pathways.

China's non-fossil energy production[30] is expected to continue growing strongly in 2025, keeping the country on track to meet its target of raising the non-fossil share of total energy consumption to 20% by 2025. This follows a record year in 2024 when non-fossil energy output reached a new high, supported by unprecedented additions of solar and wind capacity and a rebound in hydropower (Figure 4). Growth since 2021 has brought China's trajectory broadly in line with the scenarios. If China can carry on expanding its renewable capacity at its current pace while curbing the growth rate of its overall energy demand, it could enable an early peak in carbon emissions.

[30] Non-fossil energy production covers all energy produced from non-fossil sources, including electricity generation from hydropower, nuclear, wind and solar, as well as the production of other non-fossil energy forms such as biomass, geothermal energy and, in China's statistical system, primary electricity.

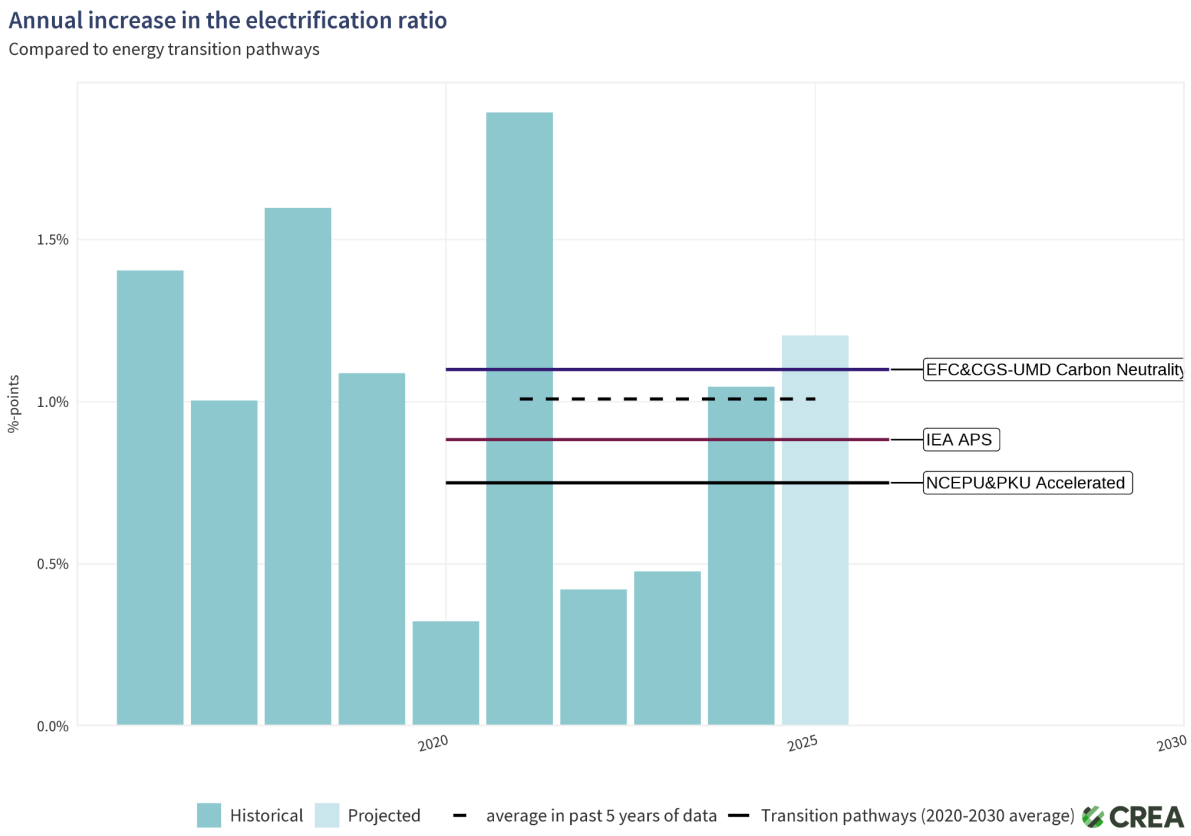

Figure 5 — Annual increase in China's electrification ratio compared to energy transition pathways.

In the transition scenarios, the share of electricity in final energy consumption increases from 25% in 2020 to about 30% in 2030. Over the past two years, electrification has advanced even faster, with the share rising by more than one percentage point per year on average (Figure 5). In 2024, electricity continued to replace direct fossil fuel use across industry, buildings and transport, supported by rapid clean energy expansion. The share of electricity in China's final energy use is projected to keep rising in 2025, which will make it easier for China to cut emissions as the power sector continues to decarbonise.

4.2 Policies in place

In 2025, China's policy focus shifted from target-setting to implementation and adjustment to ensure the delivery of the 14th FYP goals and to prepare for the 15th FYP. Energy conservation, fossil energy intensity control and renewable energy substitution remain the main priorities.

At the start of 2025, China's first comprehensive energy law[31] came into effect, bringing together previously fragmented regulations under a coherent framework for governing the

[31] State Council. (January 2025.)能源法2025年1月1日起施行
http://www.gov.cn/yaowen/liebiao/202411/content_6985705.htm

energy system. The law strengthens the principle that renewable energy should be prioritised, including in energy planning, grid dispatch and consumption.

According to the 2025 work guidance[32] issued by the National Energy Administration (NEA), China's state energy regulator, the share of non-fossil energy in total primary energy consumption is expected to exceed 20% by the end of the year, meeting the 14th FYP goal. In the 2035 NDC, China commits to raising the share of non-fossil energy consumption to over 30% by 2035[33], a level still below the roughly 40% required in most transition pathways.

In 2024, China revised its energy-intensity target by changing its scope from total energy intensity, which measures energy consumed per unit of GDP, to fossil-energy intensity, which measures only fossil-fuel consumption per unit of GDP.[34] This change allows provinces to meet part of their targets by using more renewable energy and purchasing green electricity certificates. Meanwhile, the fossil-energy intensity requirement continues to place a cap on fossil fuel consumption.

To accelerate progress on the demand side of the energy transition, China introduced a key policy in 2024[35]. The policy stipulated that the country's renewable energy consumption should exceed 1.1 billion tonnes of standard coal equivalent (tce) by 2025 and 1.5 billion tce by 2030. It also emphasised the need to increase the use of renewable electricity in end-use sectors such as transport, buildings, and industry.

China's coal sector in 2025 has shown a noticeable slowdown in demand growth. At the beginning of the year, the China National Coal Association, a trade body for the fuel, called for tighter controls on coal imports and an increase in domestic output[36]. By mid-year, as coal consumption fell, the NEA launched inspections of mines that had exceeded their production quotas to curb oversupply[37].

In this year so far, rather than introducing major initiatives, the central government has been focusing on ensuring that the existing energy and climate targets will be achieved. Simultaneously, they prioritised improving the integration of renewable energy into the grid and preparing the policy framework for the next planning cycle.

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[32] State Council. (February 2025.) 2025年能源工作指导意见 https://www.gov.cn/zhengce/zhengceku/202502/content_7007276.htm
[33] Ministry of Foreign Affairs. (September 2025.) 习近平在联合国气候变化峰会上的致辞 https://www.mfa.gov.cn/web/zyxw/202509/t20250925_11716488.shtml
[34] Dialogue Earth.(March 2024.)How China completely redefined a key energy target https://dialogue.earth/en/energy/how-china-completely-redefined-a-key-energy-target/
[35] National Development and Reform Commission. (October 2024.) 关于大力实施可再生能源替代行动的指导意见 https://www.ndrc.gov.cn/xxgk/zcfb/tz/202410/t20241030_1394119.html
[36] Sina Finance. (March 2025.) 煤炭"遇冷"，四年来最低点！两大协会呼吁 https://finance.sina.com.cn/stock/zqgd/2025-03-02/doc-inenhtax3124698.shtml
[37] CREA China Snapshot. (August 2025.) Domestic coal output fell for the first time in a year https://energyandcleanair.org/china-energy-and-emissions-trends-august-2025-snapshot/

5 Electricity generation and capacity

The energy sector is the largest emitter of CO_2 in China, and electricity generation is the largest source of energy-related CO_2 emissions. China's electricity demand has been growing and will continue to grow, even as the total energy demand growth rate slows down, because energy use in all sectors is electrified. The power sector, therefore, faces a dual challenge: On the one hand, it needs to replace fossil-fuel-based power generation with clean energy; on the other hand, it must supply additional clean electricity to support the electrification of the transport, buildings and industrial sectors. That said, decarbonising the power sector and expanding the generation of clean energy are both central to China's energy transition.

5.1 Trends compared to benchmarks

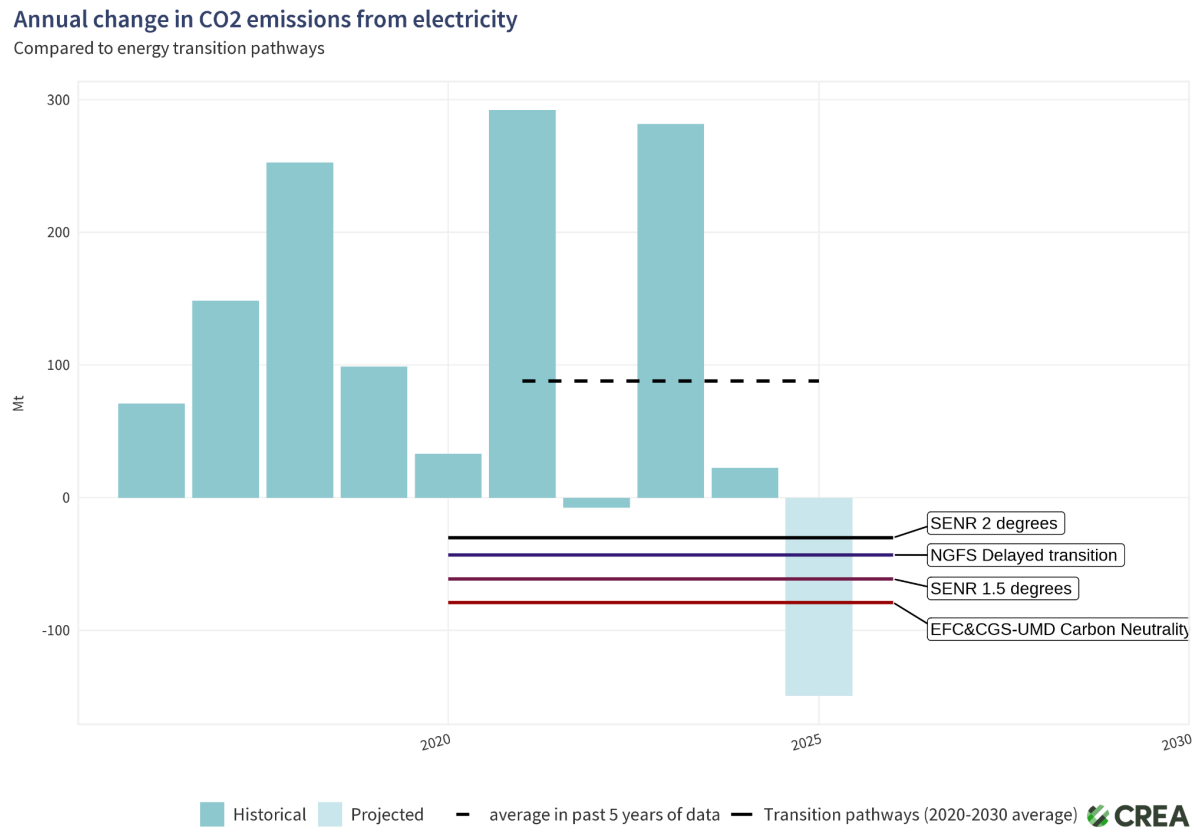

Figure 6 — Annual change in CO_2 emissions in China from electricity compared to energy transition pathways.

Over the past five years, the generation of coal power in China has grown by about 4.3% annually, while transition pathways require a decline of 0.5 to 3% per year between 2020 and 2030. In 2024, CO_2 emissions of the power sector were broadly stable, supported by strong growth in solar and wind power generation and a rebound of hydropower output. In

the first three quarters of 2025, electricity demand grew by 6.3% year-on-year. Over the same period, power-sector CO_2 emissions fell by around 2% , because record additions of clean energy continued to displace coal power generation. If this downward trend extends through the rest of the year, 2025 could mark the first full-year decline in power sector emissions since 2022, when the Covid-19 lockdown caused them to drop significantly. This would indicate that China's power sector is approaching an emissions peak.

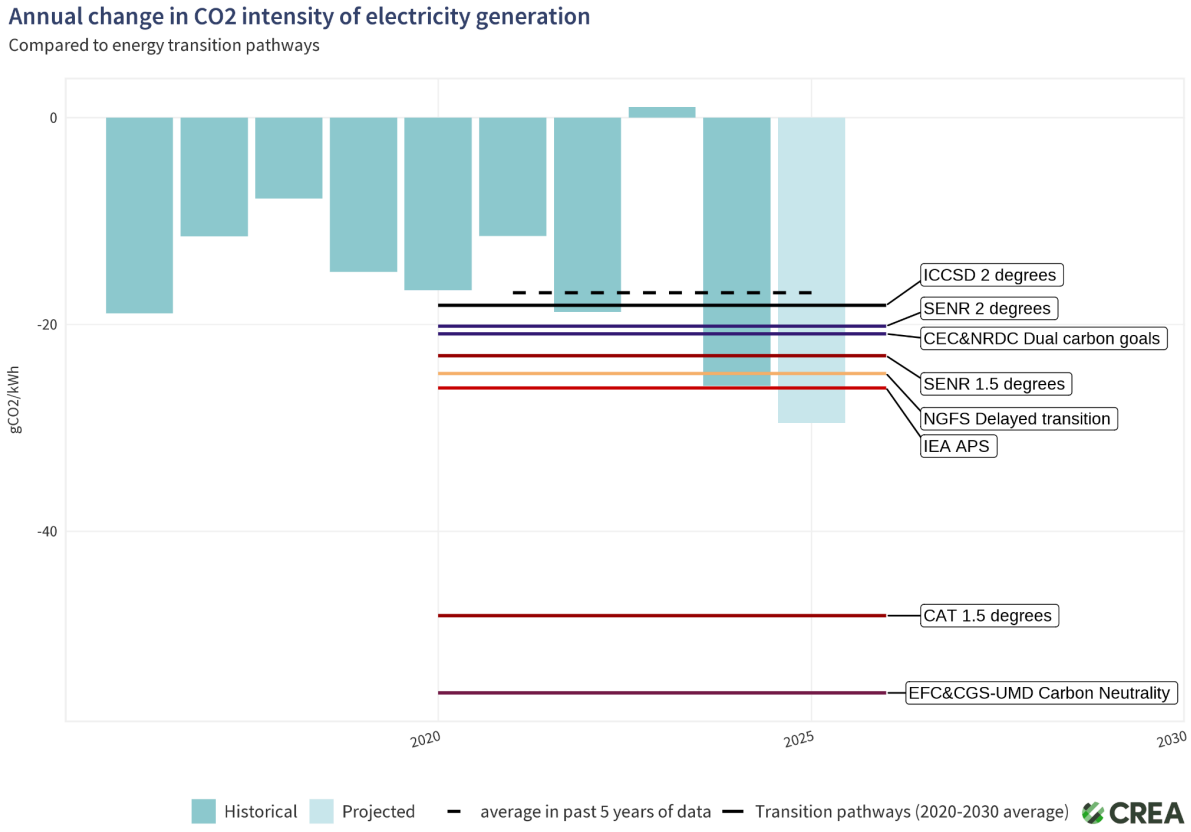

Figure 7 — China's annual change in CO_2 intensity of electricity generation compared to energy transition pathways.

The carbon intensity of power generation in China has declined steadily over the past decade, falling from 642g/kWh in 2015 to 469g/kWh in 2025, an average reduction of about 15.5g/kWh per year (Figure 7). The improvement accelerated in 2025, supported by strong growth in clean-energy power generation. This led to a notable drop in the power sector's emissions. Despite this progress, China's current decarbonisation rates remain slower than what is required by most transition pathways, which require that power plants' carbon intensity must drop to 300-400g/kWh by 2030. The gap places China at risk of falling short of its national target to reduce overall carbon intensity by 65% from 2005 levels by 2030. To stay on track, China will need to reduce the carbon intensity of its power generation at a faster pace over the coming years.

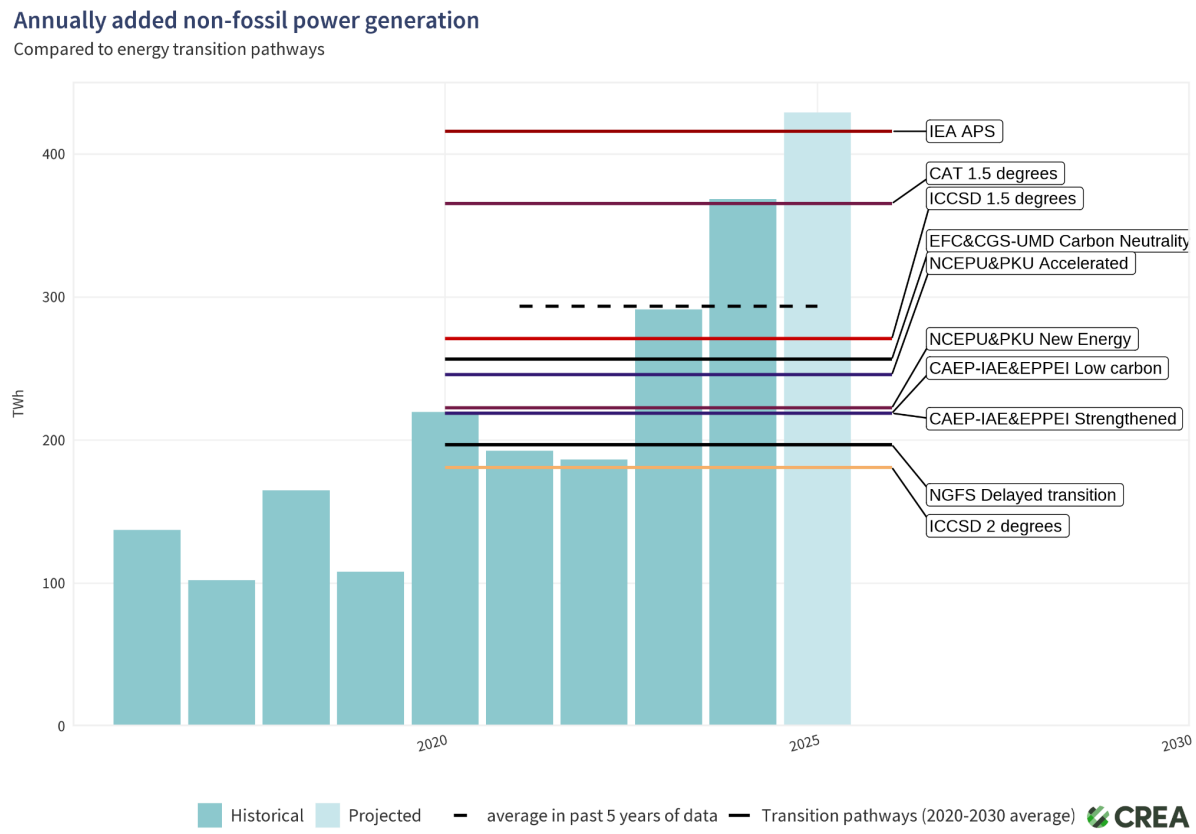

Figure 8 — China's annual added non-fossil power generation compared to energy transition pathways, with wind, solar, nuclear and hydropower capacity added each year converted to annual electricity output using average capacity factors for each technology.

China's non-fossil power generation[38] is set to reach a new high in 2025 (Figure 8). On this basis, non-fossil power generation is projected to rise by 14% year-on-year, with wind up by 15% and solar up by 45%. The expected increase exceeds the levels required in all transition pathways.

Newly installed wind and solar power capacities are also on track to hit record highs. In the first nine months of 2025, China added 240GW of solar and 61GW of wind. Many large projects scheduled for completion this year are still waiting to be connected to the grid, and they are expected to lift the full-year total of 2025 above that of 2024. There has been a slowdown in the installation of new solar and wind capacity recently, which was caused by the introduction of a new pricing system. Previously, solar and wind developers could sell their electricity at a benchmark price linked to the average cost of coal power. Under the new system, they must secure direct power purchase agreements with buyers, and this shift prompted the developers to finish their projects before the new rules took effect in June. After June, the pace of new installations fell noticeably. The scale of future wind and

[38] To control for year-to-year variation in capacity factors, we convert added wind, solar, nuclear and hydropower capacity into added annual generation using average capacity factors.

solar deployment will depend on how provinces put the new pricing rules into practice, including how they will set the price floors and contracts for difference (CfD) mechanisms.

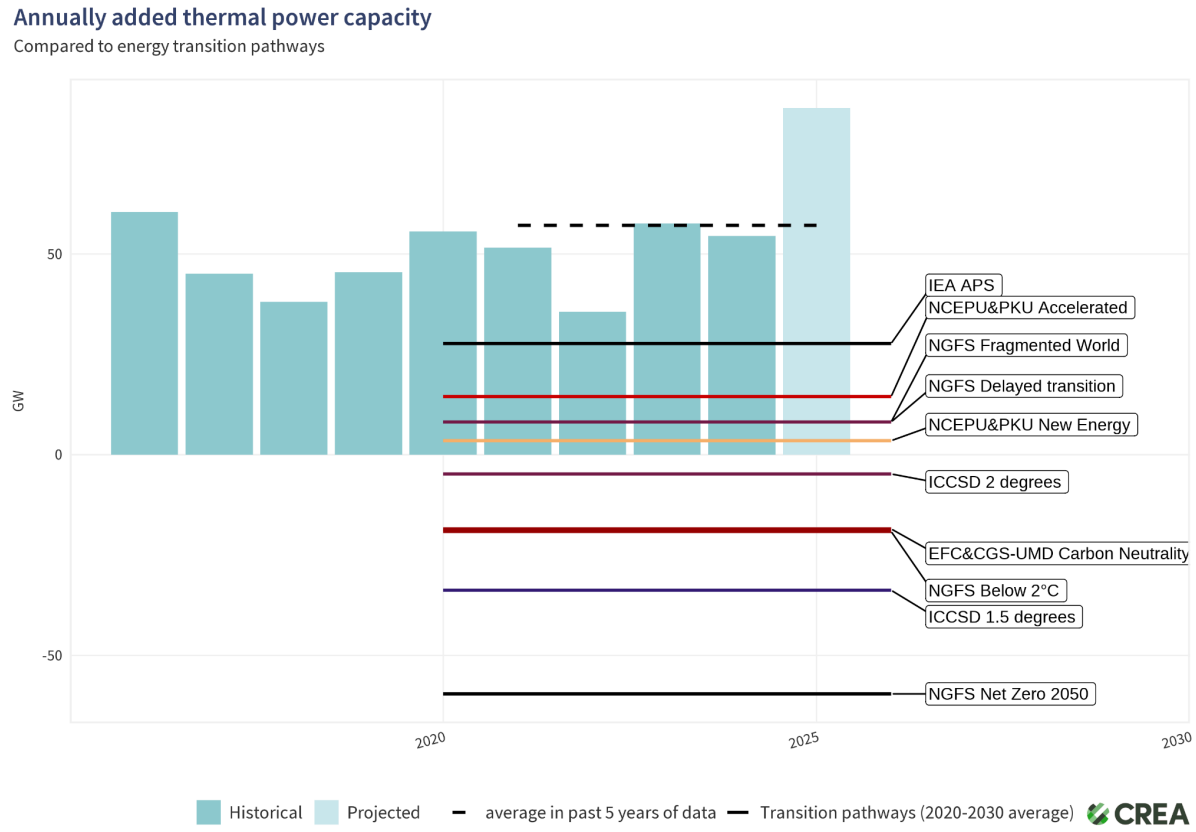

Figure 9 — China's annually added thermal power capacity compared to energy transition pathways.

China's newly added thermal power (fossil-fuel-based power) capacity in 2025 is projected to reach the highest level since 2016, significantly exceeding the annual average of the past five years (Figure 9). This surge reflects the commissioning of projects approved during the 2022-2023 coal power permitting boom, when over 200GW of new capacity was authorised. While a substantial number of these projects have started churning out power in 2025, many more are scheduled to come online in 2026 and 2027. This means China's thermal power fleet will probably keep growing at a high speed over the next few years.

Although China has slowed down its pace of approving new coal power plants since 2024, the large number of projects already under construction means that the amount of new coal power capacity entering operation each year will remain high in the near term. This wave of new coal power is due to lock China into coal dependence because once these plants are built, they tend to operate for decades. Such long lifespans will make it hard for the power sector to slash its emissions and, in turn, for China to meet its medium-term decarbonisation goals.

5.2 Policies in place

In 2025, China launched a new package of power-market reform measures. These included the rollout of market-based pricing for solar and wind power, new rules to increase clean energy power consumption, the expansion of the spot market, and the improvement of ancillary service mechanisms (power system support services such as frequency regulation and reserve capacity). These measures aim to make the power system more flexible and reliable and support the market-oriented deployment and operation of renewables.

At a broader strategic level, China's 2035 NDC reaffirms its long-term commitment to renewable energy by setting a target for its wind and solar power capacity to reach 3,600 GW by 2035. This target is widely viewed as something that China is confident it can achieve. But it points to a potential significant slowdown of the country's renewable expansion compared to its recent pace, which averaged less than 200 GW per year during 2020-2023 but jumped to around 350 GW in 2024 and is set to rise further in 2025. China reached its 2030 wind and solar target of 1,200 GW six years ahead of schedule[39], and is likely to exceed the 2035 goal well before that date. Sustained high levels of renewable energy deployment will also be important for supporting economic growth. Clean energy industries have become one of the country's GDP drivers. They accounted for about 10% of China's GDP in 2024[40] and could double in value by 2035, contributing around a quarter of China's projected GDP growth by then[41].

A new pricing system for solar and wind

An important change came in 2025 with the introduction of a new pricing system for renewable power[42]. It ended the unified benchmark tariff for new solar and wind projects, requiring developers to participate in competitive provincial auctions under a CfD mechanism.

This shift prompted many developers to rush to build their projects and connect them to the grid before June 1 in order to secure the higher benchmark tariff before the new policy kicked in. After the policy took effect, the number of newly started wind and solar projects dropped temporarily. One of the causes is that developers were waiting for provincial

[39] Bloomberg. (August 2024.)China Hits Xi Jinping's Renewable Power Target Six Years Early https://www.bloomberg.com/news/articles/2024-08-23/china-hits-xi-jinping-s-renewable-power-target-six-years-early

[40] Carbon Brief. (February 2025.)Analysis: Clean energy contributed a record 10% of China's GDP in 2024 https://www.carbonbrief.org/analysis-clean-energy-contributed-a-record-10-of-chinas-gdp-in-2024/

[41] CREA.(October 2024.) China's clean energy trends could cut emissions by 30% in 2035 if sustained https://energyandcleanair.org/wp/wp-content/uploads/2024/10/CREA_China_Scorecard_New-climate-targets_10.2024.pdf

[42] National Development and Reform Commission and National Energy Administration. (January 2025). 关于深化新能源上网电价市场化改革 促进新能源高质量发展的通知 https://www.gov.cn/zhengce/zhengceku/202502/content_7002959.htm

governments to release detailed auction results. Most provinces have issued their frameworks as of writing, including the minimum prices developers can submit and the upper limits set with reference to local coal power on-grid tariffs. So far, only six provinces have completed their first rounds of auctions, and wind projects have generally bid at higher prices than solar.

As renewable generation grows, some regions, especially western provinces and other areas with large amounts of rooftop solar, have seen more frequent requirements for them to stop generating electricity. Such restrictions increased from around 2% of generation in 2022 to about 5% in the first nine months of 2025. The pace at which new wind and solar capacity is installed now depends heavily on provincial auction results and how effectively system-integration constraints are resolved.

Clean energy power consumption

At the beginning of 2025, the central government set new targets to strengthen the power system's flexibility and ensure the effective integration of rapidly expanding renewable capacity[43]. The goal was to support the annual addition of over 200 GW of new wind and solar capacity during 2025–2027, while maintaining a nationwide renewable utilisation rate of no less than 90%. To achieve this, the policy called for expanding a wide range of flexibility solutions. These include upgrading existing coal units so they can operate more flexibly, increasing the use of gas and hydropower for balancing, building more pumped hydro and battery storage, developing solar thermal plants with storage, encouraging "grid-friendly" renewable project designs, and strengthening both the power grid and the ability of consumers to adjust demand. During periods of renewable curtailment, provinces are encouraged to dispatch battery storage first so that surplus clean electricity can be absorbed.

Despite these measures, the rapid expansion of solar and wind capacity continues to strain grid integration. Coal power remains dominant in the power market and has yet to fully play its intended role in providing flexible regulation. In response, the government introduced additional measures to promote local consumption of renewables[44], encouraging models such as green power direct supply[45](where industrial users procure renewable electricity directly) and zero-carbon" industrial parks[46]. The zero-carbon industrial park initiative is potentially significant. There are 25,000 industrial parks in

[43] National Development and Reform Commission. (January 2025). 电力系统调节能力优化专项行动实施方案（2025—2027年）. https://www.gov.cn/zhengce/zhengceku/202501/content_6996643.htm
[44] National Development and Reform Commission. (September 2025.) 完善价格机制促进新能源发电就近消纳的通知. https://www.ndrc.gov.cn/xxgk/zcfb/tz/202509/t20250912_1400444.html
[45] National Development and Reform Commission. (May 2025.) 有序推动绿电直连发展有关事项的通知. https://www.ndrc.gov.cn/xxgk/zcfb/tz/202505/t20250530_1398138.html
[46] National Development and Reform Commission. (July 2025.) 关于开展零碳园区建设的通知. https://www.ndrc.gov.cn/xxgk/zcfb/tz/202507/t20250708_1399055.html

China, and they play a key role in the economic policies of many provinces and are responsible for 30% of the country's CO_2 emissions[47].

In zero-carbon industrial parks, renewable power projects are built directly within the park and supply electricity straight to the companies operating there. Developers are required to use at least 60% of the electricity they generate each year within the park, and this self-supplied electricity must cover at least 30% of the park's total power consumption. For projects that break ground in 2030 or later, this requirement rises to 35%. To support the rollout of zero-carbon industrial parks, the central government provides funding that can cover up to 20% of the investment of eligible projects [48], and local governments often offer additional incentives, such as fiscal subsidies and preferential land policies.

In addition, China strengthened its policy[49] that requires certain heavy industries to use a minimum share of renewable electricity. The obligation was expanded to include specific targets for the steel, cement, and polysilicon industries, as well as new data centres located at national hubs. Under this policy, these sectors must ensure that renewable electricity accounts for a defined percentage of their total power consumption. See Industry section 2.5.2 for details.

Spot market expansion

In April 2025, the National Development and Reform Commission (NDRC) and the NEA jointly released a directive[50] requiring all provinces to establish continuous spot-market operations by the end of the year. The aim is to establish a system in which electricity prices are set closer to real-time supply and demand conditions, helping grid operators schedule power more efficiently and prepare the system to absorb much larger shares of wind and solar generation.

Continuous spot-market trading is expected to improve price signals and system flexibility, particularly as renewable penetration exceeds 40% in several provinces. However, progress has been uneven. Provinces still differ in how they design and settle spot-market transactions, and cross-regional spot trading remains very limited. In the first three quarters of 2025, market-based trading accounted for 63.4% of total power generation in China, but only 24% of the market-based trading involved inter-provincial transactions, and a mere 4% took place in spot trading[51]. Most provinces were still operating spot

[47] 中智科博产业研究院. (2023, May 8). 什么是零碳园区，如何实现园区“零碳”？. 搜狐网. https://m.sohu.com/a/673835448_423490/?pvid=000115_3w_a
[48] National Development and Reform Commission. (October 2025.) 节能降碳中央预算内投资专项管理办法. https://www.ndrc.gov.cn/xxgk/zcfb/ghxwj/202510/t20251014_1400943.html
[49] National Development and Reform Commission. (July 2025.) 关于2025年可再生能源电力消纳责任权重及有关事项的通知. https://www.ndrc.gov.cn/xxgk/zcfb/tz/202507/t20250711_1399141.html
[50] National Development and Reform Commission. (April 2025).关于全面加快电力现货市场建设工作的通知。https://www.ndrc.gov.cn/xxgk/zcfb/tz/202504/t20250429_1397488.html
[51] National Energy Administration. (October 2025.) 2025年1-9月全国电力市场交易电量同比增长7.2% https://www.nea.gov.cn/20251029/aec7dc9b3cff45588e39ed169c92ead4/c.html

markets on a pilot basis. Only a handful, such as Guangdong and Shandong, moved into full operation. Average mid- to long-term (MLT) trading prices were about 5% above the coal benchmark in 2025, while spot-market prices remained lower, reflecting oversupply in several regions.

The expansion of provincial markets in 2025 will thus be a critical step towards forming a more unified, responsive, and renewables-ready power market framework.

Capacity payment reform

China's capacity payment mechanism currently applies mainly to coal-fired power plants[52]. Because payments are tied to the maximum rated output of the coal power units, the system gives them little incentive to operate flexibly or to reduce their generation when renewable output is high. This approach also fails to recognise other resources that help maintain the adequacy and flexibility of the power system, such as hydropower, gas units, energy storage and demand-response services. As a result, there is a risk that the market will be skewed towards continuing to rely on coal rather than investing in faster-responding, lower-carbon resources that can balance the system more effectively as renewable generation continues to grow.

To address these shortcomings, the capacity payment scheme should be expanded to include all resources capable of providing reliable capacity and flexibility services, regardless of what types of technologies they use. In practice, this would mean incorporating gas-fired power plants, pumped hydro storage, new energy storage systems, and virtual power plants, alongside coal units. Payments should be set through a transparent, competitive process that reflects how much each resource contributes to system reliability and its ability to ramp up or down when needed. This approach would ensure that resources providing similar flexibility services are treated consistently and that investment incentives are aligned with the needs of a more renewable-heavy power system.

Several provinces have begun to trial broader capacity compensation mechanisms. Guangdong has included gas-fired units into its capacity payment scheme[53], while Gansu[54] and Liaoning[55] have brought in energy storage. In September, NDRC's action plan on storage[56] also called for improving capacity pricing mechanisms for flexible resources such

[52] National Development and Reform Commission. (November 2023.)关于建立煤电容量电价机制的通知 https://www.ndrc.gov.cn/xxgk/zcfb/tz/202311/t20231110_1361897.html
[53] National Energy Administration. (March 2024.) 南方能源监管局联合建立广东省气电容量电费考核机制 https://www.nea.gov.cn/2024-03/08/c_1310766954.htm
[54] People's Daily. (July 2025.) 首个省级容量电价机制出台. https://paper.people.com.cn/zgnyb/pc/content/202507/21/content_30089669.html
[55] Liaoning Provincial Development and Reform Commission. (September 2025.) 辽宁省深化新能源上网电价市场化改革实施方案. https://fgw.ln.gov.cn/fgw/index/tzgg/2025092617545981506/index.shtml
[56] National Development and Reform Commission. (September 2025.) 25.) 新型储能规模化建设专项行动方案(2025—2027年) https://www.ndrc.gov.cn/xxgk/zcfb/tz/202509/t20250912_1400425.html

as energy storage and establishing a reliable compensation framework that fairly rewards system adequacy.

Basic rules for the ancillary service market

In May 2025, the NDRC issued a new regulation that set the basic rules for China's ancillary service market[57]. Ancillary services refer to functions that help keep the power system stable, such as frequency regulation, reserve capacity and voltage support. With this regulation, China completed the core components of its power-market framework.

The new rules establish a principle that providers of system-support services should be compensated, and users of those services should bear the associated costs. The aim is to match costs and benefits more fairly between generators and consumers. The rules also clarify that new types of participants, including energy-storage companies, virtual power plants, smart microgrids, and vehicle-to-grid operators, are allowed to offer these services and to participate in the market on equal footing with traditional generators.

However, coordination between the energy and ancillary service markets remains limited. The current range of ancillary products is narrow, and compensation levels are generally low. Further reforms are needed to introduce more market-based pricing mechanisms and strengthen the linkage between energy and ancillary service trading.

5.3 Focus: Coal power

Coal power's share in China's power system is gradually shrinking, but coal still holds a strong position in the policy and planning system. In June 2025, coal power accounted for about 51% of electricity generation, the lowest on record, while renewables exceeded 60% of total installed capacity and met all new power demand growth. Yet, coal capacity continued to expand, reflecting long-standing incentives such as guaranteed operating hours, preferential financing and provincial investment priorities, as well as the institutional and planning practices that are slow to change.

In the first half of 2025, 21 GW of new coal capacity was commissioned, the highest level for the first half of a year since 2016. In total, more than 80 GW of new coal capacity is expected to enter operation in 2025. Another 44 GW began or resumed construction, while 25 GW was formally approved, and 75 GW of new or revived proposals were recorded in the first half of 2025. Most of the projects that have come online this year so far were permitted during 2022–2023. However, local governments and companies are still putting forward new coal power proposals, indicating that the momentum remains strong for coal power to keep expanding in China, despite its goal of peaking carbon emissions before 2030.

[57] National Development and Reform Commission. (May 2025.) 电力辅助服务市场基本规则. https://www.ndrc.gov.cn/xxgk/zcfb/ghxwj/202504/t20250429_1397483.html

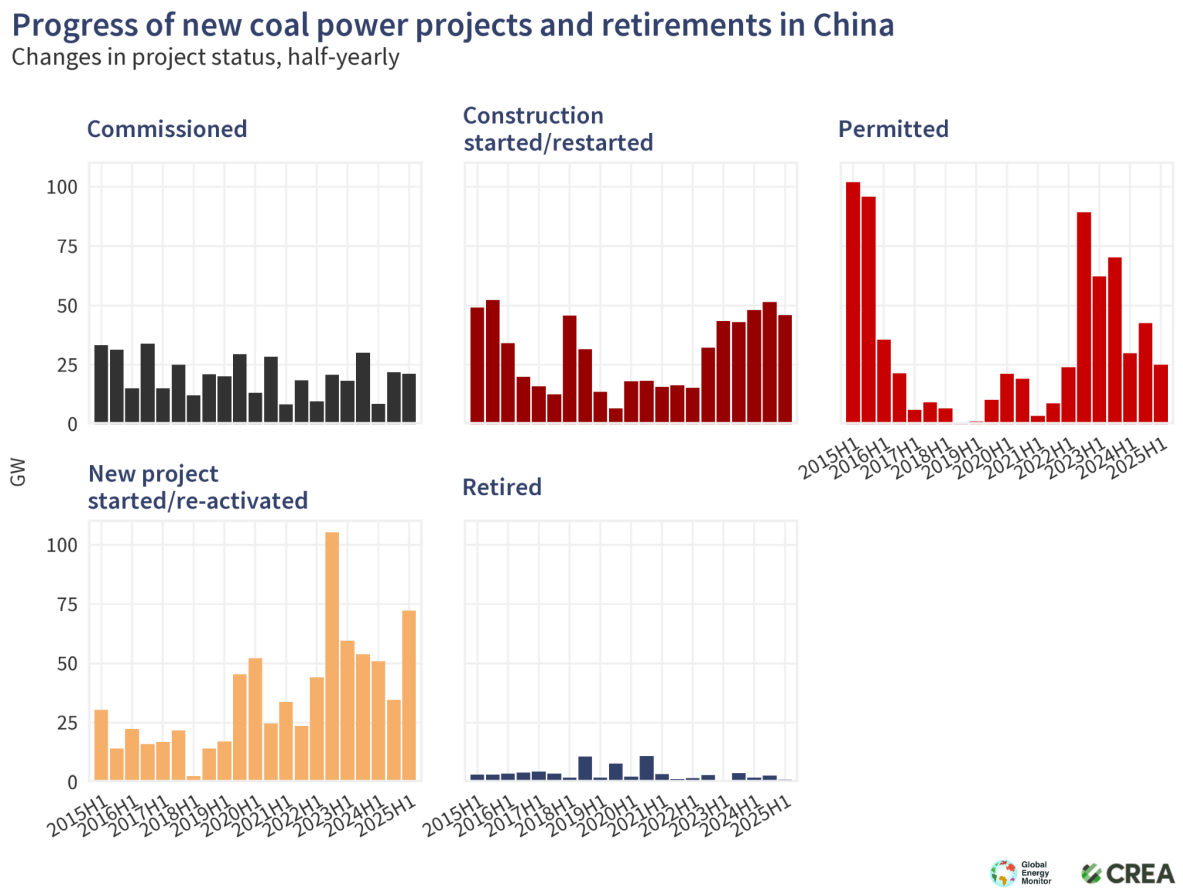

Figure 10 — Progress of new coal power projects and retirements in China.

Although official policy describes coal as a flexible and supporting resource, most plants continue to run in baseload mode. In many provinces, dispatch rules require grid operators to schedule a minimum level of coal power generation in advance, and long-term contracts guarantee coal power plants' output. Capacity payments further ensure a stable income stream, even if a plant provides little actual flexibility to the grid. As a result, coal power output can easily be increased when renewable generation is insufficient, but is seldom reduced when renewable supply is high. This limits coal power's ability to support grid balancing and constraints the integration of growing shares of wind and solar.

Most of the coal power plants currently under construction are concentrated in coal-producing provinces such as Inner Mongolia, Shaanxi and Xinjiang, where local governments cite energy security and economic development needs as the reason for new developments. What is interesting is that these provinces also lead in wind and solar expansion, yet they still rely on new coal units to provide capacity that can be dispatched on demand.

Retirements of coal power plants continue to lag. Only about 1 GW was retired in the first half of 2025, bringing total retirements since 2021 to 16 GW, far below the 30 GW target required by the 14th FYP. Nearly 100 GW of coal capacity will reach the end of its design

lifespan during the next planning period, but many plants are being refurbished rather than retired.

To ensure that China's forthcoming national climate and energy plans can be implemented smoothly, China needs a clear framework for managing coal power's decline. The priority is to stop approving new projects, reform dispatch and capacity payment mechanisms to reward genuine flexibility, and accelerate the retirement of inefficient units. Without such steps, coal will continue to occupy space in the power system even though it is no longer needed.

6 Industry

The industrial sector is the largest energy consumer in China, accounting for over 60% of total energy consumption[58]. The industrial sector also plays a dominant role in reducing the country's CO_2 emissions, not only because it uses a significant amount of energy, but also because a substantial portion of the energy it uses comes from coal. In particular, China's steel and cement industries emit huge amounts of CO_2. This isn't only because they use a lot of energy—it's also because their production processes directly release CO_2.

Many transition pathways project that China's industrial CO_2 emissions should peak between 2020 and 2025. But that prediction will only materialise on the back of three conditions that must happen simultaneously: first, the sector uses less energy; secondly, it uses electricity more and more instead of fossil fuels as a source of energy; lastly, it increases the portion of clean energy out of all the energy it uses. However, the trajectory in reality is different.

6.1 Trends compared to benchmarks

China's industrial energy consumption rose significantly faster than what all pathways had projected for the years between 2018 and 2023 (Figure 11), with sharp surges in 2021 and 2023. Rather than declining, China's industrial energy demand has grown strongly in recent years, driven by a shift toward manufacturing sectors[59], to keep its economy growing. The pivoting towards heavy industries was largely reflected by a series of pro-business policies China introduced around 2020 to respond to US tariffs and the broader economic downturn plaguing the country in the wake of COVID-19. These measures — including discounted electricity prices, tax reductions and export-promotion policies for companies — predominantly benefited manufacturing rather than services and consumer-facing sectors, which typically use less energy.

Within industry, output growth has been robust in non-ferrous metals, chemicals, and equipment manufacturing — reflecting an economy-wide trend reinforced by policy.

Even as the real estate sector contracted sharply, investment in high-end and export-oriented manufacturing has created substantial new demand for steel and other industrial materials, helping stabilise overall output in these sectors. As a result, steel production has remained broadly stable, while cement output has continued to fall, which is consistent with a gradual shift away from construction-led growth.

[58] China Statistical Yearbook. (2024). https://www.stats.gov.cn/sj/ndsj/2024/indexeenergy-intensive h.htm. Statistics.
[59] Lauri Myllyvirta. Dialogue Earth. (2024-5-25). https://dialogue.earth/en/climate/chinas-manufacturing-pushed-emissions-sky-high-whats-next/. Article.

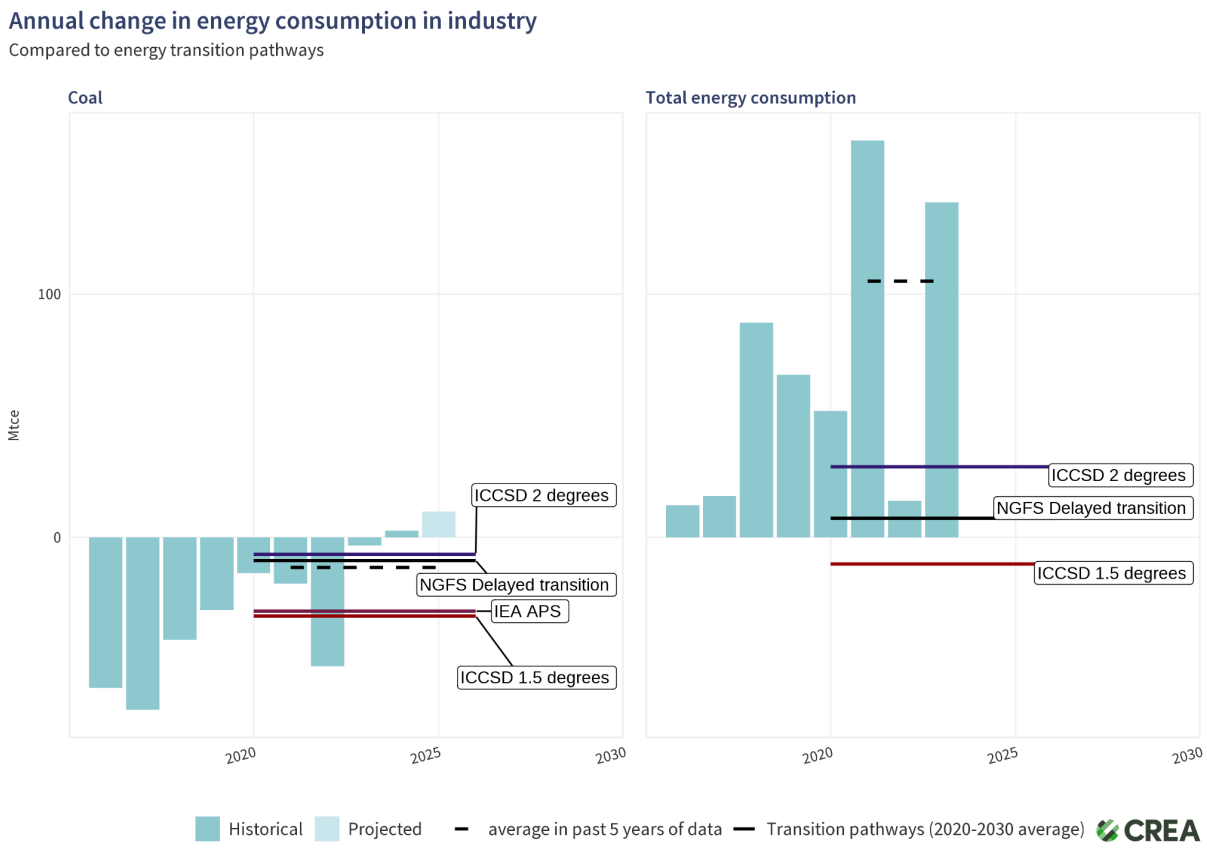

Figure 11 — Annual change in energy consumption in industry in China compared to energy transition pathways.

After several years of decline from 2016 to 2022, China's industrial coal consumption rebounded in 2024–2025 (Figure 11), mainly due to a rapid expansion of coal-based chemical production[60]. This uptick marked a reversal of the downward trend seen from 2016 to 2022 and contributed to higher overall industrial emissions in 2025.

At the same time, China's industrial electricity consumption has continued to grow steadily (Figure 12), underscoring the ongoing electrification of industry in 2023-2024. In 2025, the upward trend carried on: electricity consumption in industry reached 4.91 trillion kWh in the first three quarters, up 3.4% year-on-year[61].

Within manufacturing, high-tech and equipment industries remained key drivers, with their total electricity consumption up 5.9% year-on-year in the first three quarters of 2025 — well above the manufacturing average of 3.2% over the same period.

[60] https://www.carbonbrief.org/analysis-record-solar-growth-keeps-chinas-CO_2-falling-in-first-half-of-2025/
[61] China Electricity Council. (2025-10-27). 2025 Q3 National Power Supply and Demand Analysis and Forecast Report.https://www.cec.org.cn/detail/index.html?3-350660. Report.

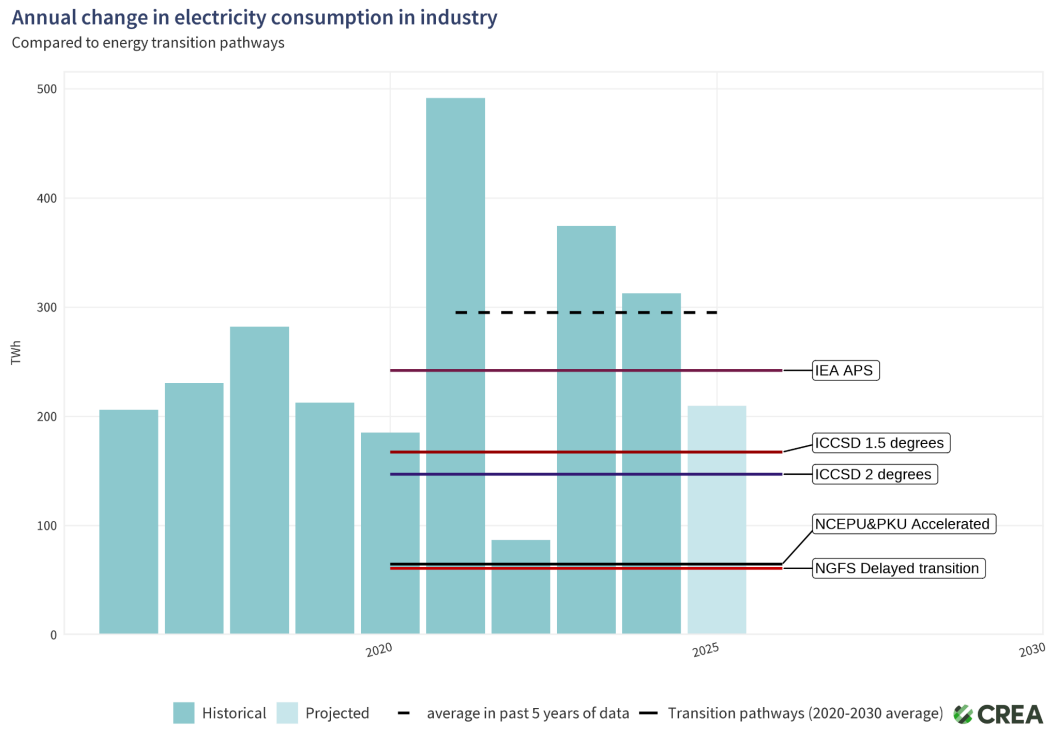

Figure 12 — Annual increase in electricity consumption in China's industrial sector compared to energy transition pathways.

The trends of China's industrial energy transition remain uncertain. Electrification is advancing rapidly in manufacturing, but coal demand has rebounded in certain sub-sectors. The balance between these dynamics will be crucial in determining whether industrial CO_2 emissions of China's industry can indeed achieve a peak closer to 2025 to align with transition pathways and ahead of 2030, the government's stipulated timeline.

6.2 Policies in place

In July 2022, central government published Implementation Plan for Peaking Carbon Emissions in the Industrial Sector set out a roadmap for the sector to peak emissions before 2030.

In 2024, a series of energy conservation and carbon reduction action plans for energy-intensive industries, including steel, non-ferrous metals, petrochemicals and building materials, were issued to strengthen implementation efforts.

From a broader perspective, the policy came amid a background of increasing external uncertainty and domestic economic transition. To stabilise industrial economic output, the Ministry of Industry and Information Technology (MIIT) has therefore paired decarbonisation initiatives with industrial stabilisation policies for 2023–2024 and 2025–2026, targeting ten major industries that together account for roughly 70% of total

industrial value added[62]. As 2025 marks both the end of the 14th FYP and the transition toward the 15th FYP, several developments illustrate China's industrial climate actions.

Expansion of the national carbon market

In 2025, China's national Emission Trading Scheme (ETS) was extended beyond the power sector to also cover steel, cement, and aluminium[63], accompanied by new guidelines to strengthen the ETS and support the green transition[64]. Key sectors, like steel, are expected to set emission caps from 2027, a significant shift away from carbon intensity targets previously used. In the following year, China plans to expand the scheme to align it more closely with international standards, meaning that over time, industries with high levels of carbon emissions will face higher costs and the increased risk of assets being stranded.

Promoting green energy use in key industries

In 2025, the central government expanded the scope of its green electricity consumption requirements—previously applied only to the aluminium industry—to additional sectors, including steel, cement and polysilicon[65]. This measure is designed to accelerate the adoption of renewable power in energy-intensive industries.

Accelerating hydrogen technology and green hydrogen development

The Chinese government aims to foster hydrogen to become a vital energy source for achieving carbon neutrality in both the power and industrial sectors[66]. Between 2024 and 2025, China continued to refine its policy framework for developing a hydrogen industry. Its focus is to drive technological innovation and encourage the energy, transport and industrial sectors to use hydrogen.

In December 2024, the MIIT issued the Implementation Plan for Promoting Clean and Low-Carbon Hydrogen in Industry, emphasising the utilisation of by-product hydrogen (hydrogen from certain industrial processes, such as coal to coke) and renewable hydrogen

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[62] Economic Reference News. (2025-9-15). New plans for stabilizing growth in the top ten key industries have been implemented one after another. https://www.news.cn/fortune/20250915/13f291f4ed5042b4ab8ed28bda0adf80/c.html. News report.
[63] Ministry of Ecology and Environment. (2025-3-21). Work Plan for Covering the Steel, Cement and Aluminum Smelting Industries in the National Carbon Emission Trading Market. https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/202503/t20250326_1104736.html. Policy.
[64] Central Committee of the Communist Party of China General Office, State Council General Office. (2025-08-25). Opinions on Promoting Green and Low-Carbon Transformation and Strengthening the Construction of the National Carbon Market. https://www.gov.cn/zhengce/202508/content_7037717.htm. Policy.
[65] Office of the National Development and Reform Commission, Comprehensive Department of the National Energy Administration. (2025-7-11). Notice on the Weight of Obligation for Renewable Energy Electricity Consumption in 2025 and Related Matters. https://www.ndrc.gov.cn/xxgk/zcfb/tz/202507/t20250711_1399141.html. Policy.
[66] National Development and Reform Commission. (2022-3-23). Medium- and Long-Term Development Plan for the Hydrogen Energy Industry (2021-2035). https://www.ndrc.gov.cn/xxgk/zcfb/ghwb/202203/t20220323_1320038.html. Policy.

[67]. In April 2025, the NDRC included nine green-hydrogen projects into its annual list of demonstration projects earmarked to receive government support[68]. The nine green-hydrogen projects have a combined capacity of 5.9GW when calculated by the capacity of their electrolysers, a device that uses electricity to split water into oxygen and hydrogen. The 5.9GW figure is seven times that of the capacity of green-hydrogen projects on 2024's list, indicating China's strong push for hydrogen.

6.3 Focus: Steel

As of mid-2025, China's progress toward its green steel targets remained underwhelming. Despite setting a target to produce at least 15% of crude steel from less carbon-intensive electric arc furnaces (EAF) in 2022, the actual share has remained stagnant at around 10%, a level that has barely shifted over the past decade[69]. The adoption of hydrogen-based metallurgy also stalled, far below the pace needed to meet 2060 carbon neutrality targets. [70] This shortfall reflects not just implementation delays but entrenched structural headwinds.

[67] Ministry of Industry and Information Technology. (2024-12-31). Accelerate the implementation plan for the application of clean and low-carbon hydrogen in the industrial sector. https://wap.miit.gov.cn/zwgk/zcwj/wjfb/tz/art/2024/art_a4dacd6bf10e40178b32cfc11e4f4265.html. Policy.
[68] Office of the National Development and Reform Commission. (2025-4-28). List of Green Low-Carbon Advanced Technology Demonstration Projects (Second Batch). https://www.ndrc.gov.cn/xwdt/tzgg/202504/t20250428_1397462.html. Policy.
[69]
https://energyandcleanair.org/publication/closing-the-loop-from-stalled-green-steel-targets-to-a-strategic-reset-in-china/
[70] Xinyi Shen, Belinda Schäpe, CREA. (2025-2-26). https://energyandcleanair.org/publication/urge-for-reform-blast-furnace-glut-in-china-erodes-profitability-and-hinders-green-steel-transition/. Report.

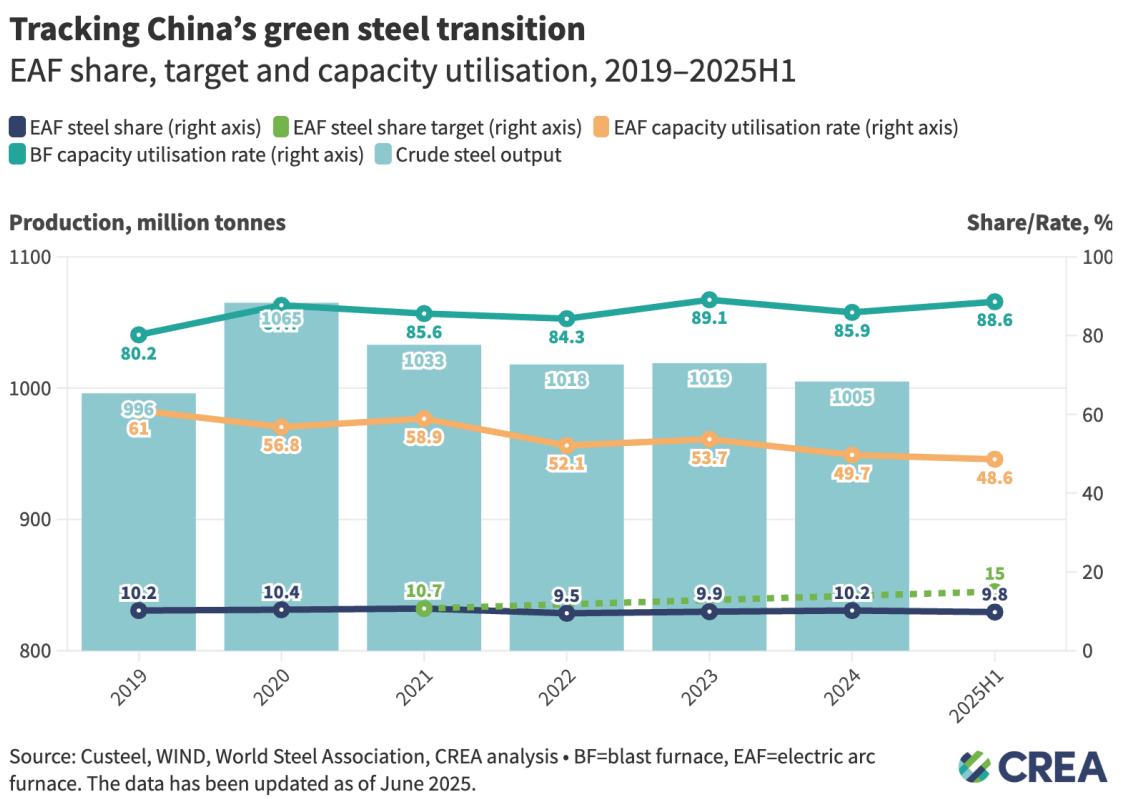

Figure 13 — Tracking China's green steel transition, EAF share, target and capacity utilisation, 2019–2025H1

As shown in Figure 13, utilisation rates have diverged sharply. While blast-furnace (BF) utilisation rose to 88.6% in the first half of 2025 (up from 85.9% in 2024), EAF utilisation fell further to 48.6% (down from 49.7%), pulling EAF's share of total output to an estimated 9.8%. Despite strong policy rhetoric, market fundamentals continue to favour blast furnace–basic oxygen furnace (BF–BOF) routes: scrap-based producers face high electricity prices, inconsistent scrap supply, and sustained losses. Meeting the 15% target will require both tighter output reduction and stronger economic incentives.

A series of policy shifts in 2025 mark Beijing's attempt to reset the steel industry and align decarbonisation with supply-side reform. In March, the NDRC reaffirmed four priorities for its work in 2025[71]: phasing out outdated capacity through a revised capacity-swap policy, strengthening carbon control via the expansion of the ETS, promoting scrap recycling, and maintaining output reduction to support consolidation.

The 2024–2025 period marks the start of a policy reset, but not yet a structural transition. Overcapacity remains the core constraint, distorting market signals and undermining the shift to electric steelmaking. Without coordinated production reduction, electricity- and

[71] The National Development and Reform Commission. Report on the 2024 plan execution and the 2025 draft plan. https://www.ndrc.gov.cn/fggz/202503/t20250314_1396569.html. Government report.

scrap-pricing reform, and stricter local enforcement in output reduction, China's pathway toward a greener steel sector will remain fragile and slow to gain traction.

6.4 Focus: Coal chemicals

The chemicals industry was the only major industry to record significant growth in output in the first half of this year. In particular, analysis suggests that average annual investment in coal-to-chemicals between 2025 and 2030 could reach three times the average level of 2021–2023, potentially driving a 2% increase in China's CO_2 emissions by 2029 compared with 2024[72].

Energy consumption in China's chemicals industry has continued to grow strongly in 2025 since 2024. Coal use in the sector rose by 20% in the first half of the year, following a 10% increase in 2024, contributing about 3% to China's total CO_2 emissions growth since 2020. Oil consumption in the chemicals industry also increased, as seen in a 9% rise in the use of a chemical compound called naphtha, a key feedstock for petrochemical production.

According to a governmental work plan issued this year, China aims to maintain growth in the chemicals industry. The plan highlights an "insufficient supply of high-end fine chemicals", and the central government has set a target for the sector's added value to grow by more than 5% during 2025–2026. This policy is expected to further drive the expansion of coal-to-chemicals and major petrochemical projects.

With gasoline and diesel demand declining, China's oil refining industry is shifting its focus from producing refined fuels to making chemical products. To reduce reliance on imported oil and gas, coal-based chemical production has been prioritised as a strategic area of development. In 2024, output from the sector reportedly replaced around 100 million tonnes of oil equivalent (Mtoe) of oil and gas. However, this shift resulted in an estimated 410–440 Mt of additional CO_2 emissions, about 4% of China's total. This reflects the fact that coal-based chemical production is significantly more carbon-intensive than production based on oil and gas.

[72] Tianfeng Securities. (December 2024).Investment in the coal-to-chemicals sector is set to surge, creating growth opportunities in engineering and equipment. https://mp.weixin.qq.com/s/xB18rY9CtmdaEIcwv0tlMA. Report.

7 Buildings

7.1 Trends compared to benchmarks

China's air pollution policies target the small-scale use of coal in buildings as one of the key sources of air pollution. This led to a rapid reduction in coal use, in line with the transition pathways. However, the use of fossil gas and electricity in China's building sector has increased faster than in the transition pathways.

China achieved historic progress in reducing the bulk use of coal by small households and small industrial boilers, a key contributor to air pollution[73]. Since 2017, bulk coal use has fallen by over 400 million tonnes, from a peak above 700 million tonnes. By the end of 2024, rural winter heating in northern China uses 55–75 million tonnes annually, small industrial boilers 28 million tonnes, and small kilns about 37 million tonnes. Cleaner heating pilots now cover 88 cities, lifting the cleaner heating rate in northern regions from 65% in 2020 to around 83% in 2024. These efforts have driven a sustained improvement in air quality.

Electricity use in residential buildings increased sharply from 2021 to 2025, compared with the previous four years. The spike was driven by heatwaves and the increasing use of air conditioning. Specifically, in the first three quarters of 2025, residential electricity use reached 1.24 trillion kWh, up 5.6% year-on-year[74].

Gas and electricity consumption by China's building sector has grown much faster than in the transition pathways (Figures 14 and 15), indicating that progress on improving energy efficiency in the building sector is lagging behind.

Improving buildings' energy efficiency can help cut emissions by saving energy, but there are also major barriers. As the construction of new buildings slows down, it's becoming more important to focus on improving energy efficiency in existing buildings. More than 40% of China's existing buildings did not meet energy-efficient building standards[75].

By the end of 2024, the share of "green buildings" with higher energy efficiency in new urban construction had risen to 97.9%, up from 95% in 2023, reflecting wide adoption of green standards[76]. 58,000 old urban communities underwent renovation (up from 53,700 in

[73] Peking University Energy Research Institute. (2025-9-18). China's Comprehensive Management Report on Substandard Coal for 2025. https://www.ccetp.cn/newsinfo/10755986.html. Report.
[74] China Electricity Council (2025-10-27). 2025 Q3 National Power Supply and Demand Analysis and Forecast Report. https://www.cec.org.cn/detail/index.html?3-350660. Report.
[75]NRDC. (2024-03-21). Accelerating Energy Conservation and Carbon Reduction in the Building Sector to Promote Comprehensive Green Transformation of Economic and Social Development. https://www.ndrc.gov.cn/xxgk/jd/jd/202403/t20240321_1365113.html. Article.
[76] Ministry of Ecological Environment. (2025-10-29). China's Policies and Actions on Climate Change 2025 Annual Report. https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202510/t20251029_1130962.shtml. Report.

2023[77]), while 74 million square metres (m^2) of buildings have undergone retrofit to improve their energy efficiency (compared with 116 million m^2 the year before).

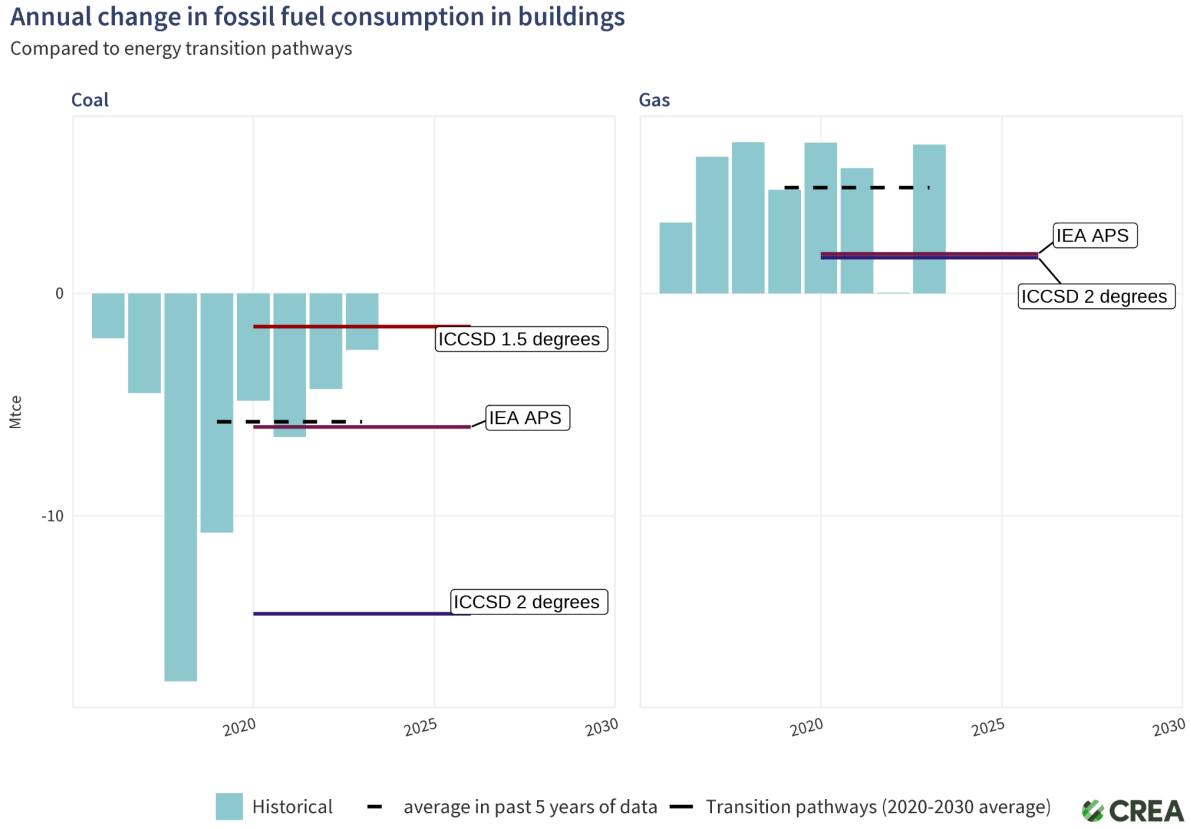

Figure 14 — Annual change in China's fossil fuel consumption in buildings compared to energy [78]transition pathways.[79]

[77] Ministry of Ecological Environment. (2024-11-06). China's Policies and Actions on Climate Change 2024 Annual Report. https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202411/t20241106_1093618.shtml. Report.
[78] Energy consumption in buildings is sourced from IEA's World Energy Balances. However, data for coal and gas consumption in 2024–25 is not yet available.
[79] Energy consumption in buildings is sourced from IEA's World Energy Balances. However, data for coal and gas consumption in 2024–25 is not yet available.

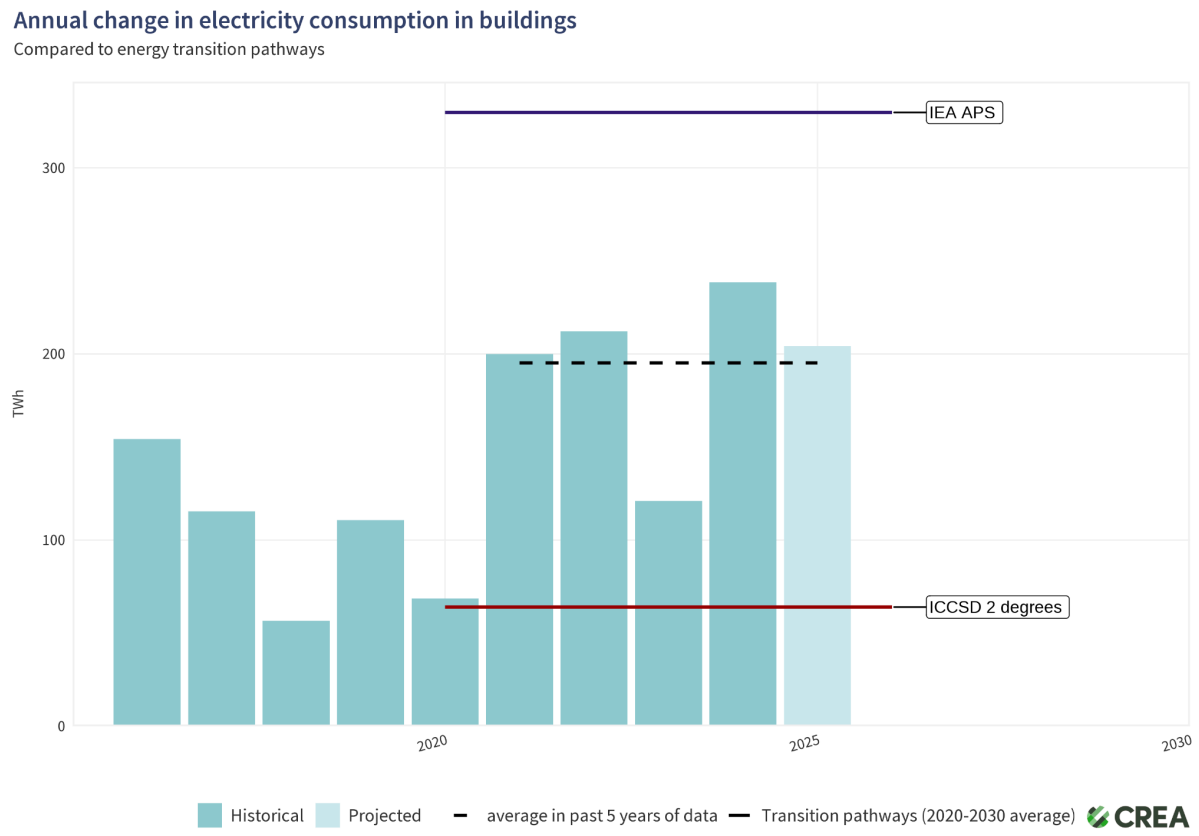

Figure 15 — Annual change in China's electricity consumption in buildings compared to energy transition pathways.

7.2 Policies in place

China's policies for the building sector focus on promoting energy efficiency, renewable energy integration, and optimised energy structures. With the slowdown of new building construction, the Action Plan to Accelerate Energy Conservation and Carbon Reduction in the Building Sector (2024) emphasises existing building energy efficiency retrofits[80].

[80] National Development and Reform Commission, Ministry of Housing and Urban-Rural Development. (2024-3-15). Work Plan for Accelerating Energy Conservation and Carbon Reduction in the Construction Sector. https://www.gov.cn/zhengce/content/202403/content_6939606.htm. Policy.

8 Transport

8.1 Trends compared to benchmarks

The speed of decarbonisation in China's transport sector is aligned with the projected rates of the transition pathways. In some cases, it is even faster than the projections, driven largely by the rapid expansion of new energy vehicles (NEVs), vehicles powered by alternative energy sources, including Battery Electric Vehicles (BEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Fuel Cell Electric Vehicles (FCEVs).

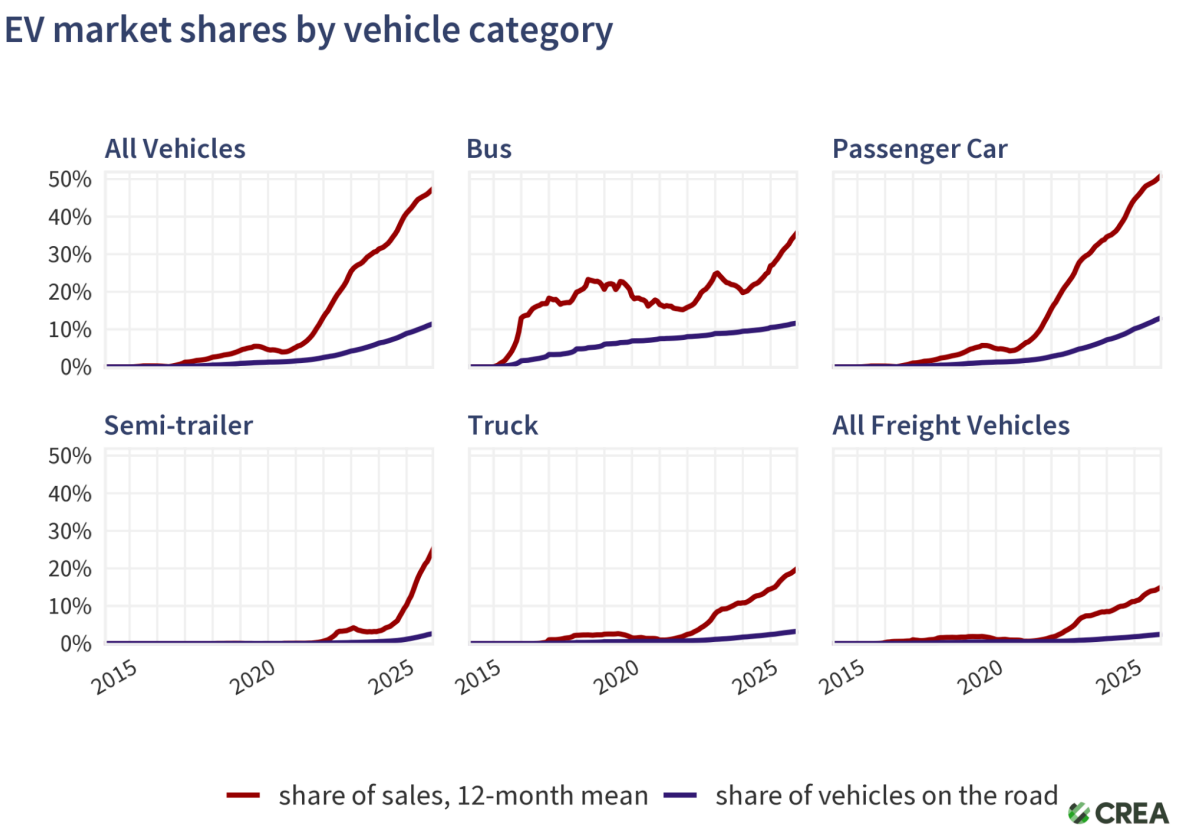

Figure 16 — NEV share of sales and vehicles on the road in China by category.

Both the production and sales of NEVs have been skyrocketing in China. The share of NEVs out of all vehicles sold increased to 50% on average in the three leading up to October 2025, compared to around 6.5% during the same time in 2020 (Figure 16). For passenger cars, the market share of NEVs has been over 50% for the past 12 months. More than one in every ten vehicles on the road is now an NEV, as the share of NEVs out of all vehicles sold in the past two decades — an indicator for the mix of cars on the road — increased from 2% at the end of 2020 to 11.6% at the end of September 2025. The production of NEVs grew by 31.6% in the 12 months leading up to October 2025, while the production of conventional vehicles fell by 2.1%. NEVs now make up 46.5% of all vehicles produced, compared to only

5.9% in 2020. Apart from passenger vehicles, the share of NEVs in buses and trucks has also increased rapidly. The sale of new energy trucks increased by 140% year-on-year to 82,000 vehicles.

Charging infrastructure continues to expand rapidly, reaching 18 million charging points by the end of September 2025, a 55% year-on-year increase. This means on average there is one charging point for every 2.2 NEVs across the country. 98% of the service stations on China's highways are now equipped with charging pillars for EVs. Charging infrastructure is largely built by private companies, with the top 8 private firms holding a market share of over 70%[81].

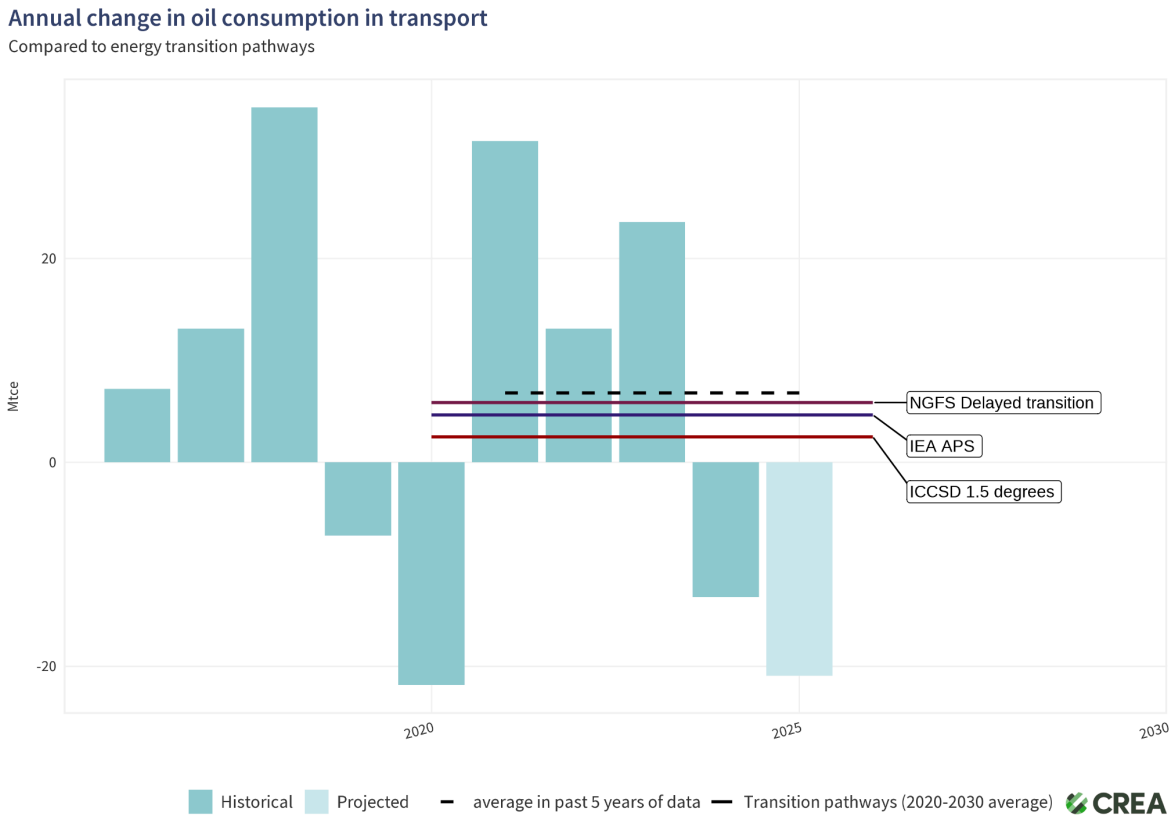

Figure 17 — Annual change in China's oil consumption in transport compared to energy transition pathways.

The fast uptake in NEVs remains a major driver behind the drop in China's oil consumption. China's oil consumption in the transport sector is projected to fall for the second consecutive year in 2025, declining by 4.6% year-on-year and by 7.2% compared to 2023 (Figure 17). This indicates that oil demand in the transport sector has likely peaked in 2023, implying that China's total oil demand may be approaching a peak, unless offset by the consumption growth in other sectors such as chemicals production.

[81] State Council. (October 2025). China's EV charging infrastructure maintains growth momentum. https://english.www.gov.cn/archive/statistics/202511/01/content_WS69055d4bc6d00ca5f9a073b6.html.

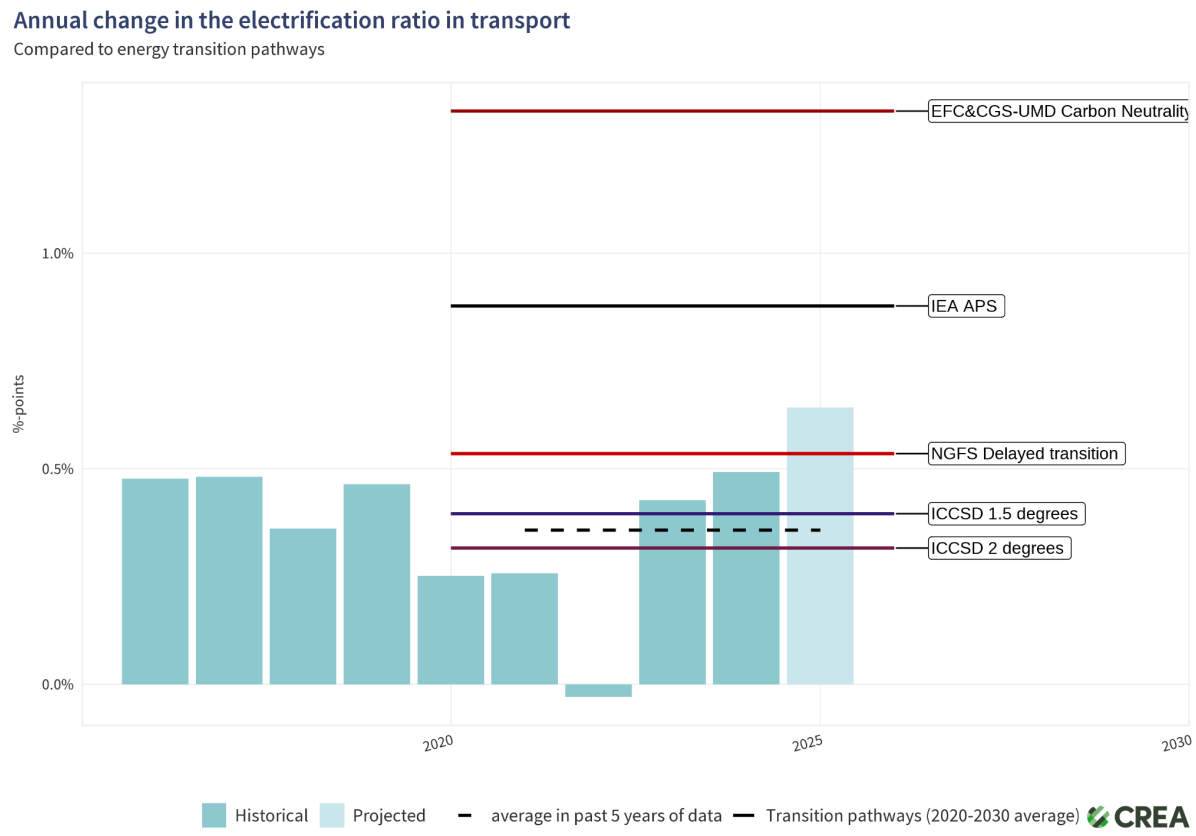

Figure 18 — Annual increase in the electrification ratio in transport in China compared to energy transition pathways.

The share of electricity in the transport sector's total energy use rose from 5.1% in 2020 to 6.8% in 2025. To align with the transition pathways, China needs to increase the electrification rate in the transport sector by 0.5 percentage points per year (Figure 18). This rate is on track to be achieved for the first time on an annual basis in 2025, even though the average growth over the past five years is still lower. It is likely that not all NEV charging is included in reported electricity consumption for road transportation and charging services, since many charging stations are located in private homes, so the actual rate of electrification for the sector is likely to be even higher.

The decarbonisation and electrification of transport in China are supported by a highly developed network of high-speed rail connections between cities, as well as urban rail and bus transport. China's high-speed rail network is by far the largest in the world, accounting for 70% of the global high-speed network. It has been growing by more than 2,000 km every year on average since 2020, and is expected to reach over 50,000 km in 2025. It is expected to reach around 70,000 km by 2035[82].

The number of rail passengers has been growing significantly over the past year, but there is currently no clear indication of a shift towards railways as the preferred mode of

[82] International Railway Journal. (Jlu 2025). China targets 400km/h high-speed network. https://www.railjournal.com/passenger/high-speed/china-targets-400km-h-high-speed-network/.

transport. Railway passenger volumes saw a record high of 3.5 billion railway passengers in the first three quarters of 2025, a year-on-year increase of 6%[83]. Air travel passengers grew slightly slower, by 5.2% compared to 2024, to 581 million passengers[84].

8.2 Policies in place

As NEVs became a key economic driver, alongside other clean technologies, they have also featured prominently in high-level government documents. China's new 2035 NDC for the first time included a target for NEVs: to become 'mainstream' in sales by 2035. While this target is rather conservative, given that NEVs already make up nearly 50% of all vehicle sales, it is an important signal that economic development and climate policy are increasingly aligned with NEVs at the centre.

Although NEV subsidies have largely been phased out, a separate policy that allowed consumers to buy an NEV at lower prices by trading in their old cars was extended in 2025. Under this vehicle trade-in policy, consumers can get up to 20,000 RMB for turning in their old internal combustion engine car for an NEV[85]. It has become a popular and important driver for the fast uptake. The policy is also intended to help cities phase out trucks and buses running on fossil fuels.

To support the continuous growth of NEVs, the government issued a three-year action plan (2025–2027) to accelerate the expansion of the country's charging infrastructure. The plan requires the nation to increase the number of its charging stations to 28 million by the end of 2027 – enough to meet the needs of more than 80 million NEVs and nearly double the current number. The plan aims to ensure a more balanced spread of charging pillars among rural areas by building more of them in pockets that have suffered shortages of the facility. It also intends to expand fast-charging stations in major cities and along highways. It emphasises innovation through vehicle-to-grid interaction (V2G), which uses two-way charging to let NEVs not only draw power from the grid but also feed electricity back into it when needed. This enables NEVs to become an asset that can help the grid balance the demand and supply of electricity during peak hours and absorb more clean energy[86].

[83] Xinhua. (October 2025). China's railway passenger trips up 6 pct in first three quarters. https://english.www.gov.cn/archive/statistics/202510/20/content_WS68f6300ac6d00ca5f9a06efd.html.
[84] Civil Aviation Administration of China. (September 2025). Statistics of main industry indicators. https://www.caac.gov.cn/XXGK/XXGK/TJSJ/index_1215.html.
[85] NDRC. (January 2025). Notice on Strengthening and Expanding the Implementation of Large-Scale Equipment Renewal and Consumer Goods Trade-in Policies in 2025. https://www.ndrc.gov.cn/xwdt/ztzl/tddgmsbgxhxfpyjhx/gzdt/202501/t20250108_1395617.html.
[86] NDRC (September 2025). Three-Year Action Plan for Doubling the Service Capacity of Electric Vehicle Charging Facilities (2025-2027). https://www.gov.cn/zhengce/zhengceku/202510/content_7044559.htm.

9 Conclusions

In 2025, China's energy and emissions trends, as well as its policies, represent mixed progress towards alignment with Paris Agreement goals. The country's CO_2 emissions are expected to stay flat for the second year, due to continued record-breaking additions of solar and wind power, electrification of transport, and falling demand for construction materials.

The power sector's CO_2 emissions are projected to record their first full-year decline since 2016, while an impressive rise in EV sales and fast expansion of high-speed railways will see transport sector emissions fall for the second year in a row.

On the flipside, rapidly expanding coal and oil use in the chemical sector is expected to offset the emission reductions from other sectors, and the failure to shift to electric-arc steelmaking diluted the reduction in emissions resulting from the drop in steel output. As a result, China is not yet reducing emissions as required to get on track to Paris-aligned emission pathways and to progress towards the country's carbon neutrality target.

Several key indicators remain off track, including total CO_2 emissions, total energy and coal consumption, and industrial energy consumption. The building sector's energy consumption and emission growth is also above Paris-aligned pathways due to a need for better energy efficiency and the use of fossil gas, rather than clean electricity, to replace coal.

Despite coal consumption and emissions staying approximately unchanged in 2025 year-on-year, the country will miss important energy and emissions targets for the 14th FYP: the carbon intensity target as well as the pledges to "strictly control" coal consumption growth and new coal-fired power plants. The country's determination to meet its 2030 climate commitments is unclear, with the commitment to gradually reduce coal consumption in 2026–30, in particular, omitted in the new NDC and the Central Committee's recommendations for the next FYP. The policy environment and target-setting for the next few years are concerning, raising the risk of a rebound after two years of stabilising emissions.

Permitting and construction of coal and gas-fired power plants have continued at a high rate. The progress on retiring older capacity is minimal. As a result, there is now a glut of fossil power capacity. This risks crowding out investment into clean power unless the government reverses its policy that encourages the construction of even more fossil power plants.

China has released its new climate commitments for 2035, a document required by the Paris agreement and the first time the country has updated its internationally pledged

targets since 2021. The new NDC included the country's first absolute emission reduction target and the first emission target covering all greenhouse gases and sectors. However, the level of ambition falls well short of what China needs to do to align with the global goals of the Paris agreement, and the emission reduction target was set from undefined "peak levels", rather than on the basis of a historical base year, leaving the door open to a near-term emission rebound.

On balance, China's clean energy boom has a momentum of its own and has gained high economic significance both nationally and on the provincial level, which makes it more likely that the boom will continue. It's clear that after the impressive growth of the clean energy sectors, China has the capability to keep emissions falling and start making progress towards its carbon neutrality target.

Appendix

Data disclosure

Non-CO_2

Emissions disclosure for non-CO_2 greenhouse gases only takes place through national communications to the UNFCCC, the most recent of which has data for 2014, which is a major shortcoming in both tracking emissions trends and the effect of policies and in China's ability to set emissions targets for these gases.

Total energy supply and demand

Data on total energy consumption and consumption of the main energy sources (coal, oil, gas, and non-fossil energy) are released annually at the end of February in the Statistical Communique on Economic and Social Development. More detailed data are made available in the China Energy Statistical Yearbook with a delay of 1–2 years. Quarterly numbers are sometimes published by the National Energy Administration (NEA), but this varies from quarter to quarter. These occasional disclosures suggest that the government has the data available internally. More systematic and disaggregated monthly or quarterly disclosure would greatly improve the timeliness of information about the development of China's energy sector's CO_2 emissions.

Historical data sources

Historical data was obtained from the National Bureau of Statistics, IEA World Energy Balances 2024, which includes officially reported data for China, and the annual and monthly electricity statistics from the China Electricity Council. Annual updates may also include revisions to historical data for years prior to 2024, based on the latest information from data sources.

For 2025, full-year data was projected based on year-on-year changes in year-to-date data until August. The breakdown of thermal power generation by fuel for 2024 was taken from the BP Statistical Review of the World's Energy and for 2025 from the Ember Global Electricity Review.

Table A1 — Historical data sources

Sector	Indicator	Product	Data source	2025 Data source
All	GHG emissions	CO_2	CAT	Projected based on fossil fuel consumption and cement production
All	Energy consumption	Coal	NBS	Monthly apparent consumption data from Wind Information
All	Energy consumption	Oil	NBS	Apparent oil products consumption based on refinery throughput data from National Bureau of Statistics of China (NBS) and net exports from China Customs
All	Energy consumption	Gas	NBS	Monthly apparent consumption data from Wind information
All	Energy consumption	Electricity	CEC	CEC
All	Energy consumption	Total primary energy	NBS	Calculated based on coal, oil and gas consumption and non-fossil power generation
All	Energy consumption	Non-fossil energy	NBS	Non-fossil power generation reported by CEC
Electricity	GHG emissions	CO_2	IEA	Changes in thermal power generation from CEC
Electricity	Total installed capacity	Wind	CEC	CEC
Electricity	Total installed capacity	Solar	CEC	CEC
Electricity	Total installed capacity	Nuclear	CEC	CEC
Electricity	Total installed capacity	Coal	CEC	CEC
Electricity	Total installed capacity	Thermal power	CEC	CEC
Electricity	Total installed capacity	Gas	CEC	CEC
Electricity	Total installed capacity	Hydropower	CEC	CEC
Electricity	Power generation	Wind	CEC	CEC
Electricity	Power generation	Solar	CEC	CEC
Electricity	Power generation	Nuclear	CEC	CEC
Electricity	Power generation	Biomass	IEA	Ember Global Electricity Review
Electricity	Power generation	Coal	BP	Ember Global Electricity Review
Electricity	Power generation	Thermal power	CEC	CEC
Electricity	Power generation	Gas	BP	Ember Global Electricity Review
Electricity	Power generation	Hydropower	CEC	CEC
Electricity	Power generation	Non-fossil	CEC	CEC
Electricity	Power generation	Total	CEC	CEC

Table A1 — Historical data sources				
Sector	**Indicator**	**Product**	**Data source**	**2025 Data source**
Industry	Energy consumption	Coal	IEA	–
Industry	Energy consumption	Oil	IEA	–
Industry	Energy consumption	Gas	IEA	–
Industry	Energy consumption	Electricity	CEC	–
Industry	Energy consumption	Total energy consumption	IEA	–
Iron and steel	Energy consumption	Coal	IEA	Consumption of coking coal and consumption of thermal coal by the metallurgical industry from Wind Information
Iron and steel	Energy consumption	Gas	IEA	–
Iron and steel	Energy consumption	Electricity	CEC	CEC
Cement	Production	Cement	NBS	NBS
Transport	Energy consumption	Oil	IEA	Apparent consumption of oil products
Transport	Energy consumption	Electricity	CEC	CEC
Buildings	Energy consumption	Coal	IEA	–
Buildings	Energy consumption	Gas	IEA	–
Buildings	Energy consumption	Electricity	CEC	CEC

Projection data sources

Projection data was compiled from a suite of climate transition scenarios consistent with the Paris Agreement prepared by the following research institutions: Central Banks and Supervisors Network for Greening the Financial System (NGFS); Climate Action Tracker (CAT); International Energy Agency (IEA); Institute of Climate Change and Sustainable Development (ICCSD) of Tsinghua University; School of Environment and Natural Resources; Renmin University (SENR-RMU); Institute of Atmospheric Environment; China Academy of Environmental Planning (CAEP-IAE) and Electric Power Planning and Engineering Institute (EPPEI); North China Electric Power University (NCEPU) and Peking University (PKU); and Energy Foundation China (EFC) and Center for Global Sustainability at the University of Maryland (CGS-UMD).

We have identified a set of indicators, such as installed clean energy capacity or transport oil consumption, that can be compared against historical data and used to measure progress in a much more granular and forward-looking fashion than a simple look at the

annual change in emissions would permit. We have converted the scenario data into benchmarks for each indicator that allow us to assess whether that particular indicator is aligned with the climate transition scenarios.

Table A2 — Overview of the global scenarios included

Institute	Scenario	Source
IEA	Announced Pledges (APS)	World Energy Outlook 2024 https://www.iea.org/reports/world-energy-outlook-2024
NGFS	Delayed transition	https://www.ngfs.net/ngfs-scenarios-portal/data-resources/
NGFS	Below 2°C	https://www.ngfs.net/ngfs-scenarios-portal/data-resources/
NGFS	Net Zero 2050	https://www.ngfs.net/ngfs-scenarios-portal/data-resources/
NGFS	Fragmented world	https://www.ngfs.net/ngfs-scenarios-portal/data-resources/
NGFS	Low demand	https://www.ngfs.net/ngfs-scenarios-portal/data-resources/
CAT	1.5 degrees	https://climateactiontracker.org/countries/china/; https://climateactiontracker.org/publications/paris-aligned-benchmarks-power-sector/
CAT	2 degrees	https://climateactiontracker.org/countries/china/

Table A3 — Overview of the included scenarios by Chinese researchers

Institute	Scenario	Source
Institute of Climate Change and Sustainable Development (ICCSD)	1.5 degrees	China's Long-Term Low-Carbon Development Strategies and Pathways https://www.efchina.org/Reports-en/report-lceg-20210711-en
Institute of Climate Change and Sustainable Development (ICCSD)	2 degrees	China's Long-Term Low-Carbon Development Strategies and Pathways https://www.efchina.org/Reports-en/report-lceg-20210711-en
School of Environment and Natural Resources (SENR), Renmin University	1.5 degrees	Wang K (2021) Research on China's carbon emissions pathway under the 1.5°C target http://www.climatechange.cn/CN/10.12006/j.issn.1673-1719.2020.228
School of Environment and Natural Resources (SENR), Renmin University	2 degrees	Wang K (2021) Research on China's carbon emissions pathway under the 1.5°C target http://www.climatechange.cn/CN/10.12006/j.issn.1673-1719.2020.228

Table A3 — Overview of the included scenarios by Chinese researchers

Institute	Scenario	Source
North China Electric Power University (NCEPU) and Peking University (PKU)	Accelerated electrification with diverse power mix (shortened to "Accelerated" in the graphs)	Pathways and Policy for Peaking CO_2 Emissions in China's Power Sector https://mp.weixin.qq.com/s/AUXybE5neN-jxCah7APZoA
North China Electric Power University (NCEPU) and Peking University (PKU)	Continued electrification led by new energy (shortened to "New Energy" in the graphs)	Pathways and Policy for Peaking CO_2 Emissions in China's Power Sector https://mp.weixin.qq.com/s/AUXybE5neN-jxCah7APZoA
Institute of Atmospheric Environment, China Academy of Environmental Planning (CAEP-IAE) and Electric Power Planning and Engineering Institute (EPPEI)	Baseline scenario: high electricity demand, energy mix trend as the 13th Five-Year Plan of China (FYP)	Pathways of carbon emission peak in China's electric power industry http://www.hjkxyj.org.cn/en/article/doi/10.13198/j.issn.1001-6929.2021.11.24
Institute of Atmospheric Environment, China Academy of Environmental Planning (CAEP-IAE) and Electric Power Planning and Engineering Institute (EPPEI)	Low carbon scenario: high electricity demand, maximise RE, lower coal consumption	Pathways of carbon emission peak in China's electric power industry http://www.hjkxyj.org.cn/en/article/doi/10.13198/j.issn.1001-6929.2021.11.24
Institute of Atmospheric Environment, China Academy of Environmental Planning (CAEP-IAE) and Electric Power Planning and Engineering Institute (EPPEI)	Strengthened scenario: low electricity demand, maximise RE, lower coal consumption	Pathways of carbon emission peak in China's electric power industry http://www.hjkxyj.org.cn/en/article/doi/10.13198/j.issn.1001-6929.2021.11.24
Energy Foundation China (EFC) and Center for Global Sustainability at the University of Maryland (CGS-UMD)	Based on updated NDC	Synthesis Report 2022 on China's Carbon Neutrality: Electrification in China's Carbon Neutrality Pathways https://www.efchina.org/Reports-en/report-snp-20221104-en?set_language=en