CREA

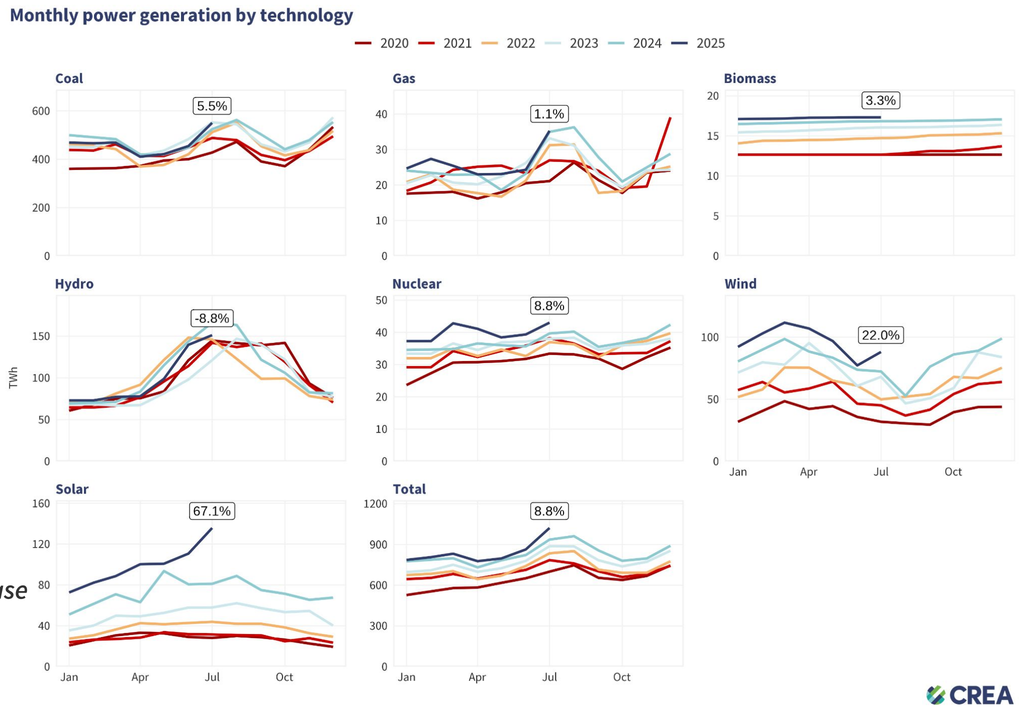
Centre for Research on Energy and Clean Air

China energy and emissions trends

August 2025 snapshot

Hot weather and weak hydropower drive thermal power growth

- Total power generation* increased by 8.8%, while large-scale power generation only grew by 3.1%, indicating most power generation growth comes from solar and wind installations that are outside of the industrial production statistics.
- In July, coal power and gas power generation rose by 5.5% and 1.1%, respectively, due to the hot and dry weather, while hydropower declined by 8.8%. Year-to-date, power generation from coal and gas is down 1.3%.
- Solar, wind* and nuclear power generation increased by 67.1%, 22% and 8.8%, respectively.



This is a prediction based on the assumption that there wasn't a major increase in wind and solar curtailment compared with the same period last year.

National Bureau of Statistics (NBS) underreports wind and solar generation, particularly from rooftop and smaller solar plants. Find CREA's methodology for power generation [here](#).

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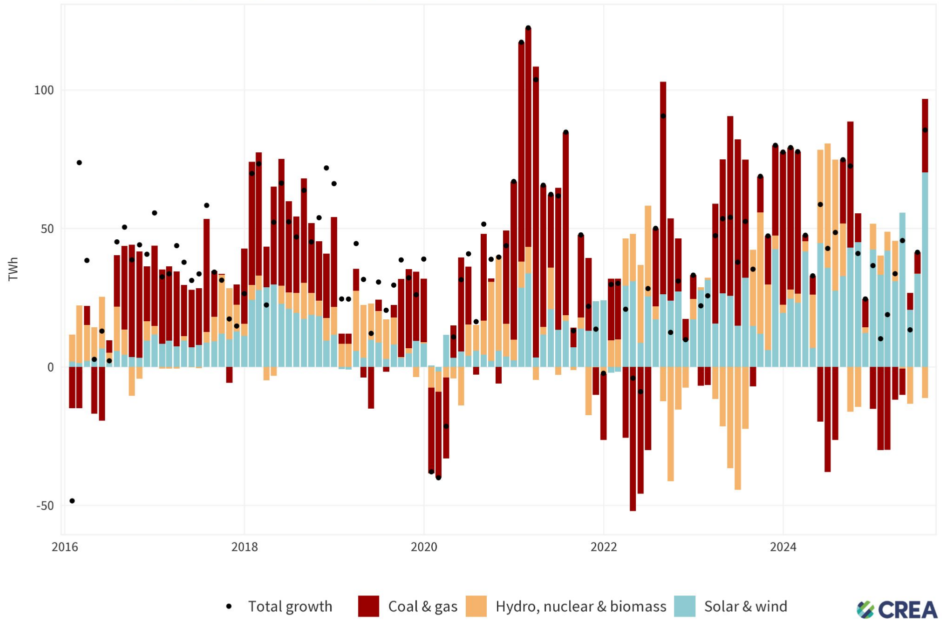
Solar and wind continue to meet most of power demand growth

- Solar and wind* power generation met 82% of overall power demand growth in July. However, thermal power output rose 4.7% year-on-year, driven by a decline in hydropower generation.
- In the first seven months of 2025, solar and wind power* accounted for 23% of total electricity generation, up from 19% a year earlier. Their output rose by 27% year-on-year, far outpacing the 4% growth in overall power demand.

Read more: [*Clean energy just put China's CO2 emissions into reverse for the first time*]()

Growth in monthly power generation by source



**This is a prediction based on the assumption that there wasn't a major increase in wind and solar curtailment compared with the same period last year.*

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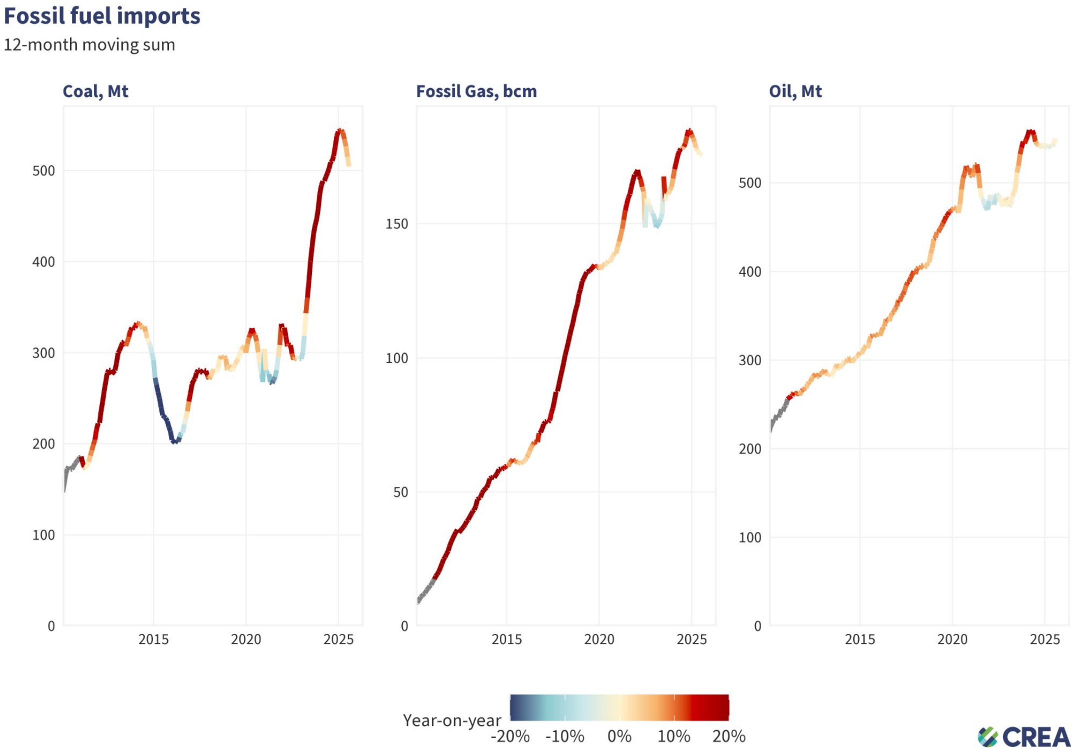
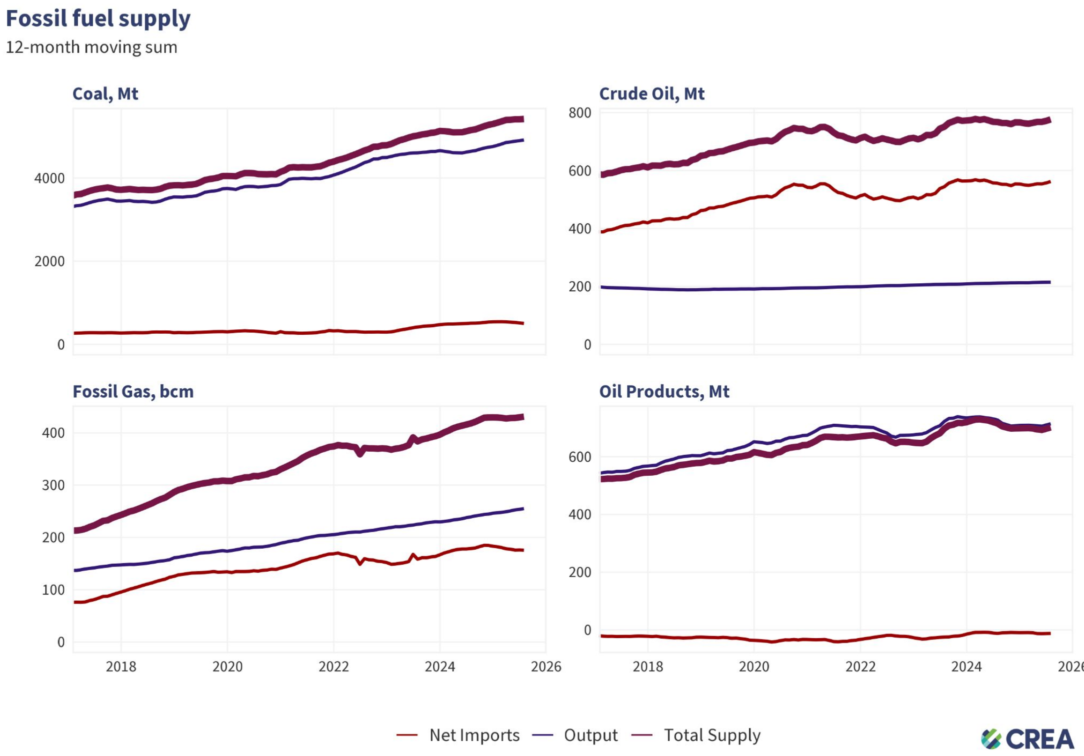
Coal imports continue to drop

- In July 2025, China's coal imports fell by 23% year-on-year. Over the first seven months of the year, total coal imports were down 13% compared to the same period in 2024.
- China's crude oil imports increased by 12% year-on-year. Over the first seven months of the year, total crude oil imports were up 2.8% compared to the same period in 2024.
- China's natural gas imports increased by 2% year-on-year, while cumulative imports for January to July fell by 6.9% compared to the same period last year.



Domestic coal output fell for the first time in a year

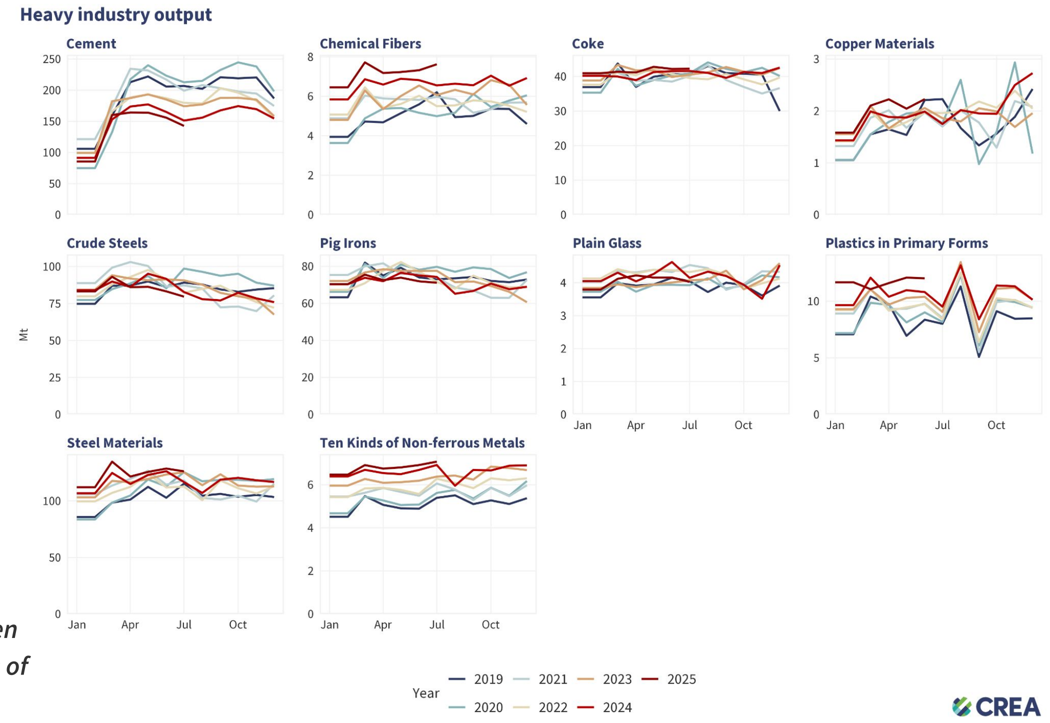
- In July, coal output fell by 3.8% year-on-year, ending a year-long growth streak. With domestic coal consumption declining, the NEA launched inspections into coal mines exceeding production limits.
- Domestic natural gas production rose by 7.4% in July, bringing output for the first seven months up 6% year-on-year. Total supply remained stable as imports declined.
- Crude oil production rose by 1.2% . Output for the first seven months was up 1.3%.
- Refinery crude oil processing rose sharply for the second consecutive month in July, up 9%, lifting year-to-date volumes by 3%. The increase was likely driven by stockpiling, demand from the chemicals sector, and a modest rise in net oil product exports.



Output in steel and cement continues to fall

- In July 2025, pig iron and crude steel output declined year-on-year by 1.4% and 4%, respectively. Steel product increased 6.4%.
- July's crude steel output fell to the lowest level this year and marked a third consecutive monthly decline. Output in the first seven months was still down 3.1% year-on-year, the weakest level since 2020.
- Cement production fell by 5.6% in July, reaching its lowest level for the month since 2019.
- Chemical fibre and non-ferrous metal output grew by 4.6% and 2.2%.
- Due to the continued downturn in the real estate market, plain glass production fell by 3.4% year-on-year.

The steel and cement industries are the largest CO2 emitters in China, when emissions from their electricity use are included. They are also bellwethers of real estate, infrastructure and other fixed asset investments that play an outsized role in China's emissions and economy.



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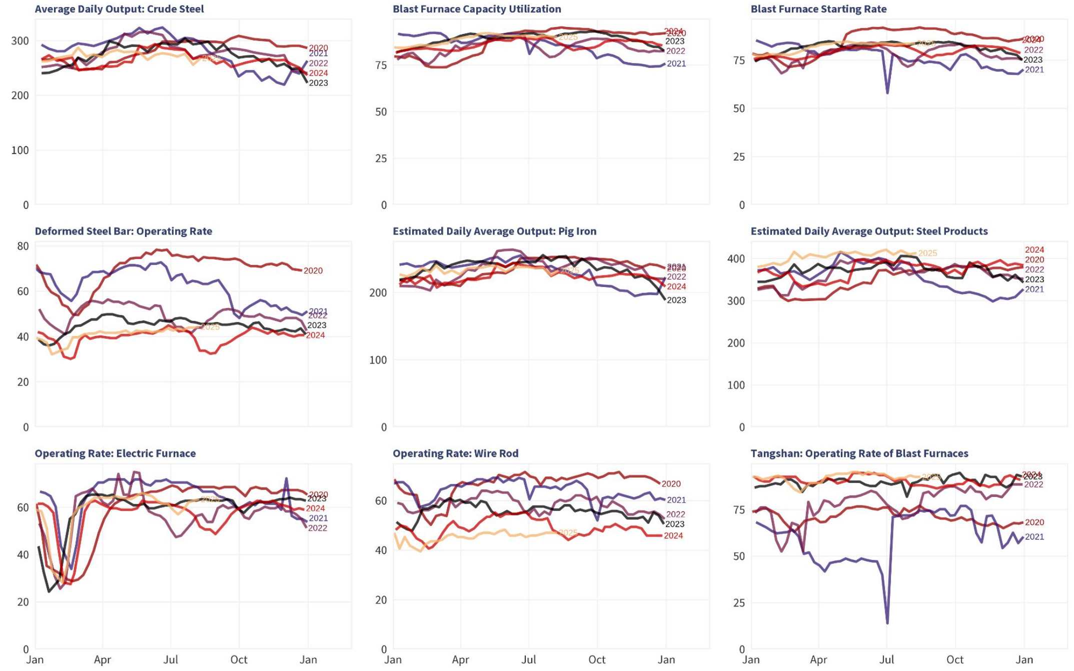
Expected supply tightening in the steel market

- Blast furnace operating rates and utilization edged up from a year earlier, while electric furnace utilization was much higher than in the same period last year.
- In July 2025, steel industry chain prices trended upward amid expectations of tighter supply and stronger demand, supported by macroeconomic developments, reduced coal output, rising raw material costs, and improved market sentiment.
- The operating rate of blast furnaces in Tangshan, China's 'steel capital' and an important source of air pollution in Beijing, remained on a record high level.
    - Hebei industrial output is a bellwether of national priorities: when air quality and emissions are the priority, it is the most tightly regulated area due to its impact on Beijing's pollution levels.

Urge for reform: blast furnace glut in China erodes profitability and hinders green steel transition. Read more [here](#).

Steel industry weekly operating indicators



Source: Wind Information

Solar and wind expansion eases slightly after policy deadline

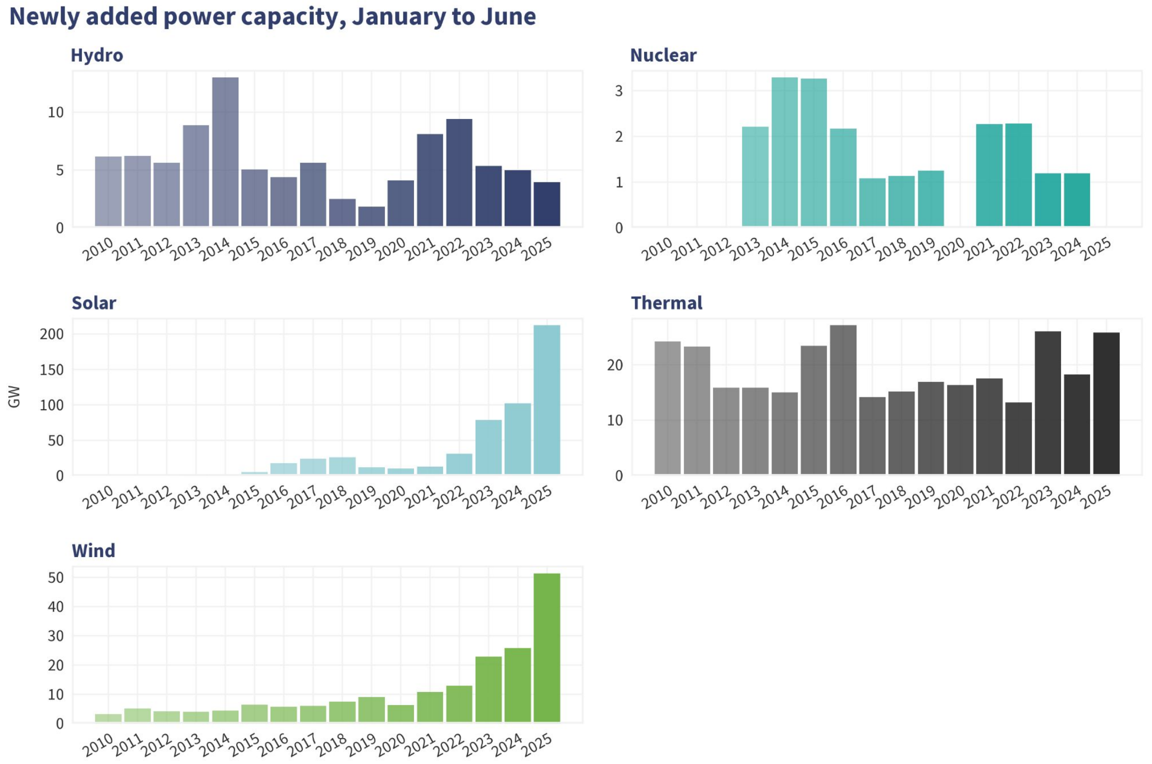
In the first six months of 2025, China added:

- 212 gigawatts (GW) of solar power capacity, up 107% from last year.
- 51 GW of wind power capacity, a 99% increase from last year.
- 26 GW of thermal power capacity, a 41% increase from last year.
- 3.9 GW of hydro power capacity, down 21% from last year.
- 0 GW of nuclear power capacity.

Read more: [Clean energy contributed a record 10% of China's GDP in 2024](#).

[Why China is still building new coal–and when it might stop](#)

[When coal won't step aside: The challenge of scaling clean energy in China](#)



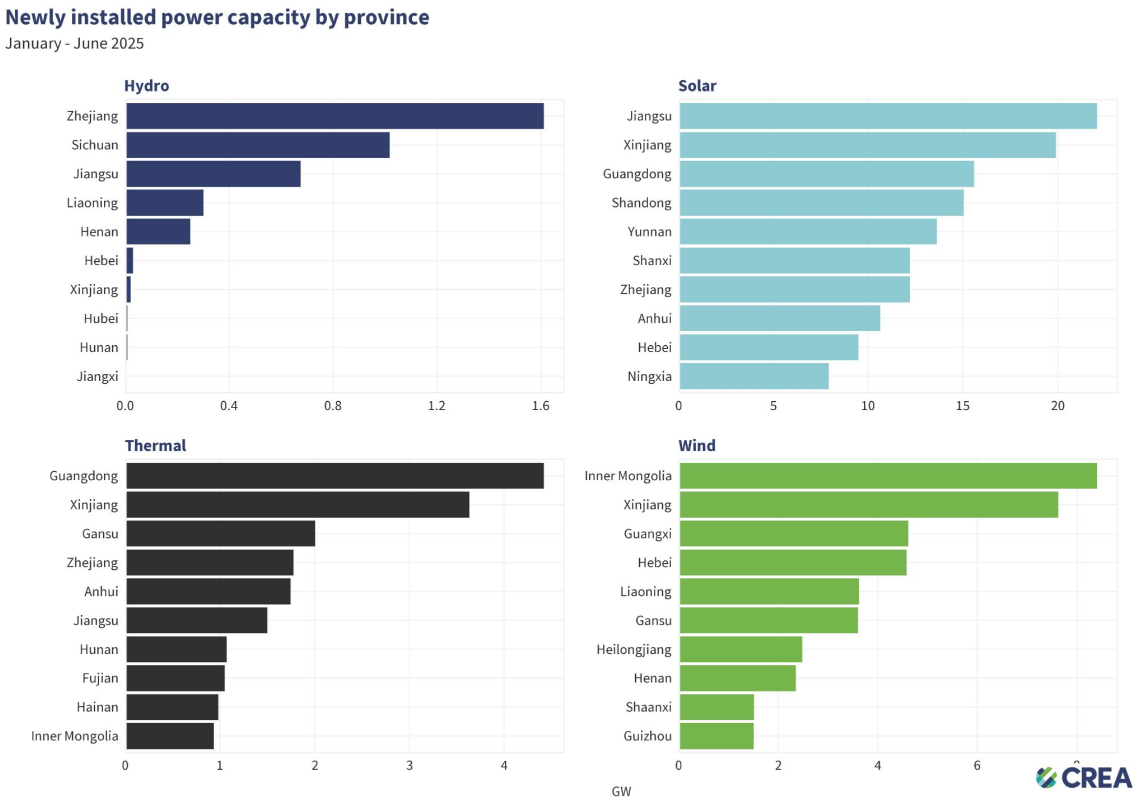
Distributed solar and large-scale energy bases take the lead

- Solar power installations are led by Jiangsu, Xinjiang, and Guangdong. Jiangsu and Guangdong focus mostly on distributed solar, while in Xinjiang large-scale energy bases take the lead.

- Inner Mongolia, Xinjiang and Guangxi lead in wind development. Guangxi is a key province for offshore wind development, while Inner Mongolia and Xinjiang are parts of the large-scale clean energy bases initiative.

- Thermal (coal) power additions accelerated in Guangdong, Xinjiang, and Gansu. In recent years, Guangdong has led the country in new thermal power capacity additions, undermining its clean energy performance and leading to signs of coal power overcapacity in 2024.

Read more: [China's north cleans up its power mix as the south lags]



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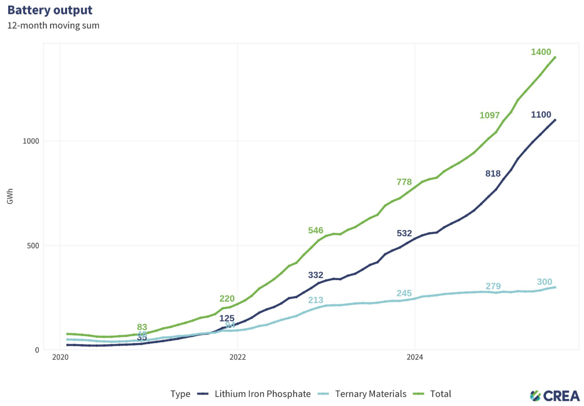
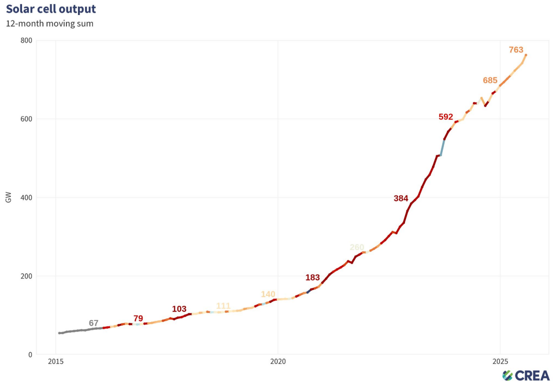
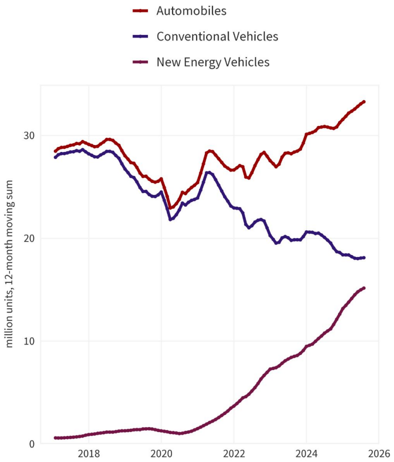
Solar cell and EV output continue to rise

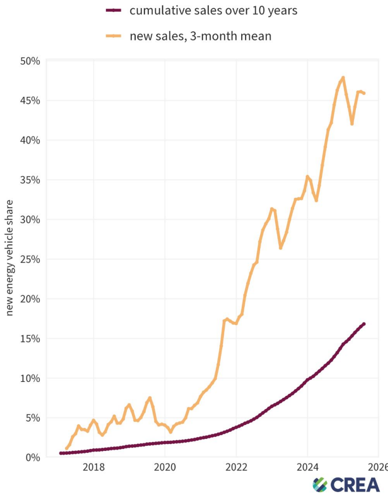
- Solar cell output rose 16% in July to 67 GW, indicating strong demand despite recent changes to tariffs for new solar plants. Year-to-date production reached 470 GW, up 20% from a year earlier.
- Electric vehicle output rose 17%, while production of fuel-powered vehicles grew 2%. So far this year, EV production has climbed 33% to 8 million units, whereas fuel-powered vehicle output has fallen 3% to 10 million.
- The three-month average market share of NEVs in new sales exceeded 45%.





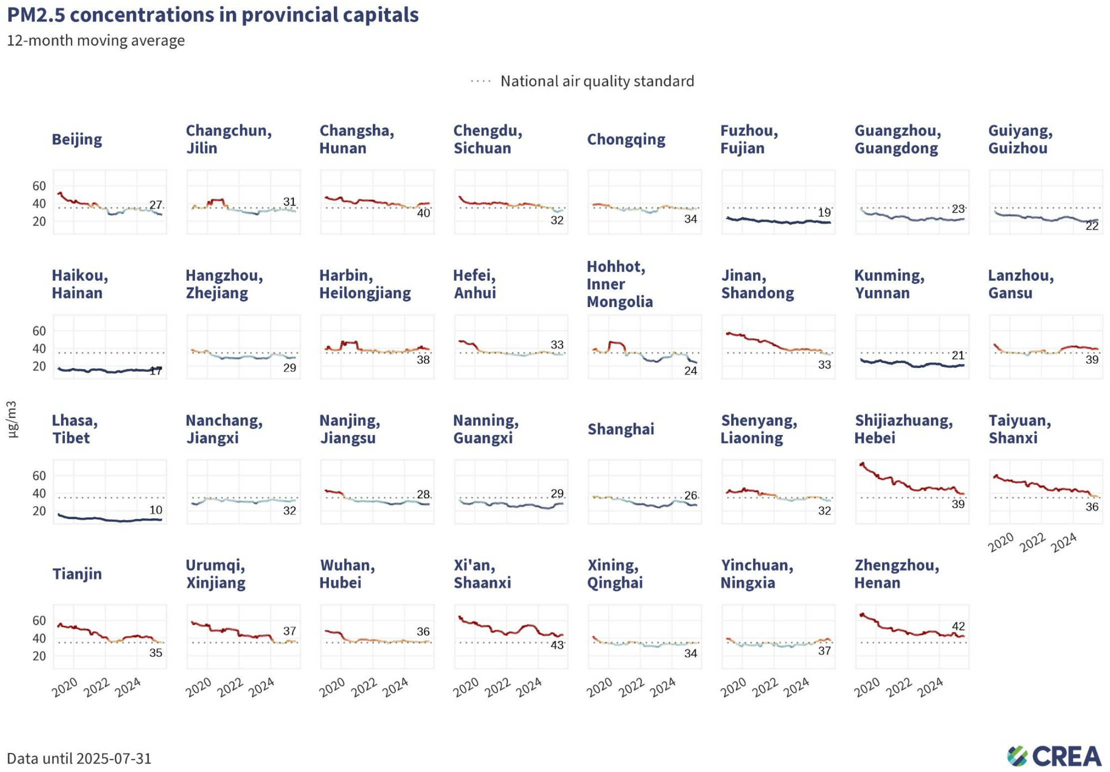
Vehicle production





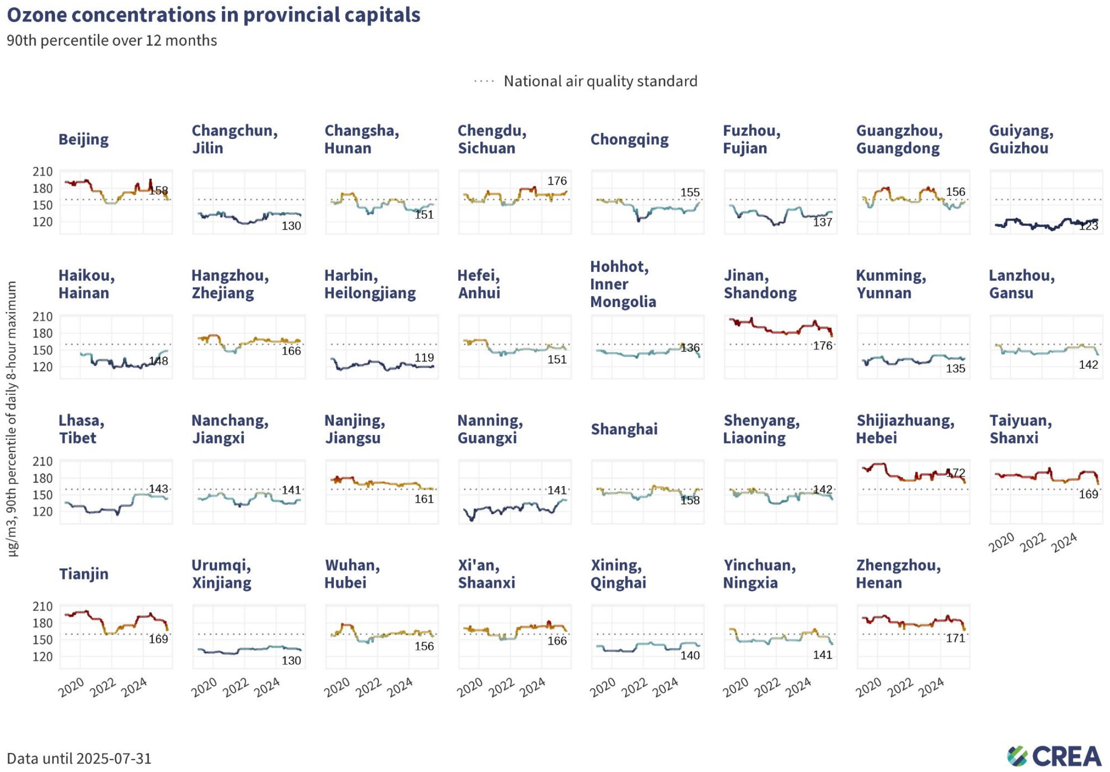
By July, 10 provincial capitals exceeded the PM2.5 standard, with southern region recording increases from June

- As of the end of July 2025, 10 out of 31 provincial capital cities in China had a 12-month moving average PM2.5 concentration exceeding the national standard of 35 μg/m³.
- The cities with the highest average PM2.5 concentrations were primarily located in northern and central-western China, including the capitals of Shaanxi, Henan, Hunan, Hebei, and Gansu, with annual averages of 43, 42, 40, 39, and 39 μg/m³, respectively.
- Additionally, provincial capitals of Guangdong, Guizhou and Guangxi saw an increase in their 12-month moving average PM2.5 concentrations compared to the previous month.



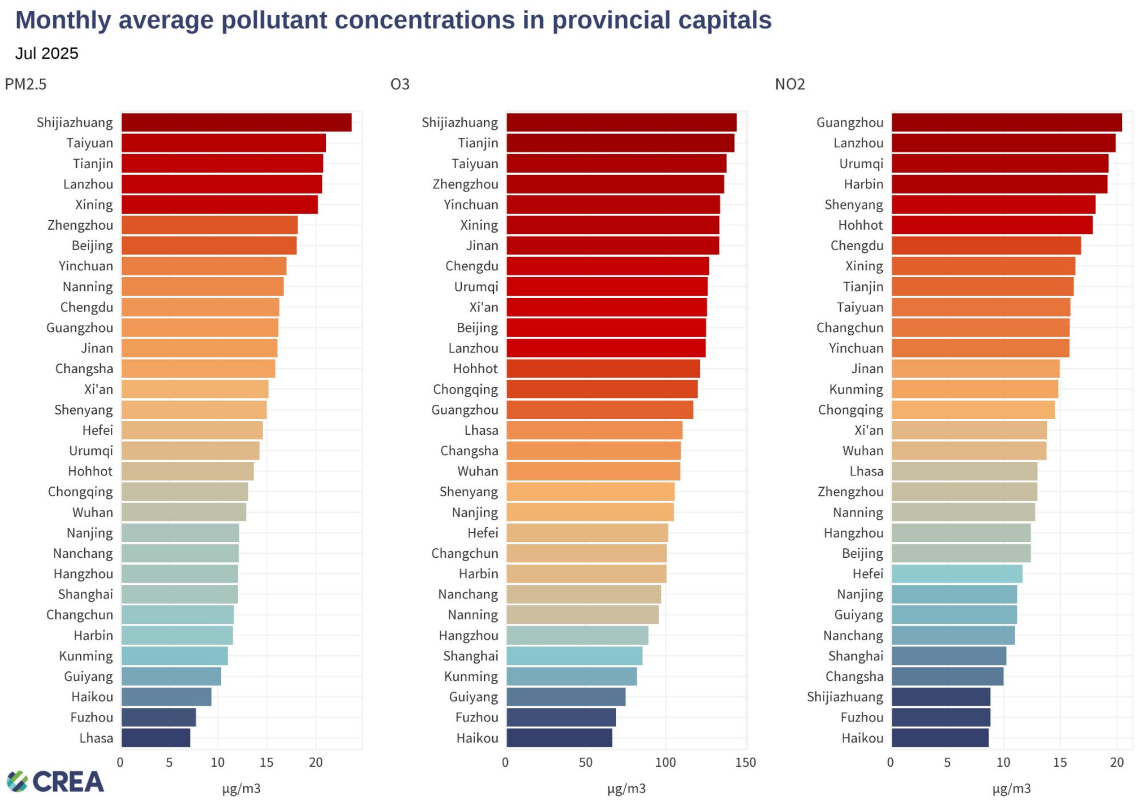
9 provincial capitals exceed 12-month ozone limit, and 8 report rising levels since last month

- As of the end of July, 9 out of 31 provincial capitals in China had annual ozone assessment values exceeding the national standard of 160 μg/m³.
- Ozone pollution was the most severe in eastern and central China, with Shandong, Sichuan, Hebei, Henan and Tianjin recording the highest 12-month 90th percentile ozone concentrations at 176, 176, 172, 171, and 169 μg/m³, respectively.
- Compared to the previous month, eight provincial capitals saw an increase in 12-month 90th percentile ozone concentrations, with capitals of Henan and Sichuan experiencing the largest rises.



In July, northern China's provincial capitals led the country in PM2.5 and ozone pollution, with Hebei's capital ranking highest in both PM2.5 and ozone levels

- In July, the provincial capital of Hebei recorded the highest PM2.5 pollution among all provincial capitals in China, both averaging 24 µg/m³. Provincial capital of Shanxi and Tianjin followed, with averages of 21 µg/m³. None of the provincial capitals exceeded the national PM2.5 standard in their monthly averages.
- Northern China had the highest ozone pollution levels in July, with Hebei's capital ranking first at an average of 144 µg/m³, followed by Tianjin and the capital city of Shanxi at 143 and 138 µg/m³, respectively.
- The capital of Guangdong recorded the highest NO_2 concentration at 20 µg/m³, followed by the capital cities of Gansu and Xinjiang at 20 and 19 µg/m³, respectively. NO_2 is harmful to human health and also contributes to the formation of PM2.5 and ozone.



Provincial capitals in southern China had the largest year-on-year increases in PM2.5, ozone, and NO_2 levels

- The provincial capitals of Guangxi, Guangdong, and Hainan recorded the largest year-on-year increases in PM2.5 levels, rising by 51%, 51%, and 36%, respectively — mainly driven by negative disperson influences. Notably, emissions were the primary factor behind the PM2.5 rise in the capitals of Chengdu and Nanjing, resulting in year-on-year increases of 19% and 11%.
- In July, ozone concentrations rose sharply in the capitals of Guangxi (+40%), Guangdong (+31%), and Sichuan (+24%), largely due to unfavourable weather.
- Yunnan's capital saw the highest year-on-year increase in NO_2 levels (+36%), followed by the capitals of Sichuan (+29%), and Guizhou (+18%). In the provincial capitals of Sichuan and Fujian, emissions accounted for the majority of the NO_2 increase — contributing 34% and 23% of the respective year-on-year growth.

Our analysis projects the influence of weather conditions on air pollution levels using a machine-learning model trained on actual data for each city. The variations that cannot be explained by weather conditions are attributed to changes in emissions.

Year-on-year changes in pollutant concentrations in provincial capitals

Jul 2025

Worst 7-day air pollution episodes by pollutant

PM2.5 (excluding sandstorms)

city	province	dates	average concentration	highest daily concentration
Hebi	Henan	Jul 09 – Jul 15	41	56
Huludao	Liaoning	Jun 29 – Jul 05	39	64
Anyang	Henan	Jul 09 – Jul 15	38	46
Tangshan	Hebei	Jun 26 – Jul 02	38	49
Yangquan	Shanxi	Jul 10 – Jul 16	36	45

Ozone

city	province	dates	average concentration	highest daily concentration
Handan	Hebei	Jul 13 – Jul 19	185	207
Chengdu	Sichuan	Jul 30 – Aug 05	183	208
Taizhou	Jiangsu	Jul 01 – Jul 07	182	212
Nantong	Jiangsu	Jun 30 – Jul 06	182	209
Xingtai	Hebei	Jul 13 – Jul 19	180	208

Sandstorms ($PM_{2.5}$)

city	province	dates	average concentration	highest daily concentration
Jinchang	Gansu	Jul 07 – Jul 13	14	52
Wuwei	Gansu	Jul 07 – Jul 13	9	60
Zhangye	Gansu	Jul 07 – Jul 13	8	59
Jiayuguan	Gansu	Jul 23 – Jul 29	7	51
Suining	Sichuan	Jun 25 – Jul 01	0	0

NO_2

city	province	dates	average concentration	highest daily concentration
Harbin	Heilongjiang	Jun 25 – Jul 01	34	63
Lanzhou	Gansu	Jun 26 – Jul 02	32	44
Liaoyuan	Jilin	Jun 25 – Jul 01	27	45
Urumqi	Xinjiang	Jul 23 – Jul 29	27	33
Luliang	Shanxi	Jul 13 – Jul 19	27	35

Unit: $\mu g/m^3$

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Data sources

- Industrial output, power generation and power capacity additions, as well as fuel imports and exports, are based on Chinese government data, through Wind Financial Terminal. Some of the data is not included in public releases.
- Measured air quality data is compiled from Chinese government air quality monitoring stations. Weather-controlled air quality is derived from CREA's deweathering algorithm.