CREA

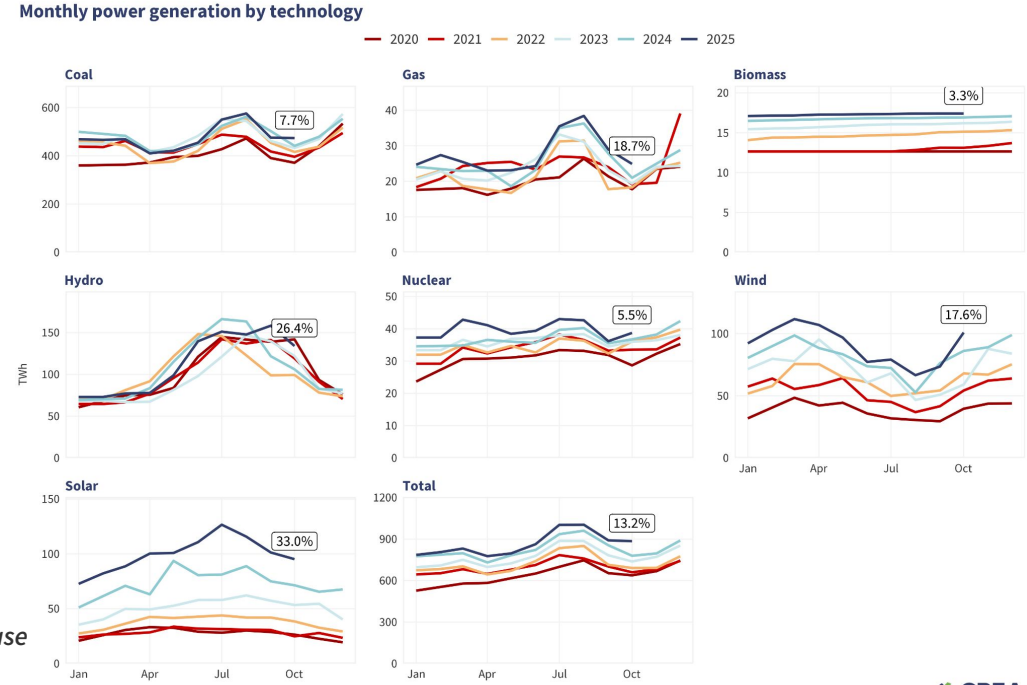
Centre for Research on Energy and Clean Air

China energy and emissions trends

November 2025 snapshot

Coal power surges while wind and solar weak

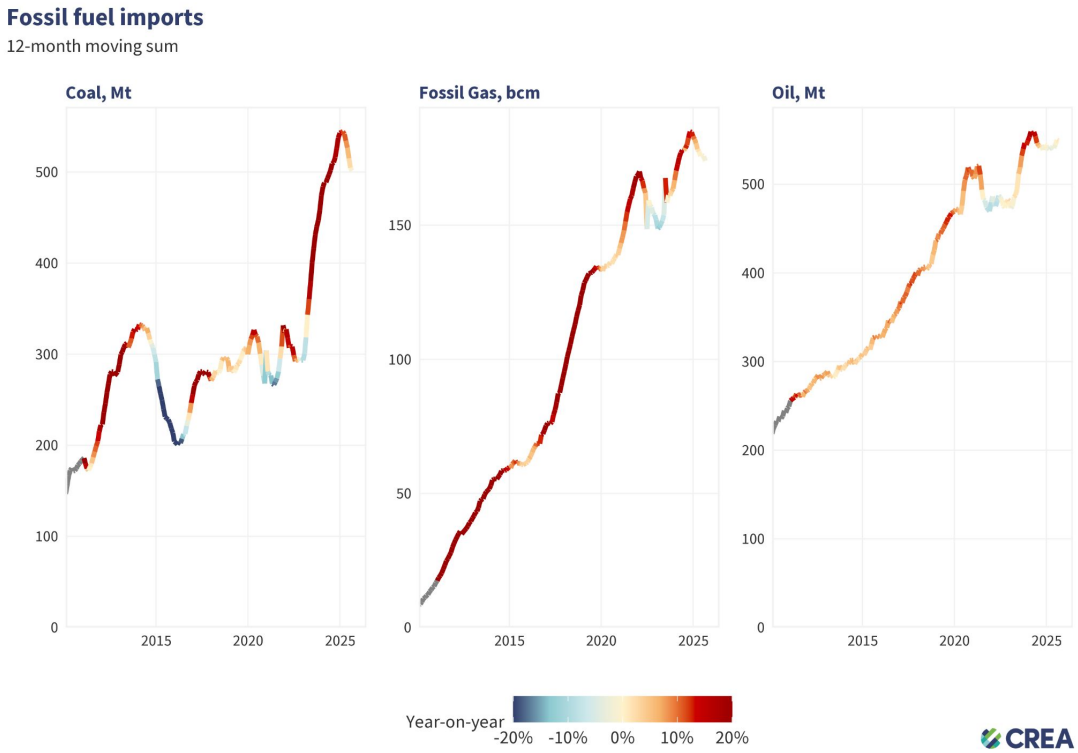
- Total power generation* increased by 13.2%, while large-scale power generation grew by 7.9%.
- In October, coal power generation recorded its largest year-on-year increase this year, rising by 7.7%. This may reflect a combination of unusually warm conditions in the South and early cold spells in the North that lifted air-conditioning demand, together with end-of-year pressure to meet medium- and long-term coal contract obligations.
- Gas power generation increased by 18.7%. In the first 10 months, thermal power generation still registered a modest 0.4% drop.
- According to the National Bureau of Statistics (NBS), solar increased by 5.9% and wind decreased 11.9%, indicating a high curtailment rate.
- Hydro grew 26.4% and nuclear grew 5.5%.



**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.*

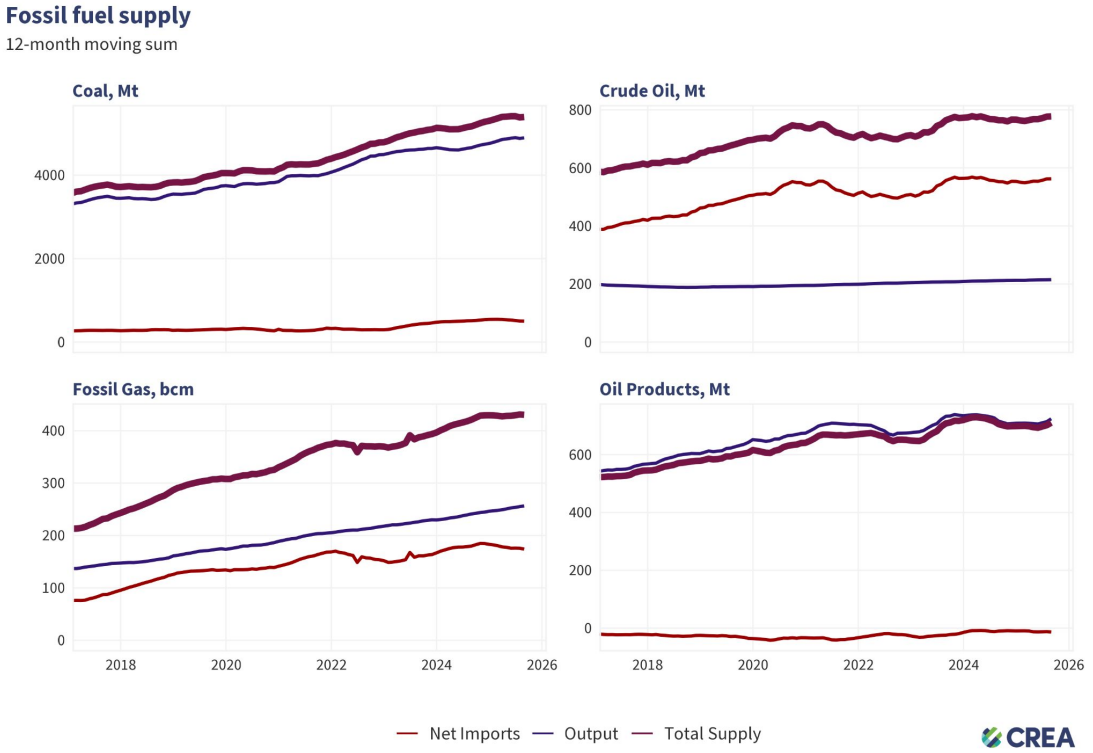
Oil imports grow, while coal and gas decline

- In October 2025, China's coal imports fell by 9.75% year-on-year. Over the first ten months of the year, total coal imports were down 11% compared to the same period in 2024.
- China's crude oil imports increased 8% year-on-year. Over the first ten months of the year, total crude oil imports were up 3.1% compared to the same period in 2024.
- China's natural gas imports dropped by 5.4% year-on-year, while cumulative imports for January to October fell by 6.2% compared to the same period last year.



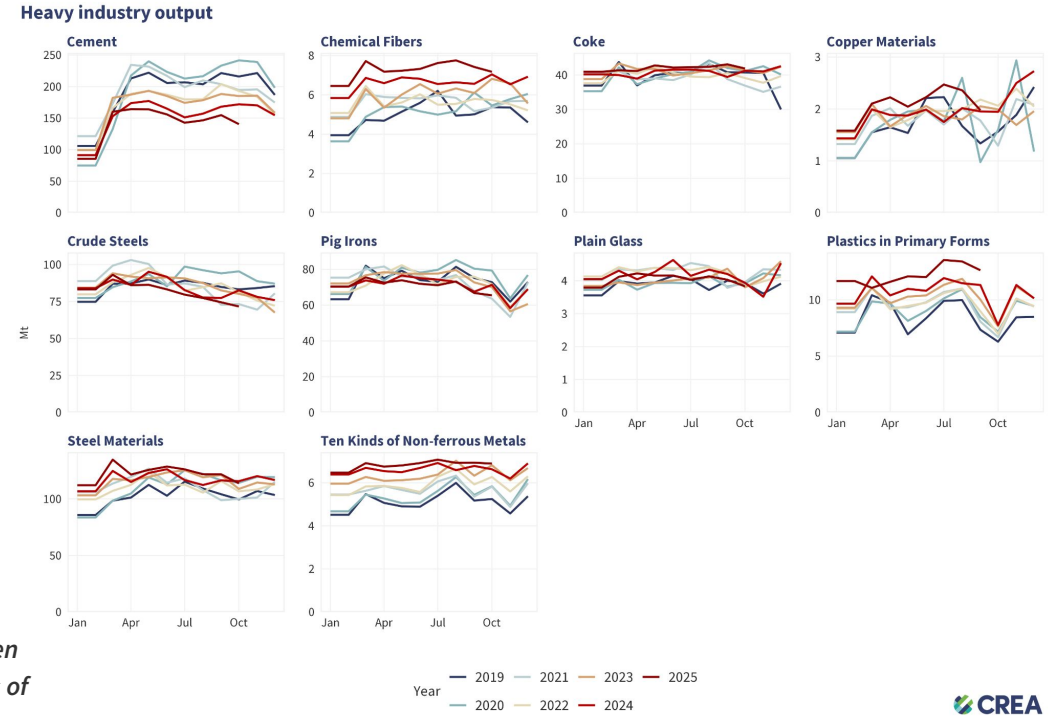
Domestic coal output continues to fall, oil and gas increase

- In October, coal output fell by 2.3% year-on-year. With domestic coal consumption declining, the National Energy Administration (NEA) launched inspections into coal mines exceeding production limits.
- Domestic natural gas production rose by 5.9% in September, bringing output for the first nine months up 6.3% year-on-year. Domestic supply increasingly replaces imports.
- Crude oil production rose by 1.3%. Output for the first nine months was up 1.7%.
- Refinery throughput rose by 6.4% year-on-year in October, and was up 4% in the first ten months of the year.



Output in steel and cement continues to fall

- In October 2025, pig iron, crude steel and steel product output declined 7.9%, 12.1% and 0.9%, respectively.
- In the first ten months, China's crude steel output fell by 3.9% year-on-year, while pig iron output declined by 1.8%. China announced plans to cut steel production and cap new capacity during 2025-2026.
- Cement production fell by 15.8% in October, reaching its lowest level for the month since 2019.
- Steel and cement are the two largest CO2 and air pollutant emitting sectors in China after the power sector. Production volumes have fallen since 2021 as the real estate market started to contract.
- Chemical fibre and non-ferrous metal output grew by 5.4% and 3.1%.
- Plain glass production grew by 3.3% year-on-year. Ethylene production, used as a key feedstock for plastics, saw growth accelerate further to 12%.

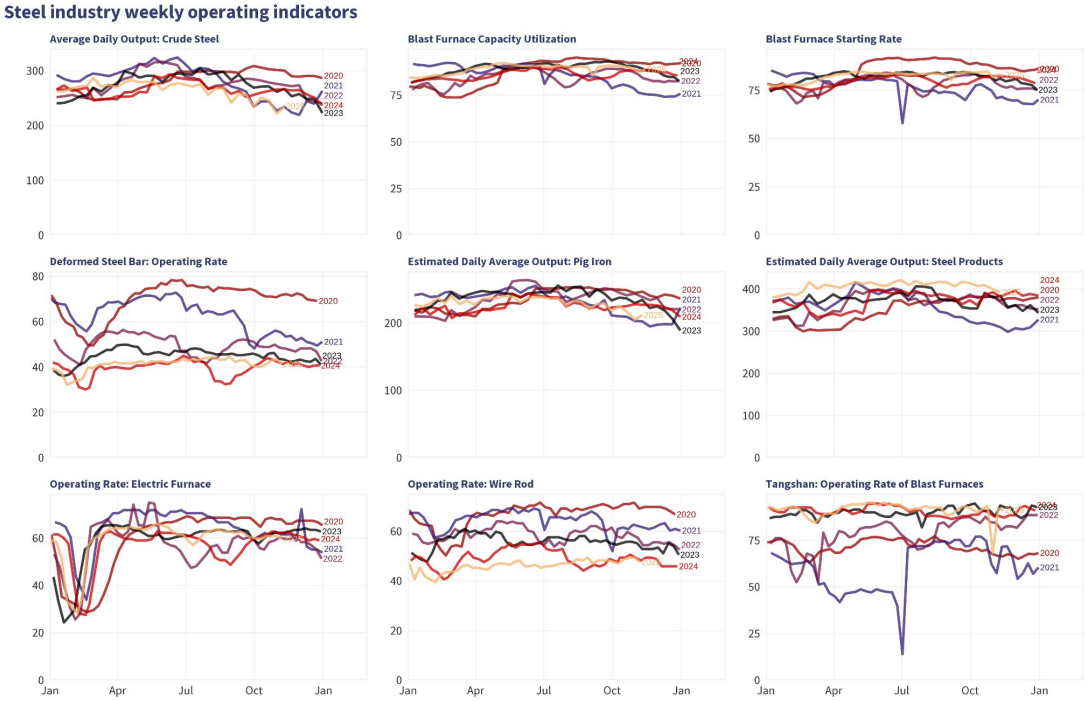


The steel and cement industries are the largest CO2 emitters in China, when emissions from their electricity use are included. They are also bellwethers of real estate, infrastructure, and other fixed asset investments that play an outsized role in China's emissions and economy.

Supply and demand remain weak in steel market

- Blast furnace operating rates and utilisation were higher than a year earlier. Electric furnace utilisation was slightly lower than in the same period last year.
- In November, multiple cities in Hebei activated heavy-pollution emergency responses, while supply and demand in the steel market remained weak.
- The operating rate of blast furnaces in Tangshan, China's 'steel capital' and an important source of air pollution in Beijing, remained on a high level.

Hebei Province 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.



Source: Wind Information

Read more: [*Closing the loop: from stalled green steel targets to a strategic reset in China*]

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Solar and wind expansion eases after policy deadline; coal surges

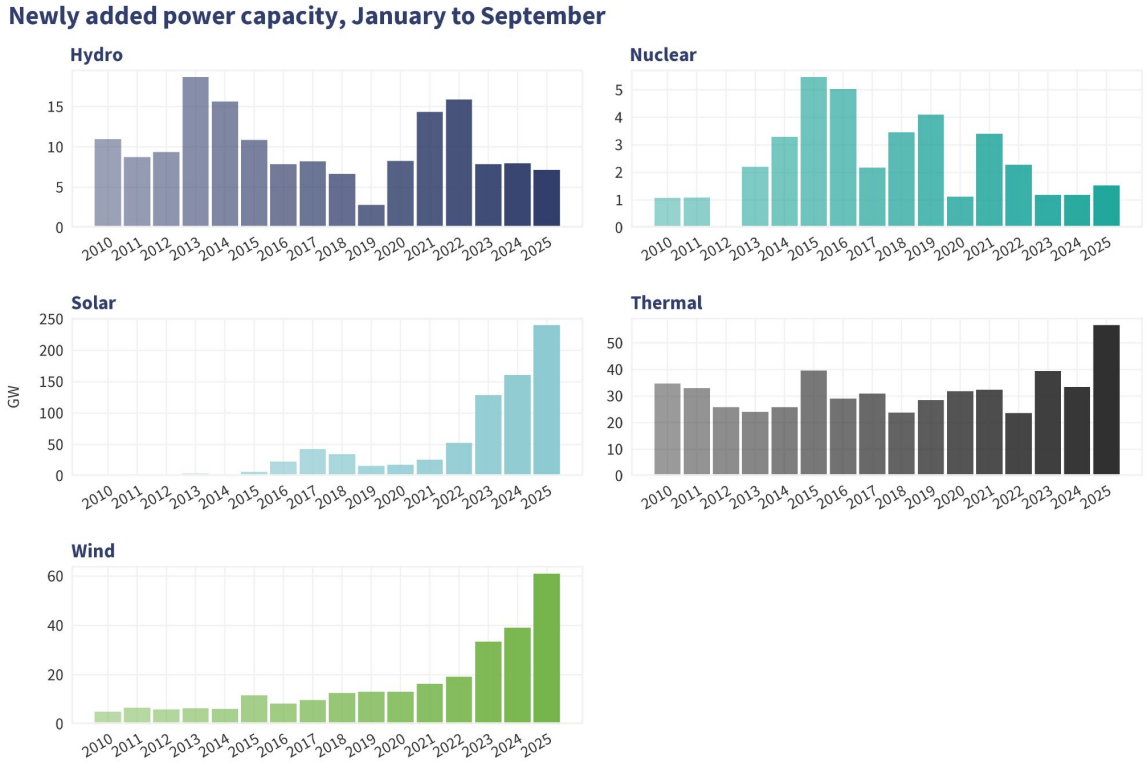
In the first nine months of 2025, China added:

- 240.3 gigawatts (GW) of solar power capacity, up 49% from last year.
- 61.1 GW of wind power capacity, a 56% increase from last year.
- 56.7 GW of thermal power capacity, a 70% increase from last year.
- 7.2 GW of hydro power capacity, a 10% decrease from last year.
- 1.5GW of nuclear power capacity, a 29% increase from last year.

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



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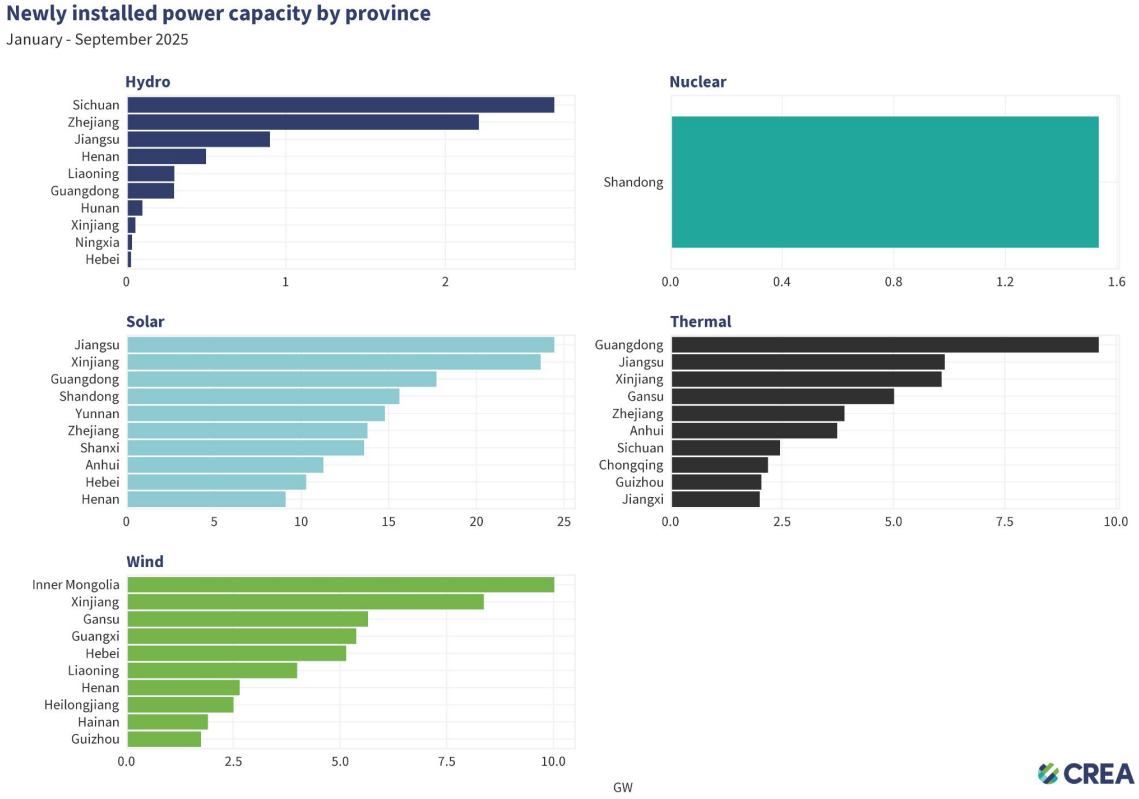
Distributed solar and large-scale energy bases take the lead

- 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 took the lead.
- Inner Mongolia, Xinjiang, and Gansu lead in wind development. These provinces are parts of the large-scale clean energy bases initiative.
- Thermal (coal) power additions accelerated in Guangdong, Xinjiang, and Jiangsu. 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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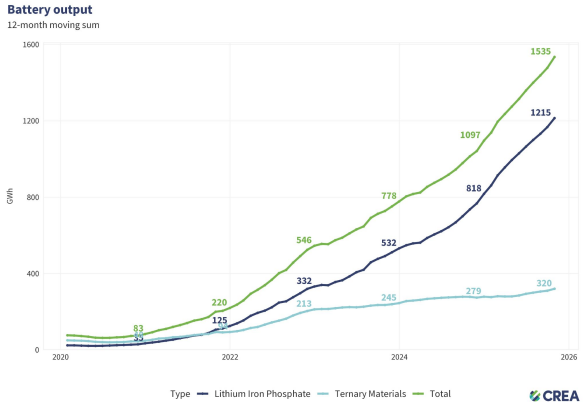
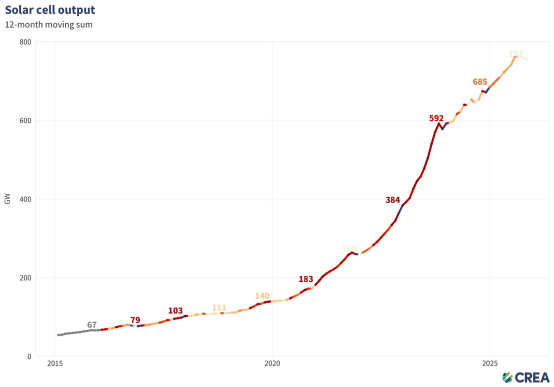
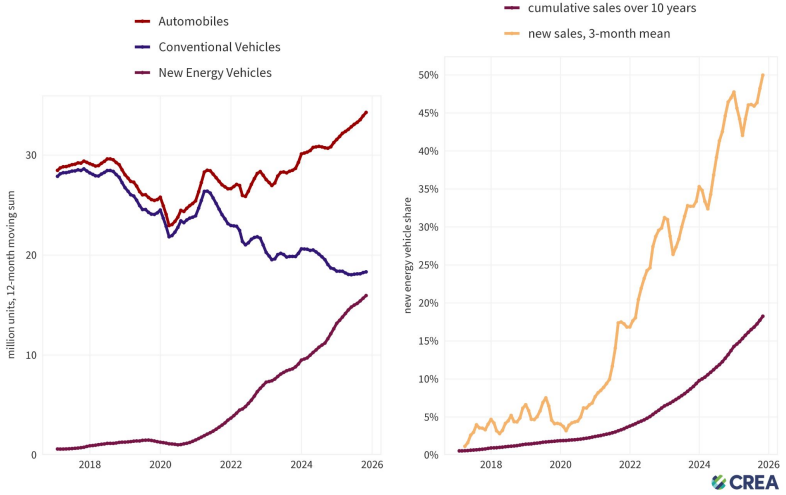
NEVs surging, solar cells moderating

- Solar cell production fell 9% in October, likely reflecting some cooling in domestic demand, but output remains up 12% year-to-date.
- Electric vehicle production rose 19% in October and 28% year-to-date, reaching 12.7 million units in the first ten months. Production of internal-combustion vehicles increased 4% in October but remained 0.5% lower year-to-date.
- The three-month average market share of NEVs in new sales reached 50%.



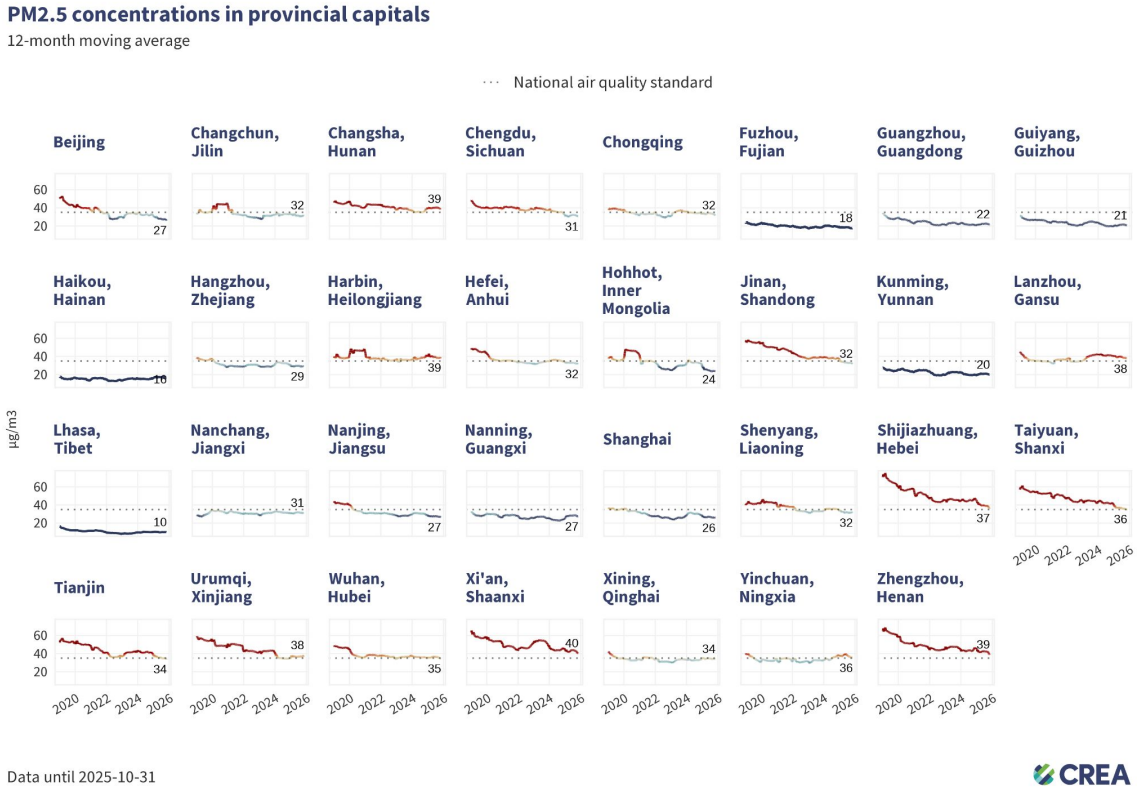


Vehicle production



As of the end of October, nine provincial capitals recorded 12-month average PM2.5 levels above the national annual standard

- As of the end of October, **nine out of 31 provincial capitals** recorded **12-month moving average $PM_{2.5}$ concentrations** exceeding the **national annual standard of 35 µg/m³**.
- **Cities with the highest $PM_{2.5}$ levels** were mainly located in **China's central-western and northern regions**. **Xi'an (Shaanxi)** recorded the highest level at **40 µg/m³**, followed by **Harbin (Heilongjiang), Zhengzhou (Henan), and Changsha (Hunan)** at **39 µg/m³**.
- Compared with the previous month, **eight provincial capitals** saw **declines** in their 12-month $PM_{2.5}$ averages, while **Urumqi (Xinjiang), Changchun (Jilin), and Harbin (Heilongjiang)** recorded increases.



Data until 2025-10-31

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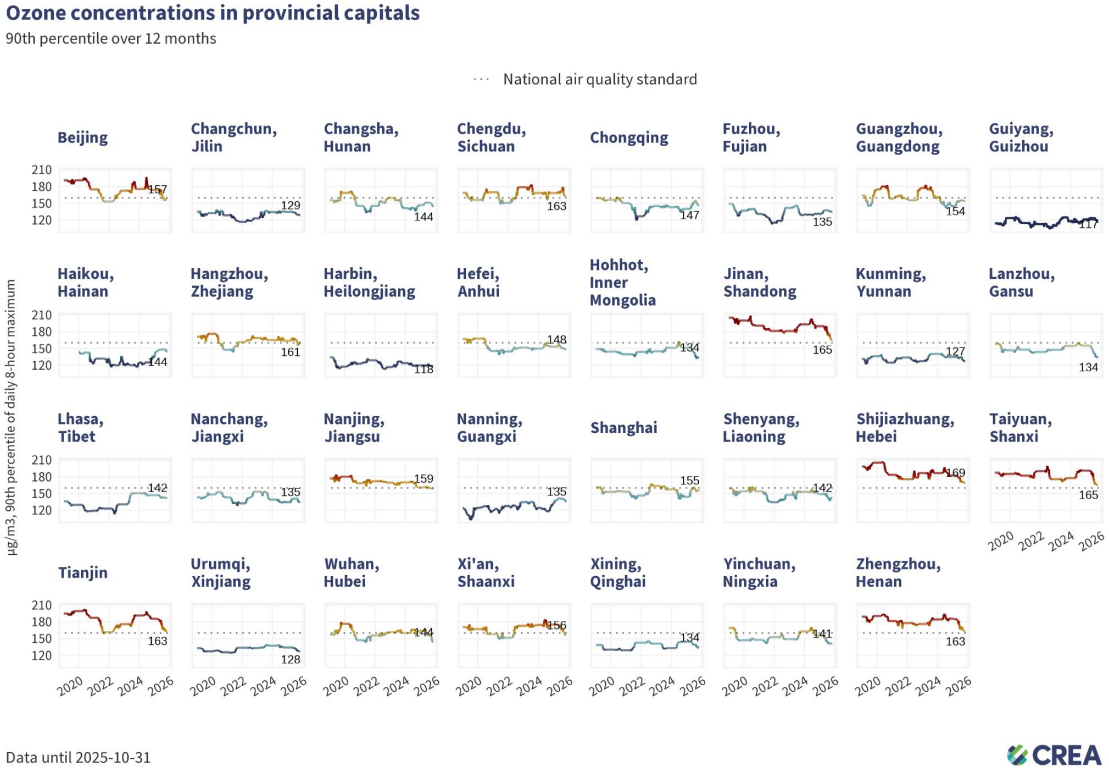
As of the end of October, seven provincial capitals exceeded the national annual ozone limit

- As of the end of October 2025, **seven out of 31 provincial capitals** recorded **12-month 90th percentile ozone concentrations** above the **national standard of 160 µg/m³**.
- **Cities with the highest ozone levels** were mainly located in **northern and central-western China**. **Shijiazhuang (Hebei)** recorded the highest level at **169 µg/m³**, followed by **Jinan (Shandong) and Taiyuan (Shanxi)** at **165 µg/m³**, and **Tianjin, Chengdu (Sichuan), and Zhengzhou (Henan)** at **163 µg/m³**.
- Compared with the previous month, **nine cities saw declines** in their annual ozone assessment values**, while only Hangzhou (Zhejiang) recorded an increase, rising by 19%.**



Data until 2025-10-31

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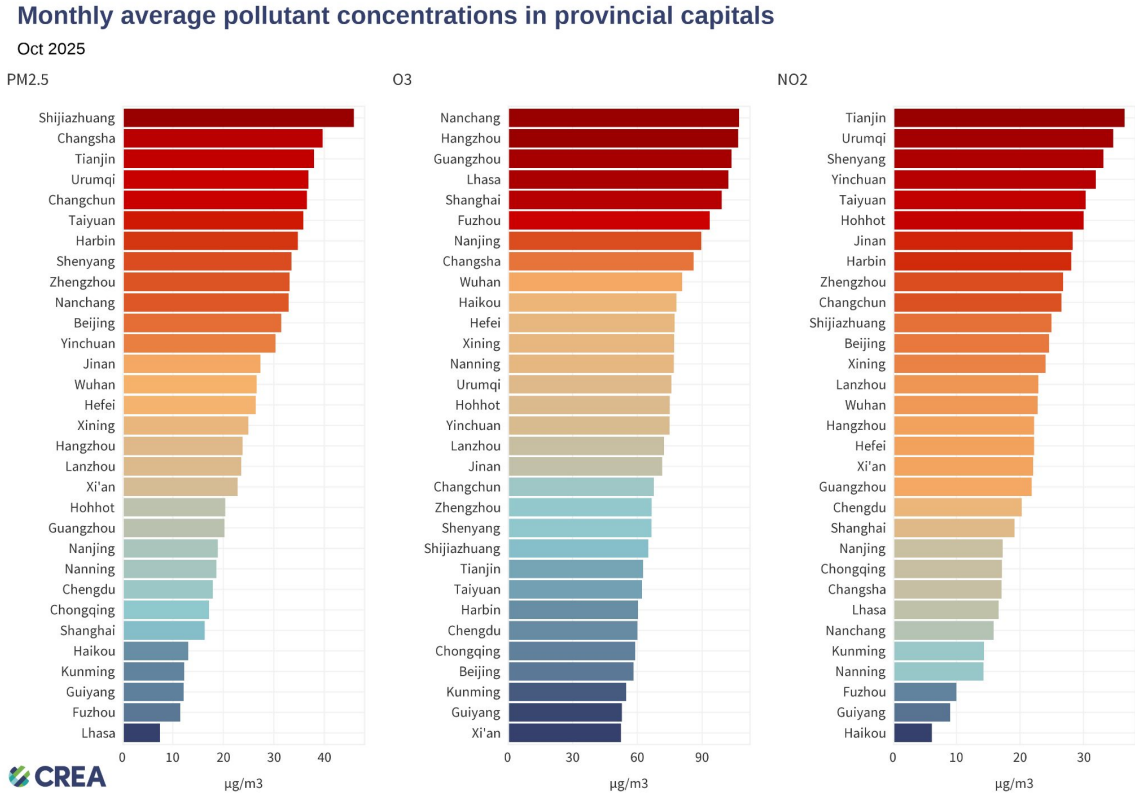
In October, PM2.5 levels remained high in northern China, ozone concentrations were elevated in the south, and Tianjin continued to record the highest NO_2 level nationwide

- In October, **Shijiazhuang (Hebei)** recorded the **highest monthly average PM2.5 concentration** among China's provincial capitals, at **46 µg/m³**, followed by Changsha (Hunan) at 40 µg/m³ and Tianjin at 38 µg/m³.
- **Ozone levels** were generally **highest in South China**, with **Nanchang (Jiangxi) and Hangzhou (Zhejiang)** both topping the list at **107 µg/m³**, followed by Guangzhou (Guangdong) and Lhasa (Tibet) at 104 µg/m³ and 102 µg/m³, respectively.
- **Tianjin has continued to record the highest nitrogen dioxide (NO_2) concentration nationwide since last month, reaching 36 µg/m³**, followed by Urumqi (Xinjiang) and Shenyang (Liaoning) at 35 µg/m³ and 33 µg/m³. Nitrogen dioxide not only poses **direct health risks**, but also **contributes to the formation of PM2.5 and ozone**, intensifying compound air pollution.



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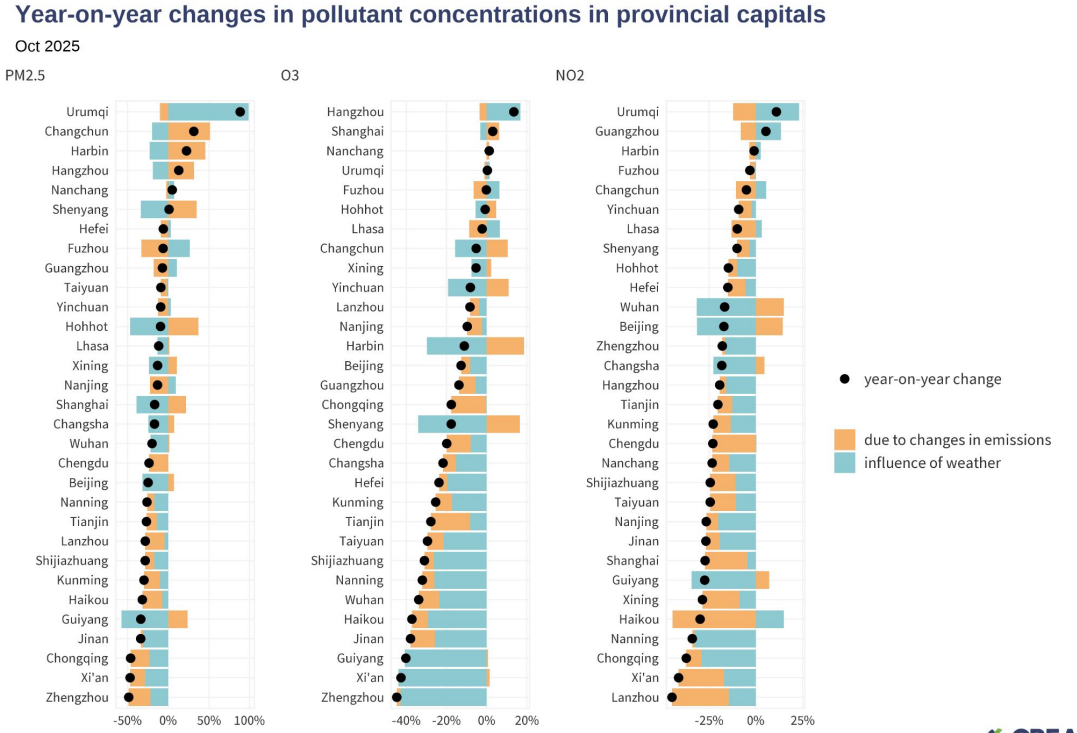
Anthropogenic emissions drove the highest year-on-year increases in PM2.5 and ozone in Northeast China in October (after weather adjustment)

- In October, provincial capitals in **Xinjiang and Northeast China** saw the **most significant year-on-year increases in PM2.5 concentrations**. Monthly average PM2.5 levels in Urumqi (Xinjiang), Changchun (Jilin), Harbin (Heilongjiang), and Hangzhou (Zhejiang) rose by 88%, 31%, 22%, and 13%, respectively, compared with the same period last year. The rise in PM2.5 pollution in Xinjiang was mainly driven by unfavourable meteorological conditions, while increases in Northeast China and Zhejiang were primarily attributed to higher human emissions.
- **Year-on-year increases in ozone concentrations were mainly observed in the Yangtze River Delta region**, where Hangzhou (Zhejiang) and Shanghai recorded monthly ozone levels 14% and 3% higher than last year, respectively. After adjusting for meteorological effects, Northeast China had the largest year-on-year increase in ozone, indicating that persistent human emissions are driving pollution accumulation in the region.
- Nitrogen dioxide (NO_2) concentrations rose most noticeably i **Urumqi (Xinjiang) and Guangzhou (Guangdong)**, mainly due to unfavourable weather conditions.



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.

Worst 7-day air pollution episodes by pollutant

PM2.5 (excluding sandstorms)

city	province	dates	average concentration	highest daily concentration
Handan	Hebei	Oct 25 – Oct 31	110	165
Anyang	Henan	Oct 26 – Nov 01	104	163
Baoding	Hebei	Oct 25 – Oct 31	104	157
Hebi	Henan	Oct 25 – Oct 31	104	153
Xinxiang	Henan	Oct 25 – Oct 31	102	153

Sandstorms ($PM_{2.5}$)

city	province	dates	average concentration	highest daily concentration
Jiayuguan	Gansu	Oct 31 – Nov 06	16	110
Zhangye	Gansu	Oct 31 – Nov 06	8	56

There were no other cities that experienced sandstorms in October.

Ozone

city	province	dates	average concentration	highest daily concentration
Yantai	Shandong	Sep 25 – Oct 01	160	195
Hangzhou	Zhejiang	Oct 06 – Oct 12	157	219
Qinhuangdao	Hebei	Sep 25 – Oct 01	156	185
Yingkou	Liaoning	Sep 26 – Oct 02	156	194
Huludao	Liaoning	Sep 26 – Oct 02	155	175

NO_2

city	province	dates	average concentration	highest daily concentration
Yinchuan	Ningxia	Oct 29 – Nov 04	56	64
Wujiaqu	Xinjiang	Oct 22 – Oct 28	54	61
Dezhou	Shandong	Oct 31 – Nov 06	53	93
Tianjin	Tianjin	Oct 22 – Oct 28	50	57
Urumqi	Xinjiang	Oct 22 – Oct 28	50	55

Unit: μg/m³

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.