



Centre for Research on Energy and Clean Air

China energy and emissions trends

October 2025 snapshot

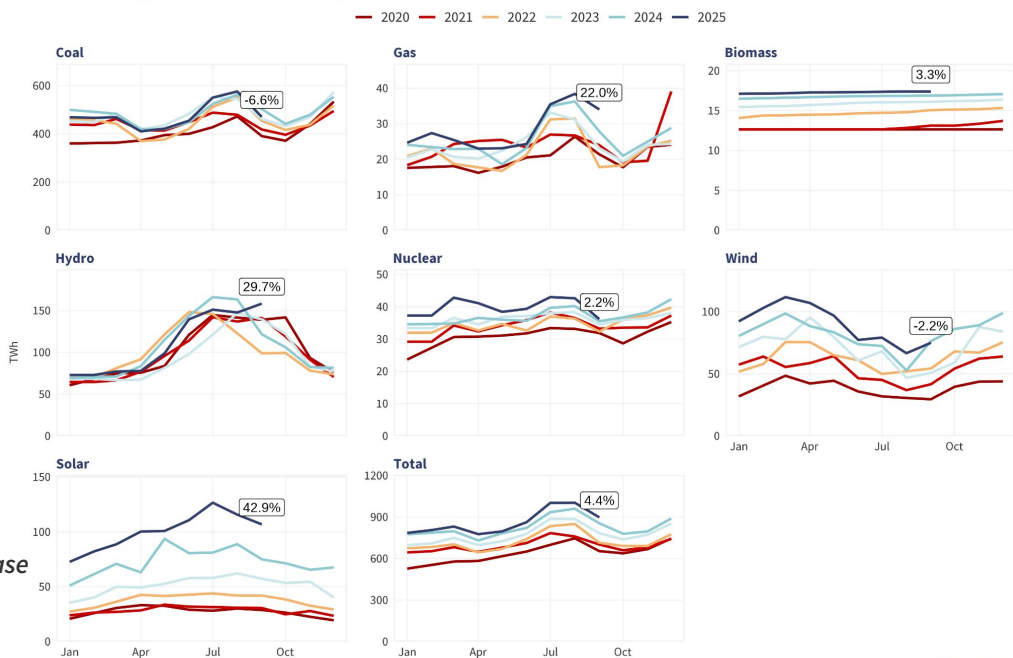
Coal power drops while hydropower bounces back

- Total power generation* increased by 4.4%, while large-scale power generation only grew by 1.5%, indicating most power generation growth comes from solar and wind installations that are outside of the industrial production statistics.
- In September, coal power generation dropped by 6.6%, while hydropower increased by 29.7%. Year-to-date, power generation from coal and gas is down 1.2%.
- Solar* power generation increased by 42.9%, while wind* decreased by 2.2%.
- Nuclear and gas power generation increased by 2.2% and 22%, 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](#).

Monthly power generation by technology



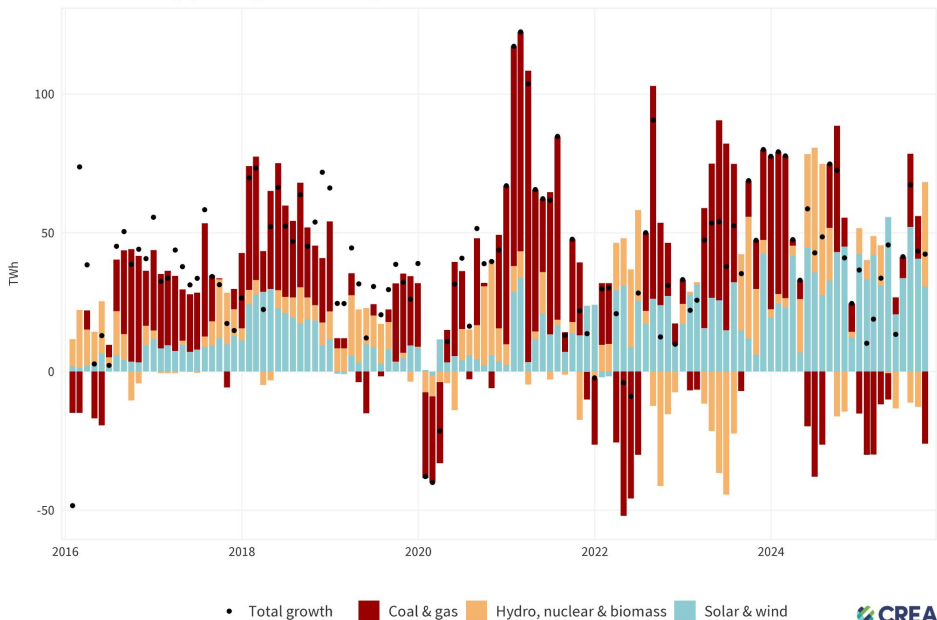
Renewables meet the power demand growth and push down coal

- Hydro, solar and wind* power generation met all power demand growth in September, pushing coal's share of total generation down to 52%.
- In the first nine months of 2025, solar and wind power* accounted for 22% of total electricity generation, up from 18% a year earlier. Their output rose by 25% 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](#)

**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.*

Growth in monthly power generation by source

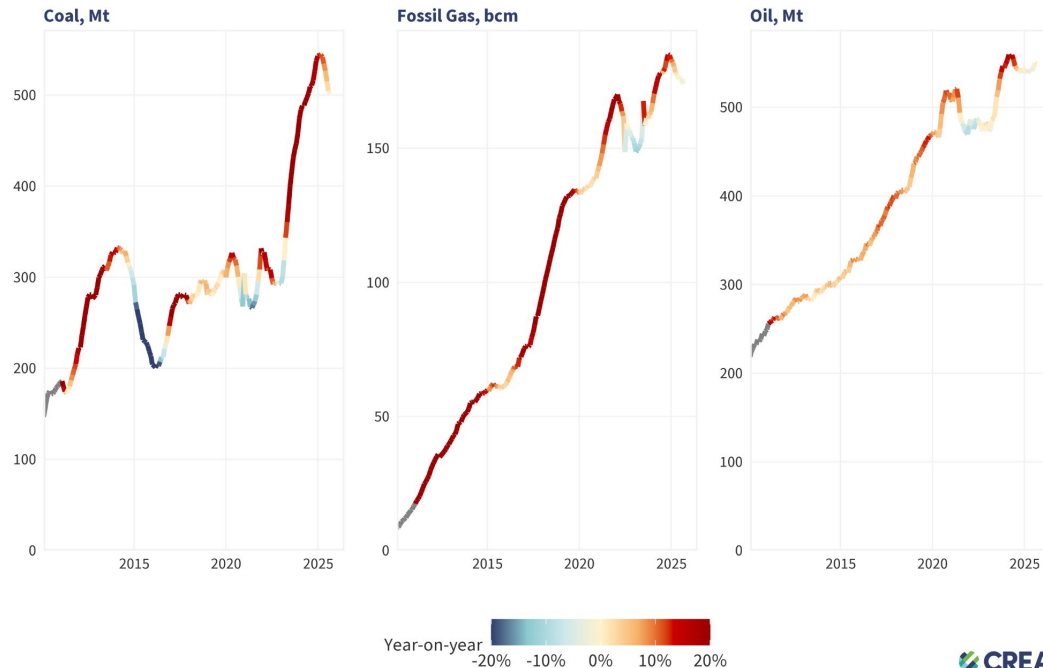


Fossil fuel import growth losing steam

- In September 2025, China's coal imports fell by 3.3% year-on-year. Over the first nine months of the year, total coal imports were down 11% compared to the same period in 2024.
- China's crude oil imports increased 3.8% year-on-year. Over the first nine months of the year, total crude oil imports were up 2.6% compared to the same period in 2024.
- China's natural gas imports dropped by 7.8% year-on-year, while cumulative imports for January to September fell by 6.2% compared to the same period last year.

Fossil fuel imports

12-month moving sum



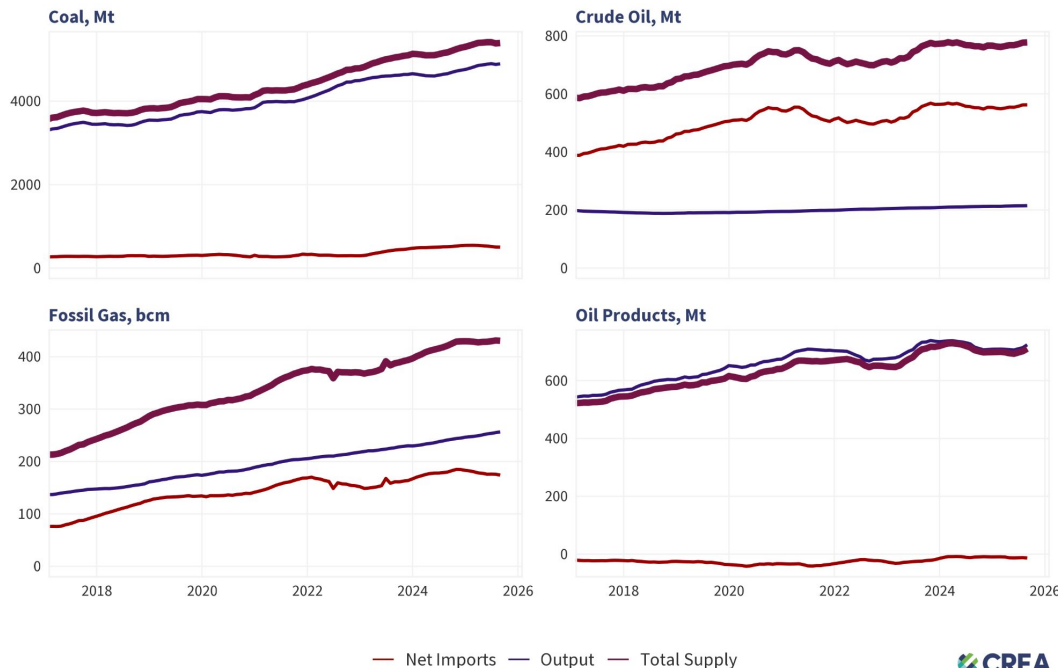
Domestic coal output continues to fall, oil and gas increase

- In September, coal output fell by 1.8% year-on-year.

With domestic coal consumption declining, the NEA launched inspections into coal mines exceeding production limits.

- Domestic natural gas production rose by 9.4% in September, bringing output for the first nine months up 6.4% year-on-year. Domestic supply increasingly replaces imports.
- Crude oil production rose by 4.1%. Output for the first nine months was up 1.7%.
- China's refinery throughput has risen by 3.7% year to date, driven mainly by surging petrochemical demand even as gasoline, diesel and fuel oil output declined.

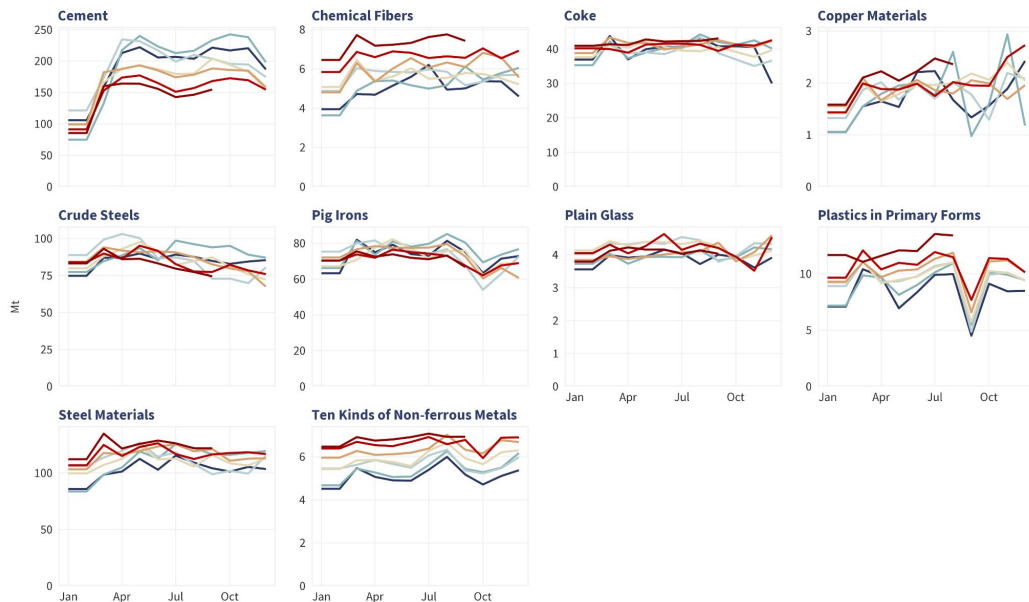
Fossil fuel supply
12-month moving sum



Output in steel and cement continues to fall

- In September 2025, pig iron and crude steel output declined 2.4% and 4.6%, respectively. Steel product increased 5.1%.
- In the first three quarters, China's crude steel output fell by 2.9% year-on-year, while pig iron output declined by 1.1%. China announced plans to cut steel production and cap new capacity during 2025-2026.
- Cement production fell by 8.6% in September, 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 4.8% and 2.9%.
- Due to the continued downturn in the real estate market, plain glass production fell by 9.7% year-on-year.

Heavy industry output



Year
 2019 2020 2021 2022 2023 2024 2025

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.

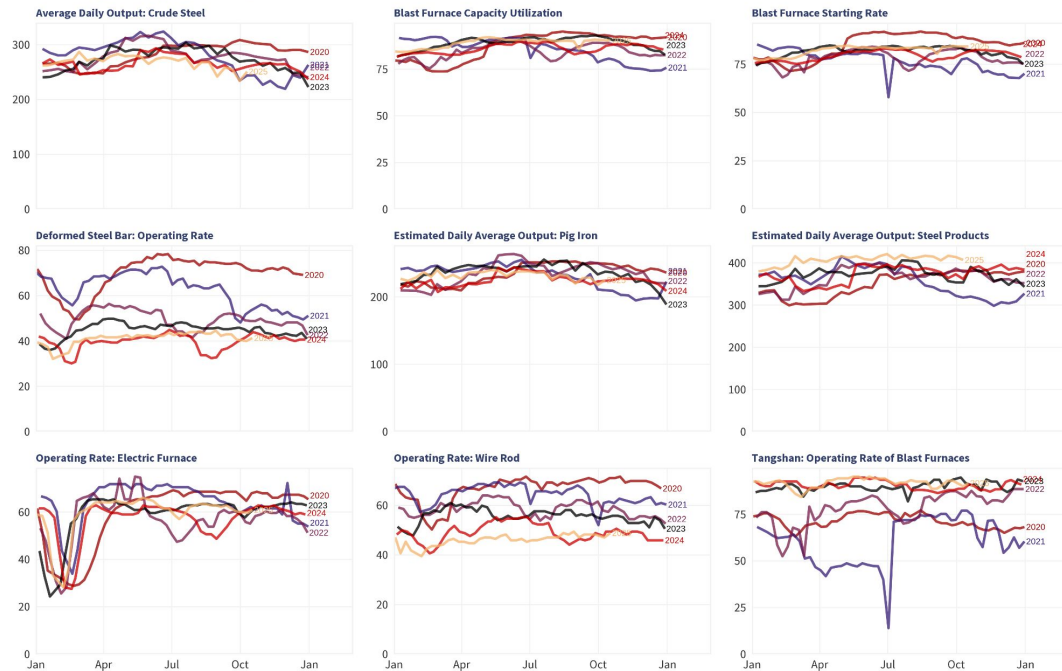
Q3 steel profits lifted by ‘de-involution’; Q4 margins under pressure

- 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.
- Driven by ‘de-involution’ policies, steel and raw material prices rose in Q3, supporting stable profits, but as supply-demand fundamentals weakened in Q4, falling steel prices and still-elevated input costs pushed producers into losses, prompting expectations of output cuts to restore balance.
- 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.

Closing the loop: from stalled green steel targets to a strategic reset in China. Read more [here](#).

Steel industry weekly operating indicators



Source: Wind Information

Solar and wind expansion eases after policy deadline; coal surges

In the first eight months of 2025, China added:

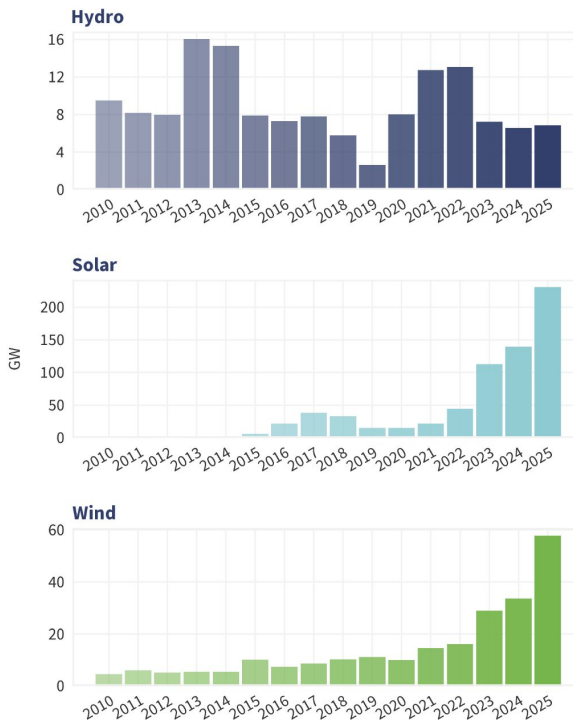
- 230.6 gigawatts (GW) of solar power capacity, up 65% from last year.
- 57.8 GW of wind power capacity, a 72% increase from last year.
- 49.9 GW of thermal power capacity, a 74% increase from last year.
- 6.8 GW of hydro power capacity, a 4% increase from last year.
- 0 GW of nuclear power capacity.

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](#)

Newly added power capacity, January to August



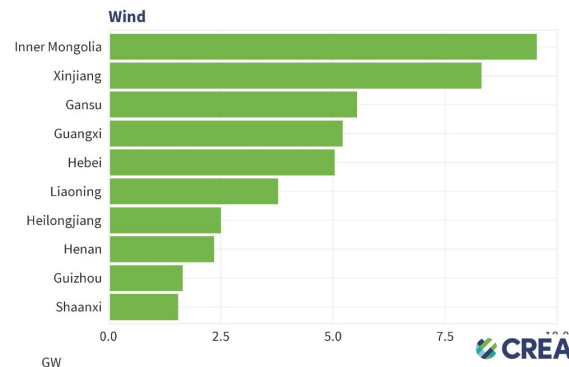
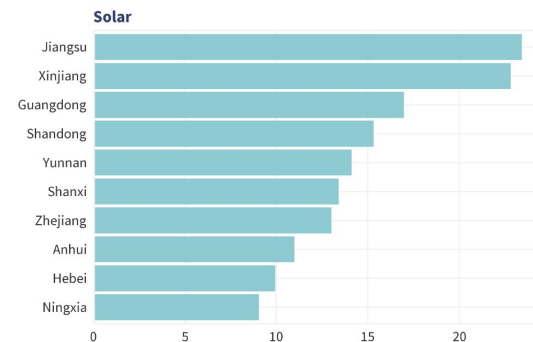
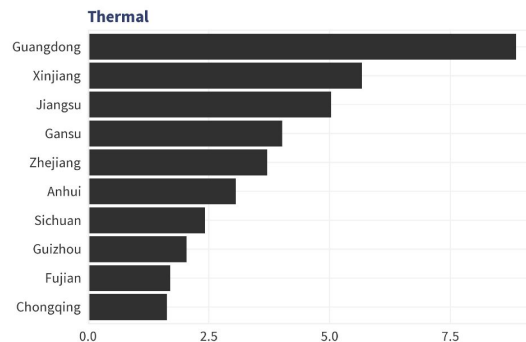
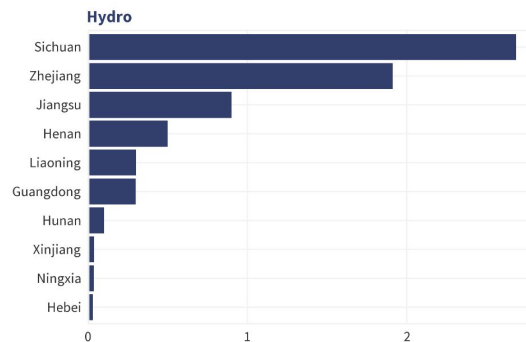
Distributed solar and large-scale energy bases take the lead

- 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](#)

Newly installed power capacity by province

January - August 2025

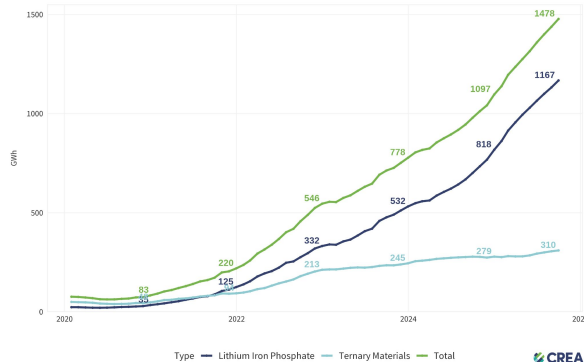


GW

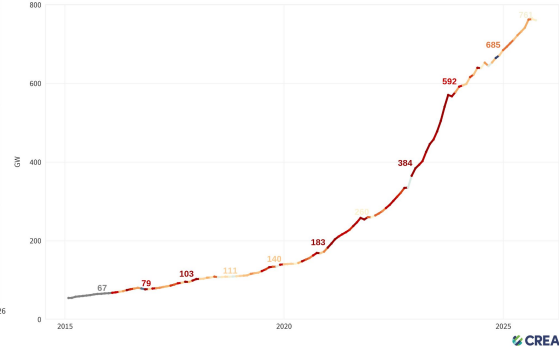
Solar cell and EV output continue to rise

- Solar cell production remained at a high level, down just 1% year-on-year despite a sharp slowdown in new capacity additions since June, with 71 GW produced in September and 620 GW in January–September, up 14% year-on-year.
- Electric vehicle production rose 20% year-on-year to 1.6 million units in September. Production of fuel-burning vehicles increased 8% in the month but declined 1% in January–September, when EVs accounted for 46% of total vehicle output.
- The three-month average market share of NEVs in new sales reached 48%.

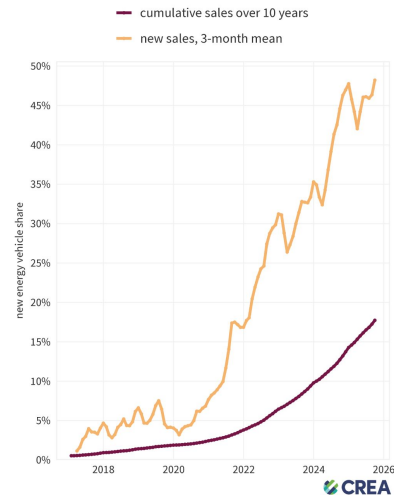
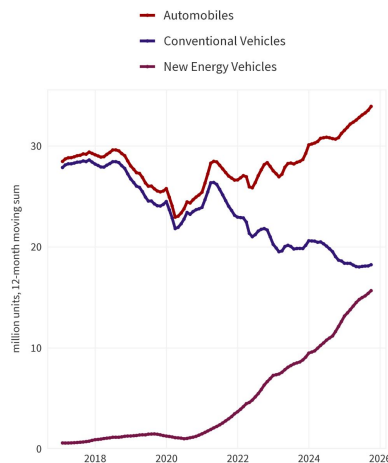
Battery output
12-month moving sum



Solar cell output
12-month moving sum



Vehicle production



As of the end of September 2025, nine provincial capitals recorded 12-month average PM2.5 levels above the national annual standard

- As of the end of September 2025, **nine out of 31 provincial capitals** recorded **12-month moving average PM2.5 concentrations** exceeding the **national annual standard of 35 $\mu\text{g}/\text{m}^3$** .
- Cities with the highest PM2.5 levels** were mainly located in **China's central-western and northern regions**. Among them, **Xi'an (Shaanxi)** and **Zhengzhou (Henan)** each averaged **42 $\mu\text{g}/\text{m}^3$** , followed by **Changsha (Hunan)** at **39 $\mu\text{g}/\text{m}^3$** , and **Lanzhou (Gansu)**, **Harbin (Heilongjiang)**, and **Shijiazhuang (Hebei)** at **38 $\mu\text{g}/\text{m}^3$** .
- Compared with the previous month, **seven provincial capitals** saw **declines** in their 12-month PM2.5 averages, while **Shenyang (Liaoning)** was the **only city showing an increase**.

PM2.5 concentrations in provincial capitals

12-month moving average

..... National air quality standard



Data until 2025-09-30

As of the end of September 2025, six provincial capitals exceeded the national annual ozone limit, with Shijiazhuang highest at 170 $\mu\text{g}/\text{m}^3$

- As of the end of September 2025, **six out of 31 provincial capitals** recorded **12-month 90th percentile ozone concentrations** above the **national standard of 160 $\mu\text{g}/\text{m}^3$** .
- Cities with the highest ozone levels** were mainly located in **northern and central-western China**, including **Shijiazhuang (Hebei, 170 $\mu\text{g}/\text{m}^3$)**, **Jinan (Shandong, 166 $\mu\text{g}/\text{m}^3$)**, **Taiyuan (Shanxi, 165 $\mu\text{g}/\text{m}^3$)**, **Zhengzhou (Henan, 164 $\mu\text{g}/\text{m}^3$)**, and **Tianjin (163 $\mu\text{g}/\text{m}^3$)**.
- Compared with the previous month, **five provincial capitals** saw **increases** in their annual ozone assessment values, with **Shenyang (Liaoning)** showing the largest rise. Meanwhile, **14 cities** experienced **declines**.

Ozone concentrations in provincial capitals

90th percentile over 12 months

..... National air quality standard



Data until 2025-09-30

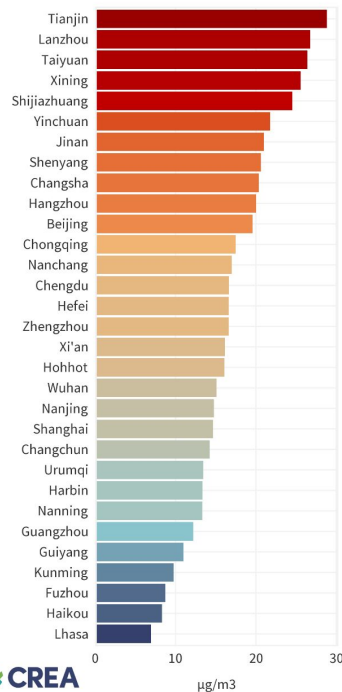
In September, Tianjin recorded the highest PM2.5 & NO₂ concentrations among all provincial capitals, while ozone pollution remained most severe in North China and the Yangtze River

- In September, **Tianjin** recorded the **highest monthly average PM2.5 concentration** among China's provincial capitals, at **29 µg/m³**, followed by **Lanzhou (Gansu, 27 µg/m³)** and **Taiyuan (Shanxi, 26 µg/m³)**.
- Ozone levels** were generally **highest in North China and the Yangtze River Delta**, with **Shijiazhuang (Hebei)** ranking first at **134 µg/m³**, followed by **Tianjin (129 µg/m³)** and **Hangzhou (118 µg/m³)**.
- Tianjin** also recorded the **highest nitrogen dioxide (NO₂) concentration**, at **29 µg/m³**, while **Hohhot (Inner Mongolia)** and **Shenyang (Liaoning)** both followed at **27 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.

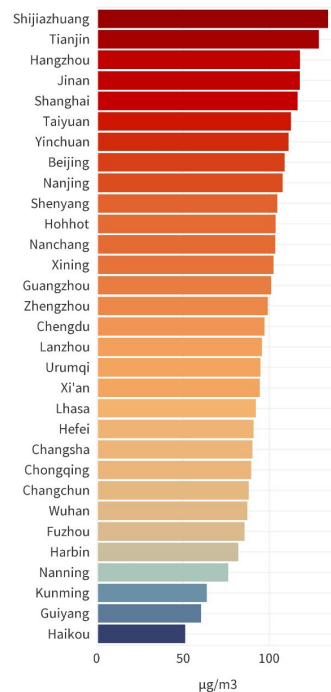
Monthly average pollutant concentrations in provincial capitals

Sep 2025

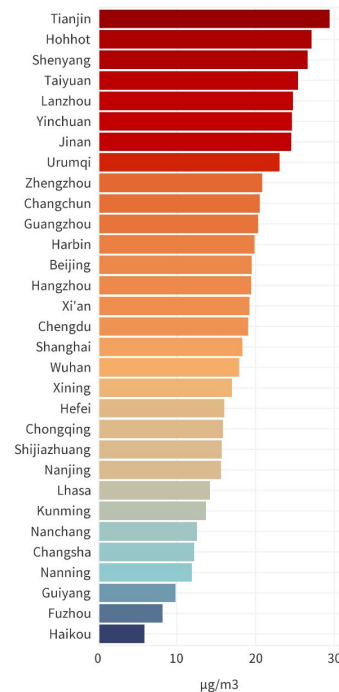
PM2.5



O3



NO2



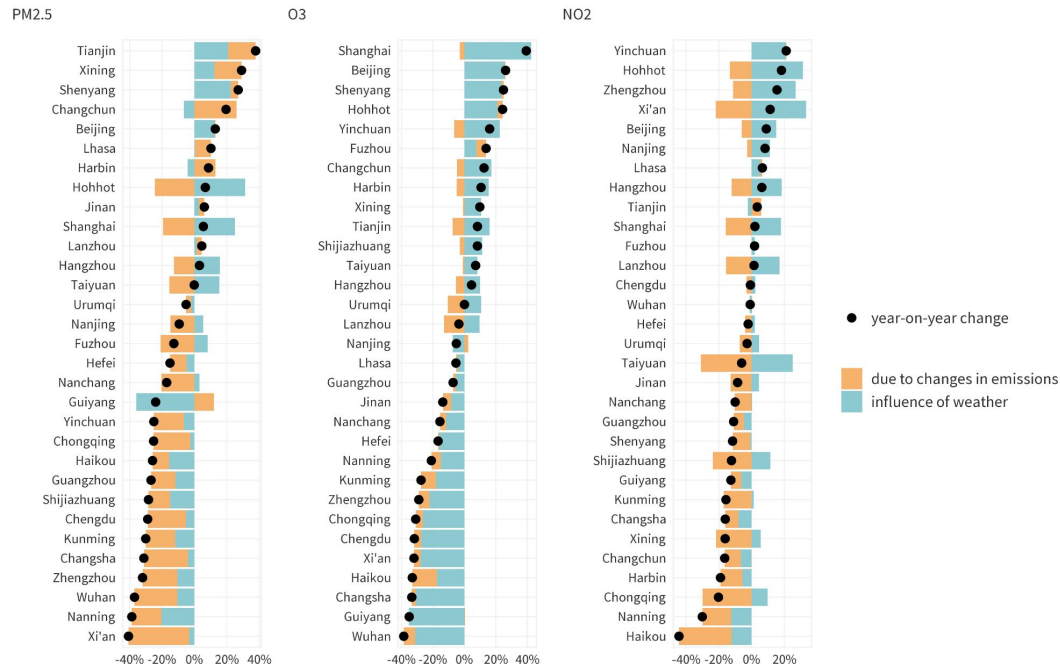
In September, PM2.5 levels rose significantly year-on-year in northern and western cities, while ozone rebounded notably in eastern and northern China

- In **September**, several provincial capitals in **northern, northeastern, and western China** recorded **notable year-on-year increases in PM2.5 concentrations**. **Tianjin, Xining (Qinghai), Shenyang (Liaoning), Changchun (Jilin), and Beijing** saw respective increases of **38%, 29%, 27%, 19%, and 13%**, compared with the same period last year, driven by **rising anthropogenic emissions** combined with **unfavourable meteorological conditions**.
- Ozone concentrations** increased most notably in **eastern and northern China**, particularly in **Shanghai, Beijing, Shenyang, Hohhot, and Yinchuan**. **Shanghai** recorded the **largest increase (+39%)**, mainly attributed to **meteorological factors**.
- For **nitrogen dioxide (NO₂)**, the sharpest increases occurred in **Yinchuan (+21%)** and **Hohhot (+18%)**, also largely due to **worse atmospheric dispersion conditions** compared with the same period last year.

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

Sep 2025



Worst 7-day air pollution episodes by pollutant

PM_{2.5} (excluding sandstorms)

city	province	dates	average concentration	highest daily concentration
Jinzhou	Liaoning	Sep 26 – Oct 02	57	73
Huludao	Liaoning	Sep 26 – Oct 02	52	62
Wuwei	Gansu	Sep 08 – Sep 14	50	145
Jinzhong	Shanxi	Sep 24 – Sep 30	46	79
Taiyuan	Shanxi	Sep 24 – Sep 30	40	61

Ozone

city	province	dates	average concentration	highest daily concentration
Jiaxing	Zhejiang	Sep 02 – Sep 08	167	206
Suzhou	Jiangsu	Sep 03 – Sep 09	166	233
Binzhou	Shandong	Sep 09 – Sep 15	164	215
Cangzhou	Hebei	Sep 08 – Sep 14	163	188
Shijiazhuang	Hebei	Sep 08 – Sep 14	161	186

Sandstorms (PM_{2.5})

city	province	dates	average concentration	highest daily concentration
Jinchang	Gansu	Sep 09 – Sep 15	29	101
Zhangye	Gansu	Sep 09 – Sep 15	21	73
Jiayuguan	Gansu	Aug 28 – Sep 03	14	49
Zhongwei	Ningxia	Aug 27 – Sep 02	10	68
Wuwei	Gansu	Sep 09 – Sep 15	9	65

NO₂

city	province	dates	average concentration	highest daily concentration
Tianjin	Tianjin	Sep 25 – Oct 01	43	52
Qinhuangdao	Hebei	Sep 26 – Oct 02	43	55
Baotou	Inner Mongolia	Sep 25 – Oct 01	40	51
Hohhot	Inner Mongolia	Sep 29 – Oct 05	40	50
Huludao	Liaoning	Sep 16 – Sep 22	37	46

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](#).