CREA

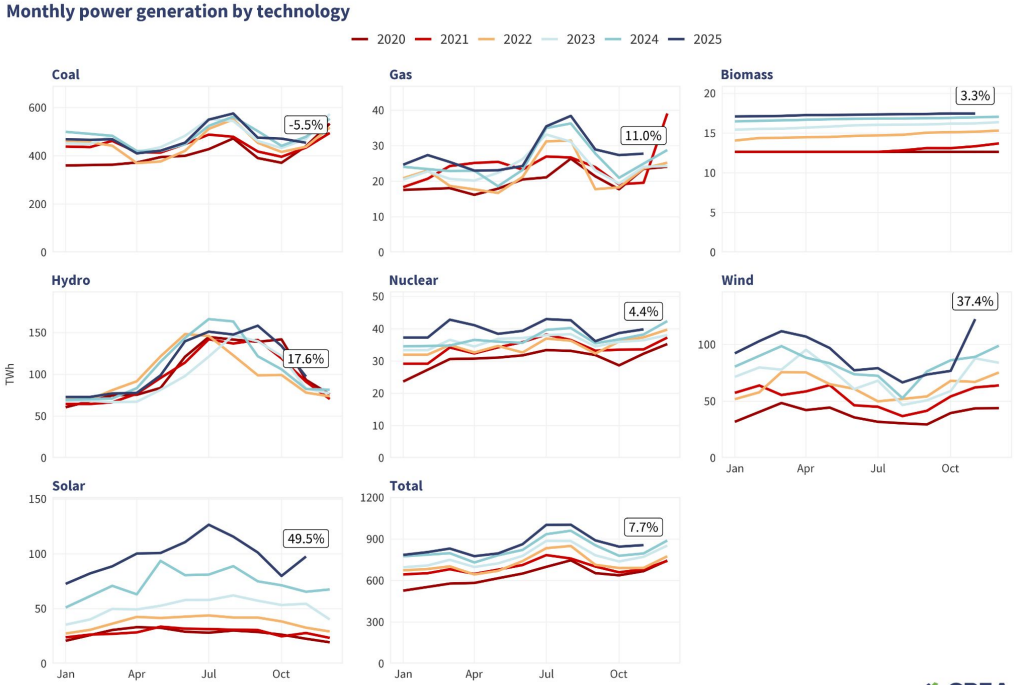
Centre for Research on Energy and Clean Air

# China energy and emissions trends

*December 2025 snapshot*

# Thermal power generation decreased in the first eleven months of 2025

- Total power generation* increased by an estimated 7.7%, while large-scale power generation grew by 2.7%, indicating most power generation growth comes from solar and wind installations that are outside of the industrial production statistics.
- After a spike in October, coal power generation decreased by 5.5% year-on-year in November, while gas power generation increased by 11%. In the first eleven months of 2025, thermal power generation decreased by 0.7%, making it almost certain that the full year will see a drop.
- Solar and wind power generation* increased by 49.5% and 37.4% respectively.
- Hydro grew 17.6% and nuclear grew 4.4%.




**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.*

# Renewables meet power demand growth and push down coal

- Wind and solar* power generation met all power demand growth in November, pushing coal's share of total generation down to 53%.
- In the first eleven months of 2025, solar and wind power* accounted for 22% of total electricity generation, up from 18% a year earlier. The rapid growth in clean energy generation squeezed coal-fired power, whose share fell to 55% of total electricity output, down four percentage points from the previous year.

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

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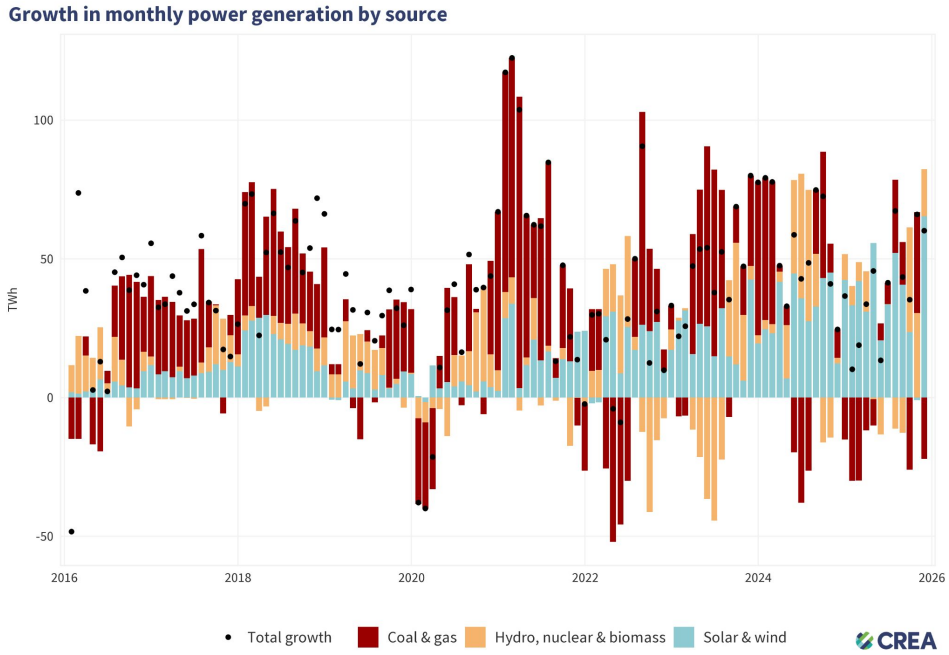
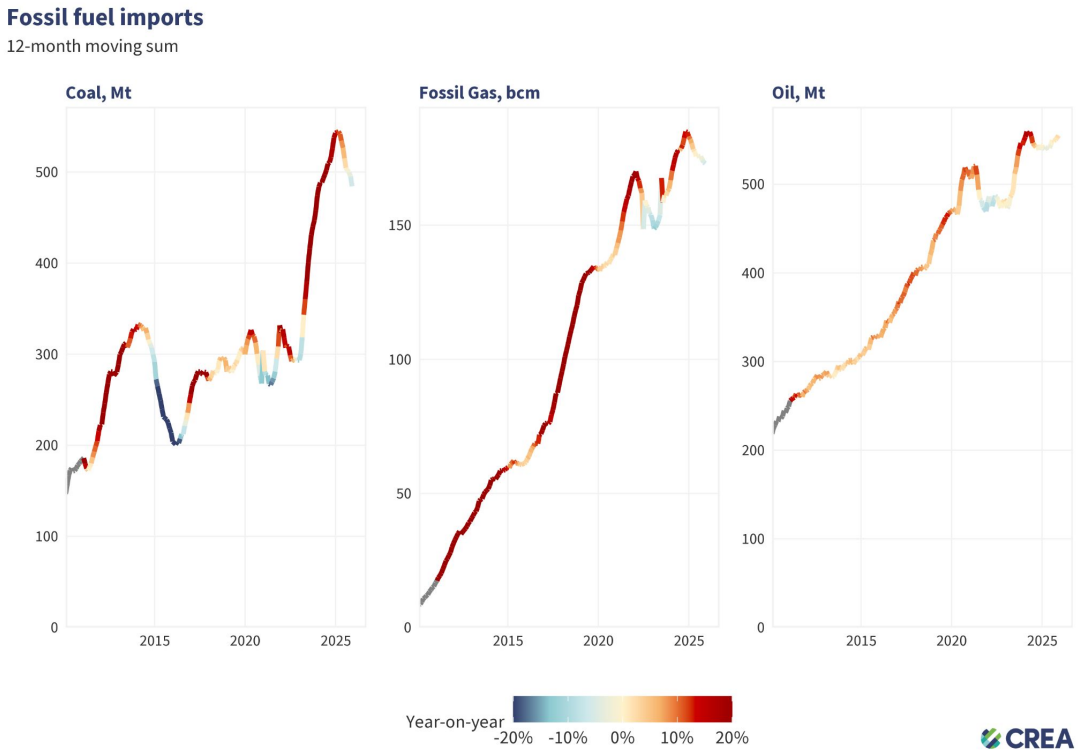


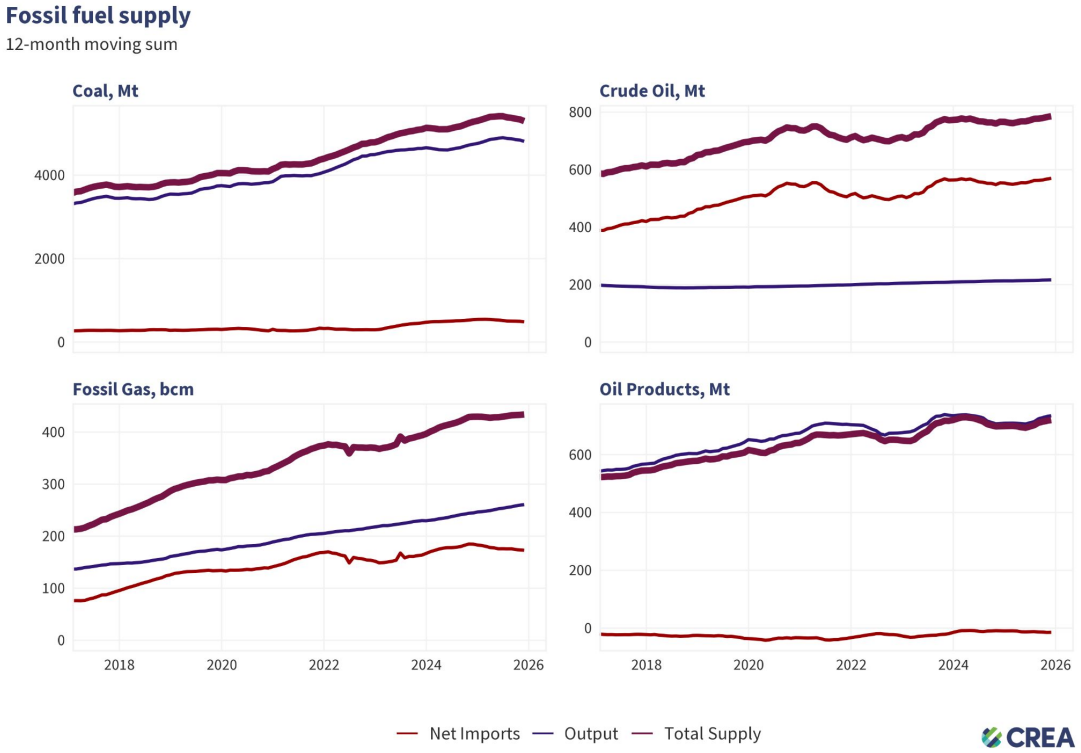
# Oil imports grow, while coal declines

- In November 2025, China's coal imports fell by 20% year-on-year. Over the first eleven months of the year, total coal imports were down 12% compared to the same period in 2024.
- China's crude oil imports increased 5% year-on-year. Over the first eleven months of the year, total crude oil imports were up 3.2% compared to the same period in 2024.
- China's natural gas imports increased by 11% year-on-year, while cumulative imports for January to November fell by 4.7% compared to the same period last year.



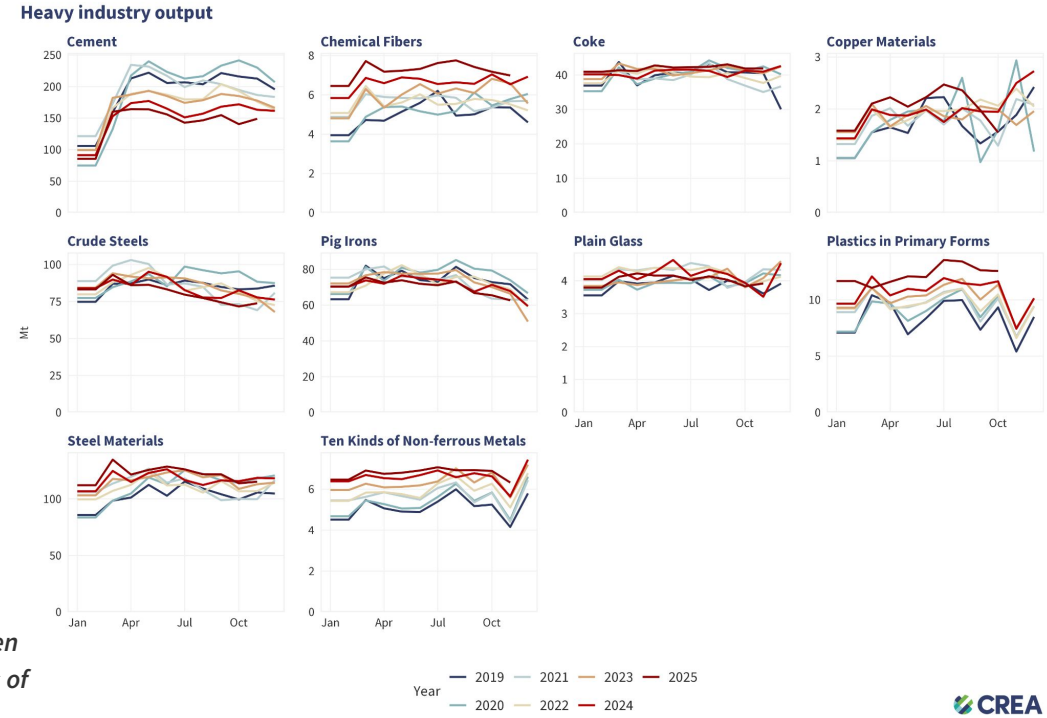
# Domestic coal output continues to fall, oil and gas increase

- In November, coal output fell by 0.5% year-on-year. Coal consumption recorded a year-on-year decline for the first time since 2017.
- Domestic natural gas production rose by 5.7% in November, bringing output for the first eleven months up 6.3% year-on-year. Domestic supply increasingly replaces imports.
- Crude oil production rose by 2.2%. Output for the first eleven months was up 1.7%.
- Refinery throughput rose by 3.9% year-on-year in November, and was up 4% in the first eleven months of the year.



# Steel and cement output continue to fall

- The data until November makes it almost certain that the two largest-emitting industrial sectors will see a full-year drop.
- In November 2025, pig iron, crude steel, and steel product output declined 8.7%, 10.9%, and 2.6%, respectively.
- In the first eleven months, China's crude steel output fell by 4% year-on-year. China announced plans to cut steel production and cap new capacity during 2025-2026.
- Cement production fell by 8.2% in November, reaching its lowest level for the month since 2019.
- Chemical fibre and non-ferrous metal output grew by 6.4% and 4.7%.
- Plain glass production grew by 3.7% year-on-year. Ethylene production, used as a key feedstock for plastics, saw growth accelerate further to 7.3%.




*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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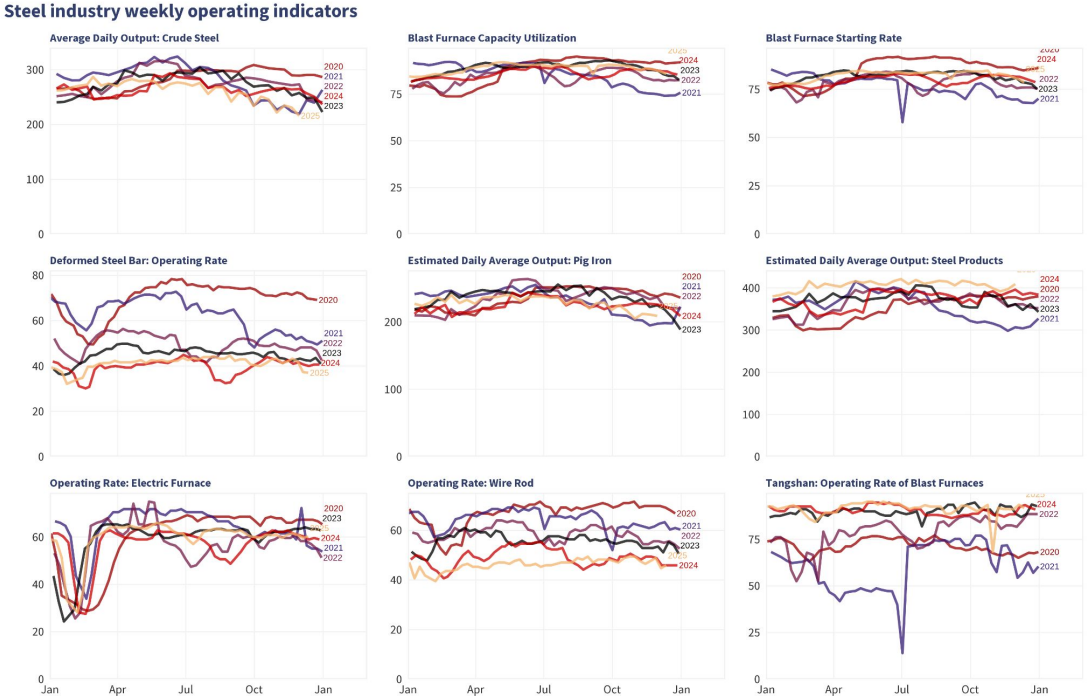
# Supply and demand remain weak in steel market

- Blast furnace operating rates and utilisation were lower than a year earlier. Electric furnace utilisation was slightly higher than in the same period last year.
- In the first eleven months of 2025, China's steel exports rose 6.7% year-on-year and are on track to surpass the previous historical peak set in 2015. Export licensing requirements will be introduced in 2026.
- 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.*

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




Source: Wind Information

# Solar and wind expansion eases after policy deadline; coal surges

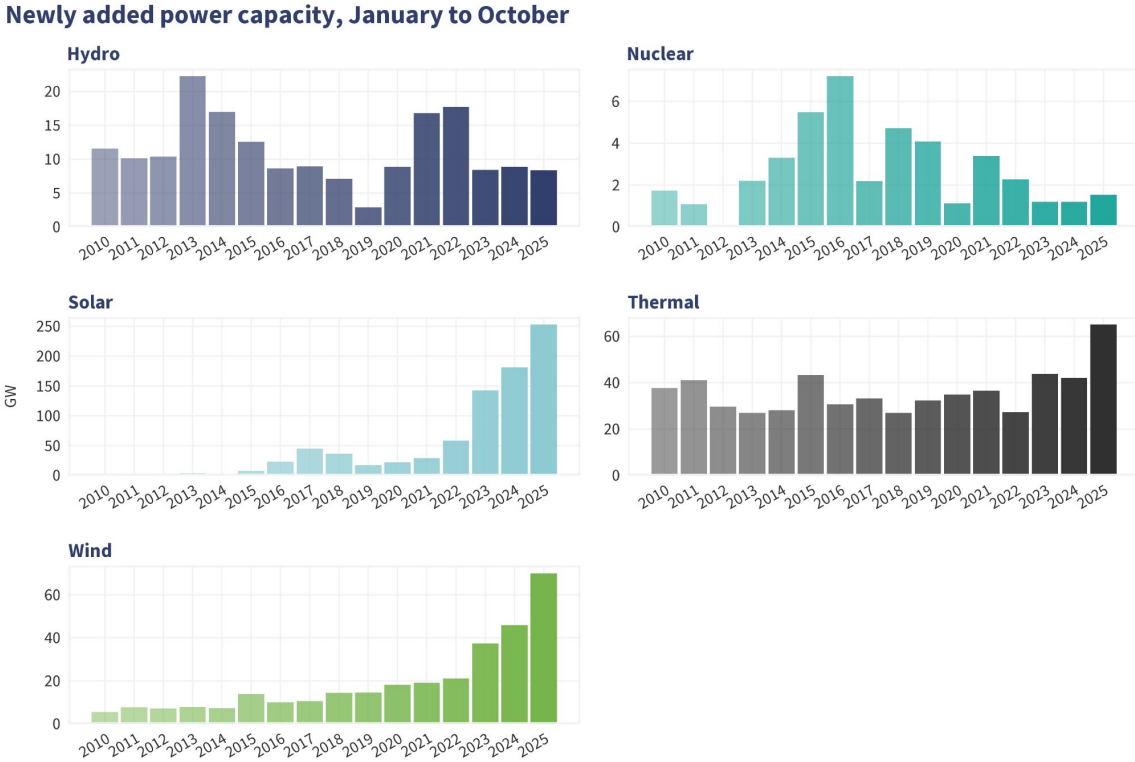
In the first ten months of 2025, China added:

- 252.9 gigawatts (GW) of solar power capacity, up 40% from last year.
- 70 GW of wind power capacity, a 53% increase from last year.
- 65 GW of thermal power capacity, a 54% increase from last year.
- 8.4 GW of hydro power capacity, a 6% 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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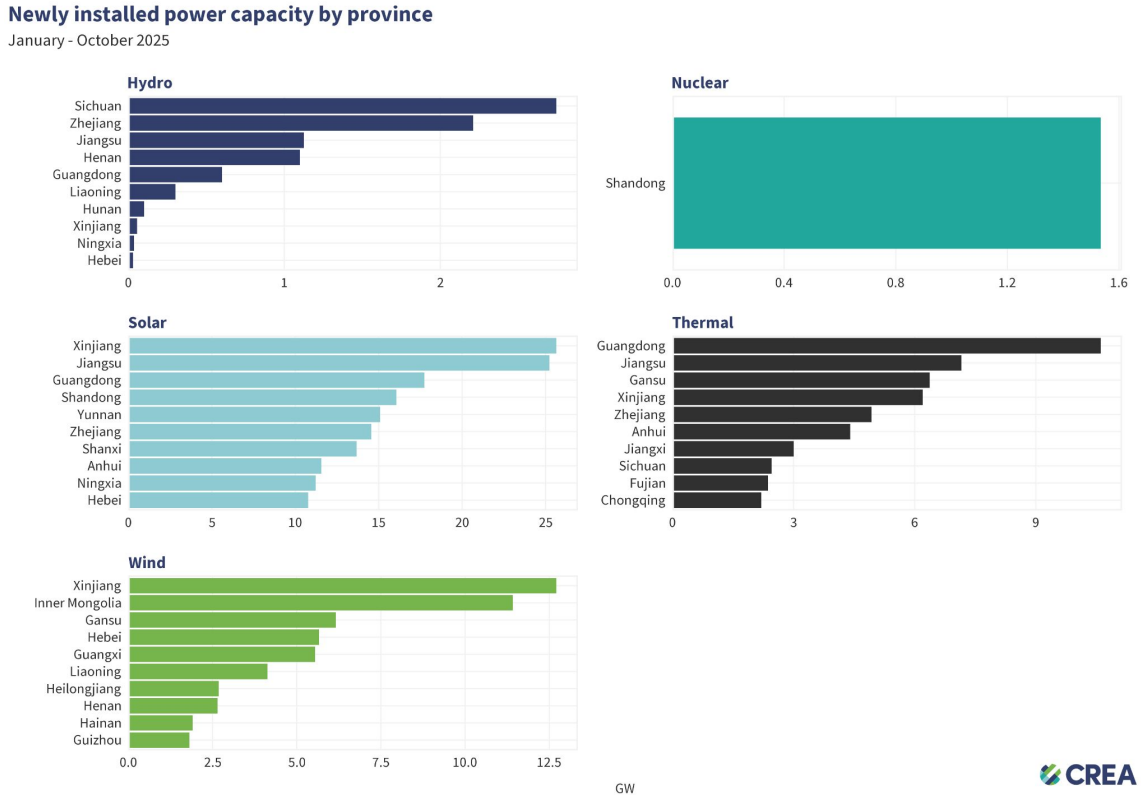
# Distributed solar and large-scale energy bases take the lead

- Solar power installations are led by Xinjiang, Jiangsu, and Guangdong. Jiangsu and Guangdong focus mostly on distributed solar, while in Xinjiang large-scale energy bases took the lead.
- Xinjiang, Inner Mongolia, 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, Jiangsu, 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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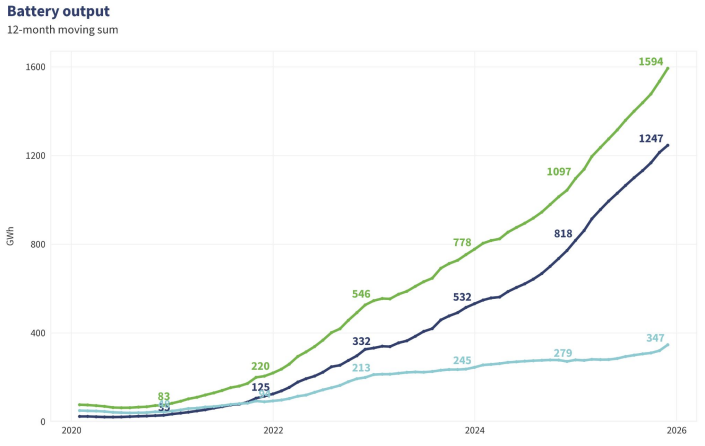
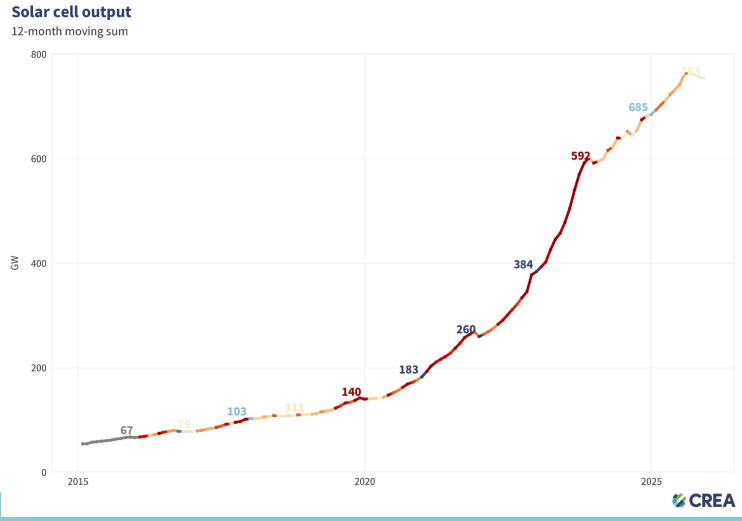
# Solar cell manufacturing remains resilient

- Solar cell production declined by 3% in November, but cumulative output for the January–November period remains around 10% higher than a year earlier. Despite the recent monthly dip, production levels are still elevated, suggesting that manufacturing activity remains strong and providing a supportive signal for continued solar deployment.
- In November, total battery output reached 176.3 GWh, up 49.2% year on year. Cumulative battery output in the January–November period rose by 51.1% compared with the same period last year.

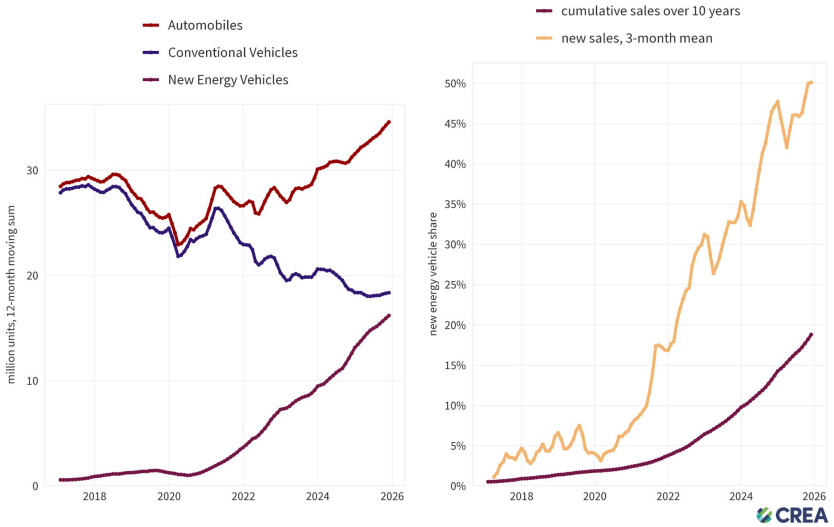


# NEVs reach majority share of output

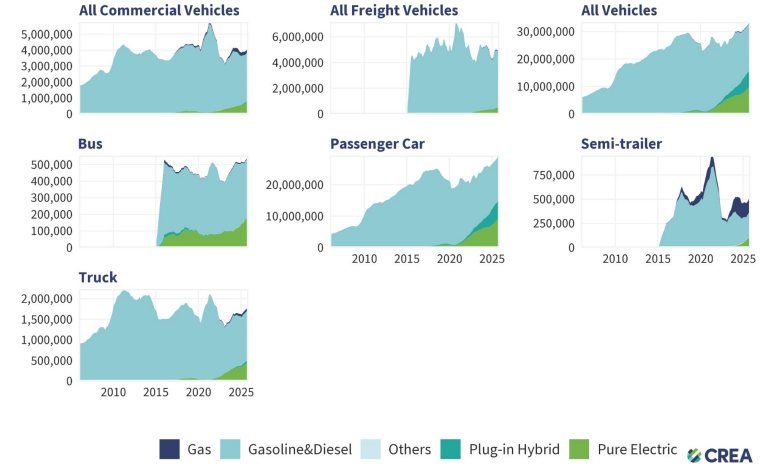
EV and plug-in hybrid output rose by 17% in November, accounting for 52% of total vehicle production, while production of internal combustion vehicles declined 10% year on year.

## Vehicle production

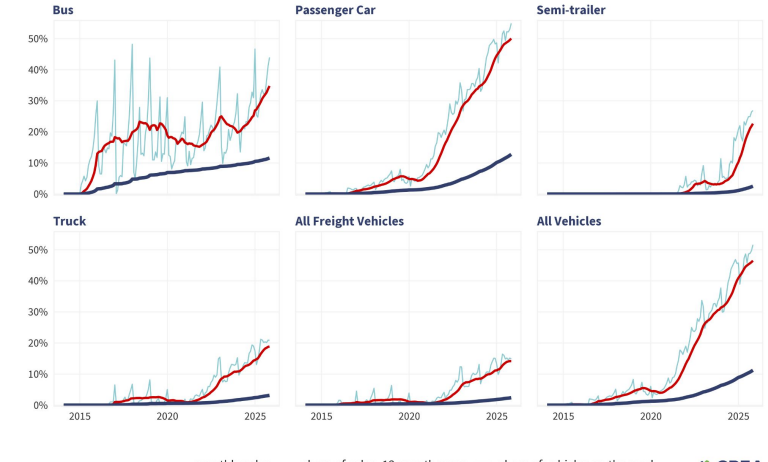



## Vehicle sales

12-month rolling sum




## EV market shares by vehicle category

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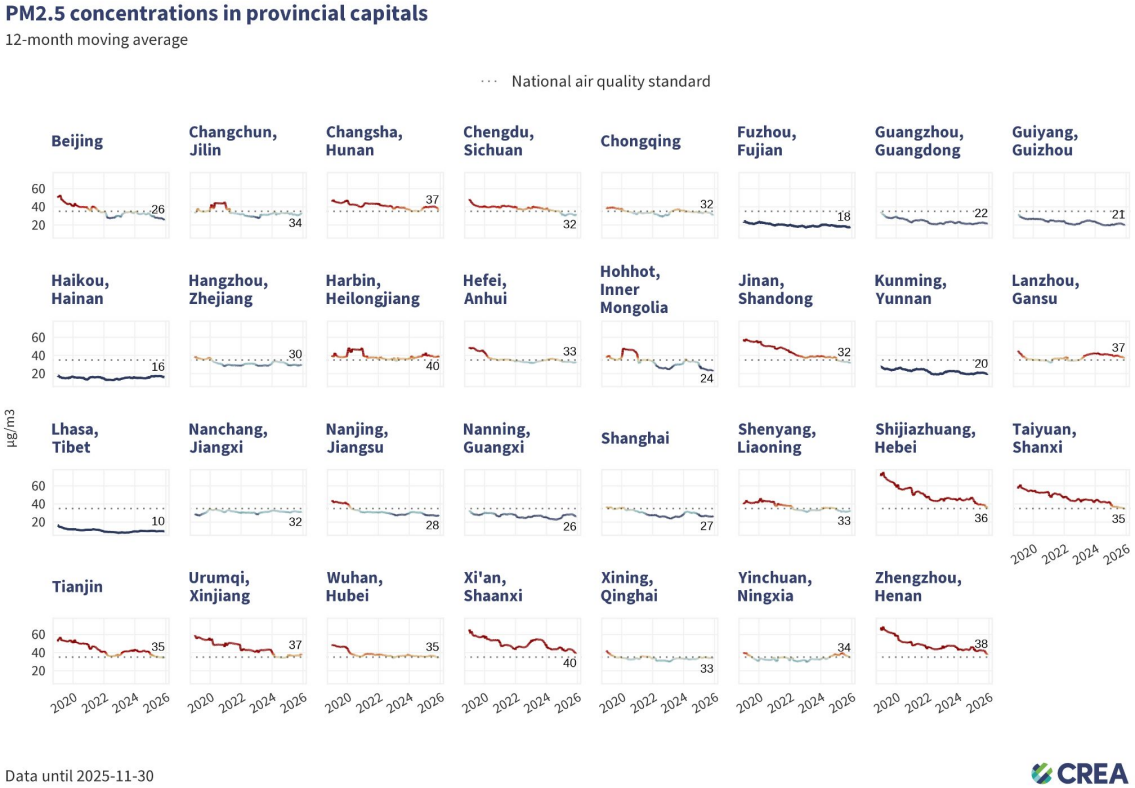
# As of the end of November, seven provincial capitals recorded 12-month average PM2.5 levels above the national annual standard

- As of the end of November, **seven 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 northern regions**. **Xi'an (Shaanxi) and Harbin (Heilongjiang)** recorded the highest level at **40 µg/m³**, followed by Zhengzhou (Henan) at 38 µg/m³, Lanzhou (Gansu), Urumqi (Xinjiang), and Changsha (Hunan) at 37 µg/m³.
- Compared with the previous month, **ten provincial capitals** saw **declines** in their 12-month $PM_{2.5}$ averages, while **ten** other recorded increases.




Data until 2025-11-30

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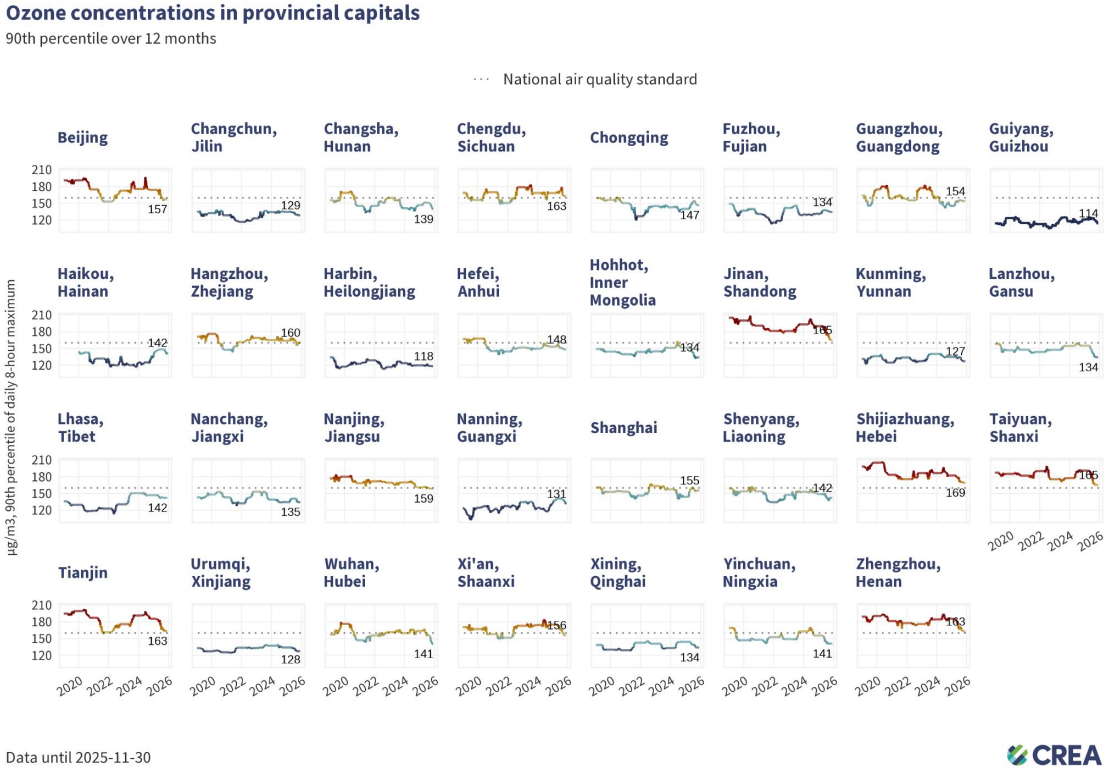
# As of the end of November, six provincial capitals exceeded the national annual ozone limit

- As of the end of November 2025, **six 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, **seven cities saw declines** in their annual ozone assessment values**, while no other cities saw increase.**




Data until 2025-11-30

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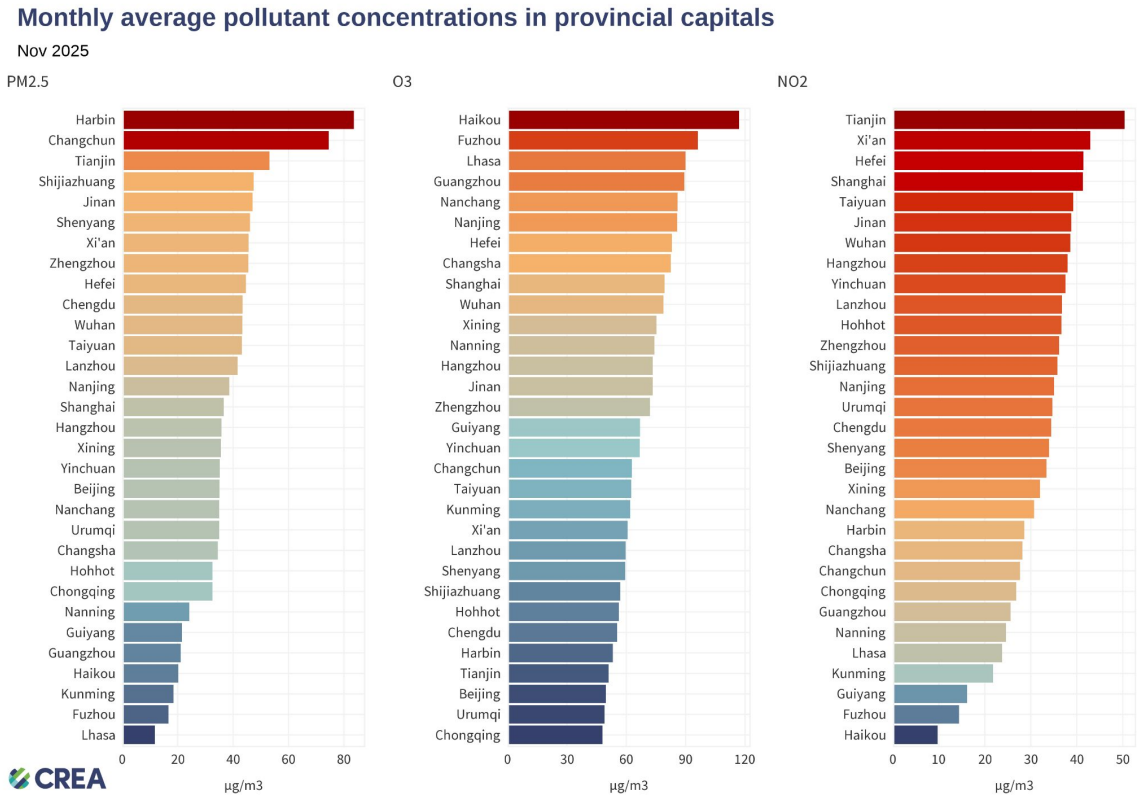
# In November, $PM_{2.5}$ levels recorded the highest in Northeast China, ozone concentrations were elevated in the south, and Tianjin continued to record the highest $NO_2$ levels nationwide

- In November, **Harbin (Heilongjiang)** recorded the **highest monthly average PM2.5 concentration** among China's provincial capitals, at **84 µg/m³**, followed by Changchun (Jilin) at 75 µg/m³ and Tianjin at 53 µg/m³.
- **Ozone levels** were generally **highest in South China**, with **Haikou (Hainan)** topping the list at **117 µg/m³**, followed by Fuzhou (Fujian) and Lhasa (Tibet) at 96 µg/m³ and 90 µg/m³, respectively.
- **Tianjin has continued to record the highest nitrogen dioxide ($NO_2$) concentration nationwide since the month before, reaching 50 µg/m³**, followed by Xi'an (Shaanxi), Hefei (Anhui) and Shanghai at 43, 41 and 41 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.



# Worst 7-day air pollution episodes by pollutant

*$PM_{2.5}$ (excluding sandstorms)*

| city | province | dates | average concentration | highest daily concentration |
|---|---|---|---|---|
| Jilin | Jilin | Nov 21 – Nov 27 | 201 | 556 |
| Suihua | Heilongjiang | Nov 22 – Nov 28 | 153 | 322 |
| Harbin | Heilongjiang | Nov 22 – Nov 28 | 138 | 258 |
| Songyuan | Jilin | Nov 22 – Nov 28 | 113 | 278 |
| Changchun | Jilin | Nov 21 – Nov 27 | 113 | 223 |

*Ozone*

| city | province | dates | average concentration | highest daily concentration |
|---|---|---|---|---|
| Haikou | Hainan | Nov 22 – Nov 28 | 144 | 169 |
| Zhuhai | Guangdong | Nov 22 – Nov 28 | 135 | 172 |
| Anqing | Anhui | Nov 10 – Nov 16 | 132 | 160 |
| Yangjiang | Guangdong | Nov 30 – Dec 06 | 132 | 181 |
| Zhongshan | Guangdong | Oct 26 – Nov 01 | 130 | 170 |

*Sandstorms ($PM_{2.5}$)*

| city | province | dates | average concentration | highest daily concentration |
|---|---|---|---|---|
| Wuhai | Inner Mongolia | Nov 22 – Nov 28 | 40 | 96 |
| Bayan Nur | Inner Mongolia | Nov 22 – Nov 28 | 38 | 92 |
| Zhangye | Gansu | Nov 02 – Nov 08 | 30 | 108 |
| Alxa | Inner Mongolia | Nov 22 – Nov 28 | 30 | 70 |
| Jiayuguan | Gansu | Nov 02 – Nov 08 | 28 | 110 |

*$NO_2$*

| city | province | dates | average concentration | highest daily concentration |
|---|---|---|---|---|
| Shanghai | Shanghai | Nov 20 – Nov 26 | 60 | 78 |
| Nantong | Jiangsu | Nov 20 – Nov 26 | 59 | 73 |
| Tianjin | Tianjin | Nov 09 – Nov 15 | 59 | 78 |
| Linyi | Shandong | Nov 18 – Nov 24 | 58 | 73 |
| Jinhua | Zhejiang | Nov 26 – Dec 02 | 58 | 70 |

***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.