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Q3 Global Power Report: No fossil fuel growth expected in 2025

Solar and wind power grew fast enough to keep up with rising electricity demand in the first three quarters of 2025, as fossil fuel growth stagnated. Ember forecasts no growth for fossil fuels in the power sector in 2025.

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About

This report analyses global electricity generation in the first three quarters of 2025 based on Ember's electricity data. The analysis lays out global trends for electricity demand, the rise of renewable generation and the plateauing of fossil fuels. It also includes a forecast for the full year of 2025.

Summary

No growth in fossil power is expected in 2025 as clean power growth meets all new demand.

Record growth in solar power, combined with moderate wind growth, exceeded the rise in electricity demand in the first three quarters of 2025, even when accounting for a fall in hydropower. As a result of fast-rising clean power, fossil generation in the global power sector is expected to remain flat in 2025 for the first time since the Covid-19 pandemic.

- **Record solar power growth pushes clean power above demand growth in the first three quarters of 2025.** In Q1-Q3 2025, solar generation grew by 498 TWh (+31%), compared to the same period in 2024, the largest increase ever over a nine-month period. Solar output in the first three quarters of 2025 has already surpassed total output in all of 2024. Combined with moderate growth in wind generation of 137 TWh (+7.6%), total solar and wind growth (+635 TWh) exceeded the increase in demand of 603 TWh (+2.7%). Nuclear's increase of 33 TWh was more than offset by a fall in hydro generation (-54 TWh). Consequently, fossil generation remained similar to 2024 levels, showing a minor fall (-17 TWh).
- **No fossil growth expected in 2025.** This step up in clean power growth, combined with more moderate demand growth leads to Ember forecasting that fossil power will not rise in 2025. This would mark the first year without a fossil generation increase since the Covid-19 pandemic, when lockdowns caused electricity demand to fall. In the first three quarters of 2025, declines in fossil generation in China (-52 TWh, -1.1%) and India (-34 TWh, -3.3%) tipped the balance of the global trend in fossil generation, and even balanced out fossil increases in the EU and US.

Record solar power growth and stagnating fossil fuels in 2025 show how clean power has become the driving force in the power sector. Historically a growth segment, fossil power now appears to be entering a period of stagnation and managed decline. China, the largest source of fossil growth, has turned a corner, signalling that reliance on fossil fuels to meet growing power demand is no longer required.

Nicolas Fulghum
Senior Data Analyst, Ember

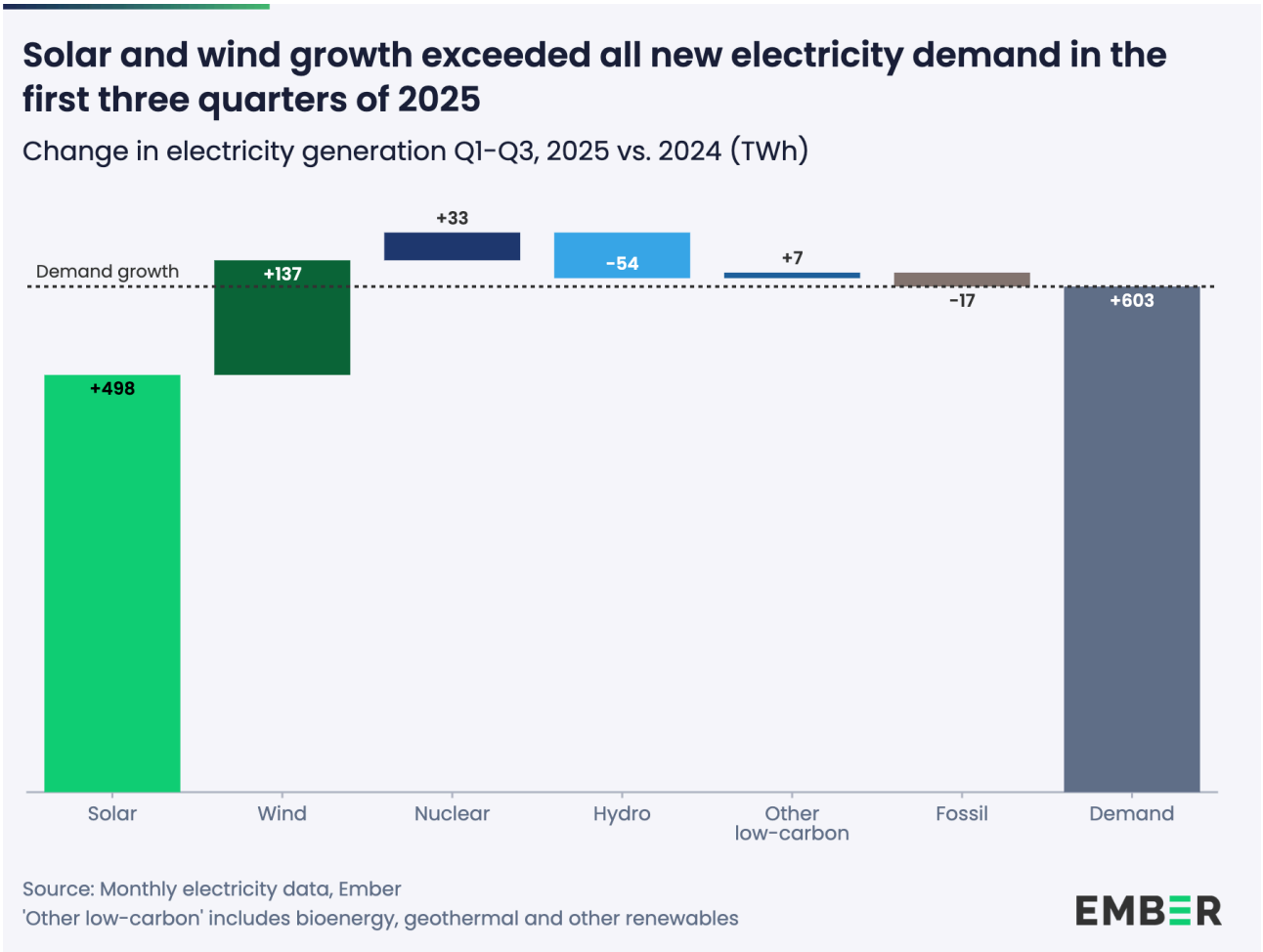
Record solar rise pushes clean power above demand growth

Record solar increase, combined with moderate wind growth, exceeded increases in electricity demand in the first three quarters of 2025. Hydropower fell, while nuclear generation saw a minor increase.

Solar is reshaping global electricity generation. In the first three quarters of 2025, solar was once again the electricity source with the largest increase, rising to new record levels.

Record solar and wind growth exceeds demand growth

Solar generation rose by 498 TWh (+31%) in the first three quarters of 2025 compared to the same period in 2024. Wind generation added an additional 137 TWh (+7.6%). Combined, they exceeded the growth in demand of 603 TWh (+2.7%).

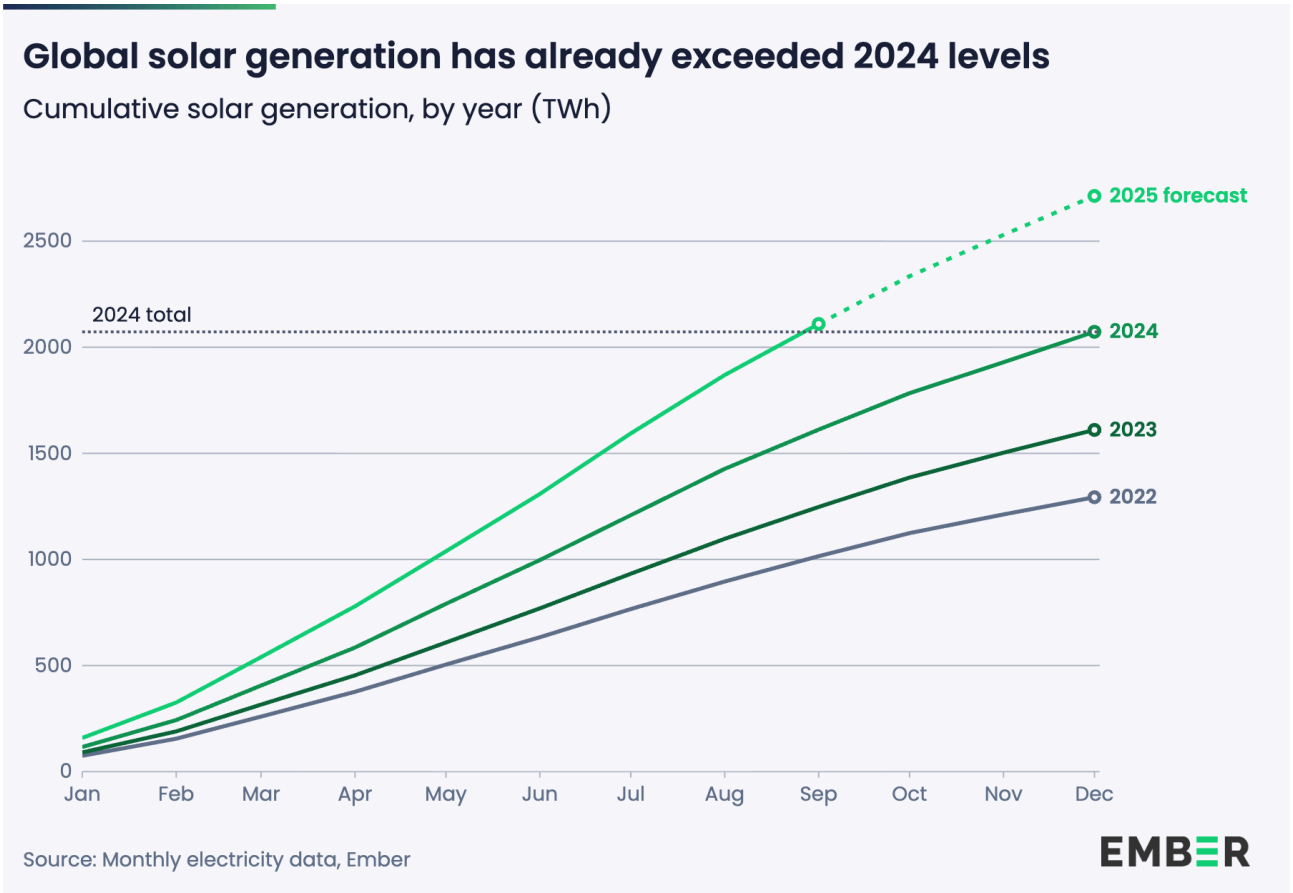


Nuclear generation increased by 33 TWh (+1.7%). A substantial fall in hydro generation (-54 TWh, -1.6%) prevented a larger decline in fossil generation. Instead, fossil generation in the first three quarters of 2025 remained similar to Q1-Q3 2024, falling by 17 TWh (-0.1%).

The rise in solar and wind power meant that their share in the global electricity mix rose from 15.2% in Q1-Q3 2024 to 17.6% in Q1-Q3 2025. In contrast, the share of fossil generation dropped from 58.7% to 57.1%. Within fossil generation, coal fell from 34.0% to 33.1%. The rise in wind and solar also pushed generation from all renewables combined above coal, a trend previously reported in Ember's Global Electricity Mid-Year Insights 2025. The share of renewables rose from 32.5% in Q1-Q3 2024 to 34.2% in Q1-Q3 2025. All low-carbon sources combined achieved a share of 43.0%, up from 41.3% in 2024.

Solar power growth at record levels again in 2025

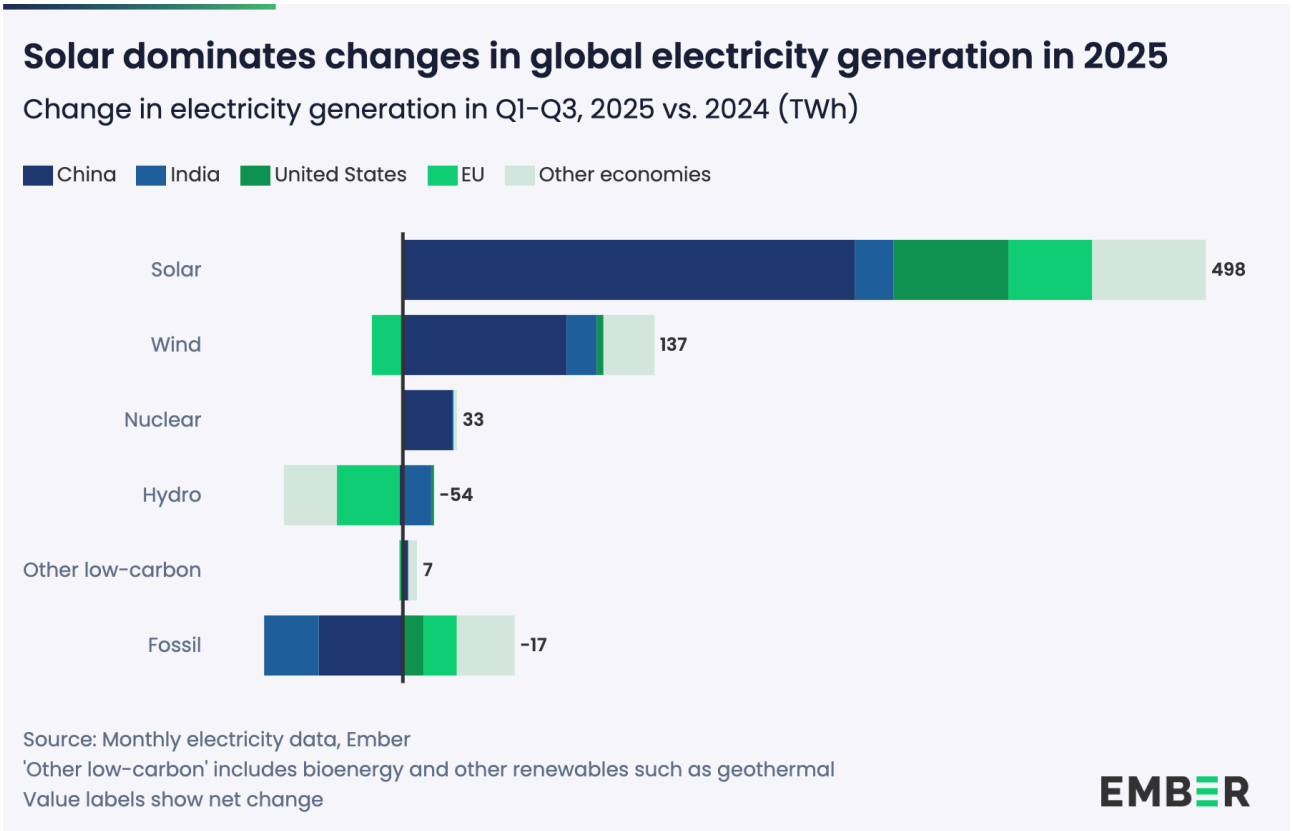
The increase in solar power of 498 TWh in Q1-Q3 2025 means this year's output has already exceeded the total solar generation for all of 2024, with three months still remaining in the year.



Solar growth in 2025 is impressive not only for its absolute level, but also for its growth rate of 31% in Q1-Q3. It is another increase in the rate of solar deployment, despite higher absolute levels, after a 29% rise in the same period of 2024. Solar generation growth in 2025 is expected to reach another substantial record of around 640 TWh.

Solar power dominates changes in global electricity generation

Solar has become the dominant driver of change in the global power system. The 498 TWh increase in solar power generation in the first three quarters of 2025 was more than three times larger than the next biggest increase, from wind (+137 TWh), and dwarfs changes in fossil power.



China made up more than half of the Q1-Q3 solar power growth at 280 TWh (+44% year-on-year growth), ahead of the US (+71 TWh, +30%) and the EU (+52 TWh, +20%).

For wind power, changes were also largely driven by China, with a 102 TWh (+14%) increase, compared to smaller increases in the US and other economies, which offset a moderate fall in the EU.

Nuclear power increased by 30 TWh (+9.3%) in China, with only minor changes elsewhere.

Hydro generation declined across the globe as a result of less favourable conditions, with India as the notable exception among larger power sectors. In the EU, conditions reverted back to lower levels after high output in 2024.

There were minor fossil generation increases in the EU, due to unfavourable weather conditions for hydro and wind power, and in the US, where demand growth remained high. These were balanced out by falls in China (-52 TWh, -1.1%) and India (-34 TWh, -3.3%), marking a remarkable reversal of the previous steady fossil generation growth in Asia's largest economies.

No fossil growth expected in 2025

Ember forecasts that fossil fuel generation will remain flat for the full year of 2025. The step up in clean power growth, particularly in China and India, combined with more moderate demand growth in 2025, indicates fossil power will not grow for the first time since the Covid-19 pandemic.

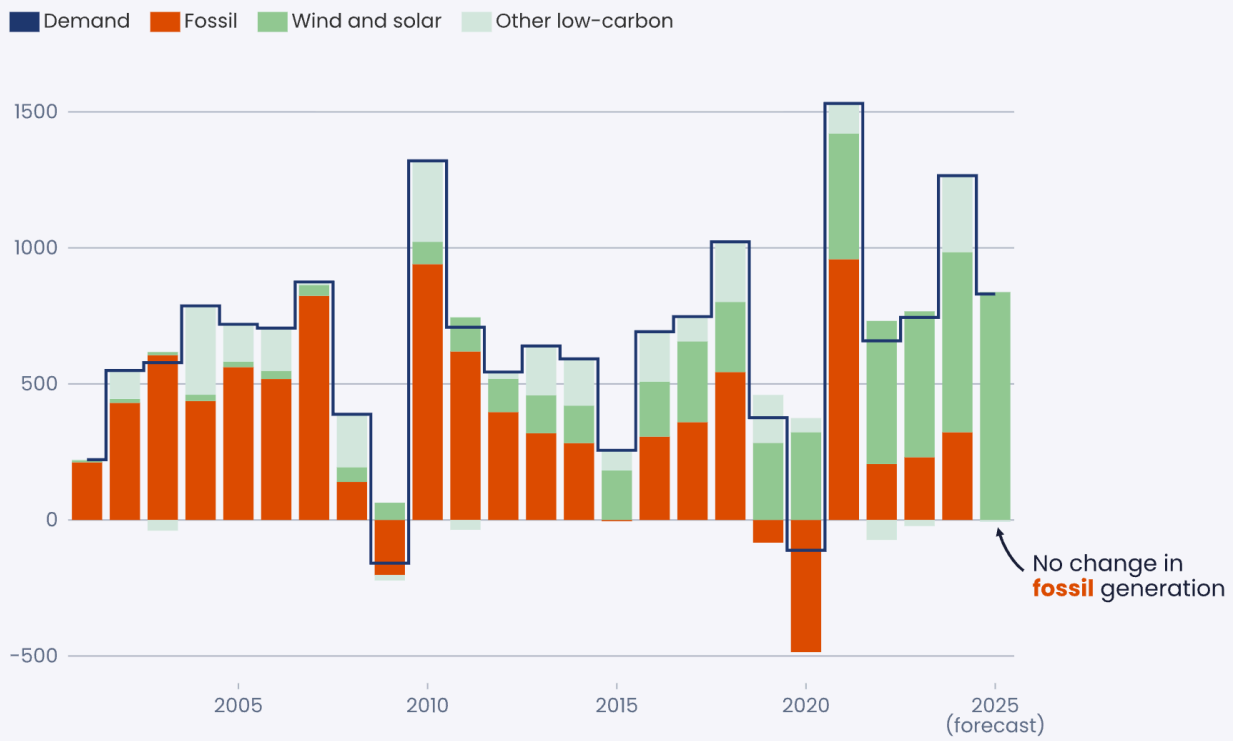
Solar power has replaced fossil fuels as the dominant driver of growth in the power sector. In 2025, this shift is expected to reach another turning point, with wind and solar growing fast enough to meet all new electricity demand and prevent any increase in fossil generation.

No fossil growth in 2025 despite substantial rise in electricity demand

Ember forecasts that 2025 will be the first year without notable fossil fuel growth in global electricity generation since the Covid-19 pandemic, when global demand fell.

No fossil growth in 2025 despite substantial rise in electricity demand

Annual change in electricity generation (TWh)



Source: Yearly electricity data, Ember; Ember forecast
'Other low-carbon' includes hydro, nuclear, bioenergy, geothermal and other renewables

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Prior to 2025, stagnation or falls in fossil generation only occurred in years with low or no electricity demand growth, such as in 2009 during the financial crisis or in 2020 during the Covid-19 pandemic. In contrast, 2025 is expected to see the sixth largest absolute increase in electricity demand ever at 831 TWh.

With growing clean power deployment, the link between demand growth and fossil generation growth has been steadily weakening. In the 2000s, most demand growth was met by increasing fossil generation, as well as rising nuclear and hydro output. In the mid 2010s, renewables, particularly wind, began to play a larger role in meeting new demand.

After the Covid-19 pandemic in 2020 and the demand rebound in 2021, fossil generation growth remained relatively low as solar deployment took off. Even in 2024, which saw very high demand growth, fossil generation grew only by a moderate 322 TWh (+1.8%).

This brings us to 2025. The record growth in solar and wind power, combined with moderate demand growth, looks set to avoid the need for an increase in fossil generation entirely.

Uncertainty in weather conditions for Q4 and incomplete data reporting for some countries mean it is yet unclear whether fossil generation will show a small increase or fall, but any change is likely to be minor.

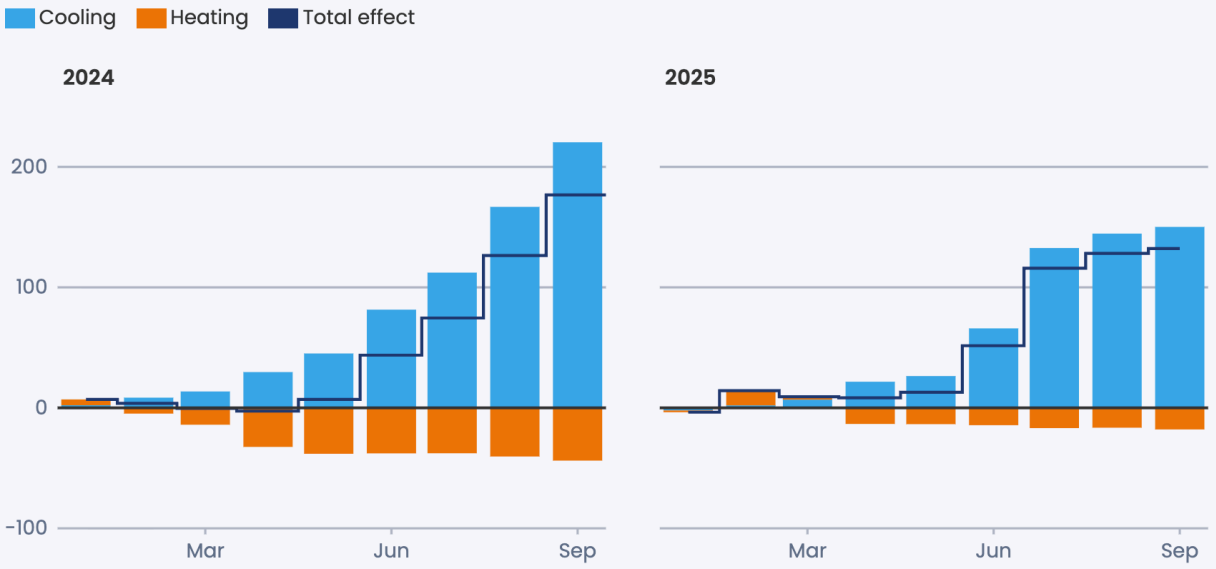
Lower impact of heatwaves on demand in 2025

Temperature impacts on electricity demand were significantly lower in 2025 than in 2024, contributing to lower overall electricity demand growth. Hotter temperatures in 2024 (versus the 2015-2024 ten-year average) drove substantial increases in cooling-related electricity demand between June and September, particularly during summer heatwaves across the northern hemisphere in China, India and the US, as reported previously by Ember.

In contrast, 2025 temperatures tracked closer to the ten-year average. Only June and July saw substantial above-average temperature impacts on demand, driven by heatwaves in the US and China. India, the third-largest power sector, experienced notably milder conditions than in 2024, substantially reducing cooling demand. Globally, August and September 2025 saw much lower temperature impacts on electricity consumption.

Fewer and less extreme heatwaves resulted in less electricity demand for cooling in 2025 compared to 2024

Cumulative temperature effect on electricity demand relative to 2015-2024 average temperatures, Jan-Sep (TWh)



Source: Monthly electricity data, Ember; ERA5; Ember analysis of temperature effects
Note: Cooling and heating changes don't account for growth in ownership rates of air conditioning or heating equipment; Analysed countries comprise 82% of global electricity demand; Effects are scaled to global demand.

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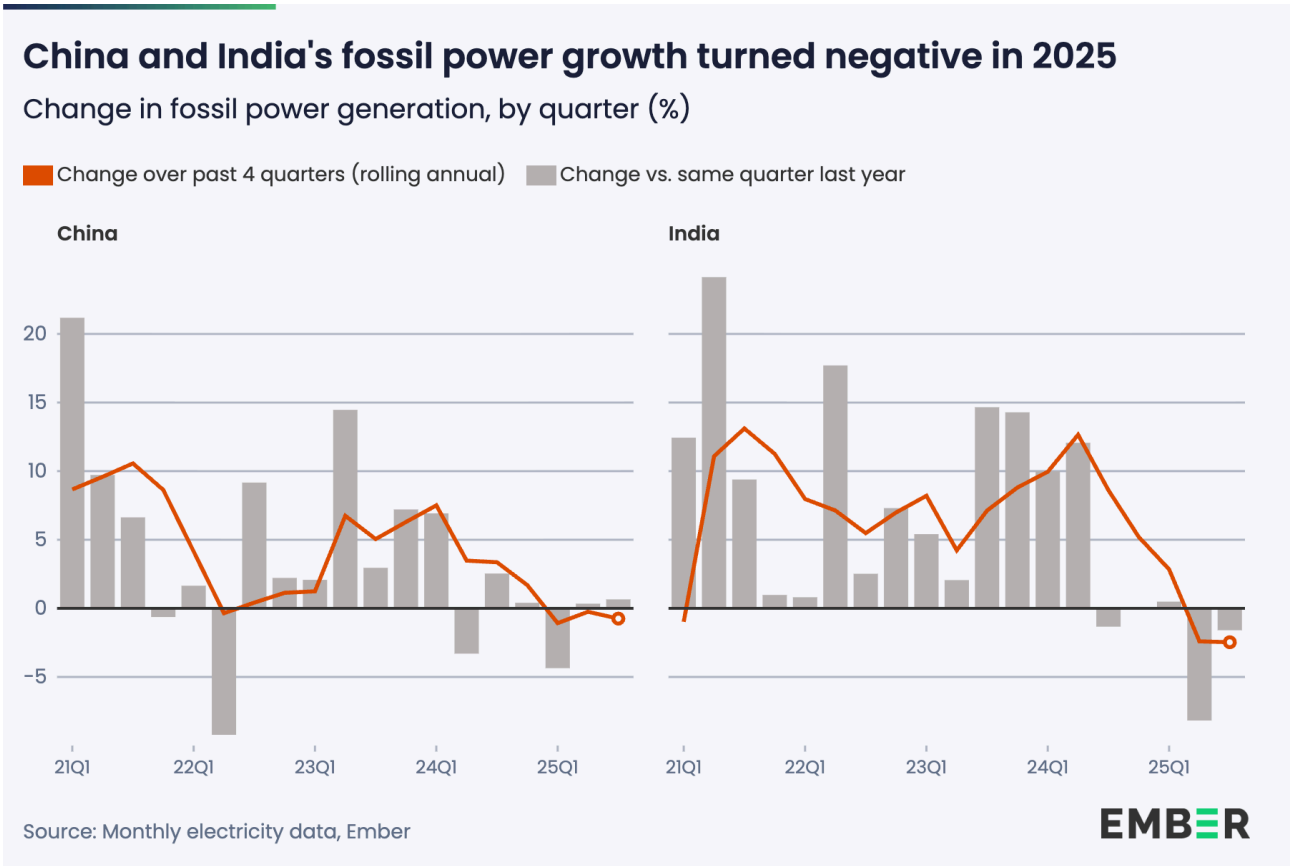
Fossil generation declines in China and India tip the global balance

China and India both saw falls in fossil generation in the first three quarters of 2025, continuing the downward trend that first emerged during 2024. For both countries, this represents a departure from years of fossil generation growth. However, the reasons differ. In China, the decline was driven by fast-growing renewables meeting all new demand, whereas India's fall resulted from renewables growth combined with unusually low demand growth driven by mild weather conditions.



China: Structural decline

In China, the last twelve months (Q4 2024-Q3 2025) saw a fossil decline of 0.7% compared to the previous twelve-month period. A rapid increase in clean power first reduced growth in fossil generation before exhibiting a full plateau over the last six quarters, as clean power met all additional demand. China is now structurally meeting all new demand with clean power.

India: Temporary decline driven by renewables surge and lower demand

India's fossil generation declined by 2.5% in the twelve months to Q3 2025. Clean power growth picked up significantly in 2025, with record growth in both solar and wind power as recently reported in Ember's Global Electricity Mid-Year Insights 2025. Solar and wind generation increased by 42 TWh (+25%) in Q1-Q3 2025.

Typically, India's electricity demand grows faster than renewables. However, 2025 was different. As detailed earlier, milder conditions compared to 2024's heatwaves substantially reduced cooling demand. This caused India's electricity demand growth to slow, with some months even recording lower demand than in 2024, which is highly unusual for India's typically fast-growing power sector. With demand growth lower than usual, the 42 TWh of new solar and wind generation was sufficient to push fossil generation into decline.

The decline is likely temporary. If temperatures in India return to more typical levels in late 2025 and into 2026, a rebound in demand and a subsequent increase in fossil generation is expected.

Clean power takes the next step

For years, solar and wind have met more and more of the growth in electricity demand. The latest data for the first three quarters of 2025, along with Ember's forecast for the full year of 2025, show that, as anticipated, clean sources are now growing fast enough to meet and exceed all electricity demand growth.

This marks a structural shift towards a period of stagnation in fossil generation. The challenge now is to sustain the growth in 2026 and beyond, not only to meet continued strong growth in electricity demand, but also to drive down fossil generation from its current levels.

Supporting information

About Ember

Ember is an independent, not-for-profit energy think tank that aims to shift the world to clean electricity using data. It gathers, curates and analyses data on the global power sector and its impact on the climate, using cutting edge technologies and making data and research as open as possible. It uses data-driven insights to shift the conversation towards high impact policies and empower other advocates to do the same. Founded in 2008 as Sandbag, it formerly focused on analysing, monitoring and reforming the EU carbon market, before rebranding as Ember in 2020. Its team of electricity analysts and other support staff are based around the world in the EU, UK, Türkiye, India, China and Indonesia.

Methodology

General methodology

Electricity generation data for countries, regions and the world is based on Ember's Monthly electricity data. Data is gathered for 88 countries from over 70 sources, including national transmission system operators, statistical agencies and data aggregators such as ENTSO-E.

In some cases, published data was not available for the full reported timeframe; here, we have estimated recent months using Ember's own generation forecasting model. Regional and world data is largely based on actual reported

data, with Ember's monthly data covering countries representing more than 90% of global electricity demand. Other countries are estimated.

A full methodology on data sources and methods is available here.

Forecasts

Ember's forecast featured in this analysis is based on Ember's proprietary time forecasting methodology. The approach takes into account economic growth expectations, historical trends in demand growth and historical trends and expectations for generation of individual sources, as well as capacity build-out.

Acknowledgements

Contributors

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