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Solar met 61% of US electricity demand growth in 2025

Solar proved invaluable in meeting fast-growing electricity demand in 2025.

About the report

This short report analyses year-end data from the Energy Information Administration (EIA) to show how solar power and batteries increased in the US in 2025.

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Summary

Solar generation met a large proportion of US electricity demand growth in 2025, including in regions where demand rose most. It met all the rise in daytime electricity demand and, supported by batteries, also met much of the rise in evening electricity demand.

01 **Solar growth met 61% of electricity demand growth in 2025.** Solar generation rose by 83 TWh (+27%), meeting 61% of the 135 TWh rise in electricity demand, as electricity demand rose by 3.1% – the fourth largest rate in a decade.

02 **Solar grew most where electricity demand grew most.** The three regions with the largest rises in solar generation – Texas, the Midwest and the Mid-Atlantic – also had the largest rises in electricity demand. Solar growth met 81%, 81% and 33% of electricity demand growth respectively in those three regions.

03 **Solar growth met all of the daytime growth in electricity demand – and some in the evenings.** The rise in solar generation in 2025, in aggregate, met all of the rise in US electricity demand in the daytime in the hours of 10:00-18:00 ET. In addition, solar – thanks to new batteries – also met some of the electricity demand rise in the evening hours from 18:00-02:00 ET.

Solar in the US can grow in many ways. The rise of batteries in the US is changing solar from cheap daytime electricity to dispatchable all-day electricity. In the last six years, California's utility solar and battery generation has risen by 58%, yet generation at the sunniest hour of the day has risen by just 8%.

The solar boom in the US is still dominated by a few states – 37 states had less than 10% of their electricity from solar in the last 12 months – although some states are now growing quickly. There is still no duck curve in the US in aggregate – non-solar electricity generation needed in the daytime is still higher than that needed overnight.

> Solar growth was essential in helping to meet fast-rising electricity demand in 2025. It generated where it was needed and – with the surge in batteries – increasingly when it was needed. Solar has the potential to meet all the rise in electricity demand and much more. With electricity demand surging, the case to build solar has never been stronger.
>
> **Dave Jones**
> Chief analyst, Ember

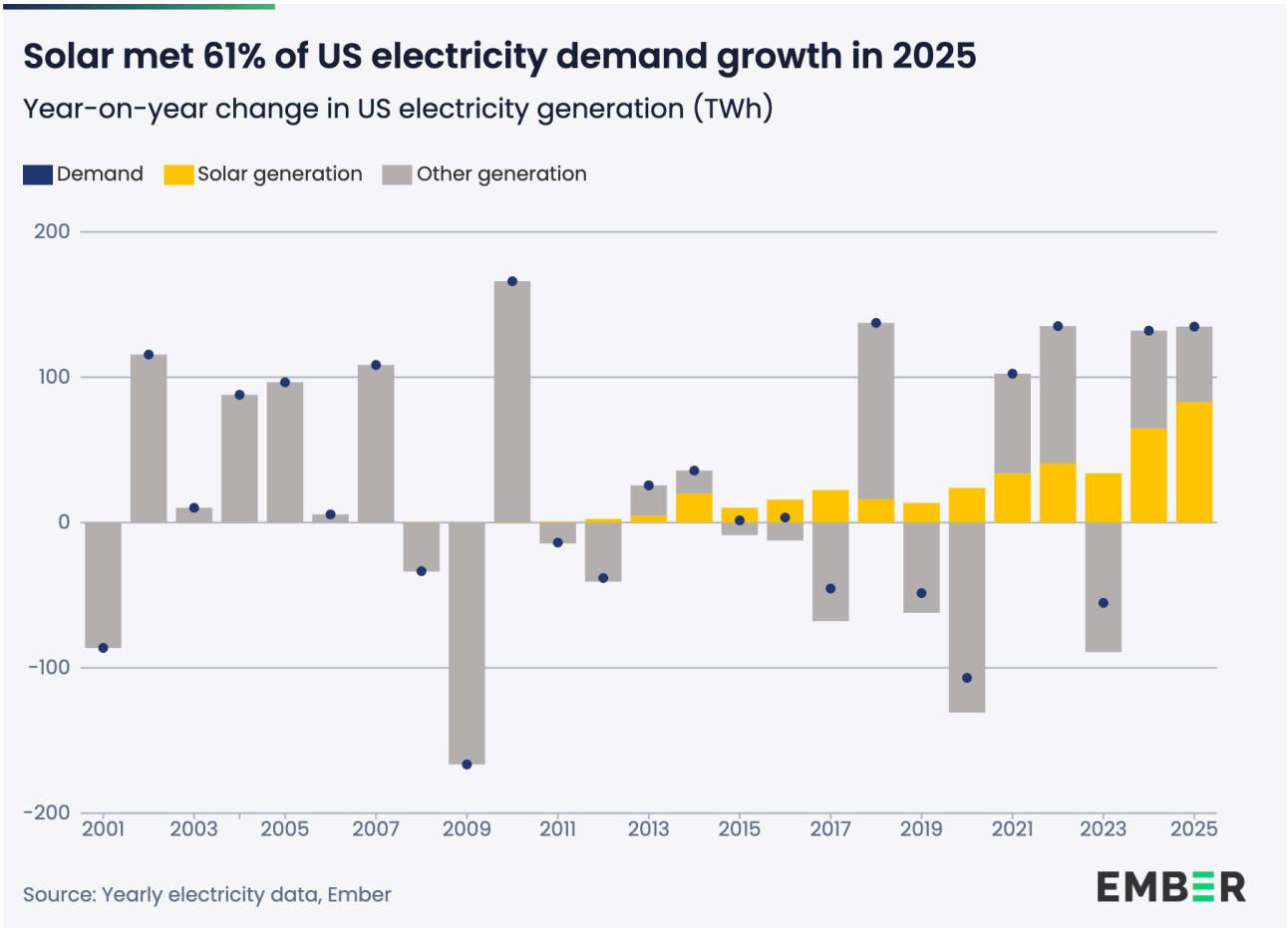
Solar met 61% of US electricity demand growth in 2025

Solar growth met nearly two thirds of electricity demand growth. This growth came where demand rose most and extended beyond daytime hours as batteries scaled alongside solar.

Solar generation increased by a record 83 TWh from 2024 (+27% to 387 TWh), which meant solar generated 8.5% of all US electricity in 2025. The solar rise was driven by continued expansion of utility-scale solar, with only marginal contributions from behind-the-meter systems. Weather played no role – overall solar insolation was unchanged in 2025 compared to 2024, according to Ember analysis of weather data.

Electricity demand rose by 3.1% (135 TWh). This was the fourth largest rate of demand increase in a decade.

This means solar's growth contributed 61% of the 135 TWh growth in electricity demand in aggregate.

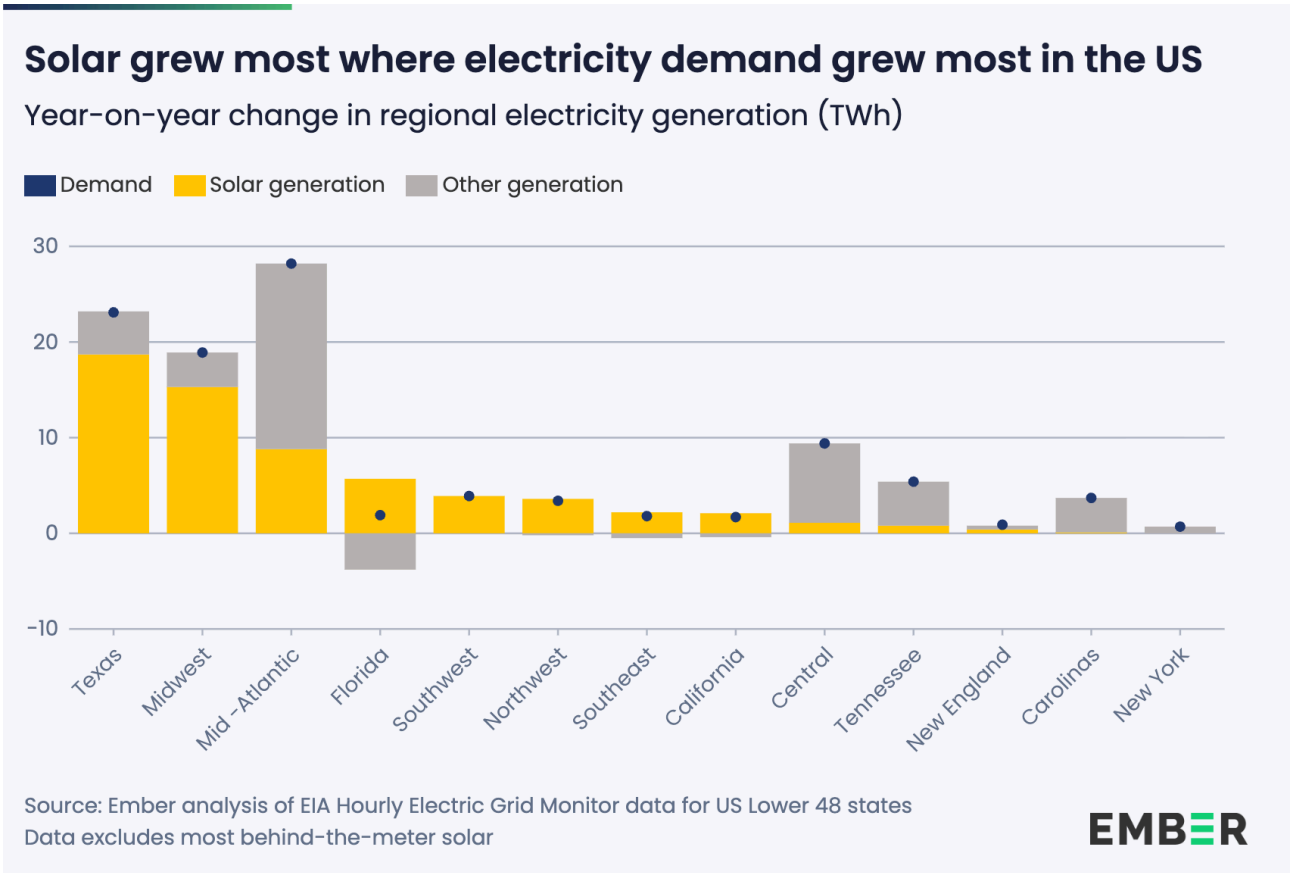


Solar grew most where electricity demand grew most. The three regions with the largest rises in solar generation also had the largest rises in electricity demand.

Texas saw the largest rise in utility solar generation of any US region, where solar met 81% of the demand rise. The Midwest region saw the second largest rise, where solar also met 81% of the demand rise. The Mid-Atlantic region had the largest rise in electricity grid demand, of which 33% was met by solar growth.

Solar growth exceeded demand growth by a large margin in Florida, contributing to a fall in fossil generation. In the Southwest, Northwest, Southeast and California regions, solar met about all of the rise in electricity demand.

Overall, the majority of new solar generation across the US happened where electricity demand grew, and therefore most of the rise in solar met rising electricity demand rather than displacing existing generation.



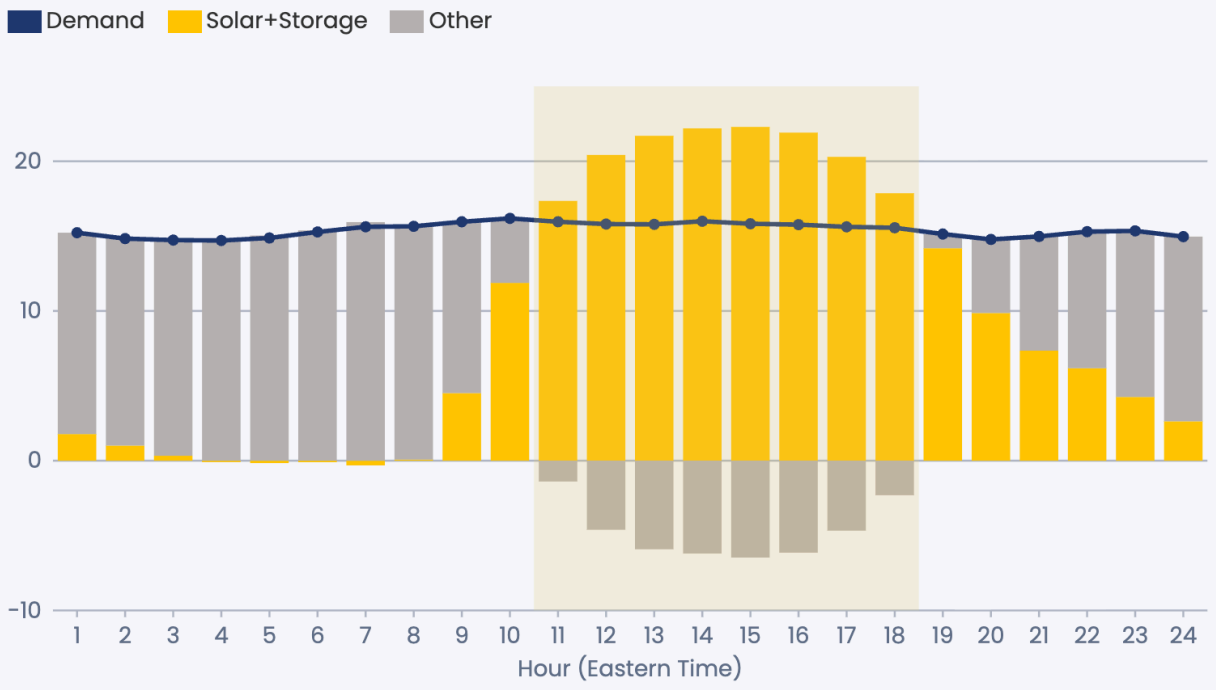
This is also true at an hourly level. The majority of solar growth was meeting electricity demand growth, rather than displacing fossil generation.

The rise in solar generation in 2025, in aggregate, met all of the rise in US electricity demand in the daytime in the hours of 10:00-18:00 ET. In addition, solar – thanks to new batteries – also met some of the electricity demand rise in the evening hours from 18:00-02:00 ET.

The rise in electricity demand overnight – and to some extent in the evening – was met with an increase in other generation, predominantly coal and gas generation.

Solar growth met all daytime demand growth in 2025 - and because of batteries - also part of evening demand growth

Change in hourly average US electricity, 2025 compared to 2024 (GW)



Source: Ember analysis of EIA US 48 lower state data.
Solar scaled up to take into account behind-the-meter.

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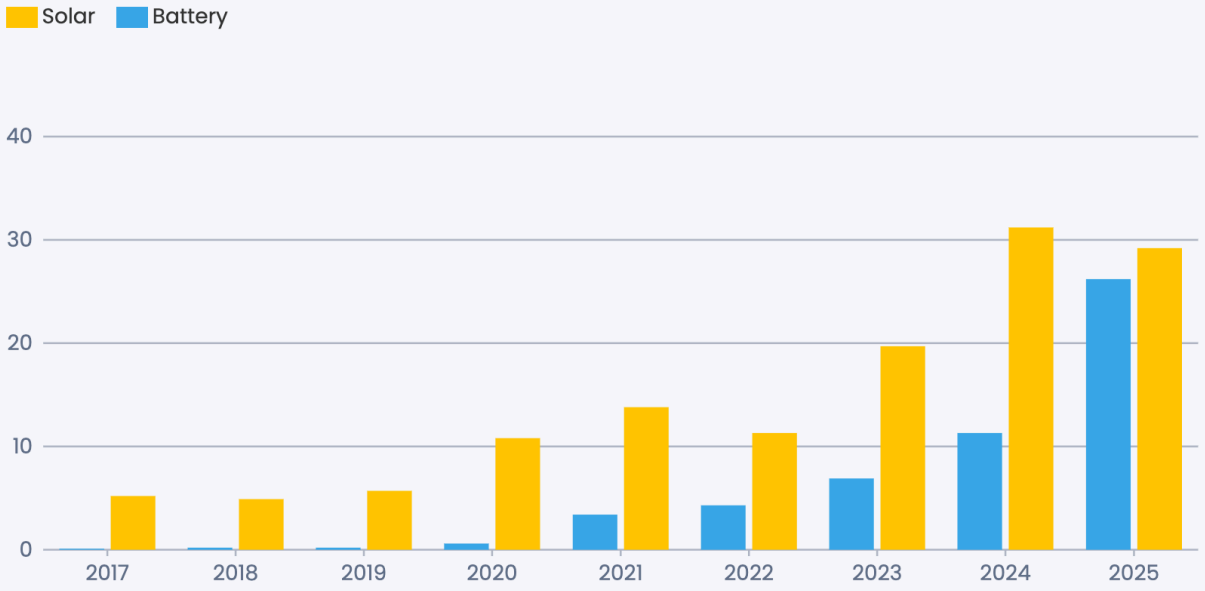
However, although solar generation rose by a record amount, solar capacity likely did not.

Provisional 2025 data shows US utility-scale solar capacity additions were 6% lower than in 2024. This was in part due to delays of many projects from the uncertainty over changing tariffs on imported solar panels, and continued long delays in getting grid connections, even as electricity demand accelerates.

Utility-scale remains dominant in the US, which was reinforced in 2025 as the largest residential market – California – saw a change to net metering rules. Batteries were a different story. Battery capacity additions surged 133% to 26 GW.

US solar capacity additions remain steady in 2025, while battery additions double

New utility-scale capacity commissioned (GW)



Source: Energy Information Administration (EIA)
2025 data not final; Estimate based on operating projects to November and planned projects

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How much further can solar grow

Solar can grow in many ways – batteries can grow solar into the night, solar's share is still low in many US states, and a duck curve hasn't even emerged yet at a national level.

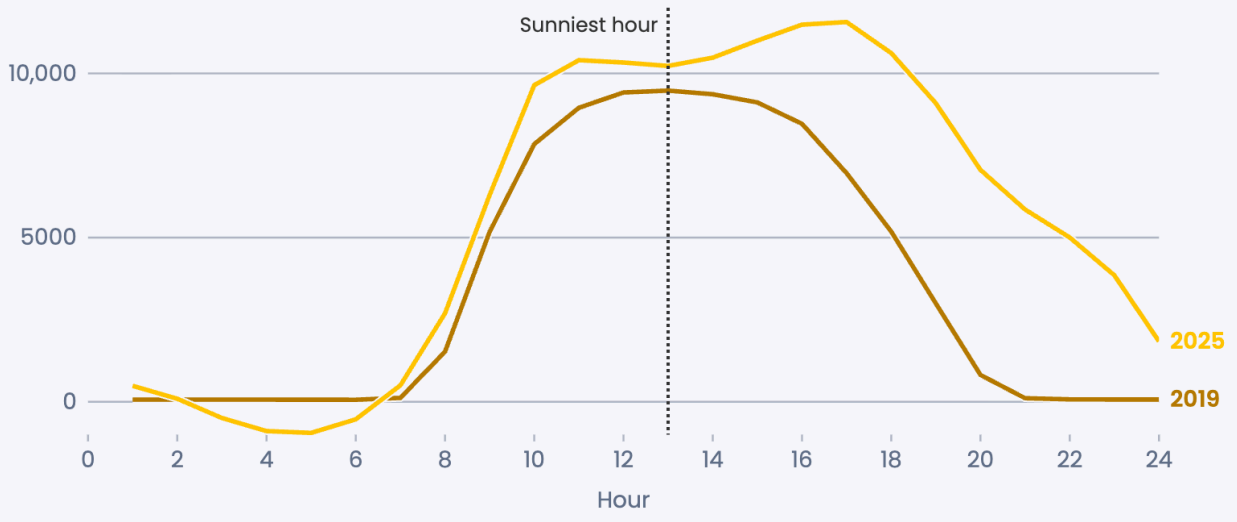
Solar electricity is not just for daytime. The rise of batteries in the US is changing solar from cheap daytime electricity to dispatchable all-day electricity. In the last six years, California's utility solar and battery generation has risen by 58%, most of which was delivered in the evening, while generation at the sunniest hour of the day rose by just 8%.

California's grid is increasingly a solar and storage story. Since 2021, more batteries have been added to the grid than solar, allowing solar generation to keep growing without significant curtailment pressure.

Putting solar where the sun doesn't shine

California's utility solar+storage generation (average MW)

California's utility solar and battery generation has risen by 58%, yet generation at the sunniest hour of the day has risen by just 8%



Source: Ember analysis EIA Hourly Electric Grid Monitor

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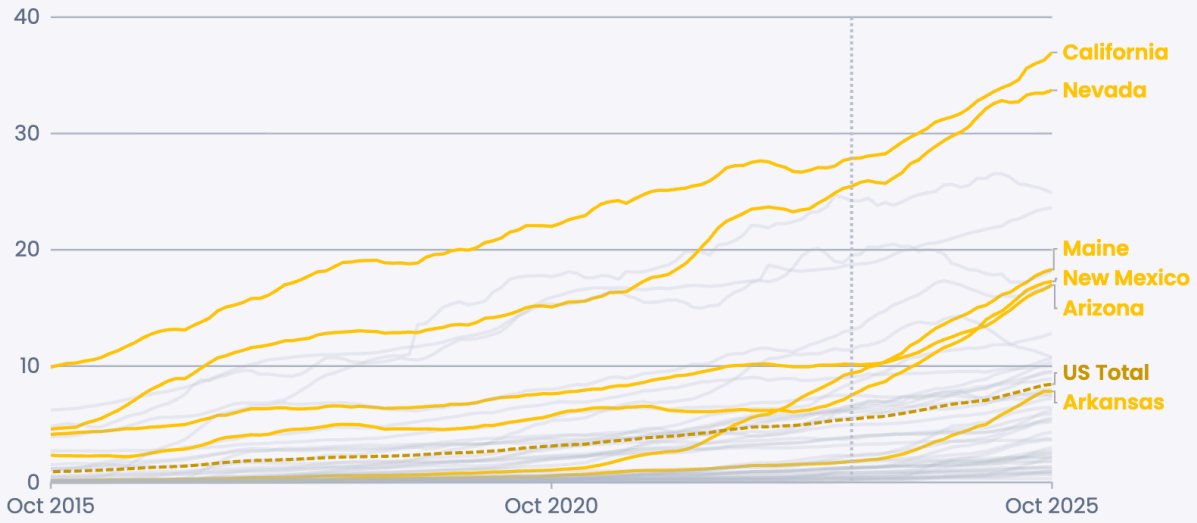
Fast change is possible. There are six US states which have seen solar's share rise by more than five percentage points in the 24 months to October 2025. New Mexico was the fastest riser, rising 10 percentage points from 7% to 17%.

California and Nevada have the highest solar share of 37% and 34% respectively. However, 37 states have less than a 10% share of solar. Most states have yet to embrace solar at scale.

Six US states saw their solar share surge by 5+ percentage points in the 24 months to October 2025

12-month rolling share of solar generation (%)



Source: US Electricity Data Explorer, Ember

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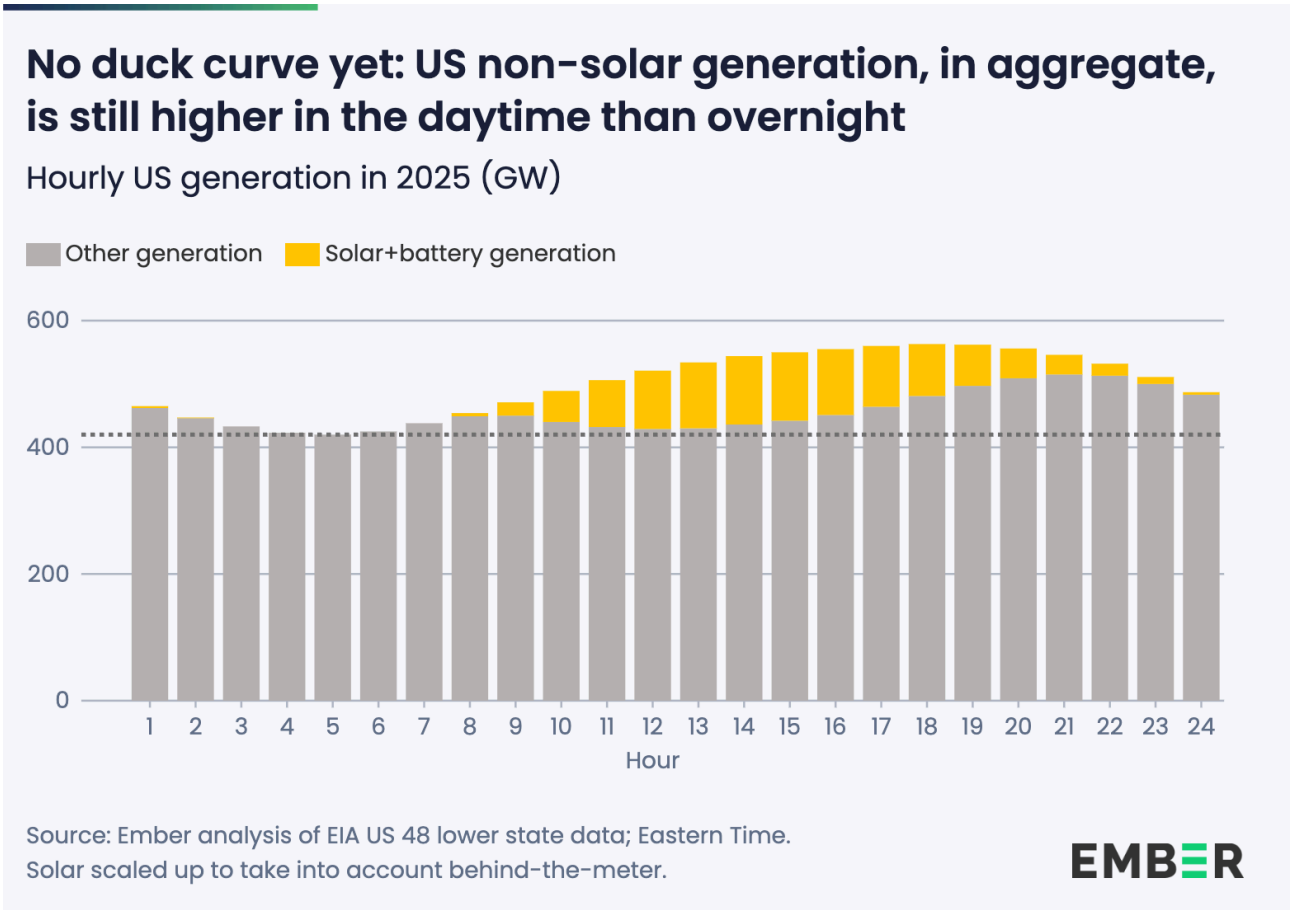
Solar benefits from batteries, but it doesn't need batteries – even at the sunniest lunchtime hour, there is plenty of fossil fuel generation that solar could displace in most states. So much so that there is still no duck curve in the US in aggregate.

A "duck curve" refers to the hourly shape that needs to be generated by other non-solar generators to meet demand when solar share is very high. Daytime solar means there is a large daytime belly, where conventional generators need to reduce their generation.

However, for the US as a whole this is not yet apparent – the non-solar electricity generation needed in the daytime is still higher than that needed overnight.

Even in the sunniest hour, solar provided only 20% US electricity generation on average across the year.



Solar in the US is only just beginning. Solar can meet fast-growing electricity demand. Solar growth already met 61% of electricity demand growth in 2025 and there's nothing to stop it meeting 100%. With the prospect of solar becoming so cheap, solar can also play an important role in reducing coal and gas use rapidly and economically.

Supporting materials

About Ember

Ember is an independent energy think tank that aims to accelerate the clean energy transition with data and policy. Its vision is a clean, electrified energy system for all. It gathers, curates and analyses data on the global energy system, publishing this openly and accessibly. 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 and reforming the EU carbon market, before rebranding as Ember in 2020. Its diverse team brings together energy analysts, data scientists, communicators and team-builders based around the world in over 20 countries, including Australia, Brazil, Colombia, Germany, India, Indonesia, Poland, South Africa, Türkiye, the UK and US.

Acknowledgements

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