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Batteries can unlock other energy technologies, and they're starting to make their mark on the grid.

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Batteries are on my mind this week. (Aren't they always?) But I've got two extra reasons to be thinking about them today.

First, there's a new special report from the International Energy Agency all about how crucial batteries are for our future energy systems. The report calls batteries a "master key," meaning they can unlock the potential of other technologies that will help cut emissions. Second, we're seeing early signs in California of how the technology might be earning that "master key" status already by helping renewables play an even bigger role on the grid. So let's dig into some battery data together.

1) Battery storage in the power sector was the fastest-growing commercial energy technology on the planet in 2023.

Deployment doubled over the previous year's figures, hitting nearly 42 gigawatts. That includes utility-scale projects as well as projects installed "behind the meter," meaning they're somewhere like a home or business and don't interact with the grid.

Over half the additions in 2023 were in China, which has been the leading market in batteries for energy storage for the past two years. Growth is faster there than the global average, and installations tripled from 2022 to last year.

One driving force of this quick growth in China is that some provincial policies require developers of new solar and wind power projects to pair them with a certain level of energy storage, according to the IEA report.

Intermittent renewables like wind and solar have grown rapidly in China and around the world, and the technologies are beginning to help clean up the grid. But these storage requirement policies reveal the next step: installing batteries to help unlock the potential of renewables even during times when the sun isn't shining and the wind isn't blowing.

When there are small amounts of renewables, it's not all that important to have storage available, since the sun's rising and setting will cause little more than blips in the overall energy mix. But as the share increases,



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some of the challenges with intermittent renewables become very clear.

We've started to see this play out in California. Renewables are able to supply nearly all the grid's energy demand during the day on sunny days. The problem is just how different the picture is at noon and just eight hours later, once the sun has gone down.

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