

Queued Up: 2024 Edition, Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2023

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Authors

[Rand, Joseph](#), [Nick Manderlink](#), [Will Gorman](#), [Ryan H Wiser](#), [Joachim Seel](#), [Julie Mulvaney Kemp](#), [Seongeun Jeong](#), [Fritz Kahrl](#)

Abstract

Electric transmission system operators (ISOs, RTOs, or utilities) require projects seeking to connect to the grid to undergo a series of impact studies before they can be built. This process establishes what new transmission equipment or upgrades may be needed before a project can connect to the system and assigns the costs of that equipment. The lists of projects in this process are known as “interconnection queues”. The amount of new electric capacity in these queues is growing dramatically, with nearly 2,600 gigawatts (GW) of total generation and storage capacity now seeking connection to the grid (over 95% of which is for zero-carbon resources like solar, wind, and battery storage). However, most projects that apply for interconnection are ultimately withdrawn, and those that are built are taking longer on average to complete the required studies and become operational. Data from these queues nonetheless provide a general indicator for mid-term trends in developer interest.

This annually updated briefing and data file compiles and analyzes interconnection queue data from all seven ISOs/RTOs alongside 44 non-ISO utilities, which collectively represent over 95% of the currently installed U.S. electric generating capacity.

- The total capacity active in the queues is growing year-over-year, with over 1,570 GW of generation and an estimated 1,030 GW of storage capacity as of the end of 2023.
- In total, over 1,480 GW of zero-carbon generating capacity is currently seeking transmission access. Solar (1,086 GW) accounts for the largest share of generation capacity in the queues. Substantial wind (366 GW) capacity is also seeking interconnection, 1/3 of which is for offshore projects (120 GW).
- Solar and battery storage are – by far – the fastest growing resources in the queues. Combined, they account for over 80% of new capacity entering the queues in 2023.
- Proposed fossil fuel generation much lower, with 79 GW of natural gas and 1.5 GW of coal currently proposed.
- Hybrid projects (co-locating multiple generation and/or storage types) comprise a large – and increasing – share of proposed projects, particularly in CAISO and the non-ISO West. 571 GW of solar hybrids (primarily solar+battery) and 48 GW of wind hybrids are currently active in the queues. Over half of the battery storage capacity in the queues is paired with some form of generation (mostly solar).
- However, much of this proposed capacity will not ultimately be built. Among a subset of queues for which data are available, only 19% of the projects (and 14% of capacity) seeking connection from 2000 to 2018 have been built as of the end of 2023.
- Interconnection wait times are also on the rise: The typical duration from connection request to commercial operation increased from <2 years for projects built in 2000-2007 to over 4 years for those built in 2018-2023 (with a median of 5 years for projects built in 2023).

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Notes

An interactive visualization of the queue data accompanies this briefing [here](#) and interactive maps [here](#). A brief overview of this study can be read [here](#). The most recent edition of this report is always available at: <https://emp.lbl.gov/queues>.

A webinar discussing this research recorded on April 23, 2024, can be viewed [here](#).

Organization

[Energy Markets and Policy Department](#), [Energy Analysis and Environmental Impacts Division](#)

Research Areas

[Grid Operations, Integration, and Infrastructure](#), [Cost, Benefit, and Market Analysis](#), [Recurring Market Tracking and Data Products](#), [Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection](#)

Related Files

[Data File XLSX \(5.76 MB\)](#)

[Briefing PDF \(20.41 MB\)](#)



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