

Energy Storage: a U.S. overview



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By

Lisa Cabral, Electricity Analyst

Energy Information Administration

Outline

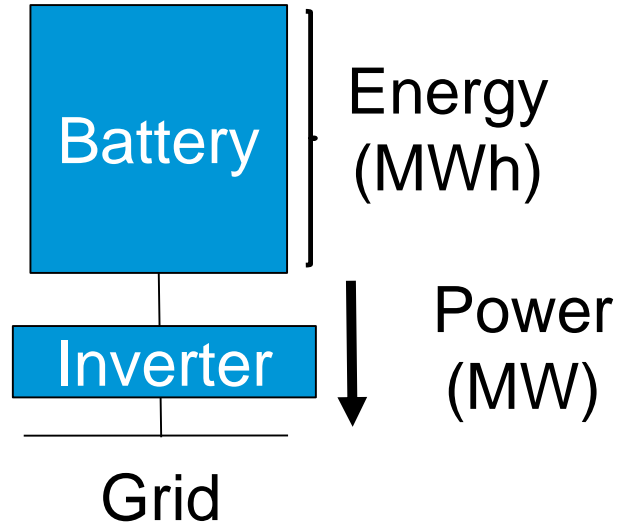
1. Definitions
2. Summary of small scale battery storage
3. Overview of large-scale battery storage:
 - regional trends
 - applications
 - installed costs
 - projections

Key takeaways

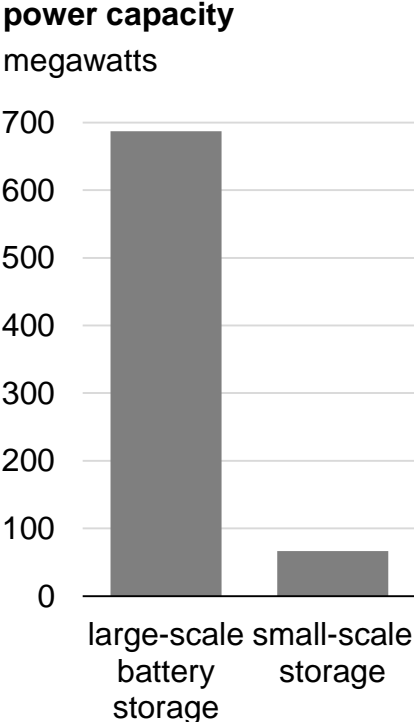
- As of end 2017, the US has 664 MW of power, 742 MWh of energy in operational large-scale battery capacity
- Most batteries are lithium-ion
- The majority are installed in CAISO or PJM
- State policy, wholesale market rules, and retail rates play a central role in where opportunities for battery storage exist
- Installed capacity is expected to grow as costs decline and market rules are updated

Definitions

- Power capacity: the maximum instantaneous amount of power output
- Energy capacity: the total amount of energy that can be stored or discharged
- Large scale: grid-connected, single installation of 1MW or greater in nameplate capacity

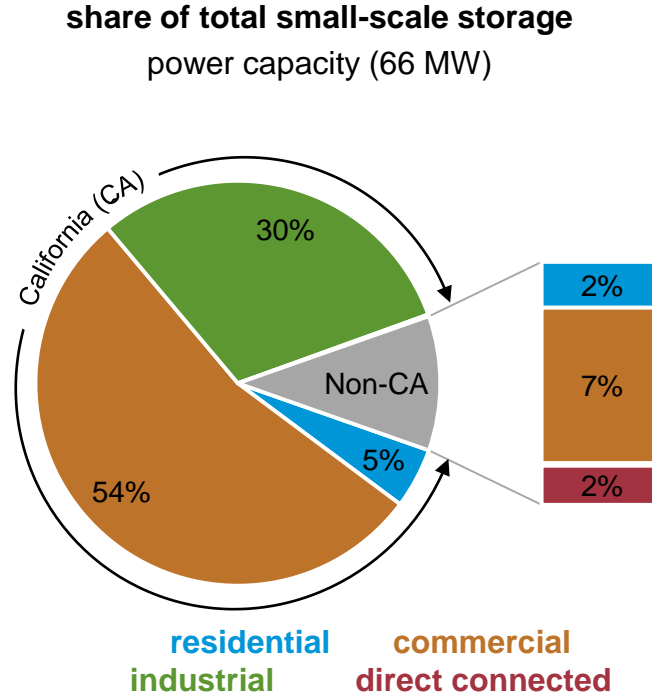
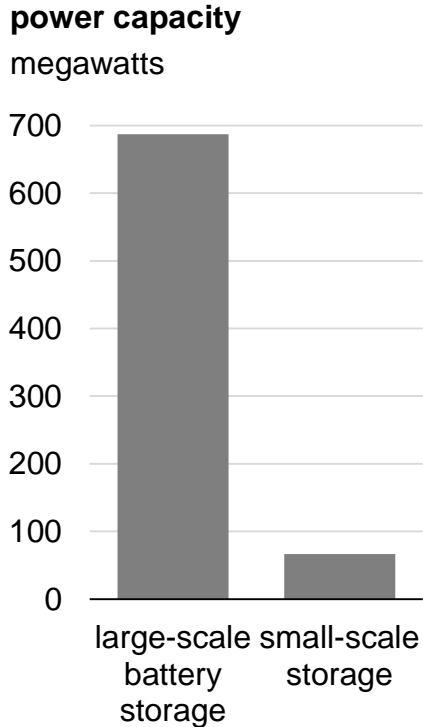


U.S. Small-Scale Storage by Sector, 2016



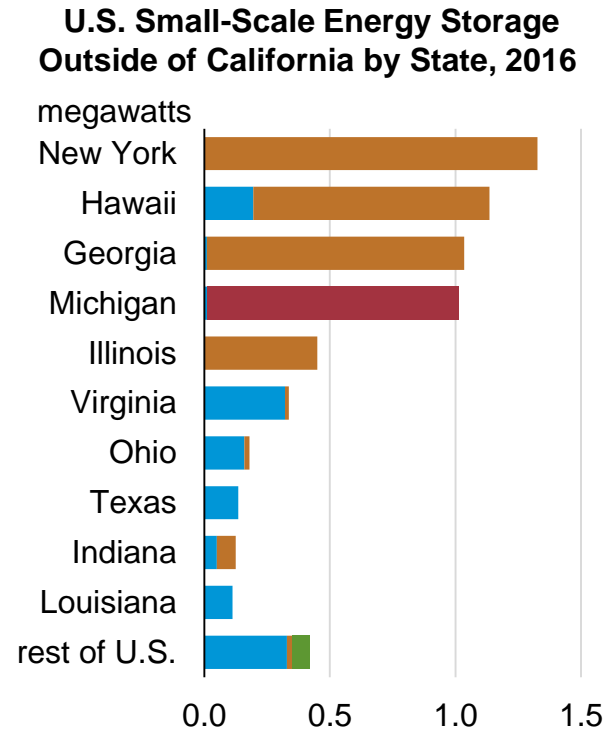
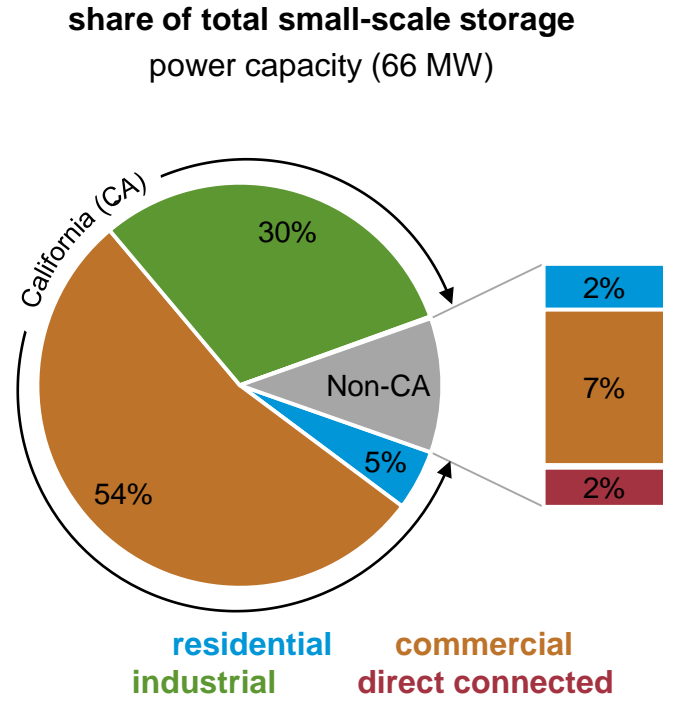
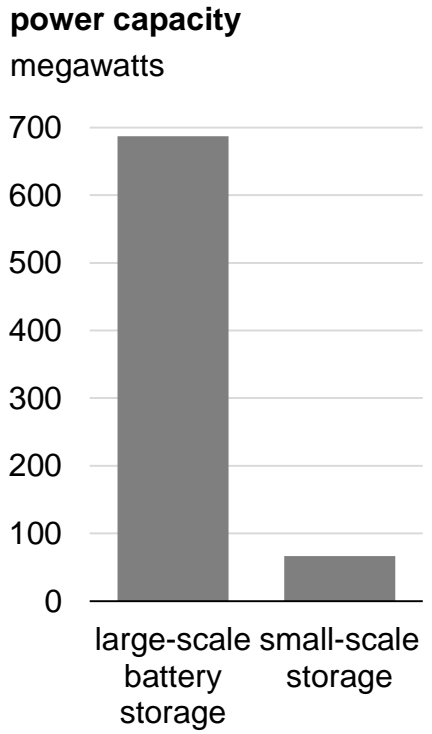
Source: U.S. Energy Information Administration, Form EIA-861, [Annual Electric Power Industry Report](#)

U.S. Small-Scale Storage by Sector, 2016



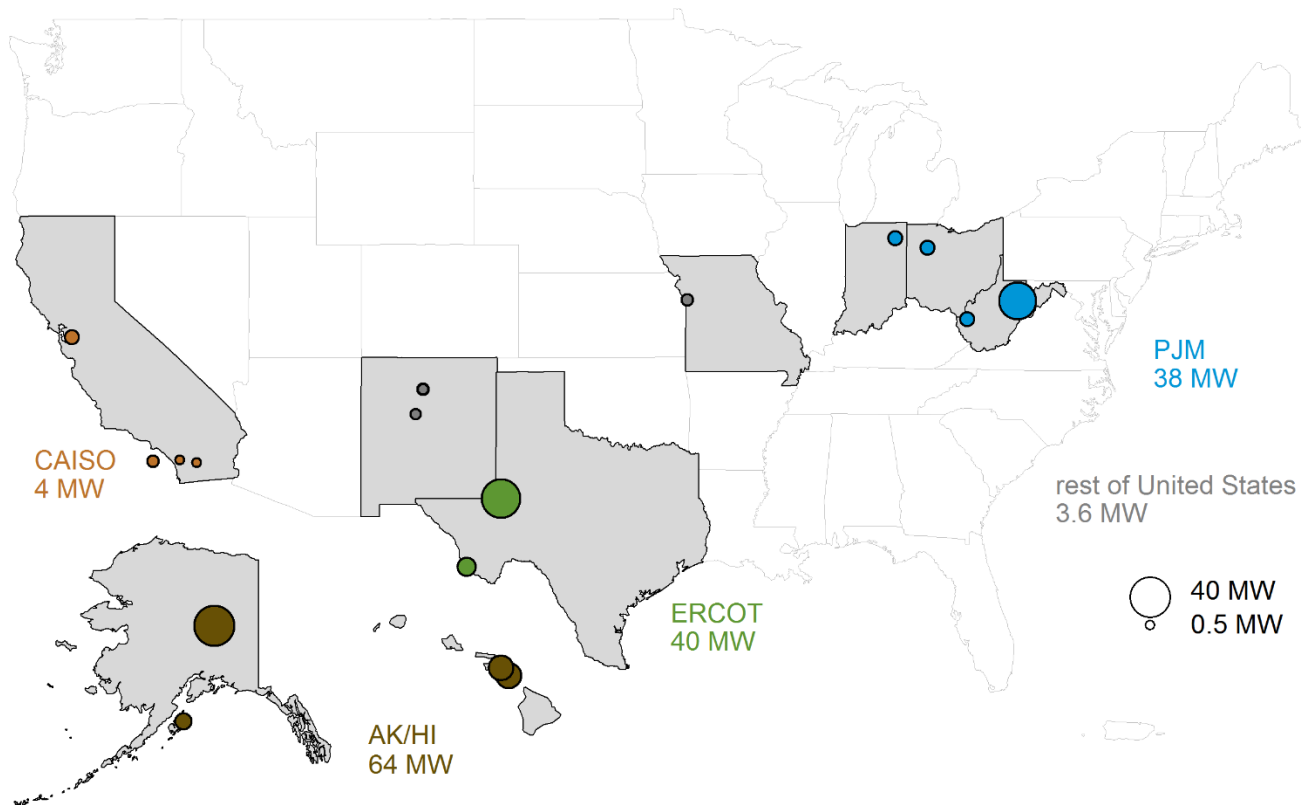
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U.S. Small-Scale Storage by Sector, 2016



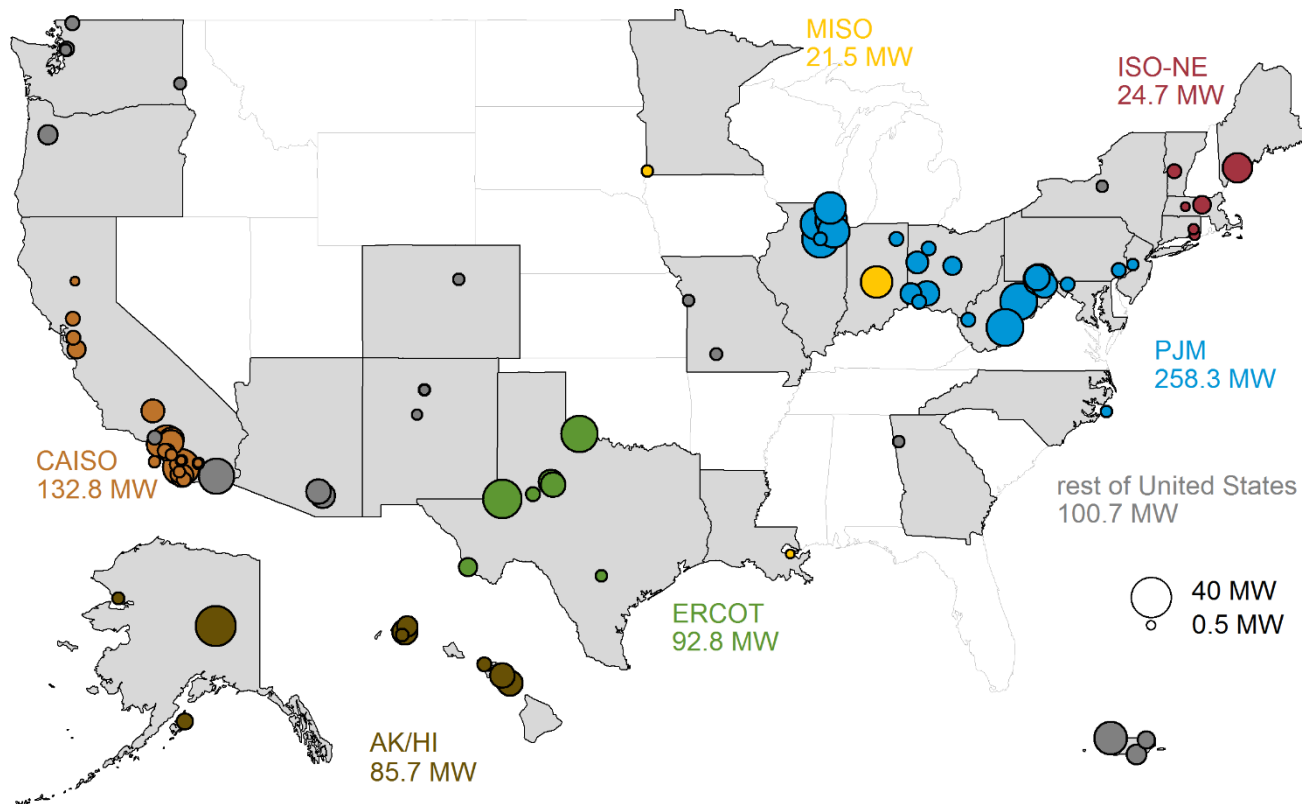
Source: U.S. Energy Information Administration, Form EIA-861, [Annual Electric Power Industry Report](#)

U.S. Large-Scale Battery Storage Capacity by Region, 2012



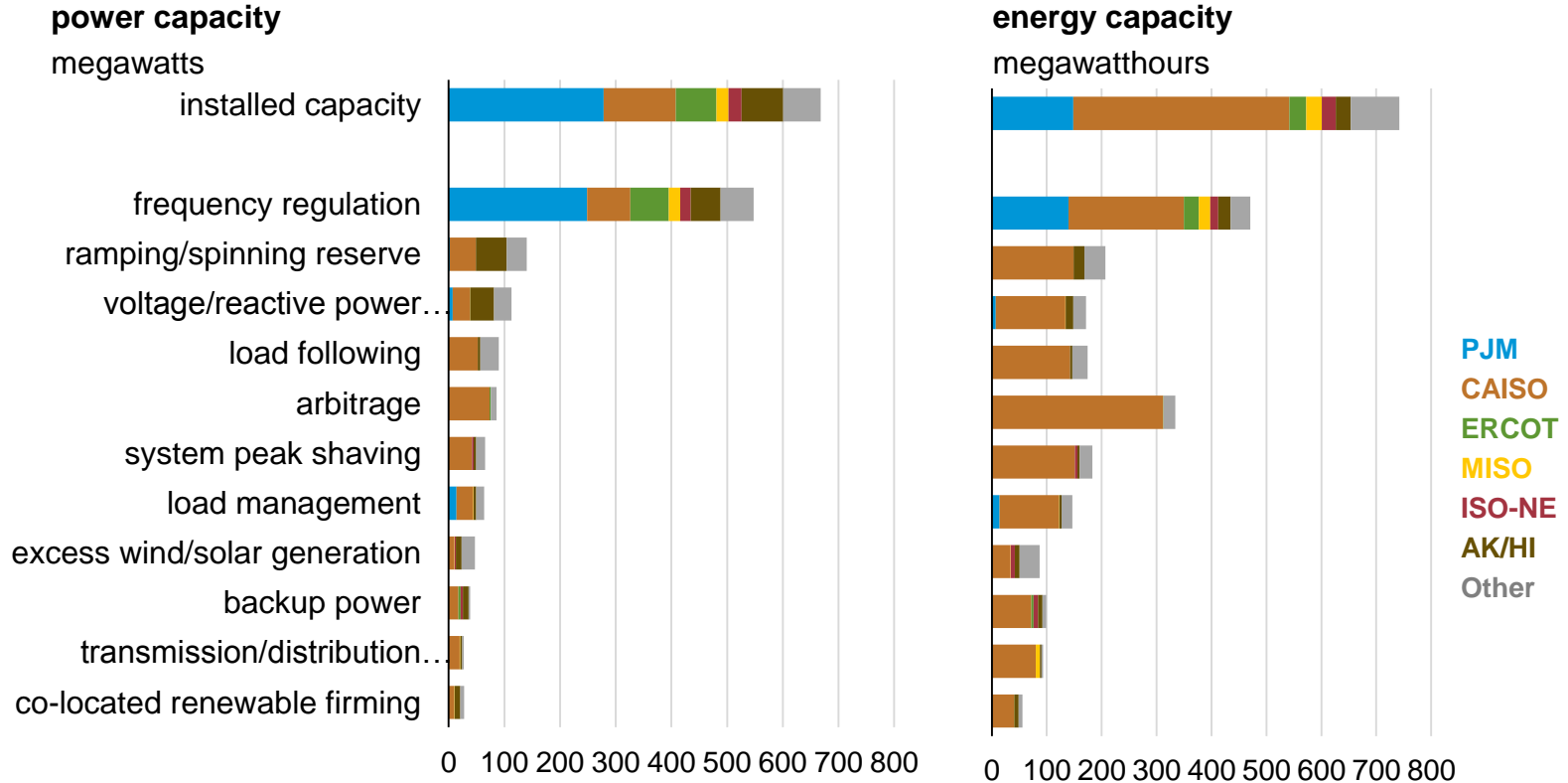
Sources: U.S. Energy Information Administration, Form EIA-860M, [Preliminary Monthly Electric Generator Inventory](#); U.S. Energy Information Administration, Form EIA-860, [Annual Electric Generator Report](#)

U.S. Large-Scale Battery Storage Capacity by Region, 2018



Sources: U.S. Energy Information Administration, Form EIA-860M, [Preliminary Monthly Electric Generator Inventory](#); U.S. Energy Information Administration, Form EIA-860, [Annual Electric Generator Report](#)

Applications Served by U.S. Large-Scale Battery Storage, 2017



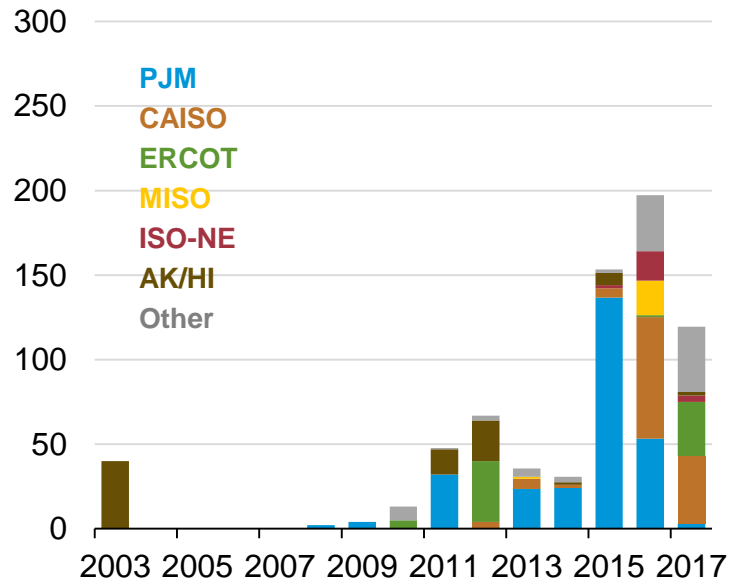
Source: U.S. Energy Information Administration, Form EIA-860, [Annual Electric Generator Report](#)

U.S. Large-Scale Battery Storage Capacity, 2003-2017

power capacity

megawatts

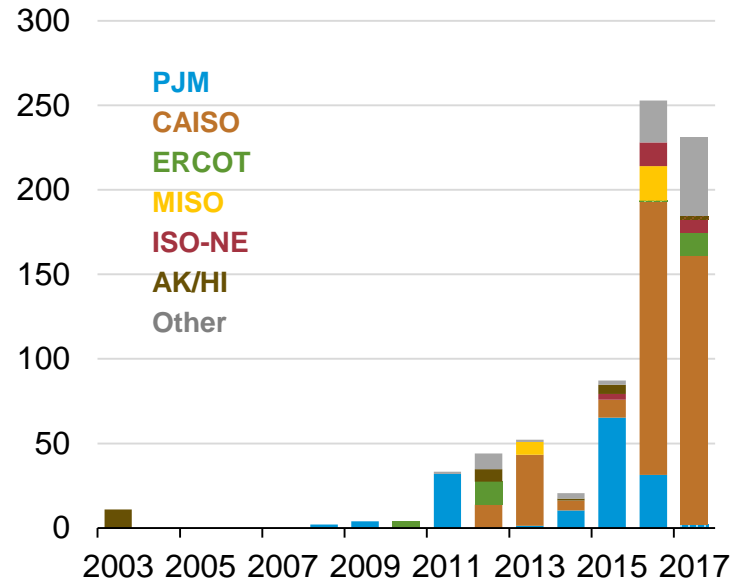
annual additions



energy capacity

megawatthours

annual additions

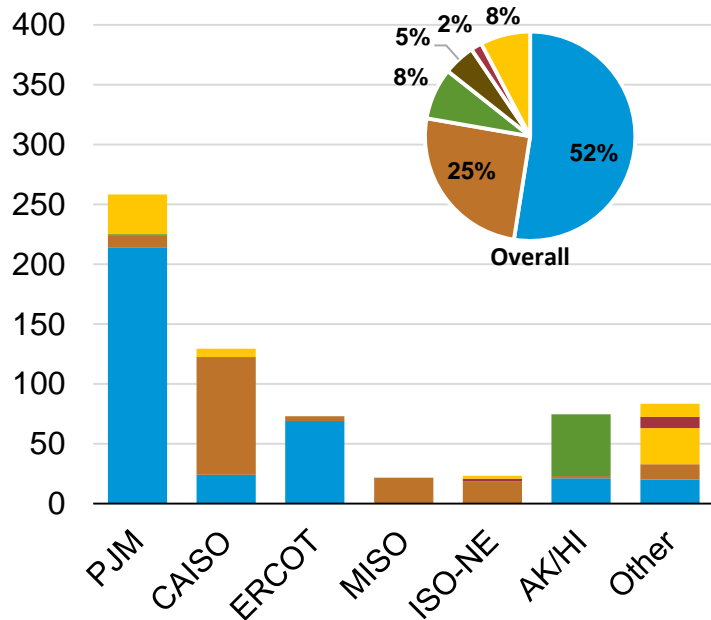


Sources: U.S. Energy Information Administration, Form EIA-860M, [Preliminary Monthly Electric Generator Inventory](#); U.S. Energy Information Administration, Form EIA-860, [Annual Electric Generator Report](#)

U.S. Large-Scale Battery Storage by Region and Ownership Type, 2017

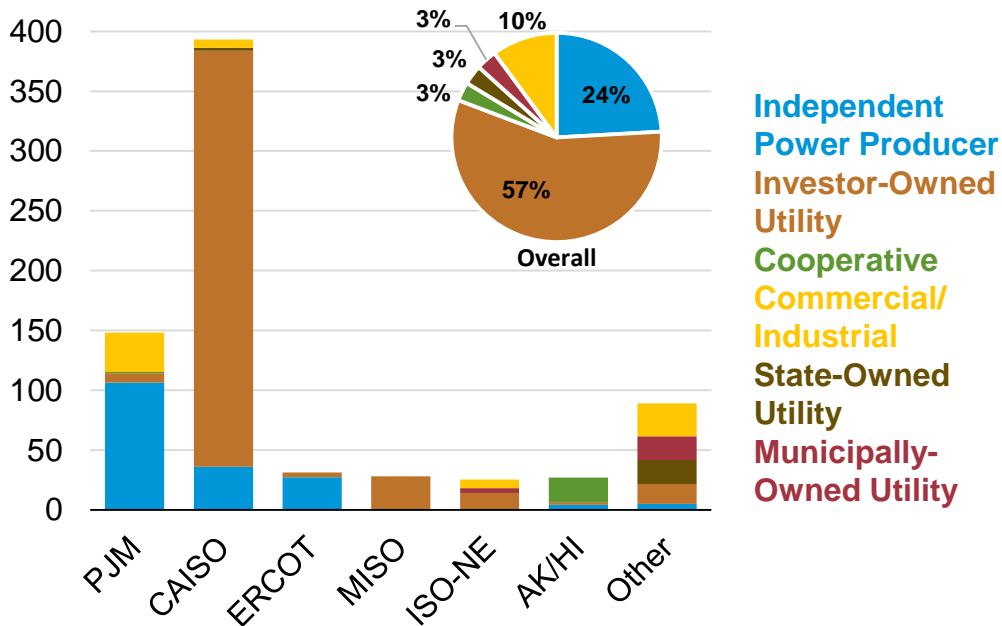
power capacity

megawatts



energy capacity

megawatthours



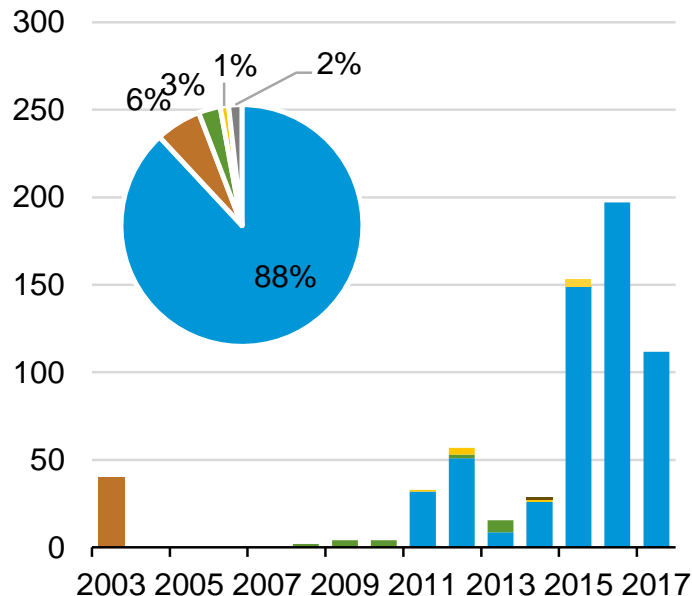
Source: U.S. Energy Information Administration, Form EIA-860, [Annual Electric Generator Report](#)

U.S. Large-Scale Battery Storage Capacity by Chemistry, 2003-2017

power capacity

megawatts

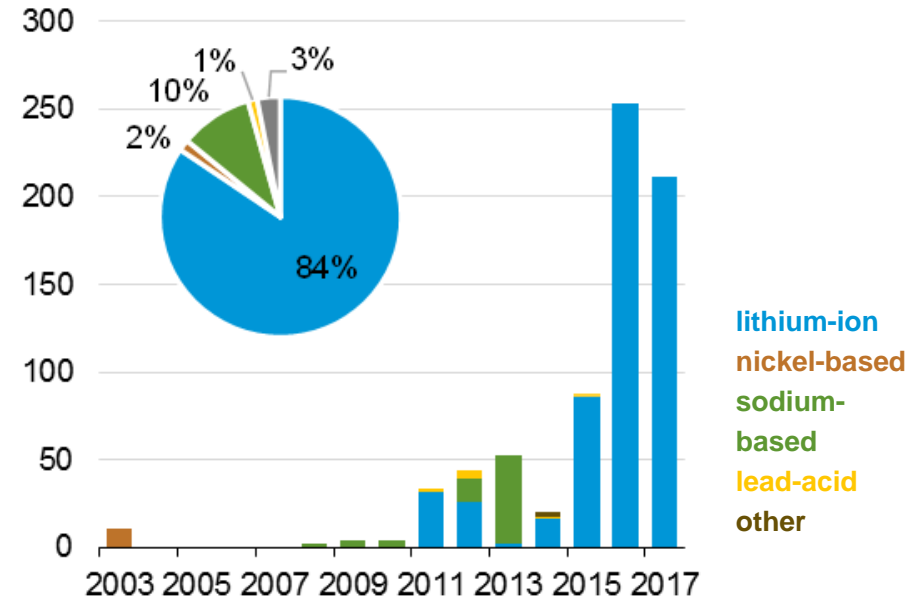
annual additions



energy capacity

megawatthours

annual additions

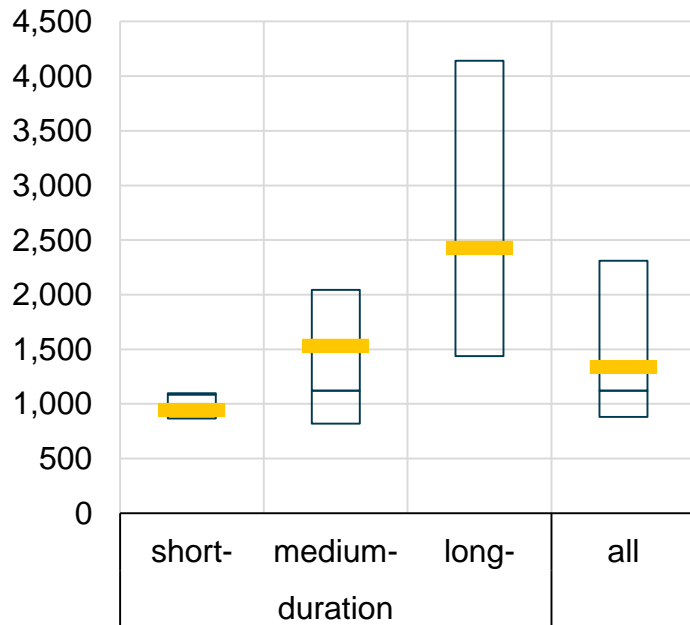


Source: U.S. Energy Information Administration, Form EIA-861, [Annual Electric Power Industry Report](#)

Installed Cost of U.S. Large-Scale Battery Storage Systems, By Duration (2013-2016)

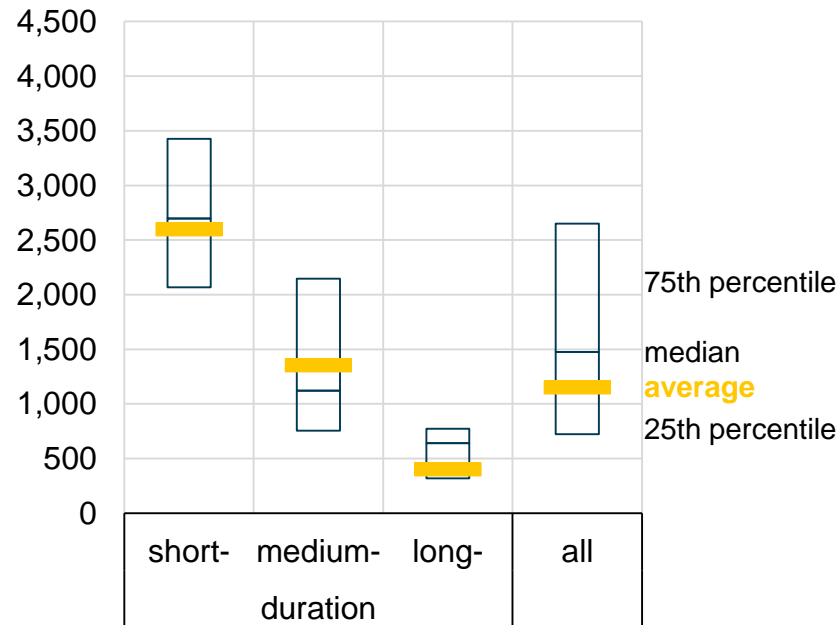
power capacity costs

dollars per kilowatt



energy capacity costs

dollars per kilowatthour

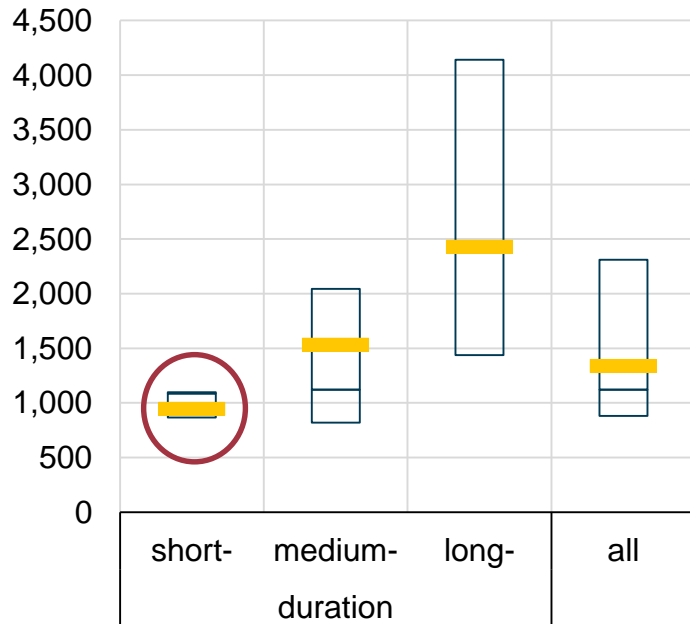


Source: U.S. Energy Information Administration, Form EIA-860, [Annual Electric Generator Report](#)

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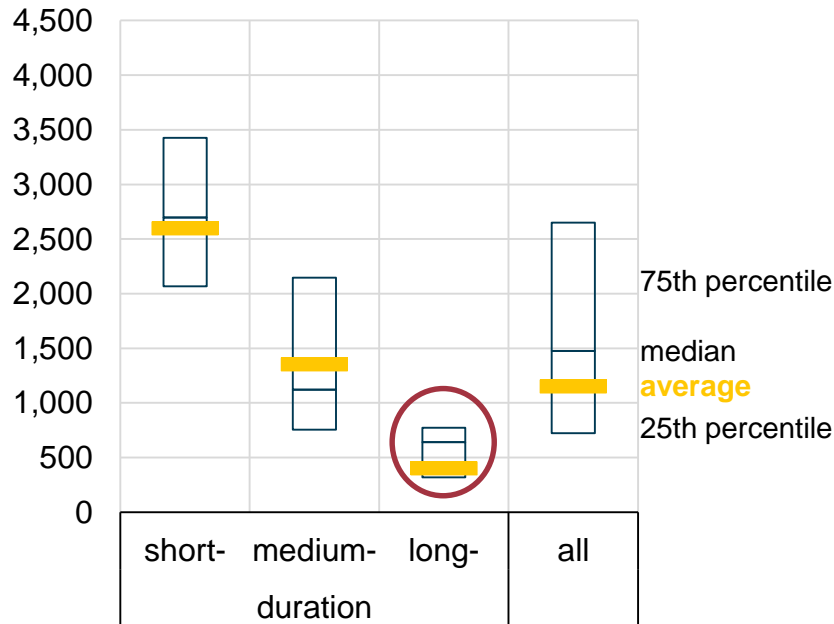
power capacity costs

dollars per kilowatt



energy capacity costs

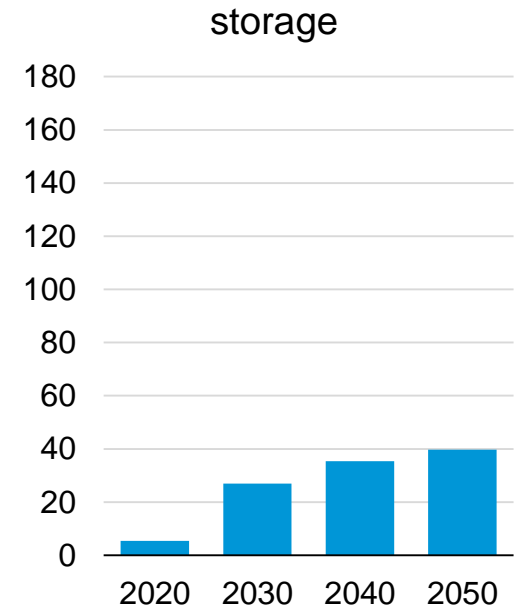
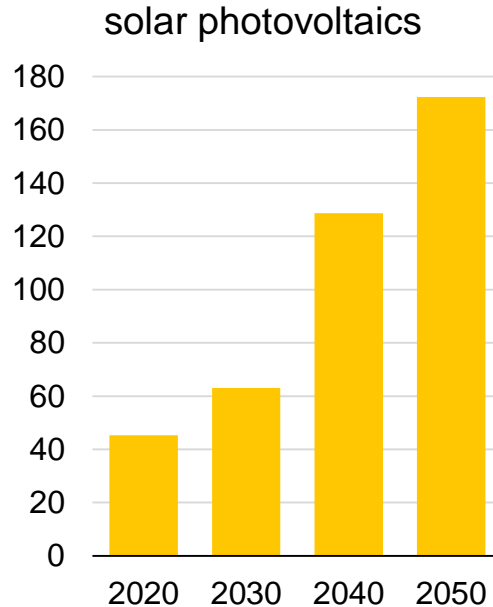
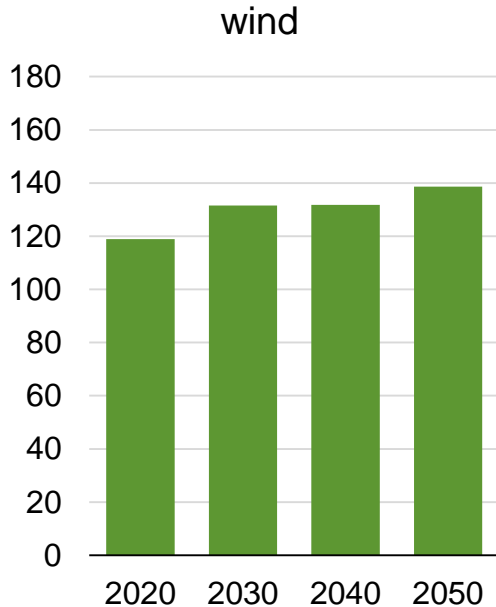
dollars per kilowatthour



Source: U.S. Energy Information Administration, Form EIA-860, [Annual Electric Generator Report](#)

U.S. Wind, Solar, and Battery Storage Capacity, 2020-2050

(power) capacity
gigawatts



Source: U.S. Energy Information Administration, [Annual Energy Outlook 2018](#)

Key takeaways

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Thank you

