Energy Storage: a U.S. overview

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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

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Source: U.S. Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report

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Source: U.S. Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report
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

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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

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

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

Source: U.S. Energy Information Administration, Form EIA-860, Annual Electric Generator Report

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

Source: U.S. Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report

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

Source: U.S. Energy Information Administration, Form EIA-860, Annual Electric Generator Report

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Source: U.S. Energy Information Administration, Form EIA-860, Annual Electric Generator Report

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

(power) capacity

gigawatts

Source: U.S. Energy Information Administration, Annual Energy Outlook 2018

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States that require storage in resource or energy plans

Source: U.S. Energy Information Administration
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Thank you