Energy storage and demand management

Battery storage is scaling up

Utility-scale battery storage in the United States increased by 18 times between 2009 and 2018.[47]

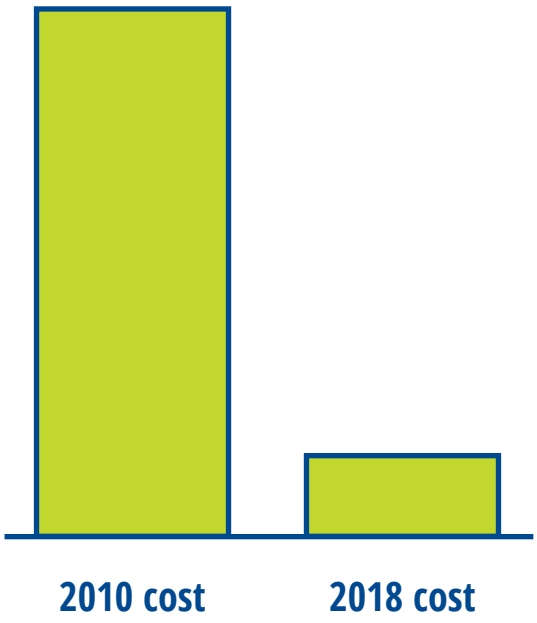
The cost of lithium ion batteries has fallen by 85% since 2010. A report from Bloomberg New Energy Finance predicts that battery costs in 2030 will be half of what they are today, leading to a 122-fold increase in battery storage globally by 2040.[48]

Utility-scale storage has arrived in Massachusetts

The Sterling Municipal Light Department installed Massachusetts' first utility-scale battery storage system in 2016. With projected savings of $400,000 for Sterling ratepayers, the battery system was also designed to provide backup power to the police station and dispatch center for up to 12 days in the event of a prolonged power outage.[49]

Sterling has since added a second battery storage system, and municipal utilities in North Reading and Ashburnham have also installed utility-scale storage.[50]

Investor-owned utilities like National Grid and Eversource are also installing storage. Battery storage systems have been installed or will soon be operating in Provincetown, Oak Bluffs, and Nantucket.[51]



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Benefits of battery storage

Battery storage will play an important role in matching the supply of variable renewable electricity generation, from sources like wind and solar, with demand for electricity. Additionally, battery storage provides several benefits to Massachusetts residents and the environment:

- **Reduced electricity bills:** Between 2013 and 2015, 40% of annual electricity costs in Massachusetts came from the most expensive 10% of hours, typically when electricity demand is highest. Energy stored in batteries can help meet demand during these peak periods, bringing electricity prices down.[52] Energy storage can also reduce the need to build or replace transmission and distribution infrastructure, the costs of which are ultimately passed along to ratepayers.[53]

- **Reduced pollution:** When demand for electricity is highest, grid operators turn on "peaking plants," which are typically more polluting than other power plants. Energy storage can reduce the need to turn on these dirty plants.[54]

- **Resiliency:** Battery storage, when installed as part of a microgrid that can be disconnected from the rest of the power grid, can help ensure a reliable supply of electricity to critical facilities during power outages.[55]

Other approaches to match energy supply and demand

Utility-scale batteries are not the only way to store energy. Other storage options include behind-the-meter residential and commercial batteries, thermal storage, and compressed air storage, as well as emerging technologies like hydrogen.[56]

Additionally, other strategies can help ensure that electricity generation matches demand:

- Integrating renewable energy generation over a wide geographic area, with sufficient transmission infrastructure to bring electricity from one place to another.
- Using detailed weather forecasting to respond to dips in wind and solar availability.
- Using demand response to reduce the use of electricity when demand exceeds supply.
- Incentivizing electric vehicle owners to charge their vehicles when there is excess electricity generation.
- "Overbuilding" wind and solar plants to ensure that there is enough electricity produced even when they are not generating at their full capacity.[57]