



Impact of Battery Storage Energy in Iowa

Iowa's success in clean energy includes game-changing energy storage solutions that contribute to the resiliency and reliability of our energy infrastructure and deliver cost savings to consumers.

- Iowa has 4 MW of battery storage capacity online.
- Iowa's battery storage projects, include:
 - **Knoxville Battery Energy Storage**
 - 1-megawatt battery storage facility online in Marion County since 2018.
 - 4-megawatt-hours of storage capacity, or enough electricity to power nearly 900 Iowa homes for up to four hours.
 - **Marshalltown Generating Station**
 - Online in Marshall County since 2020.
 - Marshalltown's Solar Garden is comprised of 9,500 solar panels that can power nearly 400 homes.
 - These solar panels can fully charge the 548kWh batteries within two hours. When discharged, the battery can power nearly 200 homes for two hours.
 - **Decorah Battery Storage**
 - Online in Winneshiek County since 2021.
 - How this project works:
 - The project's 2.5-megawatt, 2.9-megawatt-hour battery connects to a circuit with a high concentration of customer-owned solar systems.
 - The battery will absorb much of the excess energy these customers generate at the brightest parts of the day and release it on the grid when customers need it the most.
 - This solution relieves the load on the circuit and avoids the cost of rebuilding the grid to accommodate excess electricity.
 - **Duane Arnold Solar Storage II Project**
 - Will go online in 2024 (pending approval).
 - 75-megawatt-hours of storage capacity – enough electricity to power 60,000 Iowa homes for up to 4 hours.
 - That's equal to 10x the current storage capacity for the entire state of Iowa!



Nationally:



- Currently, there is a 4.7 GW and 11.3 GWh of battery storage capacity online across the country.
- 2021 was the largest year on record for battery storage installations
- In 2021, 2,695 MW and 7,774 MWh of battery storage capacity came online - a 200% increase from 2020.
- As of 2022, there are 329 projects operating across 36 states, 6 of which are in the Midwest, including Iowa.

Reliability:



- Energy storage is a game-changer for the energy industry. It allows us to store clean energy – increasing reliability, flexibility, and controlling costs for consumers and businesses.
- Iowa is prone to extreme weather like winter storms, tornadoes, and Derechos, and having a backup energy source minimizes the disruption for communities.
- During power outages, energy storage helps businesses avoid costly disruptions and continue normal operations.

Economic Benefits:

- Lithium-ion battery pack prices have fallen 89% in the last decade: from more than \$1,200/kWh in 2010 to \$132/kWh in 2021. As storage technology continues to advance, the cost will continue to decline.
- Storage can offset costs by storing energy when prices are low and discharging it during peak periods when rates are higher.
- The battery storage sector supports 66,749 jobs nationwide.
- In 2021, battery storage developers invested \$3.1 billion in projects across the country.
- The average 50MW storage project supports...
 - 120 jobs during construction
 - 10 operations and maintenance jobs for the life of the project
 - \$115 million in capital investment
 - \$4.5 million in sales, payroll, income, and other taxes during construction





How it works:

As sunlight hits the solar panels, the solar radiation is converted into direct current electricity (DC). The direct current then flows into power inverters converting it into alternating current (AC). The electricity then travels through transformers, and the voltage is boosted for delivery onto the transmission grid, allowing electric utilities to distribute the power to homes and businesses across the community.

- Electrochemical energy storage is the most common and fastest-growing form of energy storage.
 - This approach uses batteries, which store and discharge electricity through chemical reactions. The most common chemistry for battery cells is lithium-ion, but there are several other options as well.
- Energy capacity vs. power capacity
 - **Energy capacity: the total amount of energy that can be stored and measured**
 - **Power capacity: the amount of energy that can be released at a single point in time**
- Energy storage systems are designed to meet specific storage needs - short-term needs to better regulate wind or solar plant output and long-term needs to better match plant supply and consumer grid demand.

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