

# **The difference between 2 hours and 4 hours of battery energy storage**





## Overview

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BESS project duration is determined by the batteries selected for the project. A 2-hour battery takes 2 hours to charge or discharge its full capacity: it can be set to charge or discharge at a slower rate, for example for 4 hours, but at only half power. How long does a battery storage system last?

For example, a battery with 1 MW of power capacity and 4 MWh of usable energy capacity will have a storage duration of four hours. Cycle life/lifetime is the amount of time or cycles a battery storage system can provide regular charging and discharging before failure or significant degradation.

Will a fifth hour of battery storage cost more than 4 hours?

value for a fifth hour of storage (using historical market data) is less than most estimates for the annualized cost of adding Li-ion battery capacity, at least at current costs.<sup>25</sup> As a result, moving beyond 4-hour Li-ion will likely require a change in both the value proposition and storage costs, discussed in the following sections.

Should energy storage be more than 4 hours of capacity?

However, there is growing interest in the deployment of energy storage with greater than 4 hours of capacity, which has been identified as potentially playing an important role in helping integrate larger amounts of renewable energy and achieving heavily decarbonized grids.<sup>1,2,3</sup>.

What is a battery energy storage system?

In the evolving landscape of energy storage systems, Battery Energy Storage Systems (BESS) have become crucial for enhancing grid reliability and promoting renewable energy integration. Among various options, one-hour and two-hour BESS represent popular choices, each offering unique advantages and disadvantages.

What if a battery has less than the duration requirement?



A battery with less than the duration requirement can receive partial capacity value, as shown in Figure 2, representing a linear derate, so a 2-hour battery would receive half the credit of a 4-hour battery, but a 6-hour battery receives no more value or revenue (for providing capacity) than a 4-hour battery in this example.

What is the difference between rated power capacity and storage duration?

Rated power capacity is the total possible instantaneous discharge capability (in kilowatts [kW] or megawatts [MW]) of the BESS, or the maximum rate of discharge that the BESS can achieve, starting from a fully charged state. Storage duration is the amount of time storage can discharge at its power capacity before depleting its energy capacity.



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