

# Analysis of the Profit Model of Power Plant Energy Storage





## Overview

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The profit model of energy storage power stations operates primarily through: 1) frequency regulation, 2) capacity arbitrage, 3) ancillary market services, and 4) participation in energy trading markets. Is energy storage a profitable business model?

Although academic analysis finds that business models for energy storage are largely unprofitable, annual deployment of storage capacity is globally on the rise (IEA, 2020). One reason may be generous subsidy support and non-financial drivers like a first-mover advantage (Wood Mackenzie, 2019).

How do business models of energy storage work?

Building upon both strands of work, we propose to characterize business models of energy storage as the combination of an application of storage with the revenue stream earned from the operation and the market role of the investor.

How would a storage facility exploit differences in power prices?

In application (8), the owner of a storage facility would seize the opportunity to exploit differences in power prices by selling electricity when prices are high and buying energy when prices are low.

How can energy storage be profitable?

Where a profitable application of energy storage requires saving of costs or deferral of investments, direct mechanisms, such as subsidies and rebates, will be effective. For applications dependent on price arbitrage, the existence and access to variable market prices are essential.

What is a business model for storage?

We propose to characterize a “business model” for storage by three parameters: the application of a storage facility, the market role of a potential investor, and the revenue stream obtained from its operation (Massa et al.,



2017).

What is a power storage facility?

In the first three applications (i.e., provide frequency containment, short-/long-term frequency restoration, and voltage control), a storage facility would provide either power supply or power demand for certain periods of time to support the stable operation of the power grid.



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## fenrg-2022-975319 1..13

Multi-time scale trading profit model of pumped storage power plant for electricity market  
Yanhong Luo<sup>1,2</sup>, Shiwen Zhang<sup>1,2</sup>, Bowen Zhou<sup>1,2\*</sup>, Guangdi Li<sup>1,2</sup>, Bo Hu<sup>3</sup>, Yubo Liu<sup>4</sup> and Zhaoxia ...

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The financial model underpinning energy storage power stations is diverse and multi-layered, offering various routes to profitability while simultaneously addressing ...

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and power The role of Electrical Energy Storage (EES) is becoming increasingly important in the proportion of distributed generators continue to increase in the power system. With the ...

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