#### Why does Lazard's LCoS 7.0 change the cost of storage?

Lazard's latest annual Levelized Cost of Storage Analysis (LCOS 7.0) shows that year-over-year changes in the cost of storage are mixed across use cases and technologies, driven in part by the confluence of emerging supply chain constraints and shifting preferences in battery chemistry.

Does Lazard have a levelized cost of storage?

Source: Lazard estimates. (1) Given the operational parameters for the Transmission and Distribution use case (i.e., 25 cycles per year), certain levelized metrics are not comparable between this and other use cases presented in Lazard's Levelized Cost of Storage report.

What is the levelized cost of storage analysis?

Alongside the electricity cost report, is the Levelized Cost of Storage Analysis, version 6.0. The levelized cost of storage (LCOS) is what a battery would need to charge for its services in order to meet a 12% cost of capital, while putting down 20% and paying an 8% interest rate on the remaining 80% of the project's costs.

#### What is LCOE Lazard?

Reports and studies-- Financial Advisory,Levelized Cost of Energy,Levelized Cost of Hydrogen,Levelized Cost of Storage,LCOE Lazard undertakes an annual detailed analysis into the levelized costs of energy from various generation technologies, energy storage technologies and hydrogen production methods.

What drives hydrogen's levelized cost?

Key drivers of hydrogen's levelized cost are the cost of electricity, capital expenditures for production equipment and utilization of the electrolyzer. The co-authors of Lazard's annual review of Levelized Cost of Energy (LCOE) share some key highlights from this year's report.

#### How much does storage cost?

The corresponding levelized cost of storage for this case would be \$1,613/MWh - \$3,034/MWh. The scope of revenue sources is limited to those captured by existing or soon-to-be commissioned projects. Revenue sources that are not identifiable or without publicly available data are not analyzed

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# ENERGY STORAGE SYSTEM

Our Levelized Cost of Storage analysis consists of creating an energy storage model representing an illustrative project for ea ch relevant technology and solving for the \$/MWh figure that results in a levered IRR equal to the assumed cost of equity (1) Wholesale (100 MW / 200 MWh)ow Case Sample Calculations Technology-dependent Levelized (5)



LAZARD'S LEVELIZED COST OF HYDROGEN ANALYSIS Overview of Analysis Lazard has undertaken an analysis of the Levelized Cost of Hydrogen ("LCOH") in an effort to provide greater clarity to Industry participants on the ("LCOE") and Levelized Cost of Storage ("LCOS") studies. Given this breadth, we have decided to focus the

Lazard's latest annual Levelized Cost of Energy Analysis (LCOE 11.0) shows a continued decline in the cost of generating electricity from alternative energy technologies, especially utility-scale solar and wind. Lazard's latest annual Levelized Cost of

Storage Analysis (LCOS 3.0), conducted with

support from Enovation Partners, shows







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#### LAZARD'S LEVELIZED COST OF STORAGE ANALYSIS 2.0 . KEY FINDINGS . Lazard has published its second Levelized Cost of Storage Analysis ("LCOS 2.0"), 1 an in-depth study that compares the costs of various energy storage technologies for particular applications. 2.













LAZARD'S LEVELIZED COST OF STORAGE ANALYSIS ??? VERSION 6.0 Table of Contents I INTRODUCTION 1 II LAZARD'S LEVELIZED COST OF STORAGE ANALYSIS V6.0 3 III ENERGY STORAGE VALUE SNAPSHOT ANALYSIS 7 IV PRELIMINARY VIEWS ON LONG-DURATION **STORAGE 11 APPENDIX A Supplemental LCOS** Analysis Materials 14 B ???





II LAZARD'S LEVELIZED COST OF STORAGE ANALYSIS???VERSION 8.0. 15: III LAZARD'S LEVELIZED COST OF HYDROGEN ANALYSIS???VERSION 3.0. 24: APPENDIX . A Maturing Technologies: 29. 1 Carbon Capture & Storage Systems: 30. 2 Long Duration Energy Storage: 33. B LCOE v16.0: 36. C LCOS v8.0: 41. D LCOH v3.0: 43. APRIL 2023.

Lazard's Levelized Cost of Storage

Analysis???Version 3.0. The central findings of our LCOS analysis include: 1) selected energy storage technologies are establish a cycle in which energy storage cost declines facilitate wider deployment of Alternative Energy technology, creating more demand for, and spurring further



NEW YORK--(BUSINESS WIRE)--Oct. 19, 2020--. Lazard Ltd (NYSE: LAZ) has released its annual in-depth studies comparing the costs of energy from various generation technologies and the costs of energy storage technologies for different applications.. Lazard's latest annual Levelized Cost of Energy Analysis (LCOE 14.0) shows that as the cost of ???

LCOE costs in future iterations of this report (albeit not necessarily higher relative costs). Lazard's latest annual Levelized Cost of Storage Analysis (LCOS 7.0) shows that year-over-year changes in the cost of storageare mixed across use cases and technologies, driven in part by the confluenc e of

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## 7.0) shows t of storageary technologies Lazard's Lev

ENERGY STORAGE SYSTEM

Lazard's Levelized Cost of Energy+ (LCOE+) is a U.S.-focused annual publication that combines analyses across three distinct reports: Energy (LCOE, 17 th edition), Storage, (LCOS, 9 th edition) and Hydrogen (LCOH, 4 th edition). Lazard first started publishing its comparative analysis of various generation technologies in 2007.

#### II LAZARD'S LEVELIZED COST OF STORAGE ANALYSIS???VERSION 8.0. 15: III LAZARD'S LEVELIZED COST OF HYDROGEN ANALYSIS???VERSION 3.0. 24: APPENDIX . A Maturing Technologies: 29. 1 Carbon Capture & Storage Systems: 30. 2 Long Duration Energy Storage: 33. B LCOE v16.0: 36. C LCOS v8.0: 41. D LCOH v3.0: 43. APRIL 2023.

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potentially disruptive role of hydrogen across a variety of economic sectors. Our LCOH builds upon, and relates to, our annual Levelized Cost of Energy ("LCOE") and Levelized Cost of Storage ("LCOS") studies. Given this breadth, we have decided to focus the analysis on the following key topics:

Lazard released its annual set of levelized cost reports on electricity generation, energy storage, and hydrogen. In this year's Levelized Cost of Storage Analysis ??? Version 7.0, the group analyzed 12 energy storage projects, three of which were U.S.-based battery storage facilities coupled with solar power.. The first case study was a direct-to-grid wholesale project, ???

Some studies differentiate between net internal costs of storing electricity, which excludes electricity price and storage efficiency, and cost per unit of discharged electricity, which includes both. 14 This lack of common methodology is reflected in the different names that are used to describe LCOS, such as levelized cost of stored energy, 8







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The results of our Levelized Cost of Storage ("LCOS") analysis reinforce what we observe across the Power, Energy & Infrastru cture Industry???energy storage system ("ESS") applications are becoming more valuable, well understood and, by extension, widespread as grid operato rs begin adopting Key takeaways from Version 4.0 of Lazard

IV LAZARD'S LEVELIZED COST OF STORAGE ANALYSIS V4.0 A Overview of Selected Use Cases 9 B Lazard's Levelized Cost of Storage Analysis v4.0 11 V LANDSCAPE OF ENERGY STORAGE **REVENUE POTENTIAL 16 VI ENERGY STORAGE** VALUE SNAPSHOT ANALYSIS 21 APPENDIX A Supplementary LCOS Analysis Materials 26









Lazard's Levelized Cost of Energy ("LCOE") analysis addresses the following topics: High end incorporates 90% carbon capture and storage. Does not include cost of transportation and storage. (7) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Blue" hydrogen, (i.e., hydrogen produced

Lazard's latest annual Levelized Cost of Storage Analysis (LCOS 6.0) shows that storage costs have declined across most use cases and technologies, particularly for shorter-duration applications, in part driven by evolving preferences in the industry regarding battery chemistry.



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# ower Conversion

Lazard's latest annual Levelized Cost of Energy Analysis (LCOE 12.0) shows that, in some scenarios outlined below, alternative energy costs have decreased to the point that they are now at or below the marginal cost of conventional generation. Lazard's latest annual Levelized Cost of Storage Analysis (LCOS 4.0) shows significant cost

The Levelized Cost of Storage (LCOS) is a metric used to calculate the cost of energy storage systems per unit of energy consumed or produced. This calculation takes into account the initial costs, ongoing operational expenses, and the total amount of energy that the system can store and discharge during its operational life.







500KW 1MW 2MW

