

What does LCOE stand for?

Lazard's Levelized Cost of Energy Analysis--Version 16.0 The levelized cost of energy (LCOE) presents the energy-normalized cost of a generation asset by considering all associated costs (investment and operation) and total generated energy over its life cycle.

What is Lazard's LCOE+ report?

Lazard first started publishing its comparative analysis of various generation technologies in 2007. Lazard's 2024 LCOE+ report highlights that, as expected, macro pressures, including high interest rates, have raised the lower end of our LCOE for certain renewables.

Does coal LCOE include cost of Transportation and storage?

Coal LCOE does not include cost of transportation and storage. The fuel cost assumptions for Lazard's LCOE analysis of gas-fired generation, coal-fired generation and nuclear generation resources are \$3.45/MMBTU, \$1.47/MMBTU and \$0.85/MMBTU respectively, for year-over-year comparison purposes.

Why is LCOE a leveled value?

As LCOE is a leveled value, it provides a quick and easy measure to compare different energy resource technologies with different characteristics. The LCOE calculation for large-scale power plants and distributed generations (DGs) is extensively studied and can be found in the literature.

Why is the LCOE important?

As such, and as has been noted in our historic reports, the LCOE is just the starting point for resource planning and has always reinforced the need for a diversity of energy resources, including but not limited to renewable energy.

What does LCOE v15.0 mean?

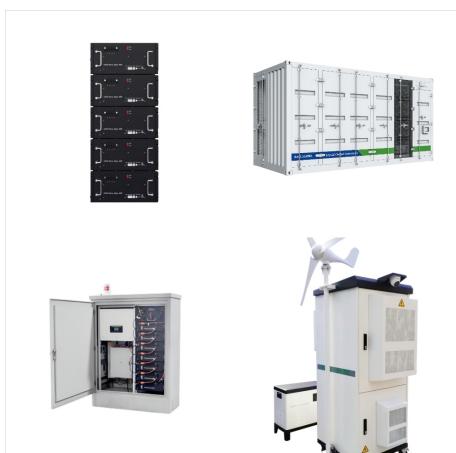
Given the limited public and/or observable data set available for new-build coal projects, the LCOE presented herein represents Lazard's LCOE v15.0 results adjusted for inflation. High end incorporates 90% carbon capture and storage ("CCS"). Does not include cost of transportation and storage.



operating expenses are based on upper - and lower -quartile estimates derived from Lazard's research. Please see page titled "Levelized Cost of Energy Comparisona??Renewable Energy versus Marginal Cost of Selected Existing Conventional Generation" for additional details. (6) High end incorporates 90% carbon capture and storage.



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.



Tabel 1: Overst investeringen i \$/kW kapacitet, dernaest kapacitetsfaktoren, levetiden og nederst LCOE, for hhv. Lazard min. og maks. og TEBB's bud pa realistiske tal. Lazard regner ogsa med en levetid pa mollerne pa 30 ar og en uaendret produktion hen gennem dette tidsrum. Det er ikke i overensstemmelse med praktiske erfaringer



Source: Lazard and Roland Berger estimates and publicly available information. Note: Here and throughout this analysis, unless otherwise indicated, the analysis assumes 60% debt at an 8% interest rate and 40% equity at a 12% cost. See page titled "Levelized Cost of Energy Comparisona??Sensitivity to Cost of Capital"



LAZARD's LEVELIZED COST OF ENERGY ANALYSISa??VERSION 14.0 Solar PV versus Gas Peaking and Wind versus CCGTa??Global Markets(1) Solar PV and wind have become increasingly competitive with conventional technologies with similar generation profiles; without storage, however, these resources lack the dispatch characteristics, and associated



Levelized Cost Of Energy, Levelized Cost Of Storage, and Levelized Cost Of Hydrogen 2021. Lazard's latest annual Levelized Cost of Energy Analysis (LCOE 15.0) shows the continued cost competitiveness of certain renewable energy technologies on a subsidized basis and the marginal cost of coal, nuclear and combined cycle gas generation.



The mean levelized cost of energy of utility-scale PV technologies is down approximately 13% from last year and the mean levelized cost of energy of onshore wind has declined almost 7%. Lazard's latest annual Levelized Cost of Storage Analysis (LCOS 4.0) shows significant cost declines across most use cases and technologies, especially for



LAZARD's LEVELIZED COST OF ENERGY ANALYSIS V E R S I O N 1 2 . 0 Lazard's Levelized Cost of Energy ("LCOE") analysis addresses the following topics: Comparative LCOE analysis for various generation technologies on a \$/MWh basis, including sensitivities, as relevant, for U.S. federal tax subsidies, fuel prices and costs of capital



The results of our Levelized Cost of Energy ("LCOE") analysis reinforce what we observe across the Power, Energy & Infrastructure Industry: sizable and well-capitalized companies that can take advantage of supply chain and other economies of scale, and that have strong balance sheet assets.



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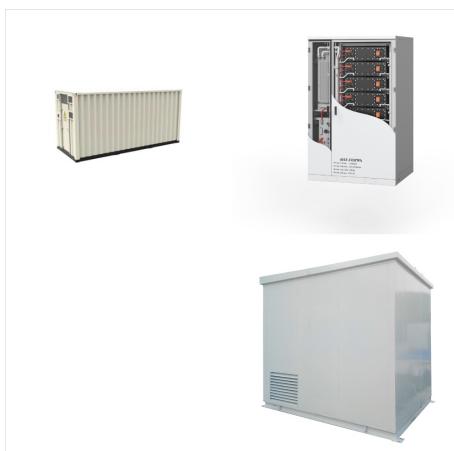
**Key Terminology** Levelized Cost of Energy - As the energy transition accelerates, Lazard actively analyzes and monitors the progression of renewable energy technologies and their price competitiveness with various forms of conventional generation.; Levelized Cost of Storage- The continued growth of low-cost renewable energy technologies relies on the ability to store the a?|



Levelized Cost of Energy 2023. Companies of scale that can take advantage of supply chain and other economies of scale will continue to lead the buildup of new renewable assets, given the observed LCOE declines for best-in-class renewable generation relative to smaller or more regionally-focused companies that have seen moderate to significant LCOE a?|



Climate change is no longer an issue that lacks for either bold commitments or vast sums of capital. The Glasgow Financial Alliance for Net Zero alone—a group of financial institutions led by former central banker Mark Carney—has pledged an eye-catching \$130 trillion of private sector capital to back the decarbonization effort. But pledges and money alone won't solve the problem.



Executive Summary—Levelized Cost of Energy Version 17.0 (1) The results of our Levelized Cost of Energy ("LCOE") analysis reinforce what we observe across the Power, Energy & Infrastructure Industry—a sizable Lazard's LCOE include: 1. Low End problem.



What is the Levelized Cost of Energy? Before we discuss how wind and solar special interest groups routinely misrepresent Lazard's Levelized Cost of Energy (LCOE) Analysis, we have to describe what the LCOE is and how it is calculated, some of the limitations of this analysis tool, and how we can improve it moving forward.



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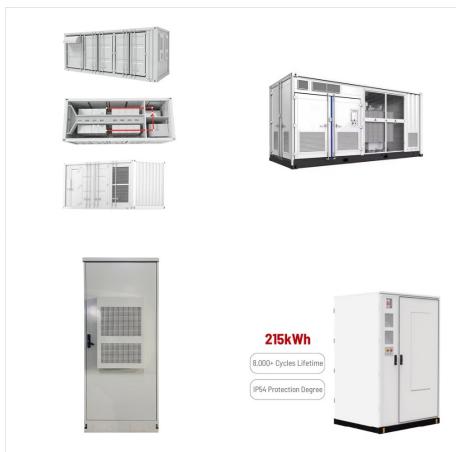
The LCOE compares the cost of generating electricity from renewable energy technologies (e.g., wind and solar) to conventional technologies (e.g., gas, coal and nuclear), including across various scenarios and sensitivities.



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According to Lazard, utility-scale PV has an LCOE range of US\$29-92/MWh. Image: US Department of Energy. The latest levelised cost of electricity (LCOE) report from US financial analyst Lazard



I LAZARD's LEVELIZED COST OF ENERGY ANALYSISa?? VERSION 16.0. Lazard's Levelized Cost of Energy ("LCOE") analysis addresses the following topics: a?c Comparative LCOE analysis for various generation technologies on a \$/MWh basis, including sensitivities for U.S. federal tax subsidies, fuel prices, carbon pricing and cost of capital a?c



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, il costo livellato dell'accumulo. Il rapporto di Lazard offre una panoramica anche sul cosiddetto LCOS a?? Levelized Cost of Storage, ossia il costo livellato dell'accumulo energetico questo caso si va da un massimo di 882-1.101 \$ per MWh per i sistemi di storage residenziali da 6 kW da 4 ore ad un minimo di 170-296 \$ per MWH per gli a?|



Levelized Cost of Energy a?? Slides (PDF)  
 Levelized Cost of Energy a?? Excel Example for a Solar Development (XL) Lazard a?? Annual LCOE Analysis (PDF) Australia a?? Solar Plant LCOE Comparison (PDF) Why Comparing LCOE Across Energy Sources is Absurd (Medium) LCOE and Value-Adjusted LCOE (IEA ) Video Table of Contents: 0:00: Introduction



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's latest annual Levelized Cost of Energy Analysis (LCOE 13.0) shows that as the cost of renewable energy continues to decline, certain technologies (e.g., onshore wind and utility-scale solar), which became cost-competitive with conventional generation several years ago on a new-build basis, continue to maintain competitiveness with the marginal cost of a?|



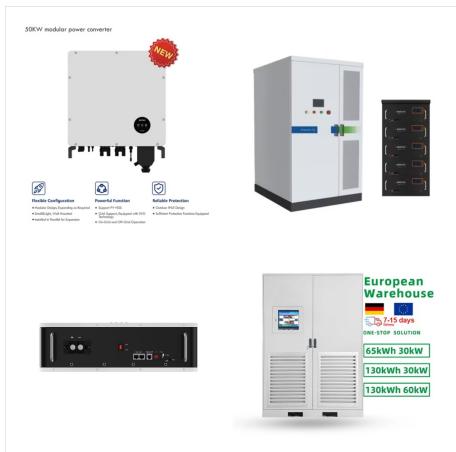
Lazard undertakes an annual detailed analysis into the levelized costs of energy from various generation technologies, energy storage technologies and hydrogen production methods. Below, the Power, Energy & Infrastructure Group shares some of the key findings from the 2023 Levelized Cost of Energy+ report. Levelized Cost of Energy: Version 16.0



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lazard's leveled cost of energy analysisa??version 17.0 lazard's leveled cost of storage analysisa??version 9.0 lazard's leveled cost of hydrogen analysisa??version 4.0 appendix lcoe v17.0 lcos v9.0 lcoh v4.0 i ii iii iv 3 7 18 26 30 a b c 31 40 a?|



Work produced earlier this year by BloombergNEF benchmarked the average LCOE of energy storage at around US\$150/MWh for lithium-ion battery storage with four hours duration. Lazard says the economic proposition of behind-the-meter projects in the commercial and industrial (C& I) sector "remains challenged without subsidies".



LAZARD's LEVELIZED COST OF ENERGY ANALYSISa??V E R S I O N 1 1 . 0 Lazard's Levelized Cost of Energy ("LCOE") analysis addresses the following topics: Comparative "levelized cost of energy" analysis for various technologies on a \$/MWh basis, including sensitivities, as relevant, for U.S. federal tax



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