INSIGHTS

Levelized Cost Of Energy, Levelized Cost Of Storage, and Levelized Cost Of Hydrogen

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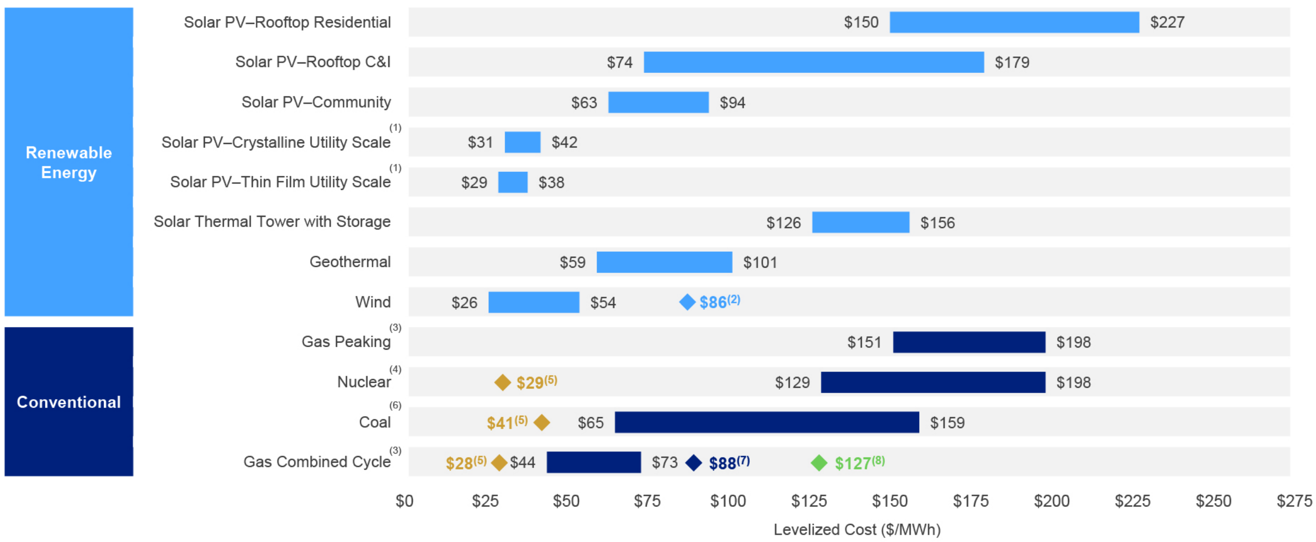
Lazard's latest annual Levelized Cost of Energy Analysis (LCOE 14.0) shows that as the cost of renewable energy continues to decline, certain technologies (e.g., onshore wind and utility-scale solar), which became cost-competitive with conventional generation several years ago on a new-build basis, continue to maintain competitiveness with the marginal cost of selected existing conventional generation technologies.

This year's LCOE, for the first time, includes a study of hydrogen as a supplemental fuel component for combined cycle gas generation.

Levelized Cost of Energy Comparison—Unsubsidized Analysis

Selected renewable energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances

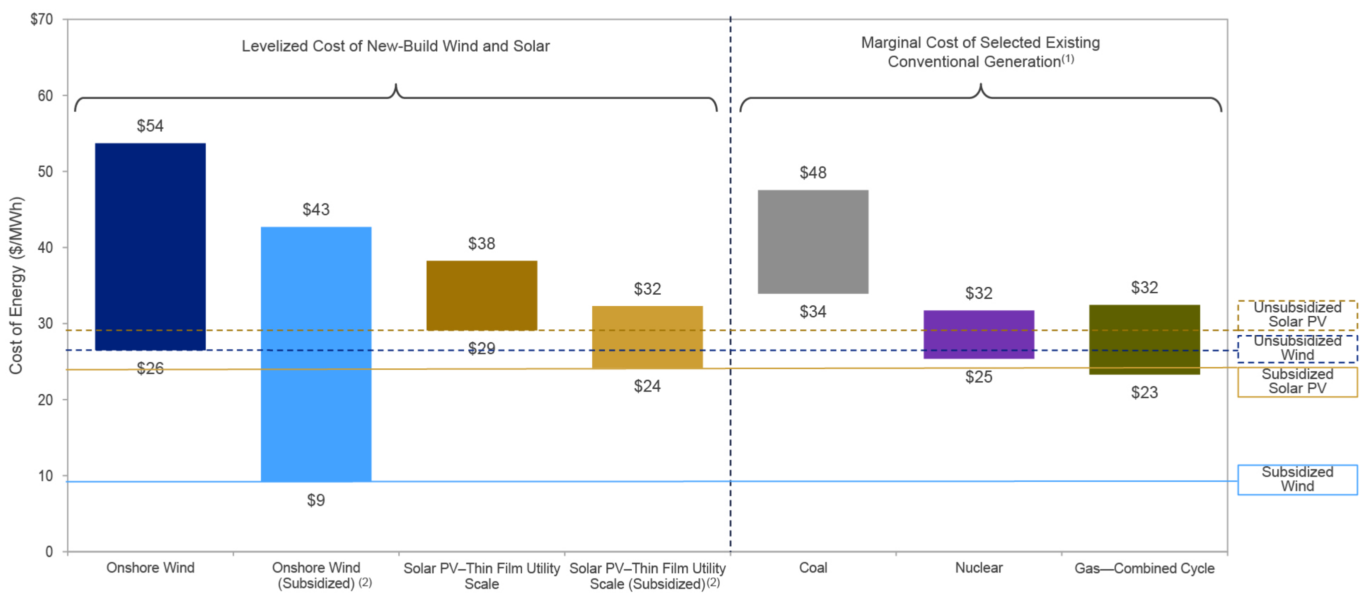


Source: *Lazard estimates.*
Note: Here and throughout this presentation, unless otherwise indicated, the analysis assumes 60% debt at 8% interest rate and 40% equity at 12% cost. Please see page titled "Levelized Cost of Energy Comparison—Sensitivity to Cost of Capital" for cost of capital sensitivities. These results are not intended to represent any particular geography. Please see page titled "Solar PV versus Gas Peaking and Wind versus CCGT—Global Markets" for regional sensitivities to selected technologies.
(1) Unless otherwise indicated herein, the low case represents a single-axis tracking system and the high case represents a fixed-tilt system.
(2) Represents the estimated implied midpoint of the LCOE of offshore wind, assuming a capital cost range of approximately $2,600 – $3,675/kW.
(3) The fuel cost assumption for Lazard's global, unsubsidized analysis for gas-fired generation resources is $3.45/MMBTU.
(4) Unless otherwise indicated, the analysis herein does not reflect decommissioning costs, ongoing maintenance-related capital expenditures or the potential economic impacts of federal loan guarantees or other subsidies.
(5) Represents the midpoint of the marginal cost of operating fully depreciated gas combined cycle, coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned gas combined cycle or coal asset is equivalent to its decommissioning and site restoration costs. Inputs are derived from a benchmark of operating gas combined cycle, coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper- and lower-quartile estimates derived from Lazard's research. Please see page titled "Levelized Cost of Energy Comparison—Renewable Energy versus Marginal Cost of Selected Existing Conventional Generation" for additional details.
(6) 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 from a steam-methane reformer, using natural gas as a feedstock, and sequestering the resulting CO_2 in a nearby saline aquifer). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $5.20/MMBTU.
(8) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Green" hydrogen, (i.e., hydrogen produced from an electrolyzer powered by a mix of wind and solar generation and stored in a nearby salt cavern). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $10.05/MMBTU.

Additional highlights for LCOE 14.0:

Levelized Cost of Energy Comparison—Renewable Energy versus Marginal Cost of Selected Existing Conventional Generation

Certain renewable energy generation technologies have an LCOE that is competitive with the marginal cost of existing conventional generation



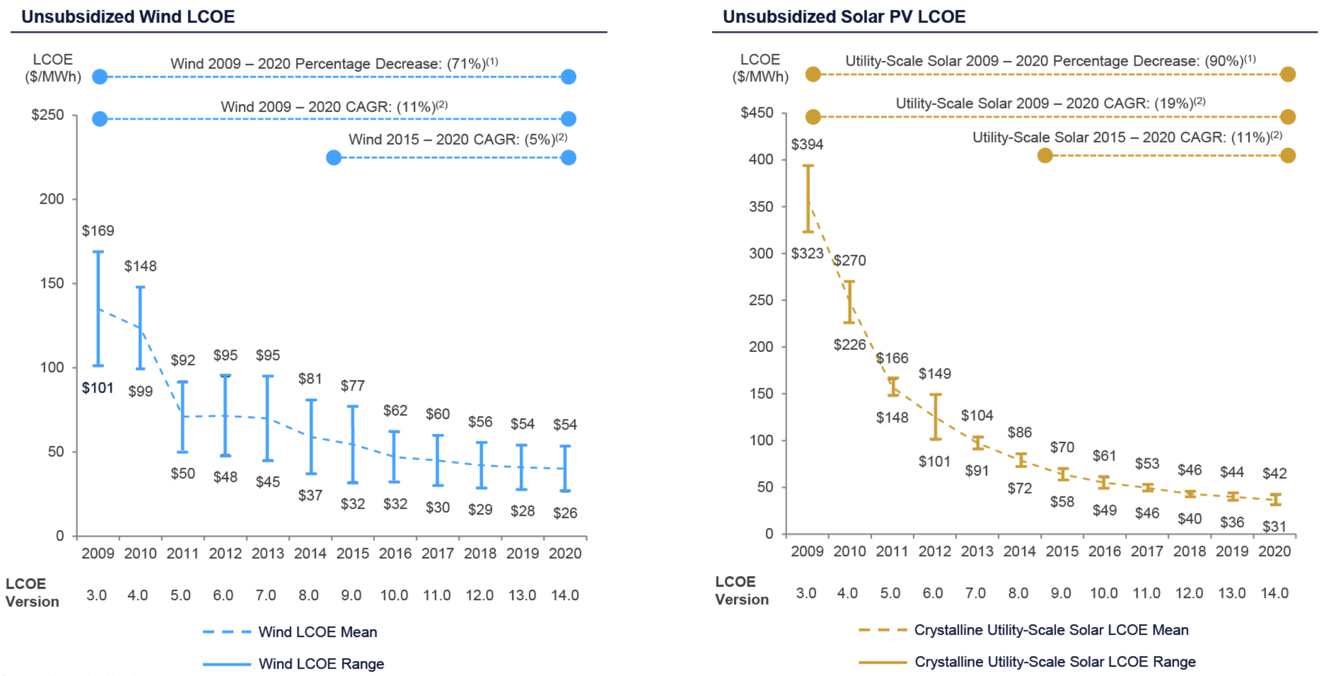
Source: *Lazard estimates.*
Note: Unless otherwise noted, the assumptions used in this sensitivity correspond to those used in the global, unsubsidized analysis as presented on the page titled "Levelized Cost of Energy Comparison—Unsubsidized Analysis".
(1) Represents the marginal cost of operating fully depreciated gas combined cycle, coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned gas combined cycle or coal asset is equivalent to its decommissioning and site restoration costs. Inputs are derived from a benchmark of operating gas combined cycle, coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper and lower quartile estimates derived from Lazard's research.

When U.S. government subsidies are included, the cost of onshore wind an[illegible]scale solar is competitive with the marginal cost of coal, nuclear and combined cycle gas generation. The former values average $31/MWh for utility-scale solar and $26/MWh for utility-scale wind, while the latter values average

$41/MWh for coal, $29/MWh for nuclear, and $28/MWh for combined cycle gas generation.

Levelized Cost of Energy Comparison—Historical Renewable Energy LCOE Declines

In light of material declines in the pricing of system components and improvements in efficiency, among other factors, wind and utility-scale solar PV have exhibited dramatic LCOE declines; however, as these industries have matured, the rates of decline have diminished

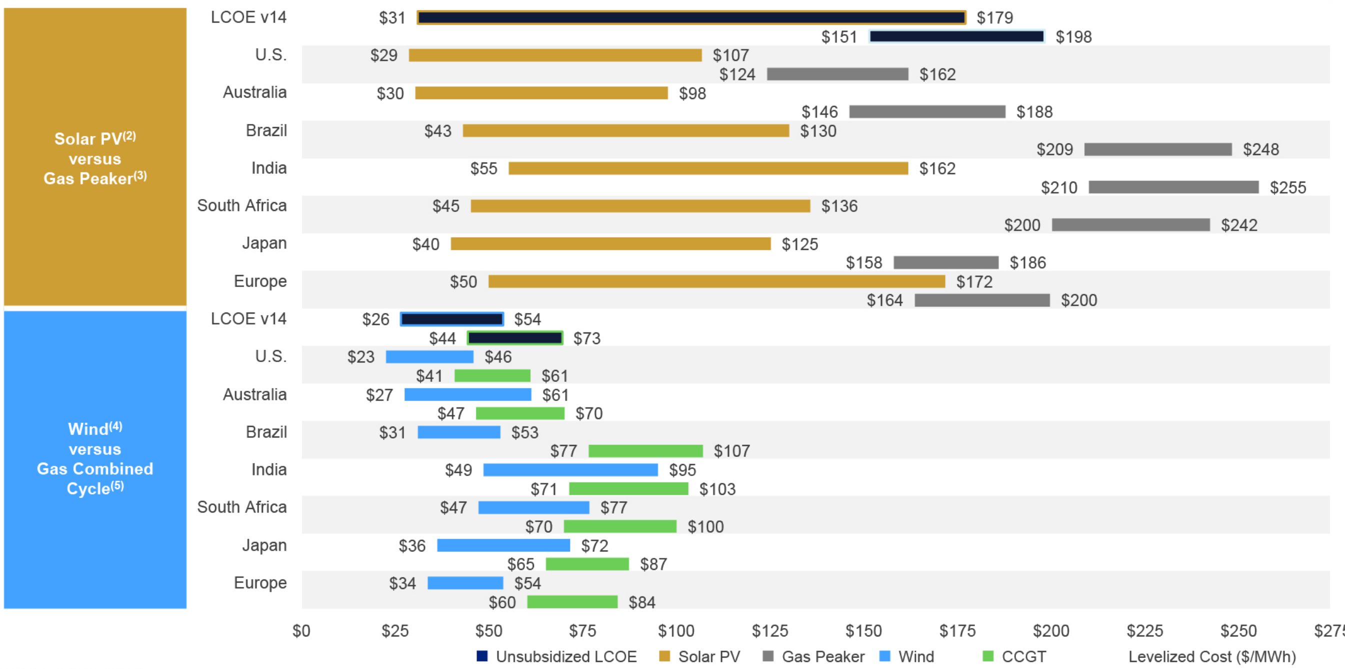


Source: *Lazard estimates.*
(1) Represents the average percentage decrease of the high end and low end of the LCOE range.
(2) Represents the average compounded annual rate of decline of the high end and low end of the LCOE range.

While the reductions in costs continue, their rate of decline has slowed, especially for onshore wind. Costs for utility-scale solar have been falling more rapidly (about 11% per year) compared to onshore wind (about 5% per year) over the past five years.

Solar PV versus Gas Peaking and Wind versus CCGT—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 benefits, of such conventional technologies



Source: Lazard estimates.

Note: The analysis presented on this page assumes country-specific or regionally applicable tax rates.

(1) Equity IRRs are assumed to be 10.0% – 12.0% for Australia, 15.0% for Brazil and South Africa, 13.0% – 15.0% for India, 8.0% – 10.0% for Japan, 7.5% – 12.0% for Europe and 7.5% – 9.0% for the U.S. Cost of debt is assumed to be 5.0% – 5.5% for Australia, 10.0% – 12.0% for Brazil, 12.0% – 13.0% for India, 3.0% for Japan, 4.5% – 5.5% for Europe, 12.0% for South Africa and 4.0% – 4.5% for the U.S.

(2) Low end assumes crystalline utility-scale solar with a single-axis tracker. High end assumes rooftop C&I solar. Solar projects assume illustrative capacity factors of 21% – 28% for the U.S., 26% – 30% for Australia, 26% – 28% for Brazil, 22% – 23% for India, 27% – 29% for South Africa, 16% – 18% for Japan and 13% – 16% for Europe.

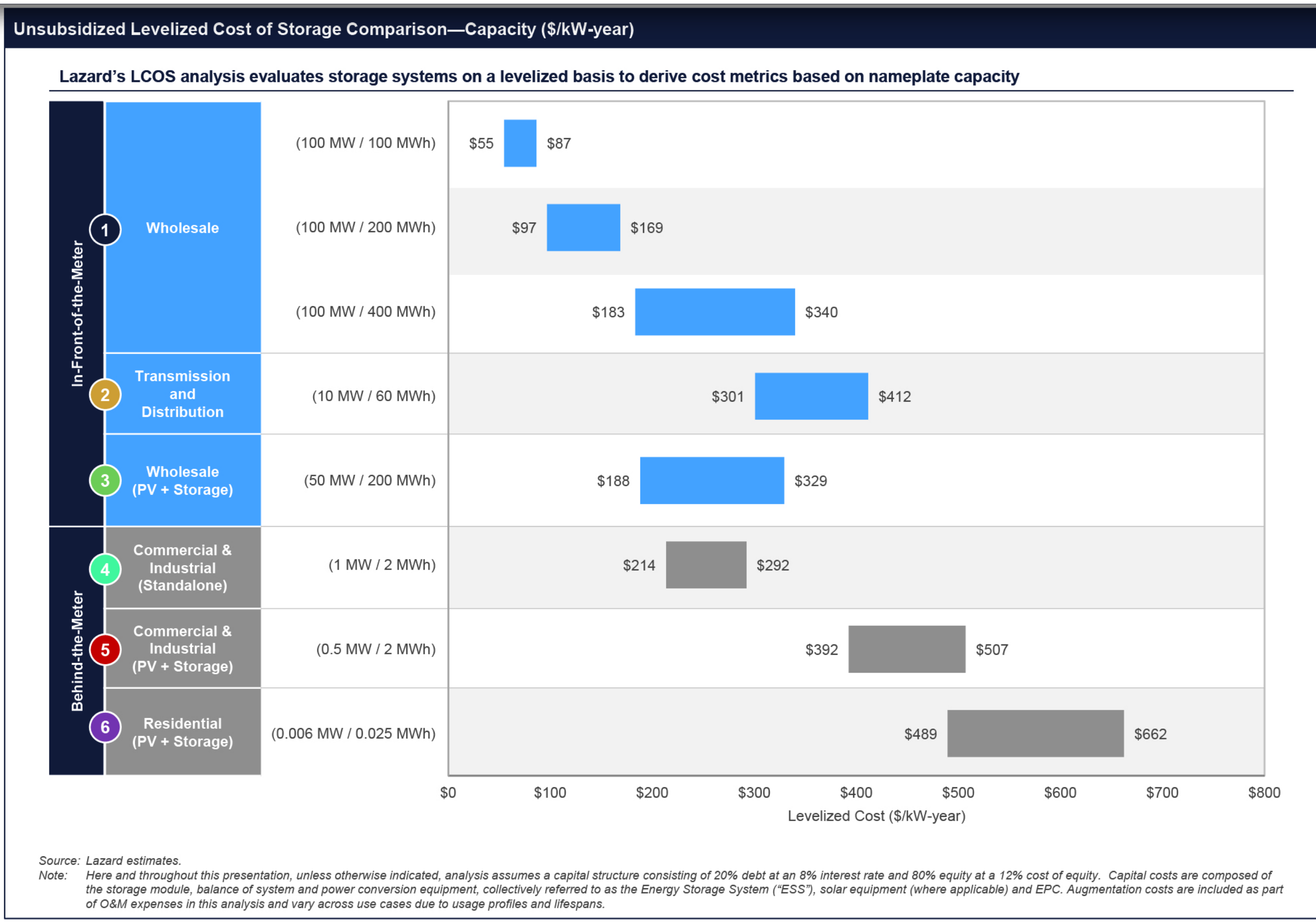
(3) Assumes natural gas prices of $3.45 for the U.S., $4.00 for Australia, $8.00 for Brazil, $7.00 for India, South Africa and Japan and $6.00 for Europe (all in U.S.$ per MMBtu). Assumes a capacity factor of 10% for all geographies.

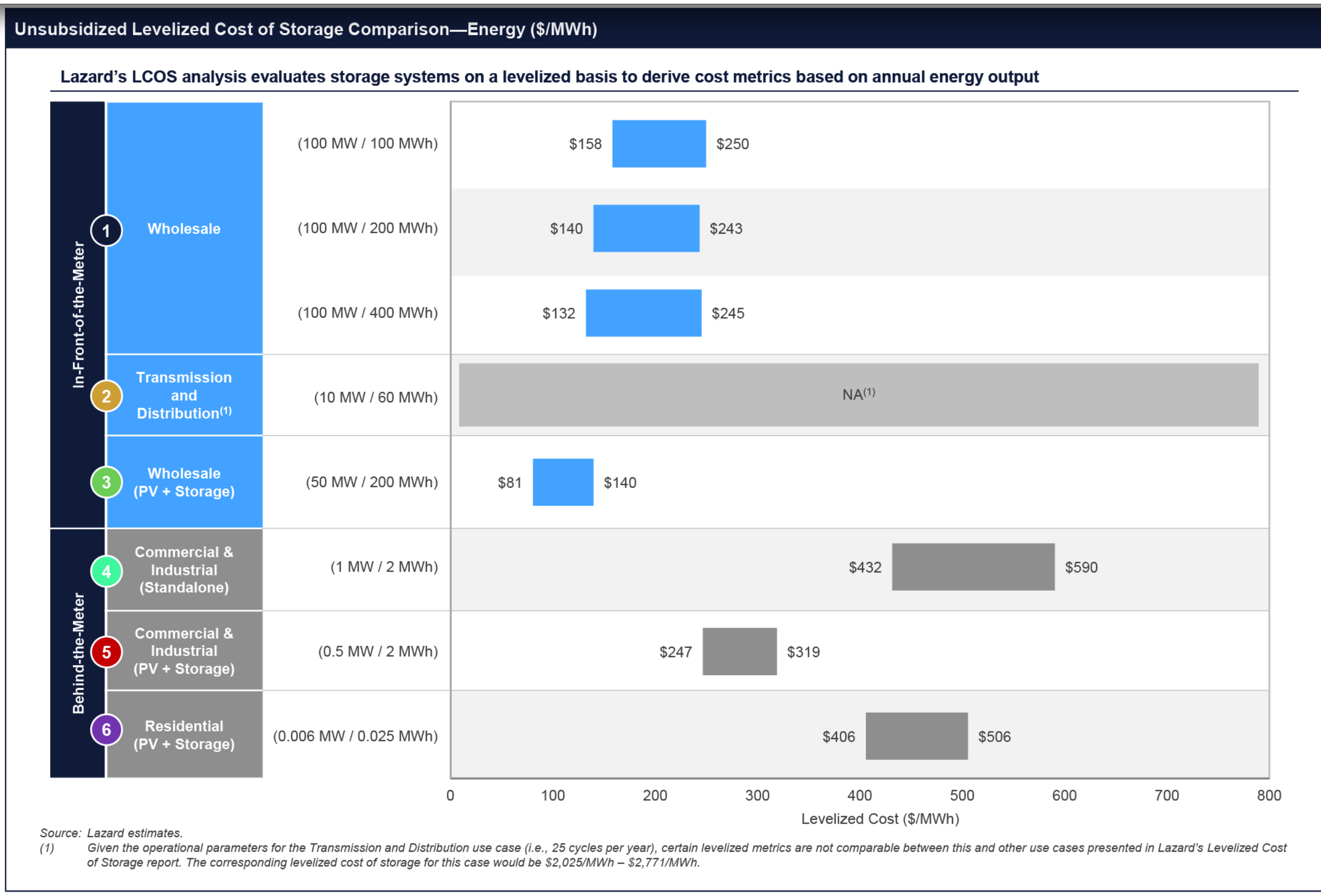
(4) Wind projects assume illustrative capacity factors of 38% – 55% for the U.S., 29% – 46% for Australia, 45% – 55% for Brazil, 25% – 35% for India, 31% – 36% for South Africa, 22% – 30% for Japan and 33% – 38% for Europe.

(5) Assumes natural gas prices of $3.45 for the U.S., $4.00 for Australia, $8.00 for Brazil, $7.00 for India, South Africa and Japan and $6.00 for Europe (all in U.S.$ per MMBtu). Assumes capacity factors of 55% – 70% on the high and low ends, respectively, for all geographies.

Selected regional differences (i.e., resource availability and fuel costs) can drive meaningful variance in the LCOE values of certain technologies, though some of this variance is mitigated by adjustments to a project's capital structure to reflect market conditions that drive the availability, and cost, of debt and equity capital.

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.


Unsubsidized Levelized Cost of Storage Comparison—Capacity ($/kW-year)
Lazard's LCOS analysis evaluates storage systems on a levelized basis to derive cost metrics based on nameplate capacity
In-Front-of-the-Meter
Behind-the-Meter
1 Wholesale
(100 MW / 100 MWh) $55 $87
(100 MW / 200 MWh) $97 $169
(100 MW / 400 MWh) $183 $340
2 Transmission and Distribution
(10 MW / 60 MWh) $301 $412
3 Wholesale (PV + Storage)
(50 MW / 200 MWh) $188 $329
4 Commercial & Industrial (Standalone)
(1 MW / 2 MWh) $214 $292
5 Commercial & Industrial (PV + Storage)
(0.5 MW / 2 MWh) $392 $507
6 Residential (PV + Storage)
(0.006 MW / 0.025 MWh) $489 $662
$0 $100 $200 $300 $400 $500 $600 $700 $800
Levelized Cost ($/kW-year)
Source: Lazard estimates.
Note: Here and throughout this presentation, unless otherwise indicated, analysis assumes a capital structure consisting of 20% debt at an 8% interest rate and 80% equity at a 12% cost of equity. Capital costs are composed of the storage module, balance of system and power conversion equipment, collectively referred to as the Energy Storage System ("ESS"), solar equipment (where applicable) and EPC. Augmentation costs are included as part of O&M expenses in this analysis and vary across use cases due to usage profiles and lifespans.



Additional highlights from LCOS 6.0:

Sustained cost declines were observed across the use cases analyzed in our LCOS for lithium-ion technologies (on both a $/MWh and $/kW-year basis). The cost declines were more pronounced for storage modules than for balance of system components or ongoing operations and maintenance expenses.

Project returns analyzed in our "Value Snapshots" continue to evolve as hardware costs decline, and the value of available revenue streams fluctuate with market fundamentals.

Project economics analyzed for standalone behind-the-meter applications remain relatively expensive without subsidies, while utility-scale solar PV + storage systems are becoming increasingly attractive.

Long-duration storage is gaining traction as a commercially viable solution to challenges created by intermittent energy resources such as solar or wind.

Levelized Cost of Hydrogen

Lazard has undertaken its inaugural Levelized Cost of Hydrogen ("LCOH") analysis in an effort to provide greater clarity to Industry participants on the potentially disruptive role of hydrogen across a variety of economic sectors. Our LCOH builds upon, and relates to, our annual LCOE and LCOS studies. The LCOH analysis provides an overview of the various methods for producing hydrogen and how it can be utilized across economic sectors, addresses FAQs pertaining to hydrogen and presents a levelized cost analysis for producing green hydrogen through electrolysis using Alkaline and PEM electrolyzers.