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| [A green bird with a lightning bolt and clouds  Description automatically generated](https://substack..K22CaSijPn8qksb-BfVF6OfDBBgcurYKIk6Le9NPlAk?) |

# [Debunking Levelized Cost of Energy (LCOE)](https://substack.com/app-link/post?publication_id=343139&post_id=138708059&utm_source=post-email-title&utm_campaign=email-post-title&isFreemail=false&r=dy18s&token=eyJ1c2VyX2lkIjoyMzQyMjkyNCwicG9zdF9pZCI6MTM4NzA4MDU5LCJpYXQiOjE2OTk2MTA3MTksImV4cCI6MTcwMjIwMjcxOSwiaXNzIjoicHViLTM0MzEzOSIsInN1YiI6InBvc3QtcmVhY3Rpb24ifQ.4Na5QZvfVSCx8iGtVPKeDpO0TJxT0X2dt7e8D8VA18M)

### Exposing one of the most expensive half-truths ever told.

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“It costs a lot of money to look this cheap.” – Dolly Parton

From elementary schools to university campuses, in newspapers and magazines, on televisions, radios, phones, and computers, an unrelenting chant of dogma deafens like no other: wind and solar are the cheapest forms of electricity. The higher prices and degraded grid reliability inevitably found wherever wind and solar achieve meaningful market penetration are of no bother to this Orwellian choir, nor is its mantra quieted by the ongoing [collapse](https://substack.com/redirect/ea7cb398-a974-4aef-b4a5-b378d749cf62?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) of the wind sector. “Wind and solar are the cheapest forms of electricity,” they say, and all evidence to the contrary is merely proof of the need to build more.

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|  | [A person in a military uniform  Description automatically generated](https://substack.com/redirect/7075ae26-feb3-4ff4-b5c5-18f679af0410?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) |  |

Windbag Bob

Among scores of examples from contemporary media stories, a recent and fawning [report](https://substack.com/redirect/b62b85e6-2c6b-4365-9478-bcdcfd335e27?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) in The New York Times stands out for its shameless puffery in this regard. Optimistically titled “The Clean Energy Future Is Arriving Faster Than You Think,” the article hoardes attention with more than 3,000 words written by the four reporters crowding its byline. A little more than halfway in, we come upon the inevitable (emphasis added throughout):

“But ***clean energy became cheap far faster than anyone expected***. Since 2009, the cost of solar power has plunged by 83 percent, while the cost of producing wind power has fallen by more than half. The price of lithium-ion battery cells fell 97 percent over the past three decades.

***Today, solar and wind power are the least expensive new sources of electricity in many markets***, generating 12 percent of global electricity and rising. This year, for the first time, global investors are expected to pour more money into solar power — some $380 billion — than into drilling for oil.”

Nearly all such claims can be traced back to the same source: [Lazard’s](https://substack.com/redirect/9d4afc4d-7d05-4fc2-b0d1-4a8874a0bf39?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) so-called levelized cost of energy (LCOE) calculations. How a financial services firm came to be the leading arbiter on the economics of energy sources is a topic for another day but, suffice it to say, Lazard’s woefully inadequate appraisal has ballooned to a degree of importance that must surprise even them. In a classic example of “if you can source it, you can use it,” the Times reporters dutifully give credit to Lazard and, by extension, indemnify themselves from bothering to even superficially probe its veracity:

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|  | [A graph of energy and electricity  Description automatically generated with medium confidence](https://substack.com/redirect/f179bbac-39c8-4b14-8d07-d3c40f87880b?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) |  |

A rather important footnote | The New York Times

Like all great lies that go viral, LCOE is a concept that feels like it could be true. To calculate LCOE, Lazard merely tallies up the expected lifetime electricity generation of proposed power plants and compares them to the costs involved in building and maintaining such facilities. As we’ll demonstrate shortly, this is the intellectual equivalent of judging the efficacy of automotive brakes by first tolerating instances in which they stop too abruptly or not at all, washing away such arbitrariness behind the cloak of the almighty mean. Lazard openly admits that its calculations have limitations, but this does little to stop the report’s widespread misuse.

Armed with the veneer of credibility so bestowed by a 175-year-old financial giant, politicians around the world have tripped over themselves to flush trillions in taxpayer money chasing renewable energy unicorns. Why are LCOE calculations flawed? Why are wind and solar irreconcilably disruptive to existing electricity grids, and what is the true long-term potential of these technologies? Let’s run through the five major defects of LCOE analyses, just in time for the holiday cocktail party circuit.

#### ****LCOE Ignores Intermittency****

The LCOE calculation averages production over the lifetime of wind and solar installations and thus suffers from an immediate and fatal flaw: it assigns no time value to electricity. In fact, LCOE turns the law of supply and demand on its head, essentially assuming that electricity is needed only when available. Rather than responding to consumer preferences, the grid in the LCOE model is expected to react to the production variance of these weather-dependent intermittent renewables. Is it an especially windy day? Get ready to accommodate an influx of electricity, regardless of how much is actually needed. An extended period of cloudy weather or stillness in the dead of night? Fuhgeddaboudit. LCOE makes no accommodation for baseload grid requirements and allows the “average” value to masquerade as the “always.”

To visualize the variability of renewables, we turn to the US Energy Information Agency (EIA), which [posts](https://substack.com/redirect/da4028fe-8146-4f56-9ef9-7ce4fe36087b?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) real-time electricity production statistics by source and region across the country. Zeroing in on California wind production, for example, we discover that from peak to trough over just a few days, wind production recently fell 93%. The herculean efforts to accommodate such fluctuations—the need to engage or curtail fossil fuel peaker plants, for example—are ignored in LCOE calculations, but consumers must nonetheless pick up the bill.

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#### ****LCOE Ignores Value Deflation****

A related issue overlooked by LCOE analyses is the concept of value deflation, a term used to describe the drop in marginal value from additional renewables as their penetration rises. For an [explanation](https://substack.com/redirect/0be1b331-1c71-4a3d-9e55-6c0c83d94113?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) of this pesky detail, we turn to the Electric Power Research Institute:

“The profile value of wind and solar declines with increasing penetration due to the declining covariance between their output and the marginal cost of serving load, especially since the output of renewables is correlated across successive installations. ***Essentially, wind and solar lower wholesale electricity prices during hours when their output is highest..***.

***Value deflation limits economic returns for wind and solar at higher deployment***, as the revenue per installed capacity has diminishing value in a given region.”

Renewable installations have high performance correlations at the regional level and tend to drive electricity prices to extremes in both directions—all the turbines in a particular area spin in unison, for example, creating gluts and shortages of electricity in the process. Once a certain critical mass in a grid is reached, adding more wind energy only exacerbates the gluts and does nothing to alleviate the shortages.

#### ****LCOE Ignores Incremental System Costs****

By necessity, wind turbines and large-scale commercial solar installations are typically sited far from major population centers, and expansive new transmission lines and other incremental system additions are required to integrate these facilities into the grid. With so much investment occurring at the same time, [shortages](https://substack.com/redirect/cf1d2108-b72b-4dcc-b7e4-380f8c71cc31?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) of key pieces of infrastructure, like distribution transformers, are sending costs skyrocketing. We turn to a recent [report](https://substack.com/redirect/b2109586-ee1b-430f-918c-e3a429739fc3?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) by The Conference Board for further insights:

“There is a shortage of electrical distribution transformers in the US, with wait times of often more than a year and prices quadrupling in some cases. As a result, electrification and construction projects are being delayed or even canceled at a time when grid expansion and modernization are key for increasing resilience and meeting renewable energy goals…

***Wait times for some transformers have gone from weeks to over a year, and costs for finished transformers have soared in some cases by more than 400 percent since 2020***, placing residential and commercial construction projects—including those that support electrification and clean energy goals—at risk and impeding the resilience of the grid, particularly in the case of natural or man-made disasters.”

Lazard excludes such costs from LCOE analyses.

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Below Lazard’s line | Getty

#### ****LCOE is Limited to New Builds****

Lazard’s approach is limited to comparing new power plant construction costs across the various technologies and does not consider the favorable economics of keeping existing traditional plants up and running. As a general rule, new facilities are far more expensive than fully depreciated assets. Furthermore, given the intermittency issues described above, wind and solar facilities are most often merely added to an existing grid, rather than overtly replacing retiring facilities. Analysts at American Experiment [detail](https://substack.com/redirect/0b5cd87e-592a-42c4-b5a7-577d4c3acfeb?j=eyJ1IjoiZHkxOHMifQ.laaQABrT6Kq5h7PQNCtPBL4mMH-MCdUfMaVmLhrXTHo) the predictable consequences for consumers:

“***This means that building new wind and solar adds to the cost of providing electricity to the grid***. If wind and solar were truly lower cost than other forms of energy, we would expect states like California and Minnesota, which have high penetrations of wind and solar, to see falling electricity costs. Instead, electricity prices in these states have increased much faster than the national average.

… California’s electricity costs have increased twice as fast as the national average since 2007, and Minnesota’s have increased 1.65 times faster. These rising costs are mainly due to mandates requiring the use of wind and solar in these states.”

#### ****LCOE is Susceptible to Manipulation of Assumptions****

Finally, like all complex calculations, LCOE analyses are only as good as the assumptions that feed them. Even Lazard’s presentation of its results includes a block of fine print so substantial it crowds out the chart, and the error bars within the chart itself are so wide as to make drawing reasonable conclusions impossible. Like all hyper-political debates, arguing over energy policy quickly devolves into an elaborate Goal Seek exercise, and LCOE analyses are not immune.

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That’s some mighty fine print you have there | Lazard

Perpetuating the myth of cheap renewable power has proven quite expensive in implementation and it is high time for LCOE to be dismissed, one well-informed conversation at a time.