Is wind power too expensive?

What The Science Says:
In the United States, onshore wind has the lowest unsubsidized levelized cost of energy (LCOE) of all utility-scale energy sources and the LCOE of offshore wind power has declined substantially over the past decade.

Climate Myth: Wind power - particularly offshore wind power - is too expensive
"[W]ind farms . . . cannot produce electricity competitively and require massive government subsidies for both installation and subsequent operation. Rate payers are hit [with] a double whammy, higher electric rates and higher taxes to pay the subsidies." (Wind Watch)

In the United States, onshore wind has the lowest unsubsidized levelized cost of energy (LCOE) of all utility-scale energy sources. Onshore wind's mean unsubsidized LCOE is $50/MWh, substantially lower than the mean unsubsidized LCOE of gas combined cycle ($70/MWh), coal ($117/MWh), and gas peaking ($168/MWh)[1]. And, as the figure below from Lazard shows, although offshore wind power is more expensive than gas combined cycle when subsidies are not taken into account, the unsubsidized mean LCOE for offshore wind ($106) is still lower than that of gas peaking and coal.[1]

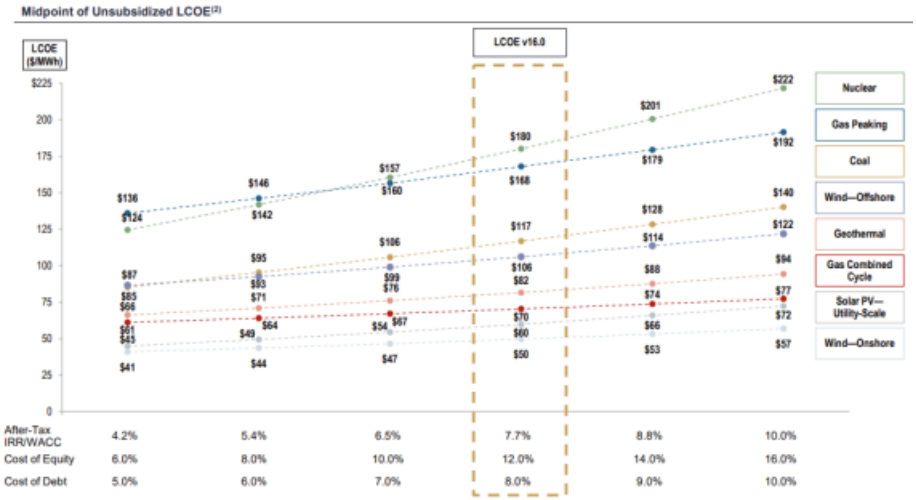

Figure 1: The range of unsubsidized LCOE for utility-scale energy sources across various cost of capital scenarios, highlighting the mean unsubsidized LCOE as of April 2023. "IRR" stands for "internal rate of return" and "WACC" stands for "weighted average cost of capital." Source: Lazard (Reproduced with permission)[1].

In addition, the LCOE for offshore wind power has declined substantially over the past decade[2] (also Wiser et al. 2021). The Department of Energy's most recent offshore wind market report estimates that the LCOE for a fixed-bottom offshore wind project beginning operations in 2022 would have been roughly 50% lower than one beginning operations in 2014, despite a 6% increase in costs compared to a 2021 cost estimate. Researchers further project that the average LCOE for offshore wind energy will fall to $63/MWh by 2030.[2]

Due in large part to this dramatic price decline, deployment of offshore wind has surged in recent years, both domestically and globally. By the end of 2022, global capacity had reached 59,009 MW, up roughly 18% from 2021.[3] As of the end of May 2023, the pipeline of U.S. offshore wind projects in development and operation

was estimated to represent 52,687 MW of wind energy capacity, a 15% growth compared to May 2022.[2] It bears noting, however, that several offshore wind projects have been removed from the U.S. offshore wind pipeline since May 2023 as a result of project cancellation.[4] This includes Ocean Wind I and II, canceled in October 2023, which were anticipated to deliver over 2,200 MW of wind energy capacity.[5]

Once operational, offshore wind turbines generate more energy and greater revenues than onshore wind farms, due to higher and steadier wind speeds; they also have the advantage of generating energy closer to many U.S. coastal population centers, thus reducing the need for long-distance transmission.[6] According to the European Wind Energy Association, while the average onshore wind turbine generates enough energy to power 1,500 homes, the average offshore turbine can power more than 3,300 homes. Moreover, when factoring in costs associated with climate change and human health impacts, offshore wind becomes even less expensive compared to many fossil fuel energy sources.[7]

Footnotes:

[1] Levelized Cost of Energy Analysis: Version 16.0, Lazard, 9 (Apr. 2023) at 2, 6, 9.

[2] See Walter Musial et al., Offshore Wind Market Report: 2023 Edition, Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy, at xiii, 81-83 (2023)

[3] Walter Musial et al., Offshore Wind Market Report: 2022 Edition, Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy, ix (2022).

[4] See Associated Press, In a setback for the wind industry, 2 large offshore projects are canceled in N.J., NPR, Nov. 1, 2023; Heather Richards, Offshore wind faces more financial turbulence in 2024, EnergyWire, Jan. 8, 2024.

[5] Ocean Wind 2 (last visited March 25, 2024).

[6] What are the Advantages and Disadvantages of Offshore Wind Farms?, American Geoscience Institute (last visited March 25, 2024); Adrijana Buljan, Offshore Wind Costs in 2050 Could be Lower than Previously Expected, offshoreWind.biz (Apr. 19, 2021); Laura Small et al., Fact Sheet | Offshore Wind: Can the United States Catch Up With Europe?, Environmental & Energy Study Institute, 3 (January 4, 2016); Wind Turbines: the Bigger, the Better, United States Dep't of Energy, Aug. 24, 2023.

[7] Paul R. Epstein et al., Full Cost Accounting for the Life Cycle of Coal, 1219 Ecological Econ. Rev., Annals of the N.Y. Academy of Sciences, Apr. 2011, 73-98 (Robert Costanza, Karin Limburg & Ida Kubiszewski eds., 2011).

This rebuttal is based on the report "Rebutting 33 False Claims About Solar, Wind, and Electric Vehicles" written by Matthew Eisenson, Jacob Elkin, Andy Fitch, Matthew Ard, Kaya Sittinger & Samuel Lavine and published by the Sabin Center for Climate Change Law at Columbia Law School in 2024. Skeptical Science sincerely appreciates Sabin Center's generosity in collaborating with us to make this information available as widely as possible.

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