

The Biden Offshore Wind Initiative



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But I thought offshore wind was dead...

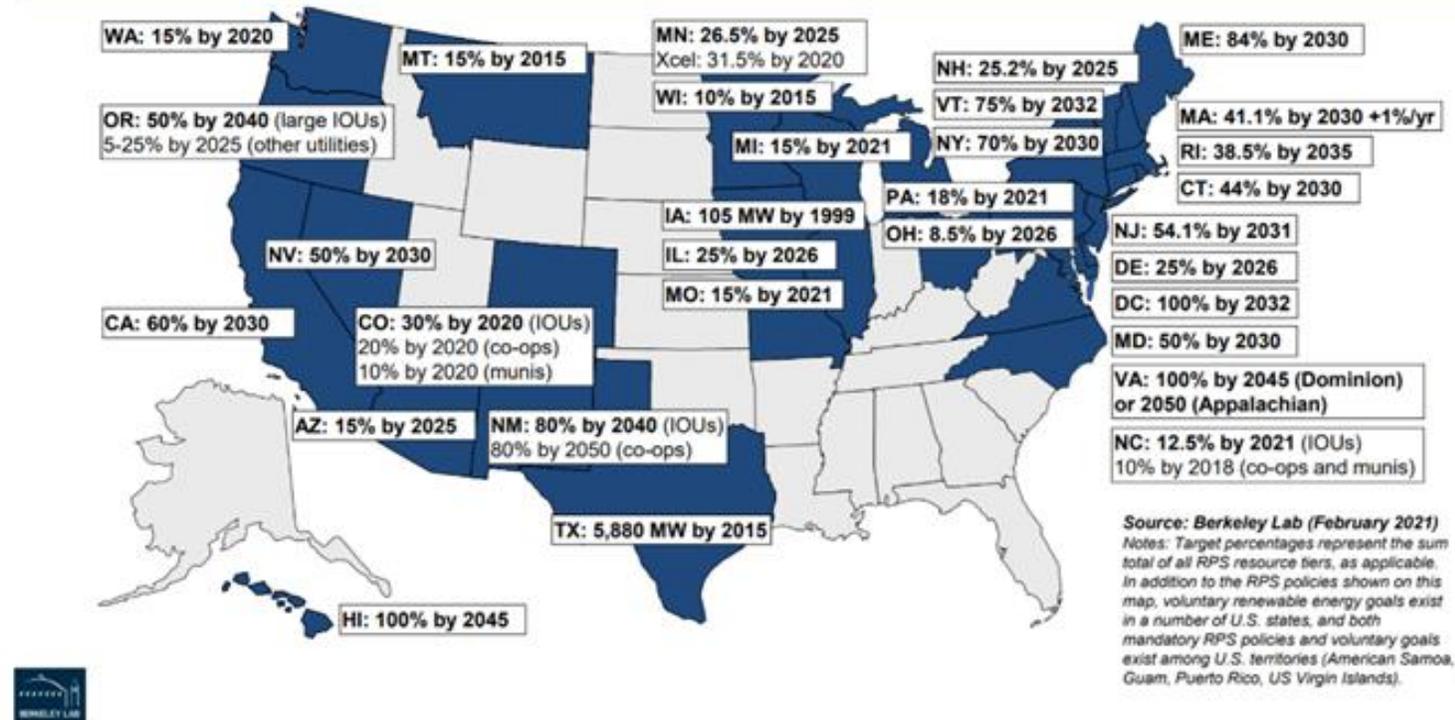
- On 29 March, President Biden announced an offshore wind initiative aimed at deploying some 30 gigawatts of new capacity by 2030.
- There has been almost 100 gigawatts of wind power built in the United States, mostly in the past 20 years, but only 0.4-percent has been offshore.
- After the experience of the Cape Wind project, observers can be pardoned for being skeptical about this initiative.
- However, there are grounds for optimism, because...



National Policies and Most Coastal State Policies are aligned....

- The Executive Branch has broad discretionary powers w.r.t to offshore leasing. No new legal authorities needed
- In the Biden Administration, the Bureau of Ocean Energy Management has already shown that it can move quickly
- Coastal state governments generally favor offshore wind leasing, and are being helpful.
- The widespread adoption of renewable portfolio standards by coastal states has created a regime where there is a substantial regulatory market for renewable energy

RPS Policies Exist in 30 States and DC Apply to 58% of Total U.S. Retail Electricity Sales



The Interior Department's Bureau of Ocean Energy Management is now very active....

One Final approval, begins six EIS, one lease sale begins, three area IDs, one EA:

- 3/29: Wind Energy Areas in New York Bight identified;
- 3/29: Begins EA for site characterization in NY Bight
- 3/29: Begins EIS for the Const/Ops Plan for Ocean Wind (NJ)
- 4/29: Begins EIS for the Const/Ops Plan for Revolution Wind
- 5/11: Final Approval for Vineyard Wind (MA) – 800 MW
- 5/25: Areas Identified for Morro Bay, California
- 6/8: Request for Interest for Wind Areas in Gulf of Mexico
- 6/11: Proposed Sale Notice for Lease Sale in NY Bight
- 6/17: Begins EIS for Const/Ops Plan for Empire Wind (NY)
- 6/28: Begins EIS for COP for Vineyard Wind South (MA)
- 7/1: Begins EIS for COP for Coastal Virginia Offshore Wind
- 7/28: Request for Interest for Morro Bay East & West, CA
- 7/29 Begins EIS for Const/Ops Plan for Kitty Hawk (NC)



BOEM Leasing Areas Are Designed to Limit Conflict

- Farther offshore than Cape Wind;
- Areas of environmental concern
- Wildlife habitat and bird migration routes
- Merchant ship corridors;
- Military Uses
- Fishing areas

But will this be sufficient?

- NIMOV: Hamptons, Martha's Vineyard, Atlantic City
- Fishing (especially trawling)

Graphic source: <https://www.northeastoceandata.org/data-explorer/?energy-infrastructure|planning-areas>

NJ State is developing New Jersey Wind Port



- Cost: \$300 - \$400 million
- Adjacent land available for ancillary development
- Construction Manger (AECOM) appointed July 2021



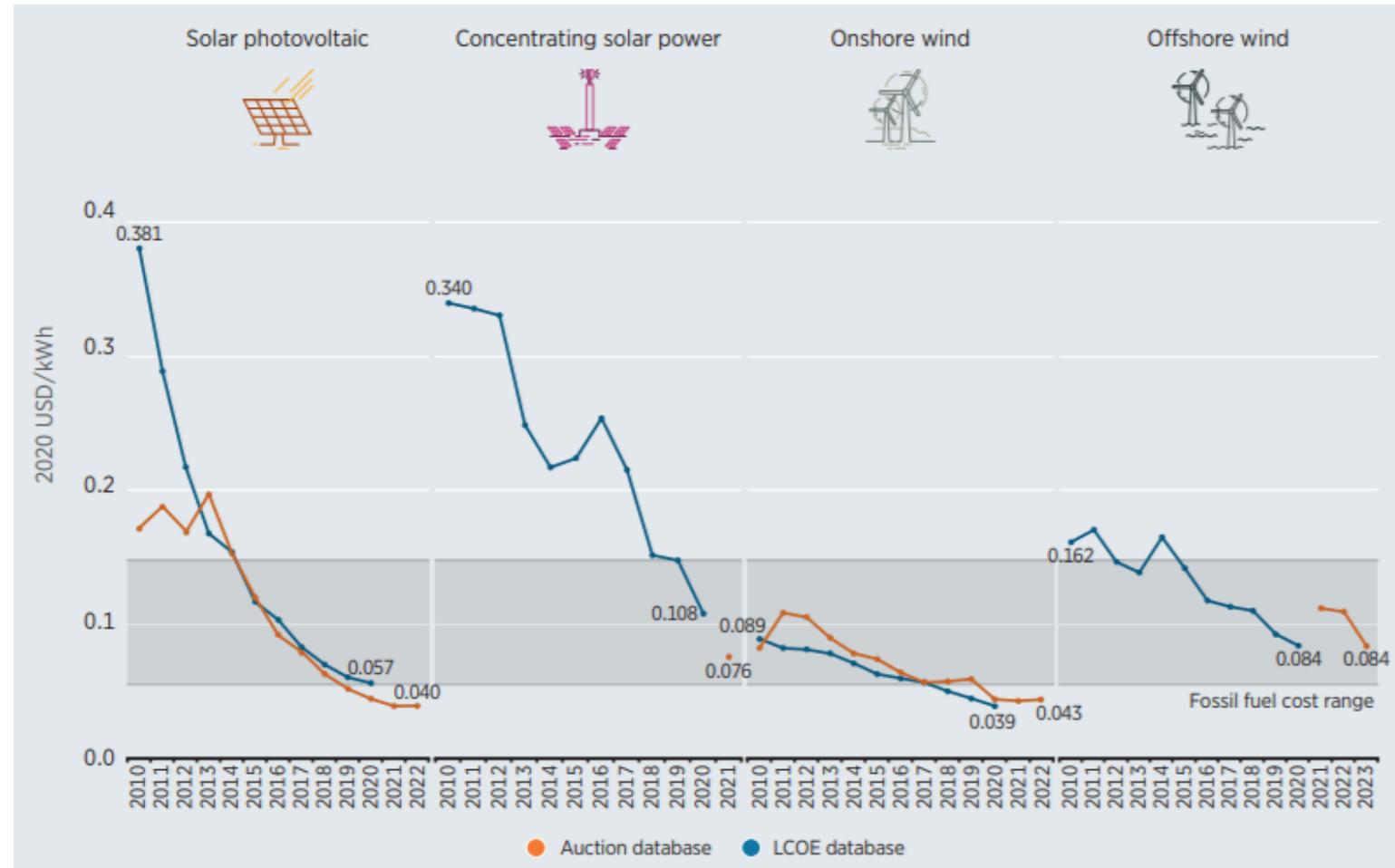
Offshore wind economics appear to be improving

- Sliding down the learning curve;
- Bigger turbines: GE Haliade X now 14 MW;
- Fewer turbines, greater height'
- Stronger and less variable winds offshore;

Offsetting factors:

- Farther offshore, deeper water;
- Intermittent renewables market saturates;
- PV is also competitive

Figure ES.3 The global weighted-average LCOE and PPA/auction prices for solar PV, onshore wind, offshore wind and CSP, 2010-2023

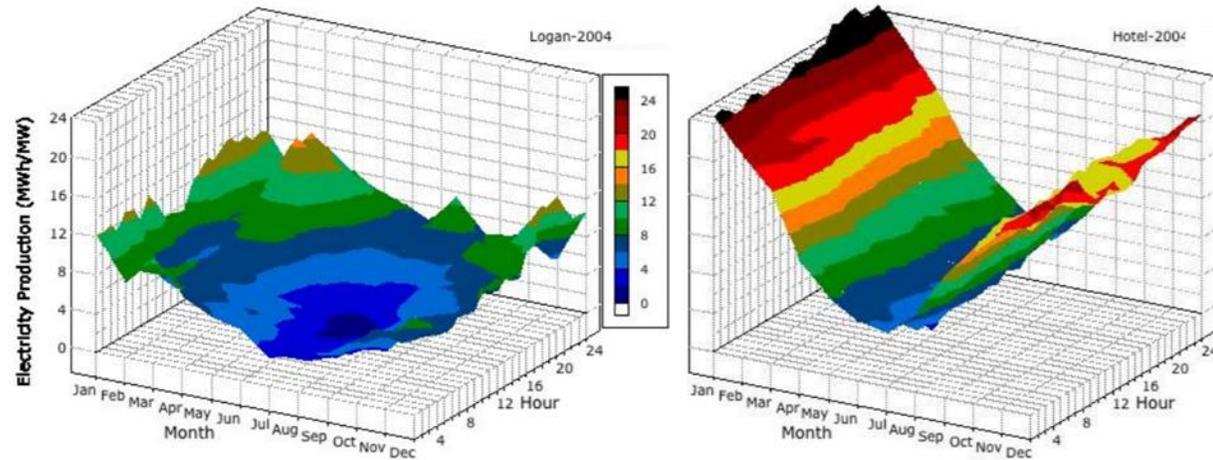


Source: IRENA Renewable Cost Database

Note: The thick lines are the global weighted average LCOE, or auction values, by year. For the LCOE data, see Figure ES2 note. The band that crosses the entire chart represents the fossil fuel-fired power generation cost range.

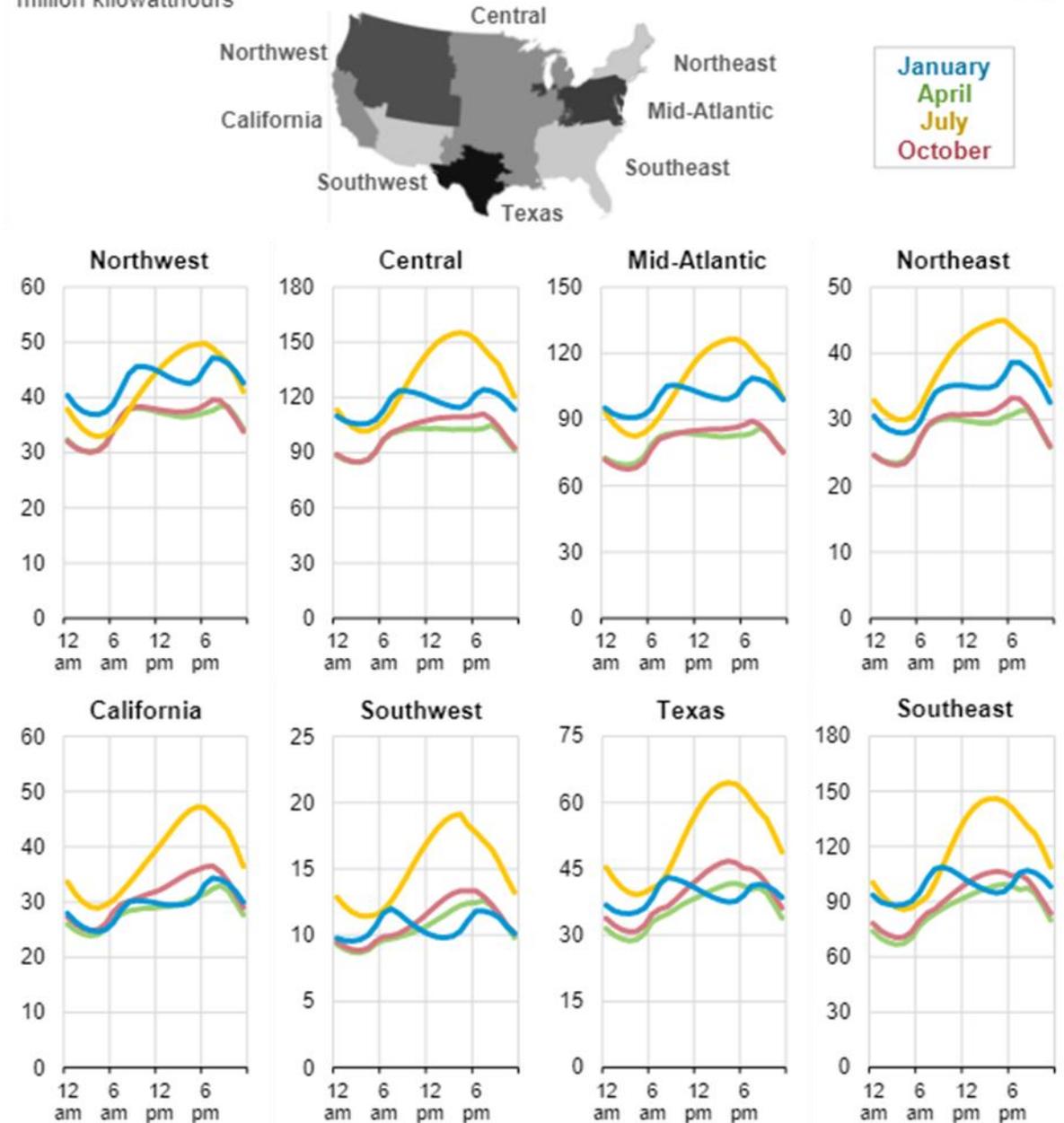


BUT: Managing increasing amounts of intermittent renewable power with seasonal and diurnal load fluctuations will be a growing challenge.



Examples of hourly and monthly wide generation at two coastal sites in Massachusetts

Average hourly electricity load during typical day by region, selected months
million kilowatthours



Offshore wind, manufacturing, and jobs

- Guess-timating capital costs for US offshore wind projects at \$2,800 - \$3,900 per kilowatt.
- 30 GW of new capacity suggests direct capital expenditure of \$84 - \$117 billion over eight years.
- Much of the content of the expenditure is inherently local.
- O&M costs might be \$80-\$120 per kilowatt capacity, so direct O&M costs after completion for 30 GW might be \$2.4 - \$3.6 billion per year
- A rule-of-thumb for direct jobs for offshore wind capital expenditure might be 17-28 jobs/MW, or 64 – 105,000 jobs every year over eight years (2022-2030).
- O&M might be 1.6-1.7 jobs per MW, or 48,000 jobs when all 30 GW have been installed by 2030.

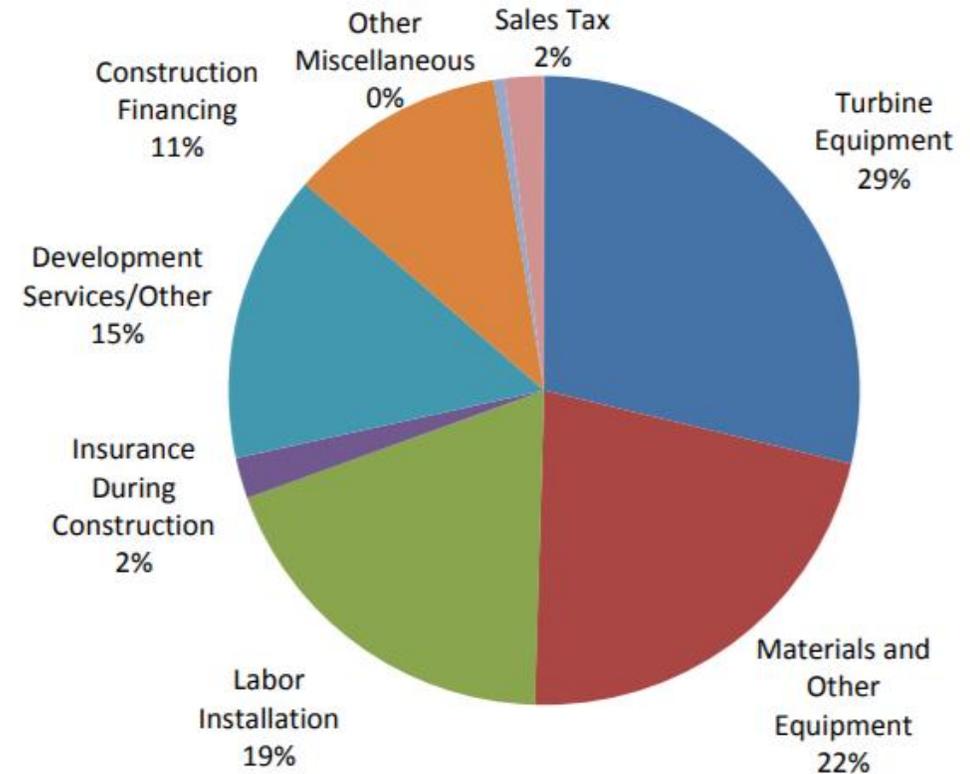


Figure 4. Capital expenditure cost distribution for offshore wind in the Mid-Atlantic region

Local Content Issues

- There are only one U.S. maker of giant wind turbines: General Electric.
- GE makes its state-of-the-art Haliade X turbines in France. GE has said that if the U.S. market develops, they may manufacture in the U.S., but may mean component sourcing.
- Installing the largest wind turbines offshore requires specialized ships, which currently exist only in Europe.
- The Jones Act requires the use of US-built, US-flag vessels in domestic trade.
- European ships would require a waiver or a complex Canadian work-around.
- There is a global shortage of wind turbine construction vessels.
- The first U.S. Jones Act construction ship, the *Charybdis*, has been ordered by Dominion Energy. Other U.S. firms are considering modifying existing oil service vessels and ordering specialized ships for this new market.