

# US wind energy monitor: 2023 year in review

## Executive summary report

Joint report from Wood Mackenzie and  
the American Clean Power Association

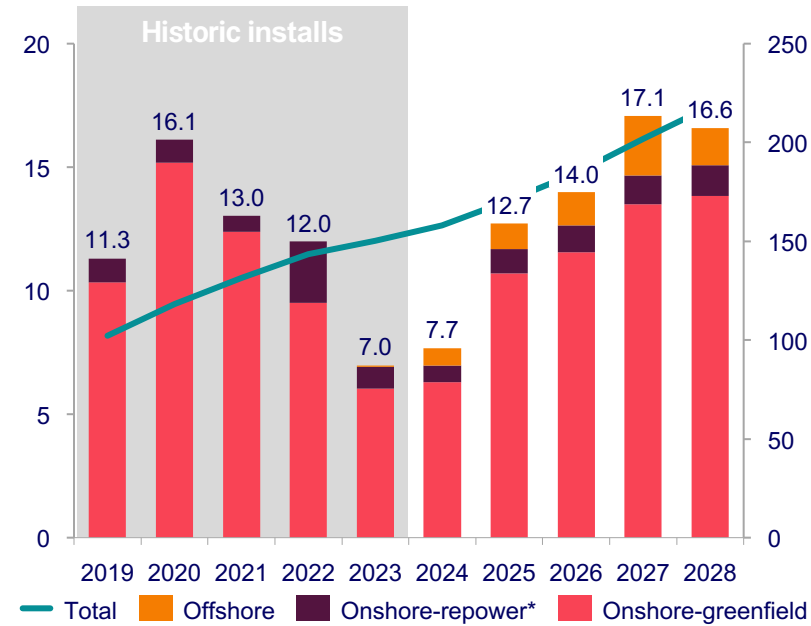
Q1 2024



# Despite 2024 looking like another slow year, US to add 68 GW of capacity by 2028

The industry continues to wait out cost pressures, supply chain issues and legislative uncertainty

## US wind energy market outlook (GW)



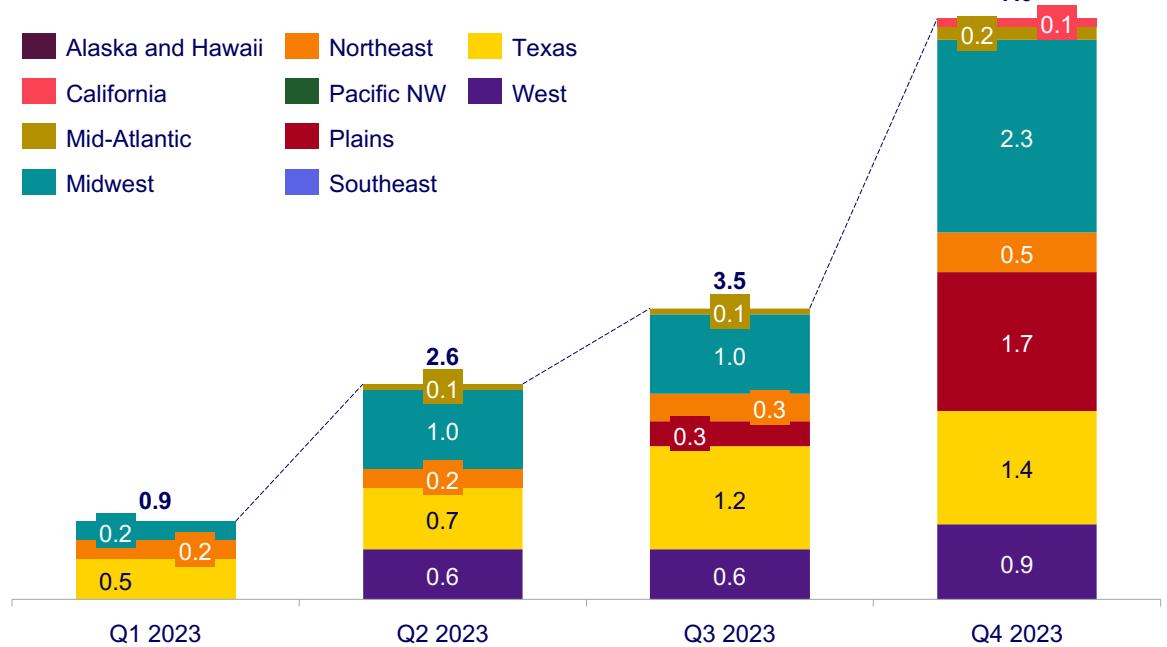
Drivers/barriers	Short-term (2024-2026)	Mid-term (2027-2029)	Long-term (2030-2032)
PTC/ITC availability	● ● ●	● ● ●	● ● ●
Tax credit transferability	● ● ○	● ● ●	● ● ●
Repowering	● ○ ○	● ● ○	● ● ○
Federal land development	● ○ ○	● ● ○	● ● ○
State policy/ RPS	● ○ ○	● ○ ○	● ○ ○
Tax equity availability	● ○ ○	● ● ○	● ● ●
Grid congestion and transmission	● ○ ○	● ● ○	● ● ○
Interconnection queue backlog	● ○ ○	● ○ ○	● ● ○
Supply chain	● ● ○	● ○ ○	● ○ ○
Treasury guidance clarity	● ● ●	● ○ ○	● ○ ○
Inflationary and cost pressure	● ● ●	● ● ○	● ○ ○

# 2023 was a year of uncertainty that caused many development projects to be delayed

Half of all wind installations in 2023 occurred in the last quarter of the year

- The mere 7 GW grid-connected in 2023 marks the lowest deployment of new-build onshore wind capacity since 2017.
- Repowering activity slowed in 2023 as well, with only about 1 GW completed, down from the 2.5 GW seen in 2022.
- Long-term tax credit certainty helped ease the onshore industry's sense of urgency.
- With over 23 GW of projects in advanced development, developers have chosen to wait out inflationary pressures, supply chain issues, high interest rates and stalled treasury guidance.
- The offshore wind industry faced significant headwinds throughout the year but was ultimately rewarded by South Fork flowing first commercial-scale offshore wind power into the New York grid.

**Cumulative deployed onshore and offshore wind capacity (GW)**

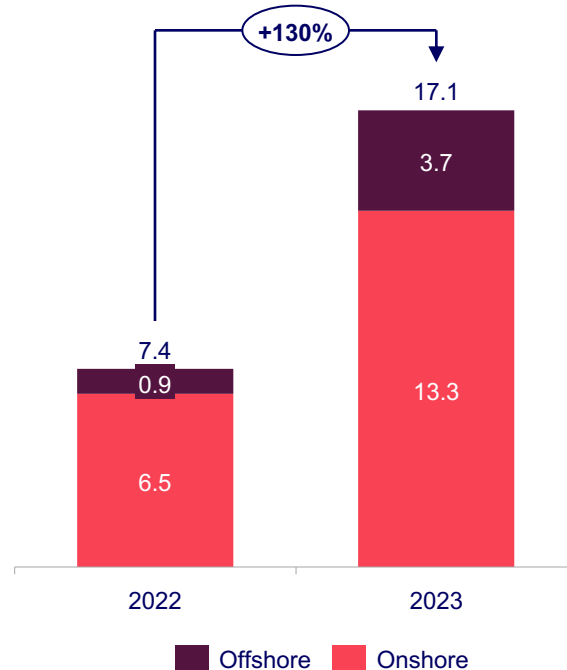


# A 130% surge in turbine orders from 2022 to 2023 suggests an industry rebound

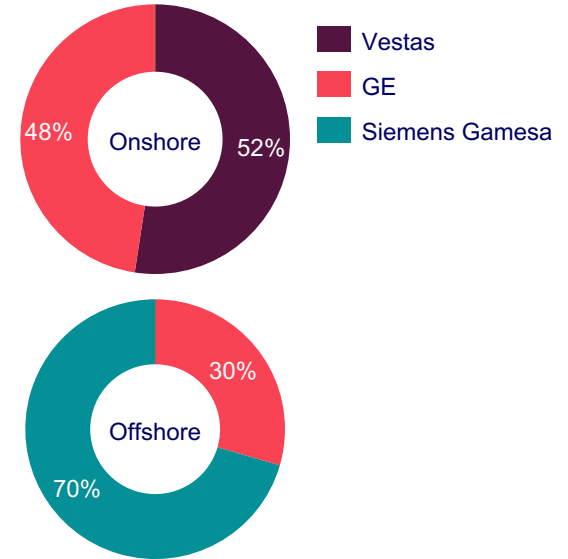
80% of 2023 orders have delivery of 2025 or beyond, indicating the rebound to be slower than anticipated

- Of the orders made in 2023, 74% of onshore orders and 100% of offshore orders have delivery dates of 2025 or beyond.
- Long equipment lead times due to ongoing global supply chain issues are forcing developers to procure equipment earlier in the development timeline to hedge against availability and price volatility.
- The 'Big 3' turbine OEMs remained the primary players in the US market with GE present in both the onshore and offshore markets.

End-of-year firm orders, 2022 vs 2023 (GW)



2023 firm orders by OEM (GW)



# As major markets become saturated, US onshore wind will shift to the West

Coastal markets will focus on offshore wind as land constraints and population limit onshore wind deployment

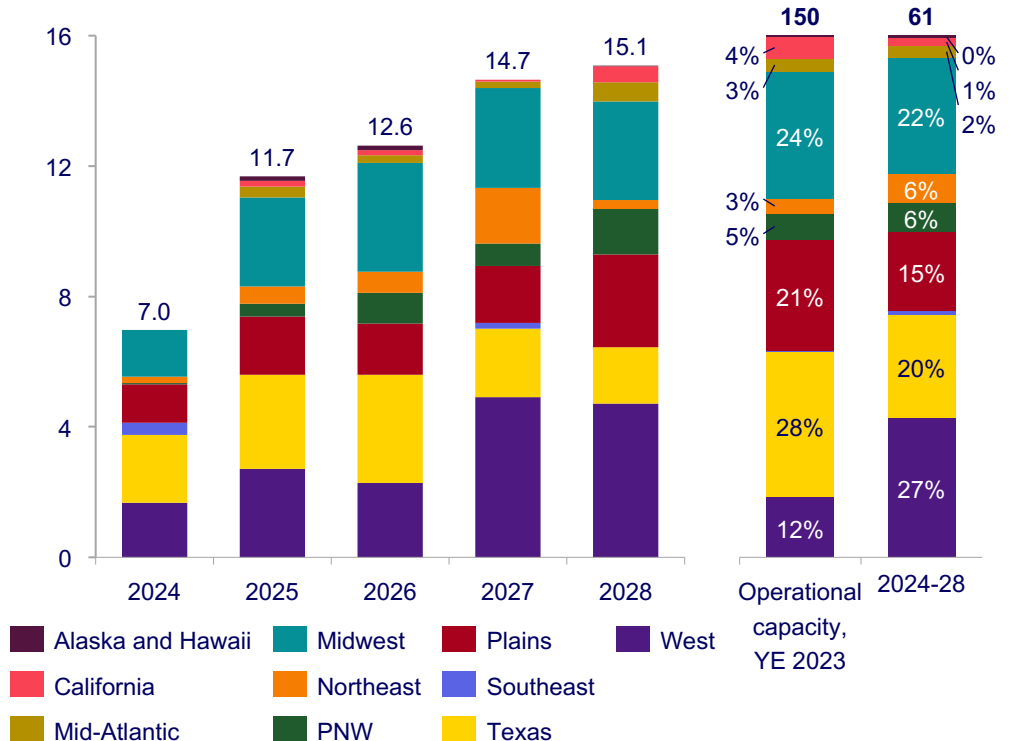
**Abundant wind resources and relative permitting ease make the West an attractive location for onshore wind expansion.**

- Approval of high-voltage transmission projects enables power transmission from the West to coastal population centers.
- California's increasing demand for renewables, including substantial out-of-state wind capacity, provides a route to market for projects sited in a region where economics and state policies are already favorable.

**The Midwest remains a major market, but Texas and the Plains will have a less prominent role in onshore wind.**

- Texas has been the largest regional market, due to excellent wind resources, market liquidity and access to low cost land.
- High wind penetration, solar competition and transmission congestion in ERCOT will begin to slow wind growth.
- Emergence of the Southeast and MidAtlantic onshore markets enabled by larger turbines targeted towards low-wind speeds.

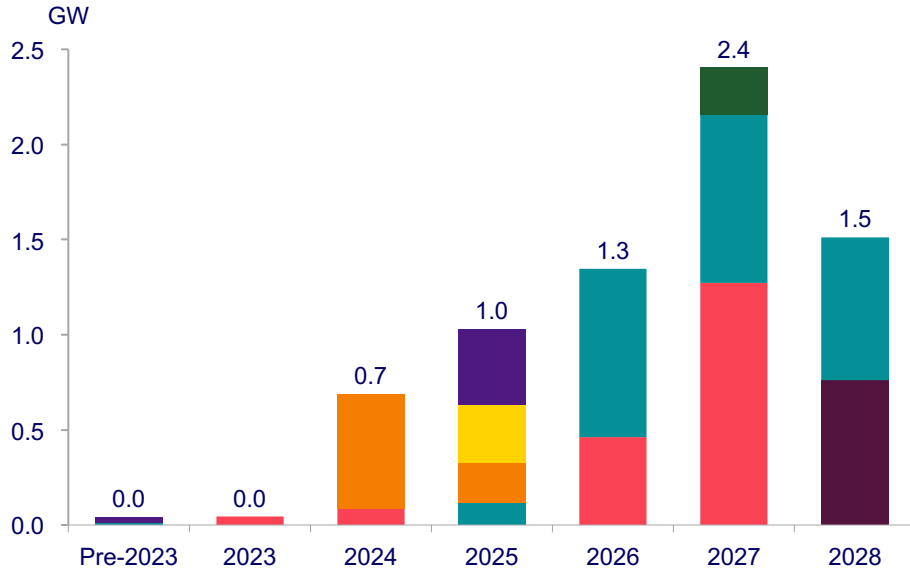
**US onshore wind forecast, by region (GW)**



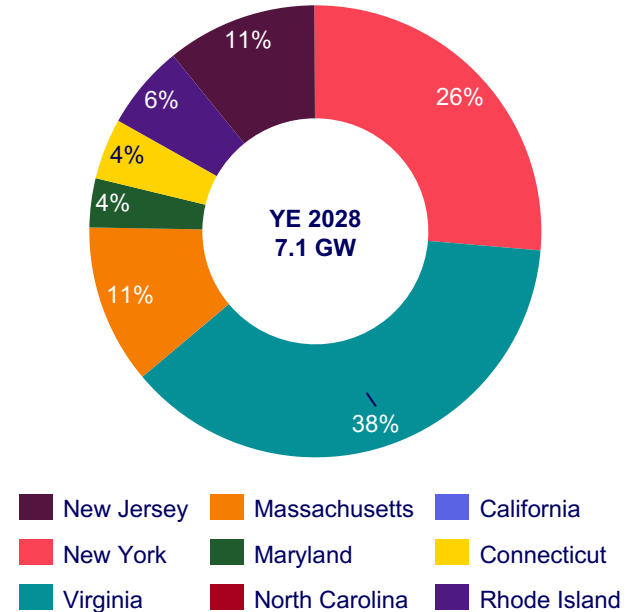
# Delays and cancellations of early mover projects have stymied installation targets

Administration goal of 30 GW installed by 2030 is increasingly out of reach, assuming realistic project timelines

## Annual capacity additions by market



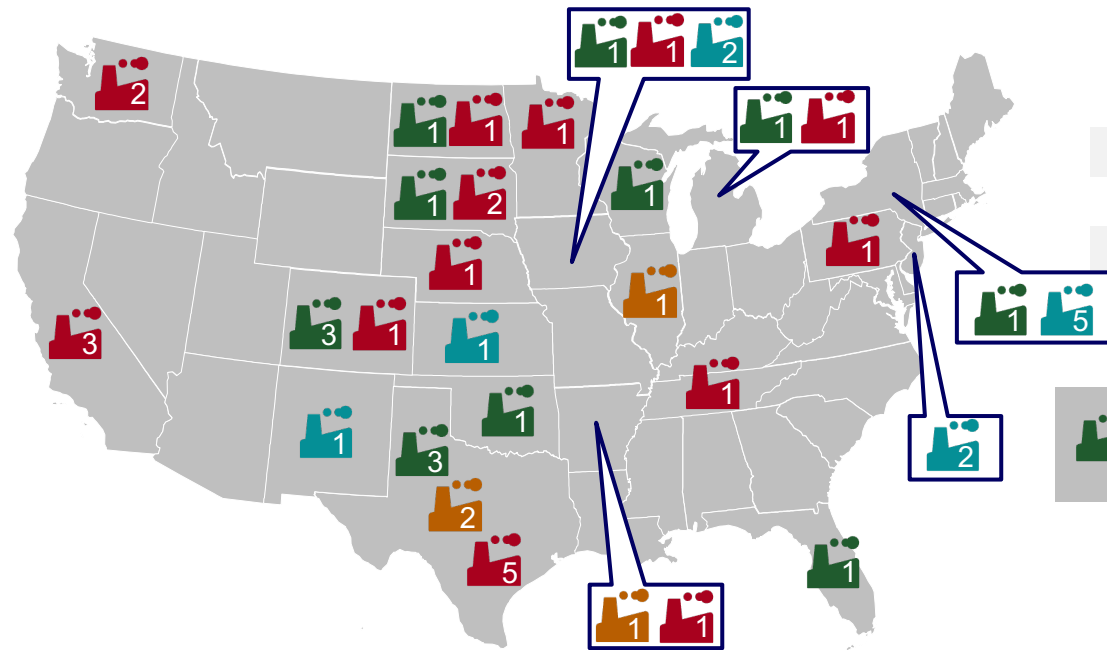
## Cumulative capacity by market\*



# US manufacturing industry shows signs of life despite lacking treasury guidance

The industry has begun leveraging existing facilities, with 2.3 GW of capacity expected back online in 2024

### Map of existing wind component manufacturing facilities



### Number of facilities by status and component

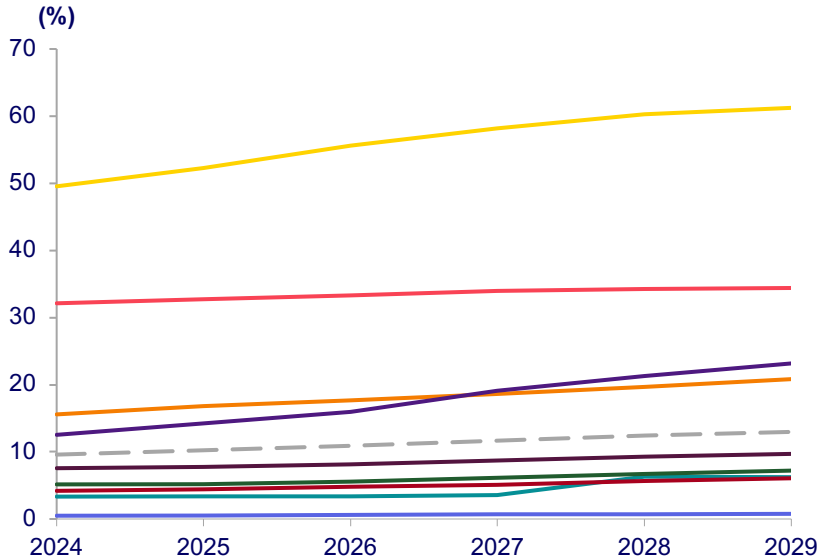
	Operating	Idle	Shut down	Announced/re-opening
Towers	9	2	14	6
Blades	2	2	2	4
Nacelles	3	0	6	4



# Total wind penetration will increase to 14% for the whole of the US by 2029

Onshore wind's robust project pipeline will drive penetration while offshore wind will have a more localized effect

## Onshore wind penetration by ISO/RTO



## Offshore wind penetration by ISO/RTO

