



ACP Market Report

Fourth Quarter 2020



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Fourth Quarter Highlights



Fourth Quarter Highlights

2020 Wind Project Installations

- The U.S. wind industry installed 10,593 MW of new wind power capacity in the fourth quarter of 2020, the highest quarter on record. In fact, more wind was installed at the end of 2020, then any other year except 2012.
- 2020 was a banner year for the wind industry. Developers commissioned 16,913 MW, representing an 85 percent increase over 2019.
- Project owners commissioned 54 new projects across 20 states in the fourth quarter. Texas led with 2,197 MW installed, followed by Wyoming (895 MW), Oklahoma (866), Iowa (861 MW), and Missouri (786 MW).
- There are now 122,468 MW of operating wind power capacity in the United States, with over 60,000 wind turbines operating across 41 states and two U.S. territories.

Wind Capacity Under Construction and in Advanced Development

- Projects totaling 34,757 MW were under construction (17,302 MW) or in advanced development (17,455 MW) at the end of December.
- Projects totaling 3,334 MW started construction in the fourth quarter and 500 MW entered advanced development.
- There are currently 10 states with over 1,000 MW in the near-term pipeline. Federal waters host 26% of the total development pipeline, followed by Texas (13%), Wyoming (10%), Oklahoma (7%), and Kansas (5%).

Wind Power Procurement Activity

- Project developers and power purchasers reported 700 MW of new PPAs in the fourth quarter, bringing PPA activity for the year to 5,444 MW.
- Corporate PPA activity declined this quarter, with only one announcement of 200 MW.

Turbine Technology Trends

- GE Renewable Energy led turbine installations in 2020, capturing 53% of the market through December. Vestas ranks second with 35%, followed by Siemens Gamesa Renewable Energy with 10% and Nordex USA with 3%.
- Project owners completed 2,899 MW of partial repowerings in 2020. GE Renewable Energy led this market segment as well, repowering 2,086 MW. Vestas repowered 774 MW and Siemens Gamesa repowered 39 MW in the year.

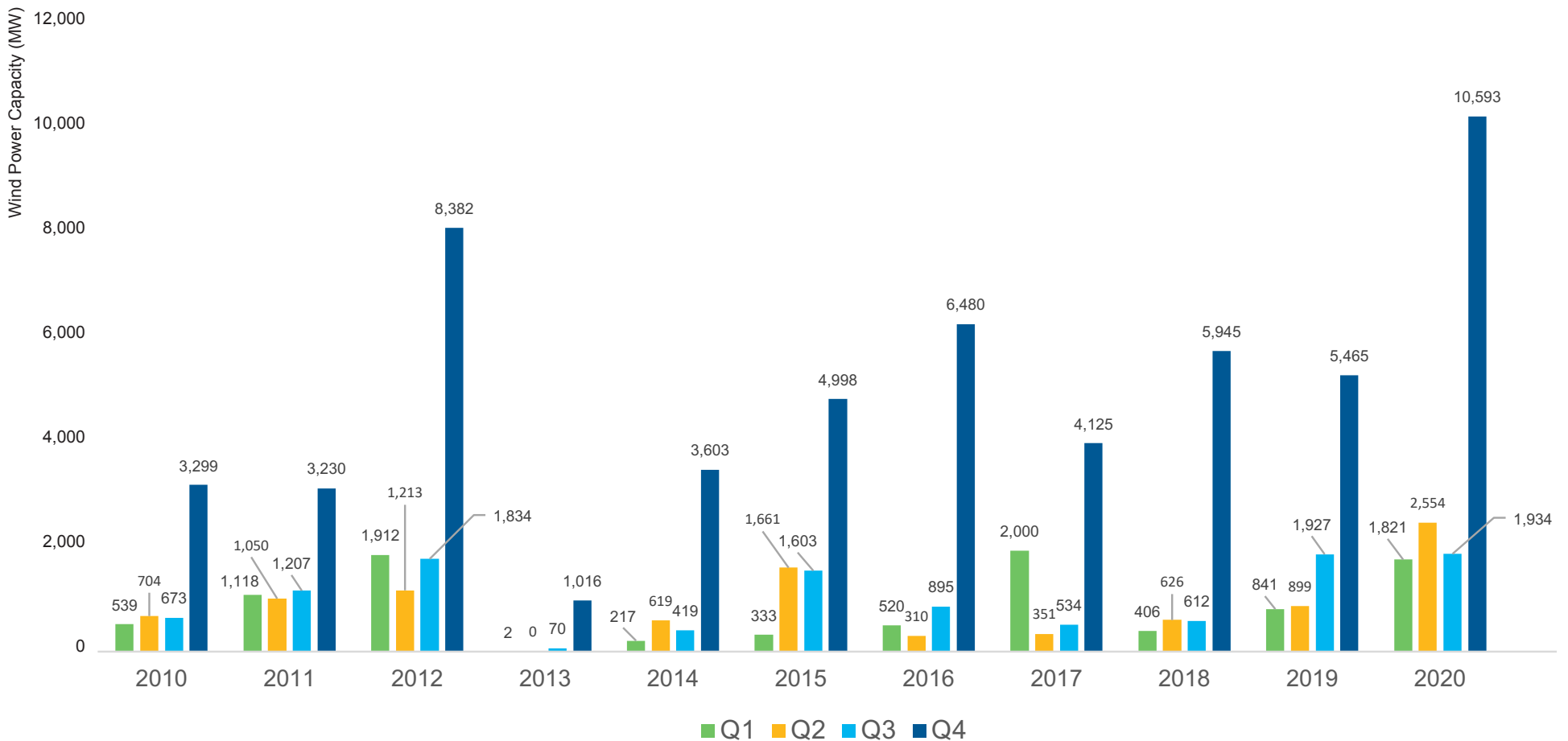


U.S. Wind Power Capacity Growth



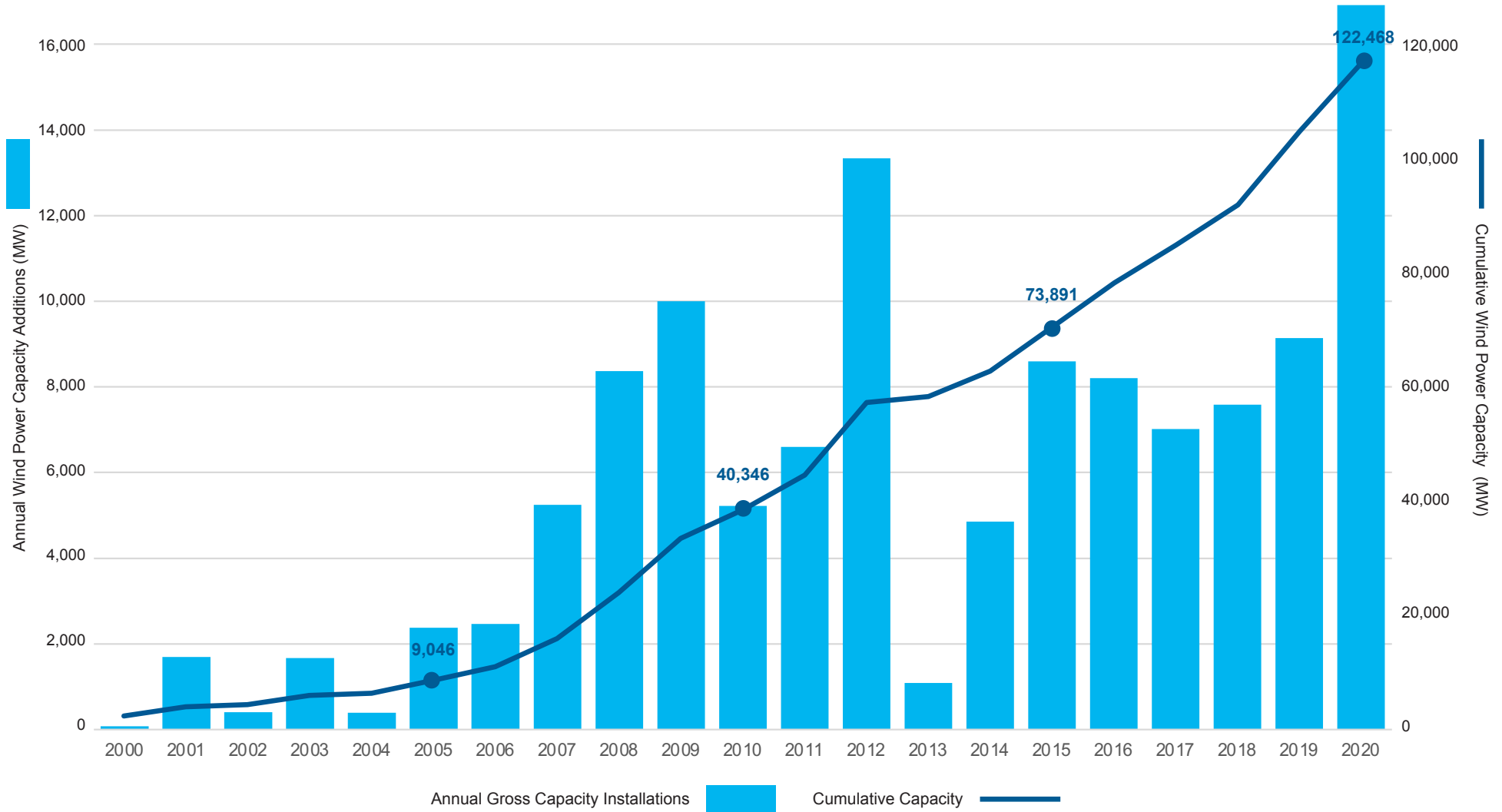
Quarterly U.S. Wind Power Capacity Installations

- The U.S. wind industry commissioned 10,593 MW of wind power capacity in the fourth quarter of 2020, the highest quarter on record.
- Wind capacity additions were up 94% in the fourth quarter of 2020 compared to the same period last year. This year broke the record for capacity installations.
- More wind power was installed in the fourth quarter of 2020 than any other year except for 2012.



U.S. Annual and Cumulative Wind Power Capacity Growth

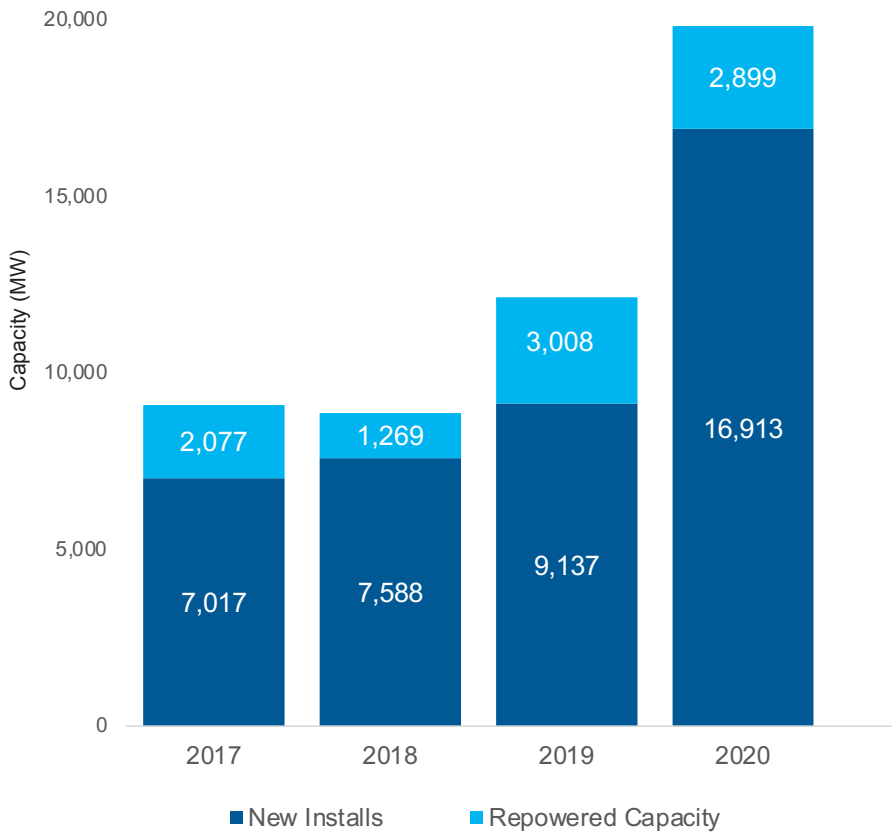
- Wind power installations set a new highwater mark in 2020 as the industry commissioned 16,913 MW.
- There are now 122,468 MW of wind energy operating in the United States, with over 60,000 wind turbines spinning across 41 states and two U.S. territories.



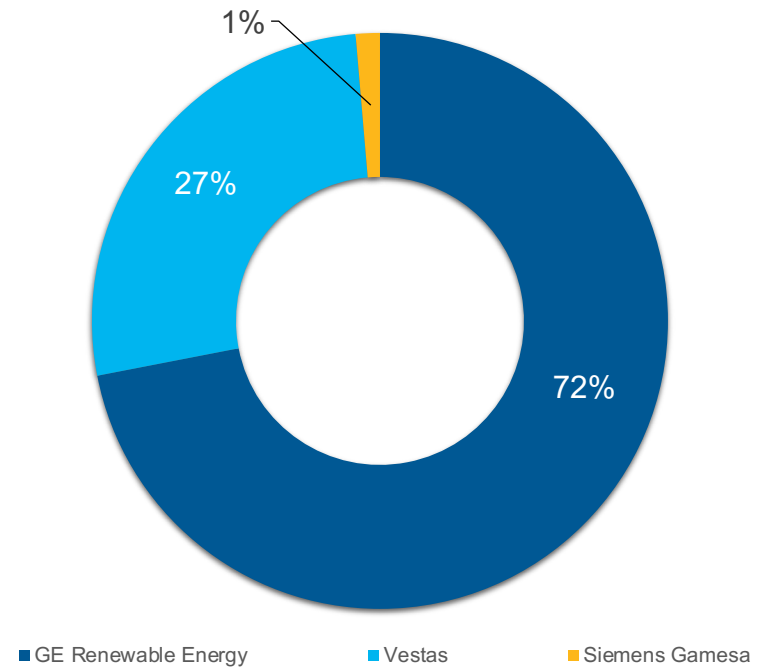
Wind Repowers

- Project owners partially repowered 31 wind phases in 2020. After repowering these projects now total 2,899 MW.
- Partial repowering activity was flat in 2020 compared to 2019, though 130% higher than 2018.
- GE Renewable Energy dominated this market, repowering projects totaling 2,086 MW. Vestas followed by repowering 774 MW, including many full nacelle replacements of legacy Clipper turbines.

NEW INSTALLS AND PARTIAL REPOWERING

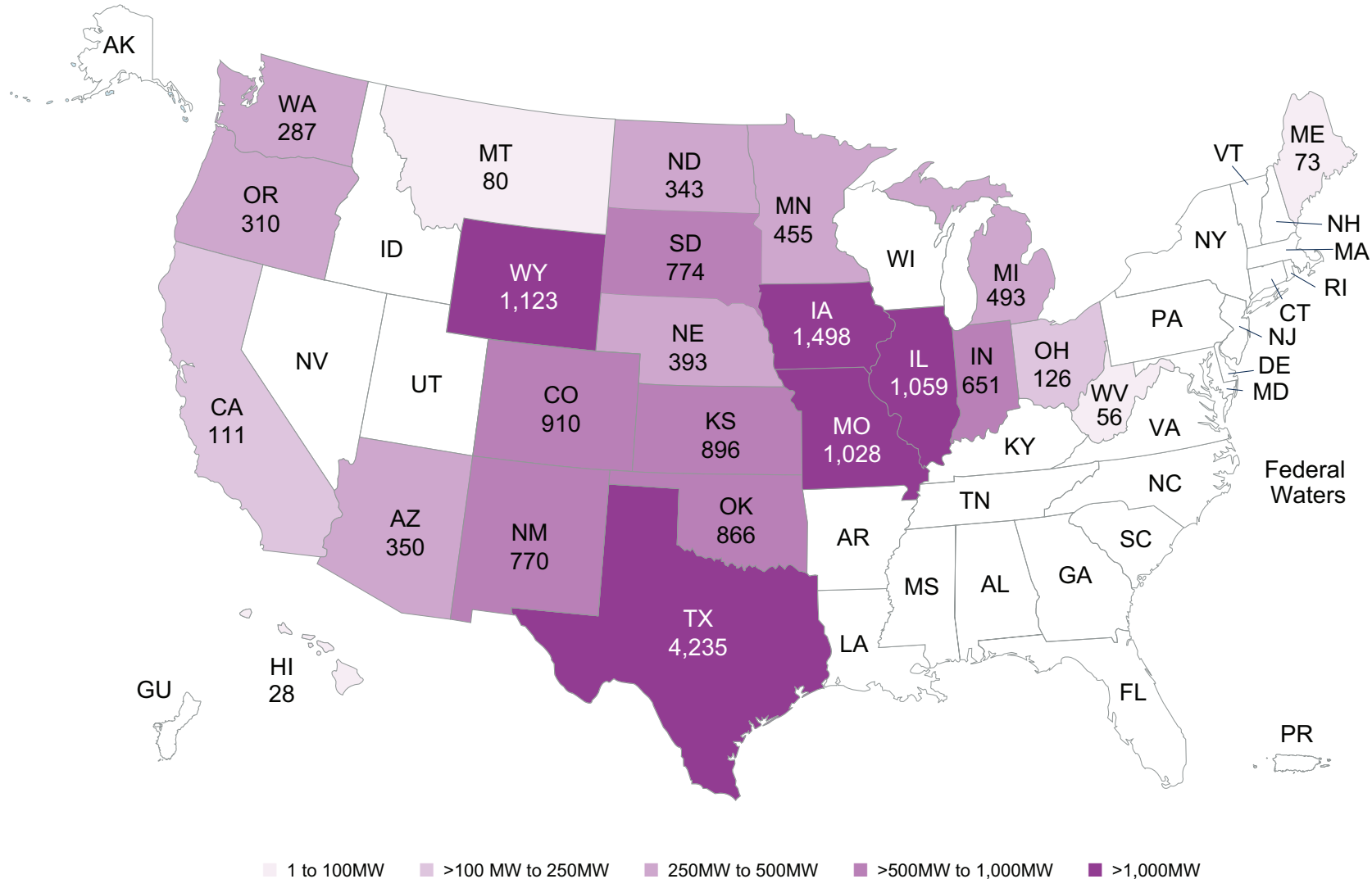


WIND REPOWERINGS, BY OEM



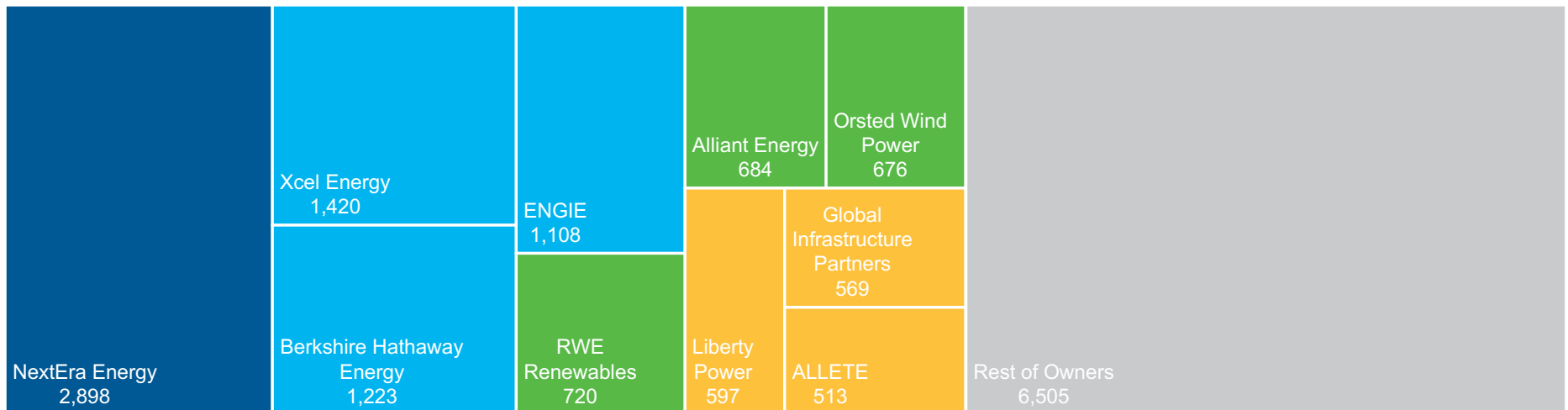
Wind Power Capacity Installations in 2020

- Developers installed 54 new wind projects, totaling 10,593 across 20 states during the fourth quarter of 2020.
- Texas led with 2,197 MW installed, followed by Wyoming (895 MW), Oklahoma (866), Iowa (861 MW), and Missouri (786 MW).
- Year-to-date the industry has added 90 projects across 26 states totaling 16,913 MW. Texas leads installations for the year (4,235 MW), followed by Iowa (1,498 MW) and Wyoming (1,123 MW).



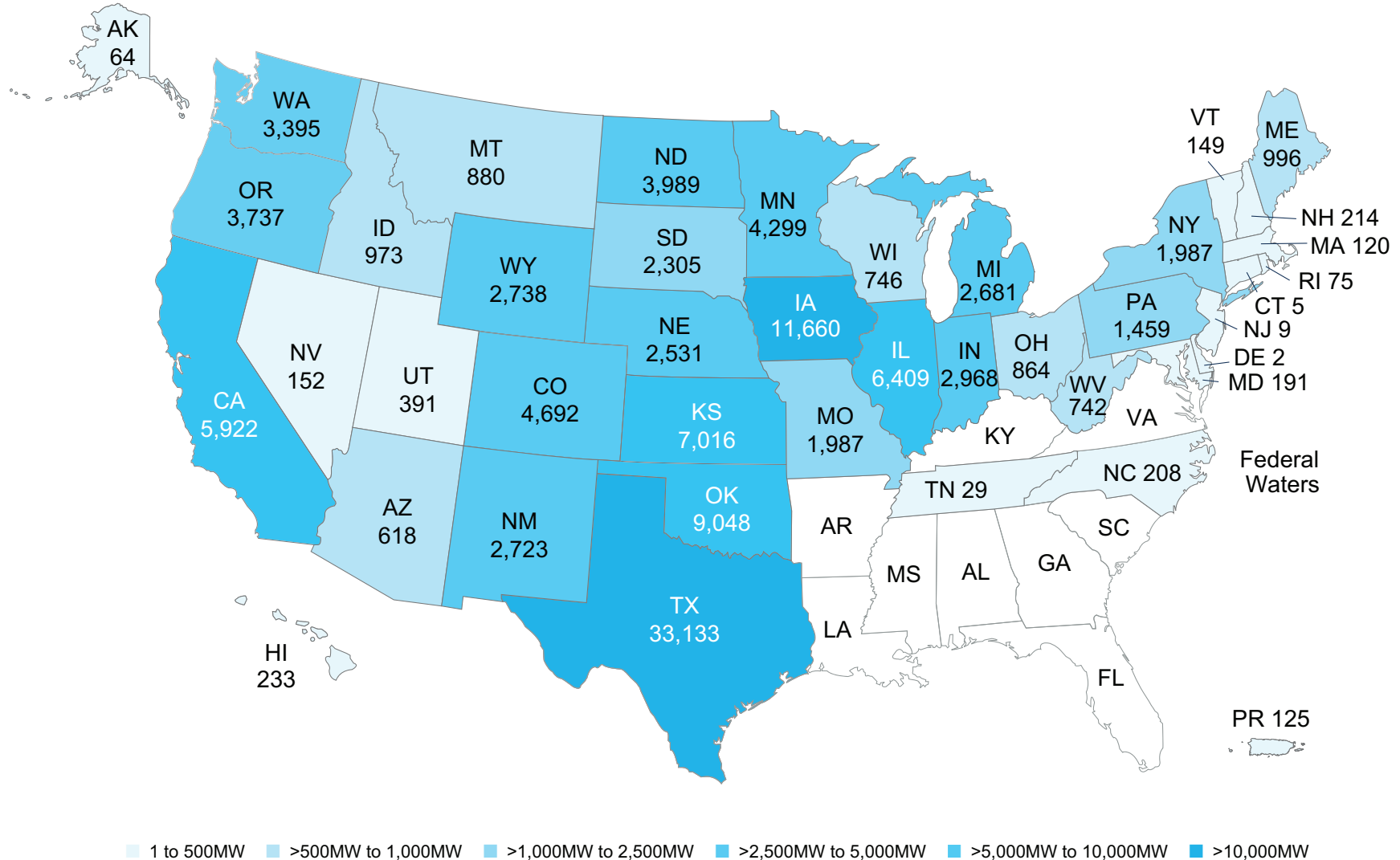
Top Owners of 2020 Wind Power Additions

- Three companies added more than 5,540 MW to their portfolios this year—NextEra, Xcel Energy, and Berkshire Hathaway Energy. NextEra leads the group after bringing online 13 wind projects totaling 2,898 MW.
- Xcel delivered five projects this year, including New Mexico’s largest wind farm to date, the 522 MW Sagamore Wind project and the second largest single phase wind project, Cheyenne Ridge (496 MW).
- Berkshire Hathaway brought nine projects online in 2020, eight of which came online in the fourth quarter with a combined capacity of 1,162 MW.
- The top ten owners of 2020 represent 62% of the wind power capacity brought online.



Operational Wind Power Capacity, by State

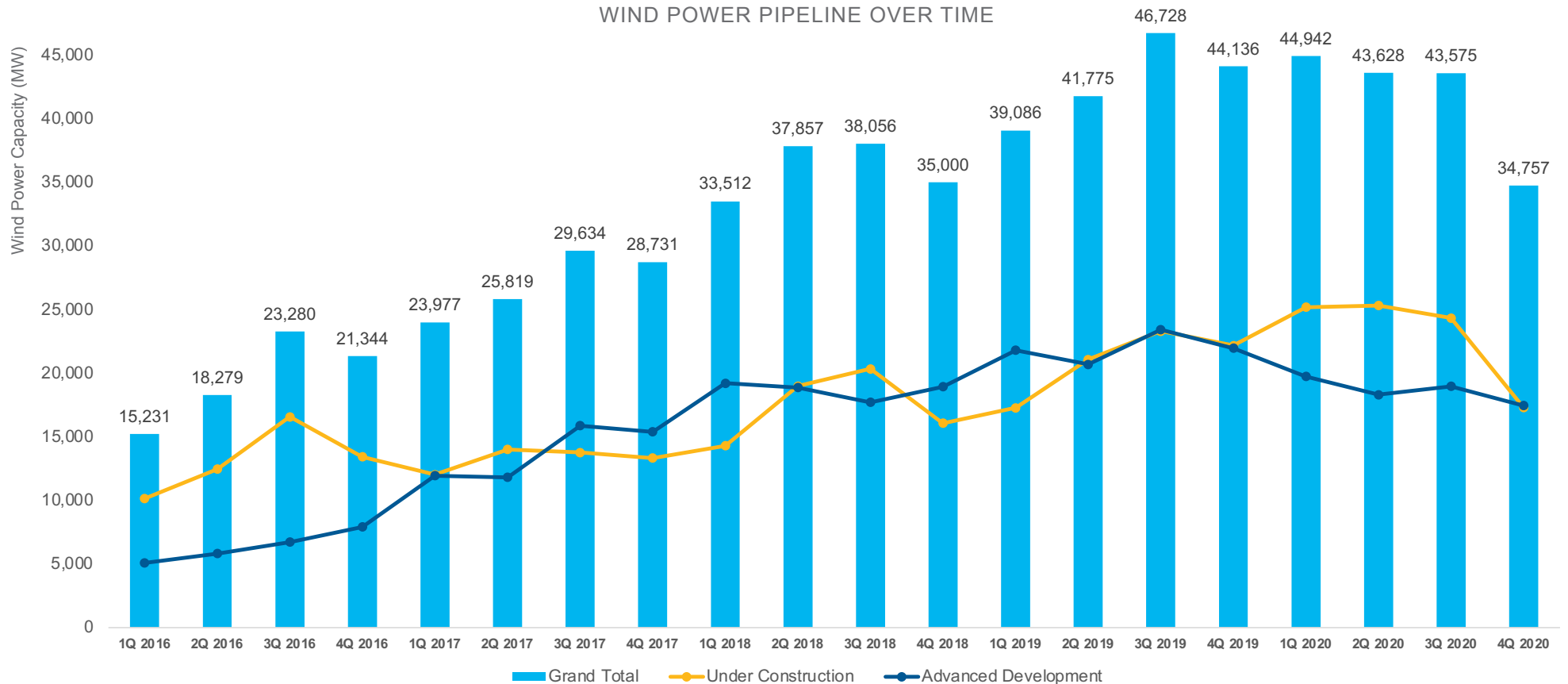
- The addition of Sagamore Wind (523 MW) allows New Mexico to claim the second largest, single-phase wind project in the country. Texas' Maverick Creek (492 MW), also placed-in-service this quarter, is the fourth largest, single-phase wind project.
- Currently, 20 states have over 1,000 MW of installed capacity.



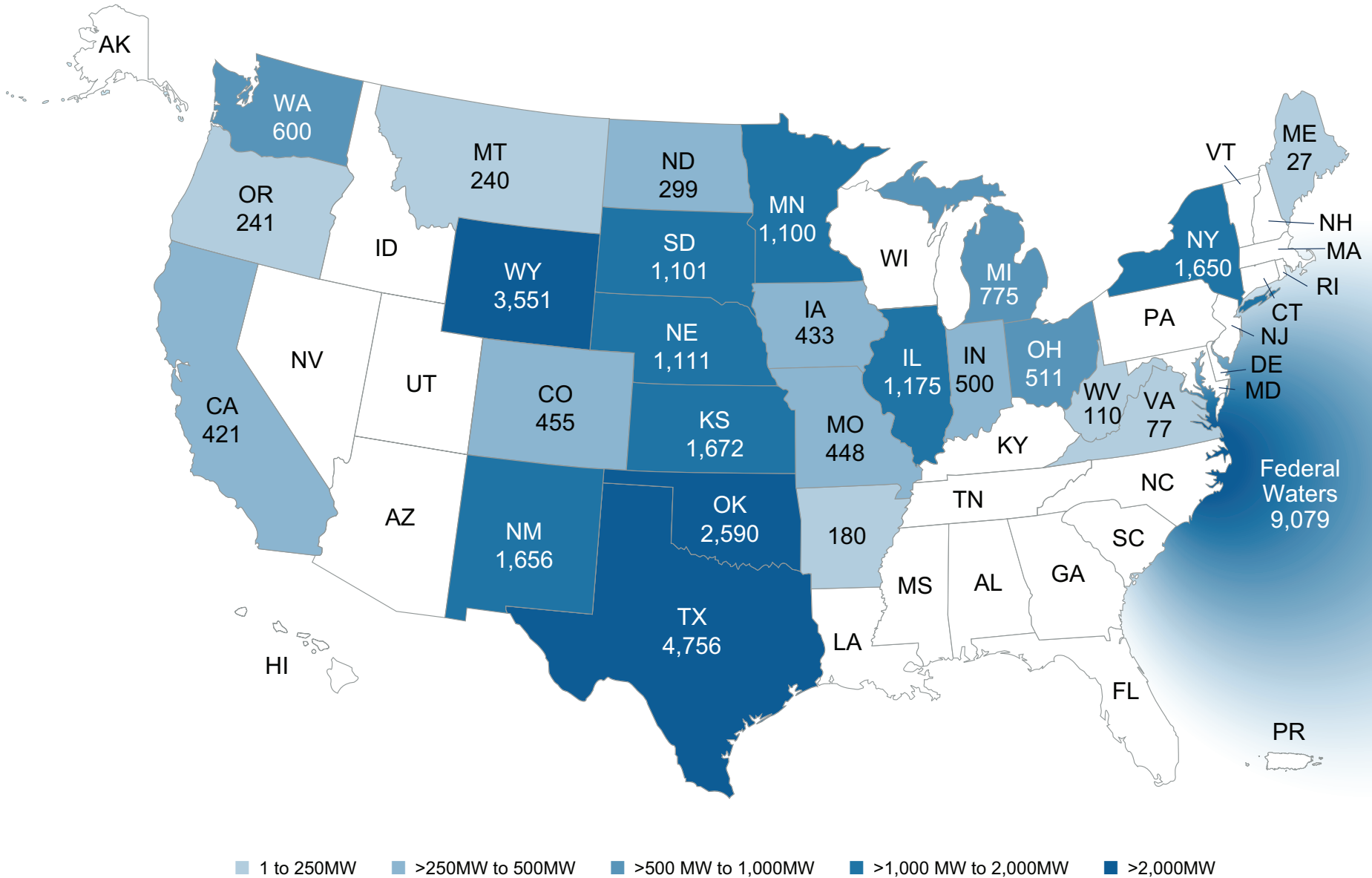
Wind Power Capacity Under Construction or in Advanced Development

- At the end of December 2020, there were 34,757 MW of wind power capacity in the near-term pipeline, including 17,302 MW under construction and 17,445 MW in advanced development. Total pipeline activity decreased by 20% from the previous quarter due to the record level of commissioning in 2020.
- Despite continued disruptions from COVID-19, project developers announced 3,834 in combined new development activity in the fourth quarter of 2020, with projects totaling 3,334 MW starting construction and an additional 500 MW entering advanced development.
- Developers continue to report challenges raising tax equity for projects in development. Tax equity supply is reported to be tight, due to economic uncertainty, tighter lending standards, and more limited capital allocations.

WIND POWER PIPELINE OVER TIME



Wind Power Pipeline, by State

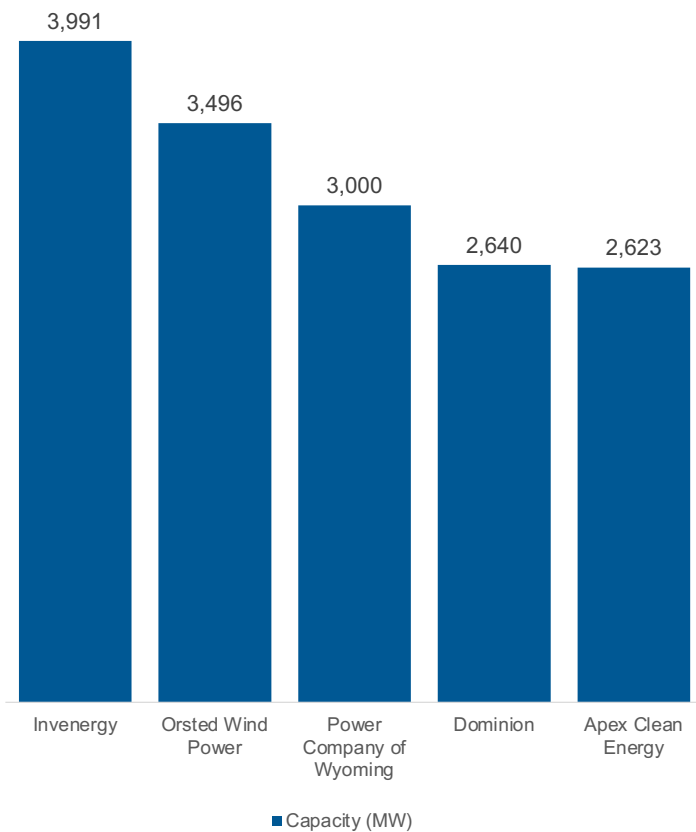


U.S. WIND POWER CAPACITY GROWTH

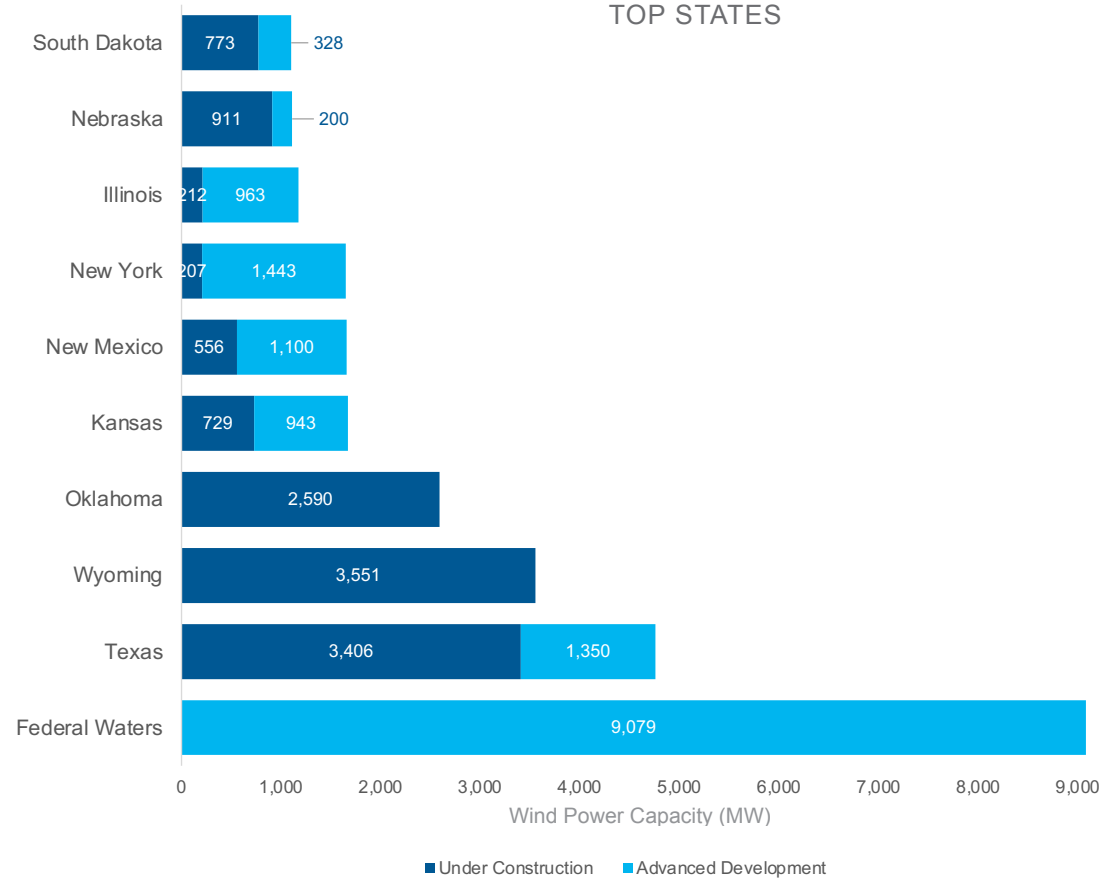
Wind Power Pipeline, Top States

- The 34,757 MW of combined construction and advanced development activity is spread across 177 project phases in 26 states and 15 project phases in federal waters.
- Federal waters host 9,079 MW of total development activity, representing 26% of the total development pipeline.
- Texas hosts more activity than any other state with 13% of the pipeline, followed by Wyoming (10%), Oklahoma (7%), Kansas (5%), and New Mexico (4%).
- A total of 14 states have over 1,000 MW of wind capacity in the pipeline.
- Invenergy is currently the top developer of projects under construction or in advanced development, followed by Orsted and Power Company of Wyoming.

TOP DEVELOPERS OF NEAR-TERM WIND PIPELINE



TOP STATES

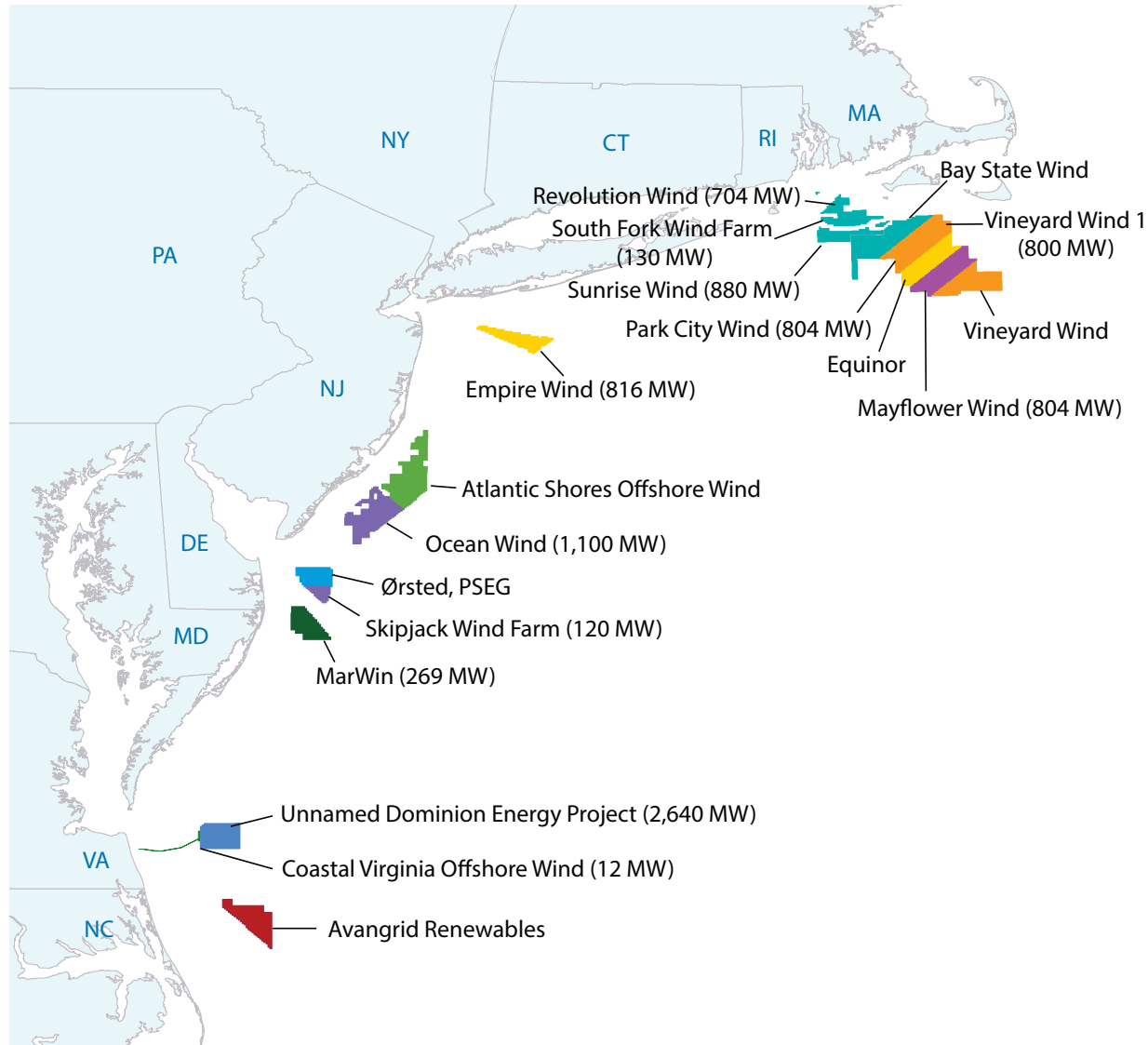


U.S. Offshore Wind Energy Activity

Offshore Wind Updates



Fourth Quarter U.S. Offshore Wind Energy Activity

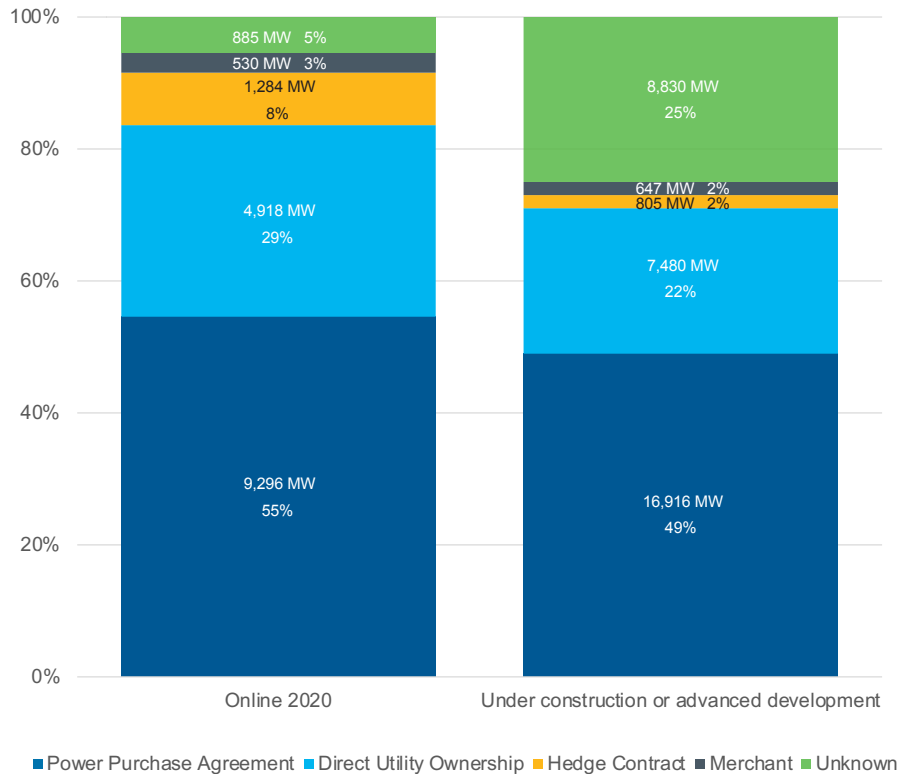


- In October Rhode Island announced a competitive request for proposals for up to 600 MW of new offshore wind power.
- On October 29, Gov. Larry Hogan of MD, Gov. Ralph Northam of VA, and Gov. Roy Cooper of NC announced the execution of an offshore wind MOU to partner on coordination of supply chain and administrative processes and regional promotion of the technology—The Southeast and Mid-Atlantic Regional Transformative Partnership for Offshore Wind Energy Resources (SMART-POWER)
- In November, Massachusetts approved contracts for the 804 MW Mayflower Wind Offshore project. The combined price for energy and RECs is \$77.76/MWh on a nominal levelized basis for both the Phase 1 and Phase 2 PPAs.
- Vineyard Wind announced in early December that it would temporarily withdraw its construction and operations plan for its 800 MW project off the coast of Massachusetts. Early in 2021, Vineyard rescinded its withdrawal.
- In December, Avangrid Renewables submitted a construction and operations plan (COP) to federal regulators for the first 800 MW phase of its Kitty Hawk offshore wind project, which could eventually grow to 2.4 GW or more if two other phases are eventually built. The first phase aims to start construction by 2024.
- Dominion Energy filed a COP for the 2,640 MW Coastal Virginia Offshore Wind project with BOEM in mid-December. The project is expected to create 900 construction jobs and 1,100 operations jobs.

Wind Power Procurement Activity

Wind Power Offtake Status

- Long-term PPAs remain the most popular offtake mechanism for wind energy, accounting for 55% of new wind power capacity commissioned in the fourth quarter.
- Direct utility ownership of wind power continues to grow, as four utilities commissioned 4,918 MW in 2020. Dominion and AEP lead these direct ownership additions.
- Hedge contracts account for 8% of capacity installed year-to-date, tied to projects in Illinois, Kansas, and Texas.
- Over 16 GW of projects underway have a PPA in place, representing just over half of the current pipeline. Utility ownership accounts for 22% of capacity underway, while merchant hedge and merchant activity represent 2%. The 25% balance have not yet reported an offtake structure.
- Utility purchasers (through direct ownership and PPAs) currently account for 70% of capacity under construction or in advanced development. Dominion Energy leads utilities with over 2,652 MW underway, followed AEP and Eversource Energy.

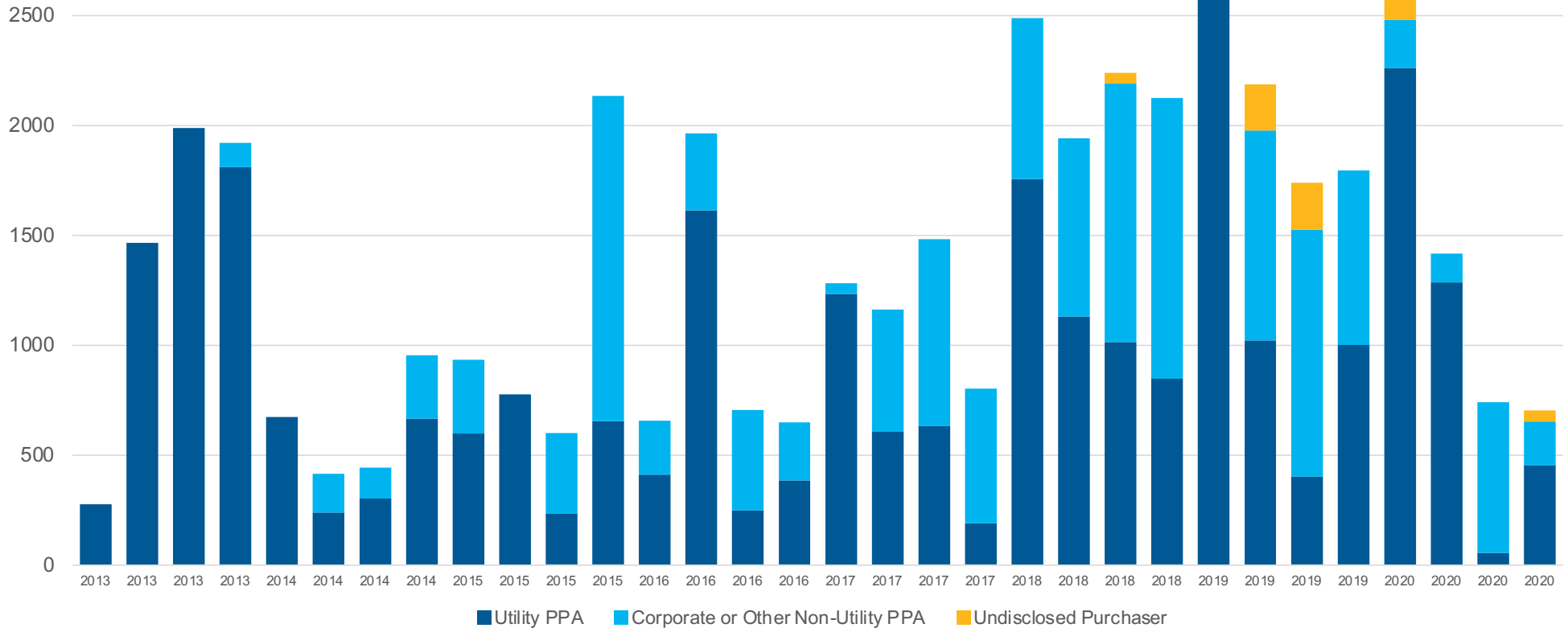


Top Utilities by Near-Term Wind Project Pipeline

UTILITY	DIRECT OWNERSHIP (MW)	LONG-TERM CONTRACT (MW)	TOTAL
Dominion	2,652		2,652
AEP	1,484		1,484
Eversource Energy		1,245	1,245
Xcel Energy	728	453	1,181
National Grid		1,037	1,037

Wind Power Purchase Agreements

- PPA announcements this quarter continued to be down noticeably from quarterly levels throughout 2018 and 2019, partially due to uncertainty caused by COVID-19.
- Project developers and power purchasers announced 700 MW of new PPAs in the fourth quarter, bringing PPA activity for the year to 5,444 MW.
- McDonalds Corporation was the only corporation to announce a PPA from October to December. The burger chain signed a PPA for 200 MW from Caddo Wind Farm.
- In a reversal from the third quarter utility PPA activity picked up again—two utilities announced wind power contracts totaling 450 MW.



Wind Turbine Market Trends

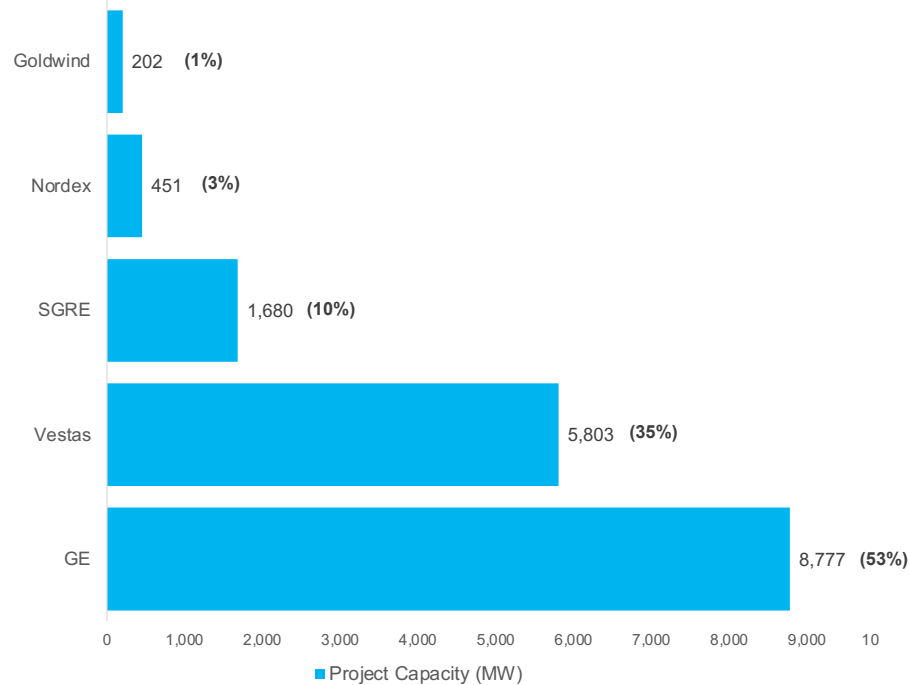


Wind Turbine Manufacturer Market

2020 Installations

- GE Renewable Energy (GE) led 2020 wind power capacity installations, capturing 53% of new turbine capacity.
- Vestas ranked second with 35% of installations, followed by Siemens Gamesa Renewable Energy (SGRE) with 10%. Nordex USA represented the remaining 3%.
- On a capacity basis, the majority (71%) of turbines installed in the year are rated between 2 MW to less than 3 MW, while 28% are rated over 3 MW. There are now thirteen projects utilizing 4 MW class turbines totaling 2,229 MW operating in the U.S.
- GE's 2.82-127 model was the most popular turbine installed this year, accounting for 28% of capacity additions, followed by Vestas' V120-2.2 and the GE 2.5-127.

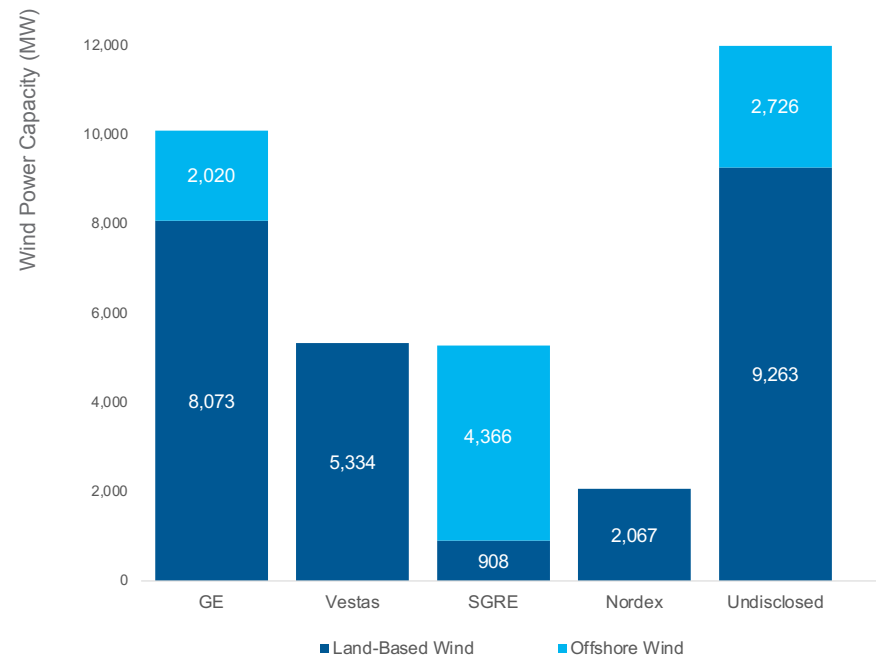
2020 CAPACITY INSTALLATIONS, BY OEM



Construction and Advanced Development

- For land-based wind projects, GE and Vestas account for 82% of projects under construction and in advanced development that have reported an OEM. GE currently represents 49% of this market, Vestas represents 33%, and Nordex captures 13%.
- Considering offshore wind projects, SGRE is supplying 68% of projects where an OEM has been reported. GE increased its market share in the fourth quarter capturing 32% of the market.
- Approximately 34% of all projects under construction or in advanced development have not yet reported a turbine manufacturer to ACP.

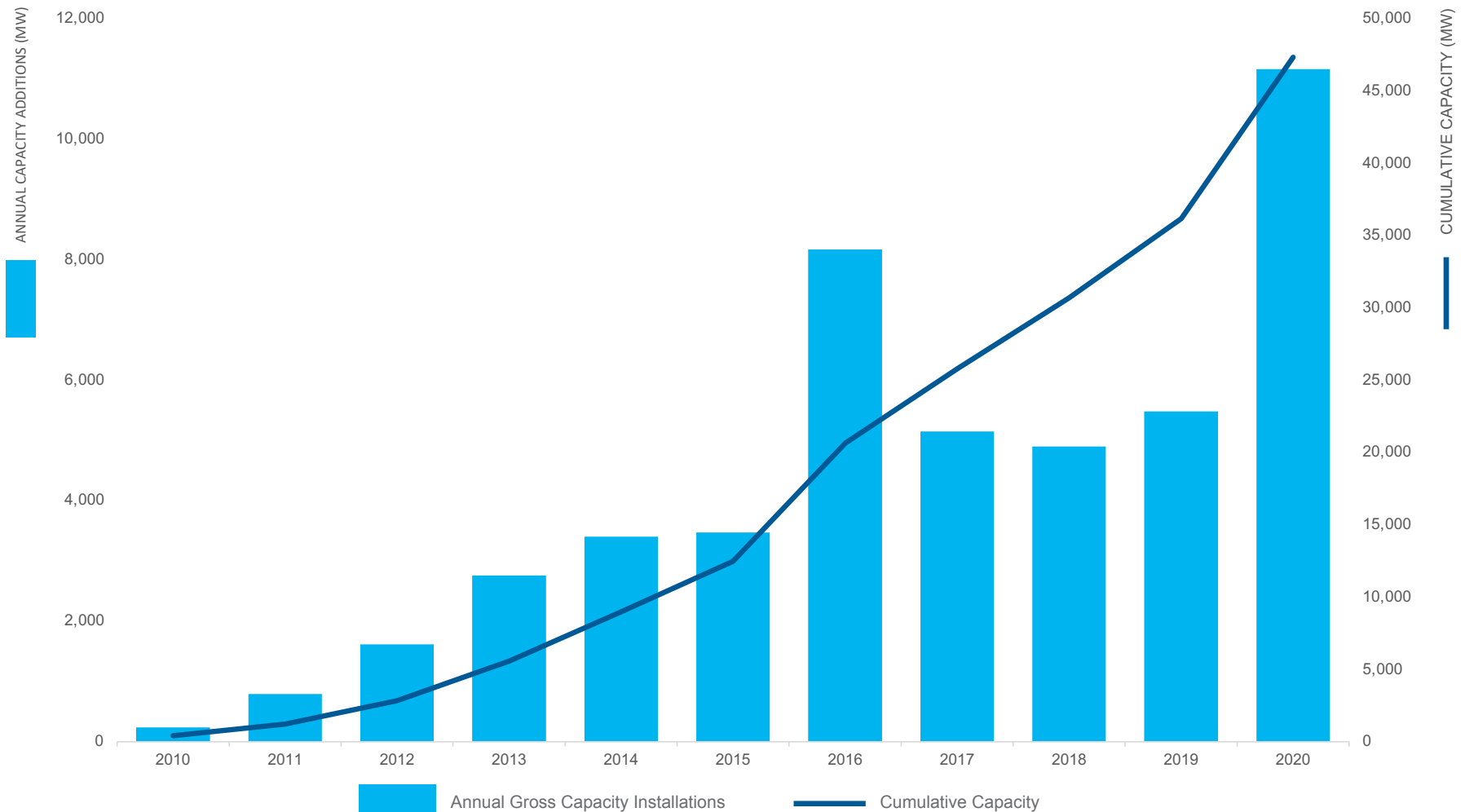
NEAR-TERM PIPELINE CAPACITY, BY OEM



U.S. Utility Solar and Battery Storage Market

U.S. Annual and Cumulative Utility Solar Power Capacity

- Wind, solar, and energy storage set annual capacity addition records in 2020. Utility solar additions more than doubled from 2019 as the industry installed 11,158 MW. This marks a 37% improvement on the previous record set in 2016.
- There are now 47,318 MW of operating utility solar power capacity in the country. Cumulative capacity grew 31% year-over-year.
- Operating utility solar projects can power the equivalent of 11 million American homes.



Source: ACP, EIA

Operational Utility Solar Power, by State

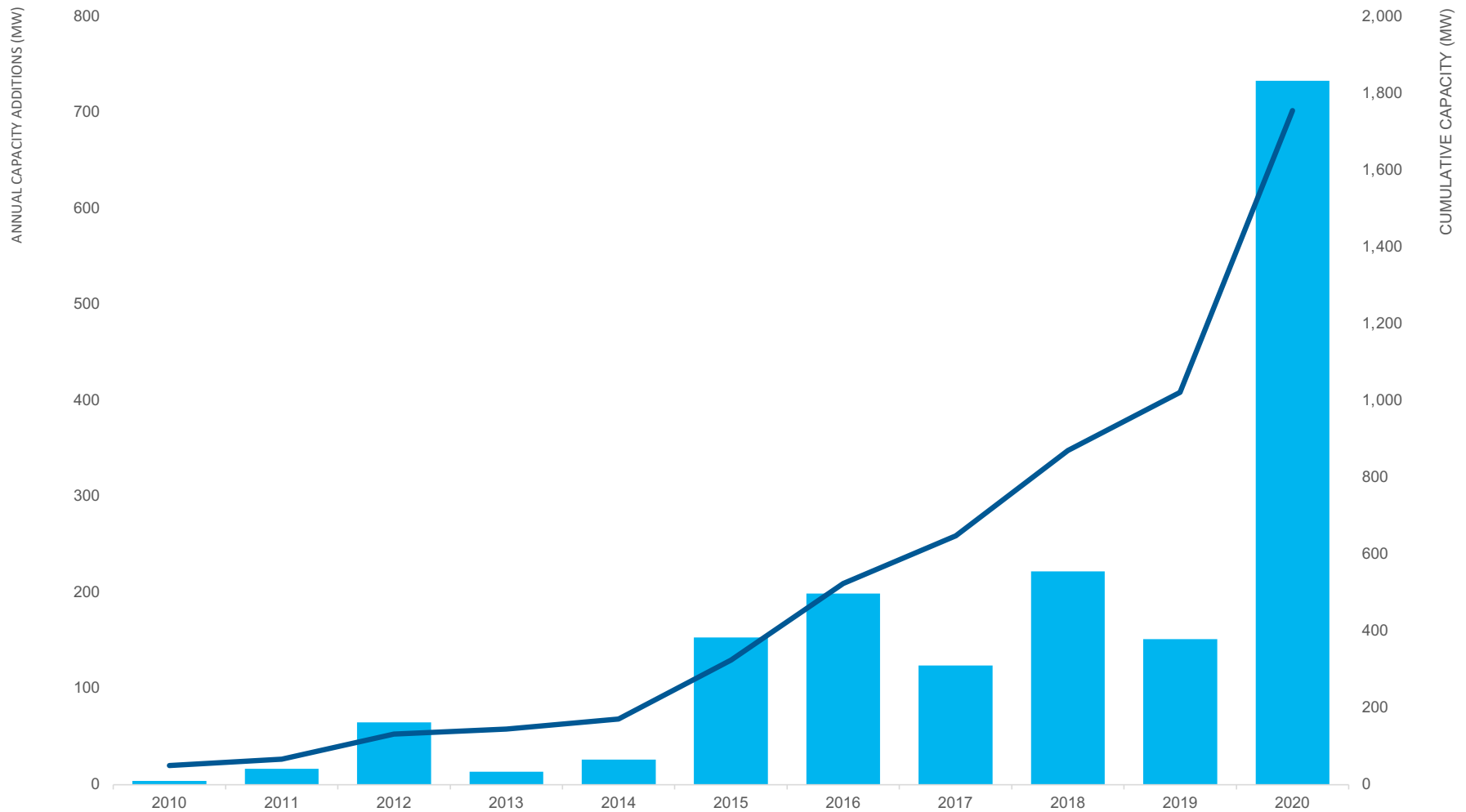
- Forty-seven states and D.C. have operational utility solar power capacity. California leads the solar market with over 13 GW of installed capacity, more than double second placed Texas.
- Nearly 30% of installed utility solar power is in California, followed by Texas (11%), North Carolina (11%), Florida (8%), and Nevada (5%).
- In 2020, Texas led solar power additions with 2,852 MW installed. California was in second with 1,726 MW and Florida rounded out the podium with 1,714 MW installed.

State	Prior-2020 Capacity (MW)	2020 Additions (MW)	Total Capacity (MW)
Texas	2,454	2,852	5,306
California	11,504	1,726	13,230
Florida	2,150	1,714	3,864
Virginia	646	844	1,489
Georgia	1,470	664	2,134
North Carolina	4,567	457	5,024
South Carolina	663	400	1,063
Arizona	1,846	293	2,138
Utah	917	279	1,196
Oregon	401	185	585
Remaining States	9,543	1,745	11,289
Total	36,160	11,158	47,318

Source: ACP, EIA

U.S. Annual and Cumulative Utility Battery Storage Capacity

- In 2020 battery energy storage broke annual capacity records. Utility battery storage increased over 300% from 2019 as the industry installed 734 MW.
- There are now 1,756 MW of operating utility battery energy storage capacity in the U.S. Cumulative capacity grew 72% year-over-year.



Source: ACP, EIA

Operational Utility Battery Storage, by State

- Thirty-four states have operational utility battery storage capacity. California hosts the most battery storage with 876 MW of installed capacity, followed by Texas (134 MW), Illinois (133 MW), Massachusetts (81 MW) and Hawaii (63 MW)
- In 2020, California installed the most battery storage additions, bringing online 621 MW. Massachusetts came in second with 48 MW, with Texas coming in third with 20 MW.
- Ten states installed utility-scale battery storage facilities in 2020, with six of those states installing 10 MW or more.

State	Prior-2020 Capacity (MW)	2020 Additions (MW)	Total Capacity (MW)
California	255	621	876
Massachusetts	33	48	81
Texas	114	20	134
New York	33	12	45
Indiana	28	10	38
Oklahoma	0	10	10
North Carolina	1	9	10
Georgia	1	1	2
Colorado	11	1	12
Washington	6	1	7
Remaining States	541	0	541
Total	1,022	734	1,756

Source: ACP, EIA



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