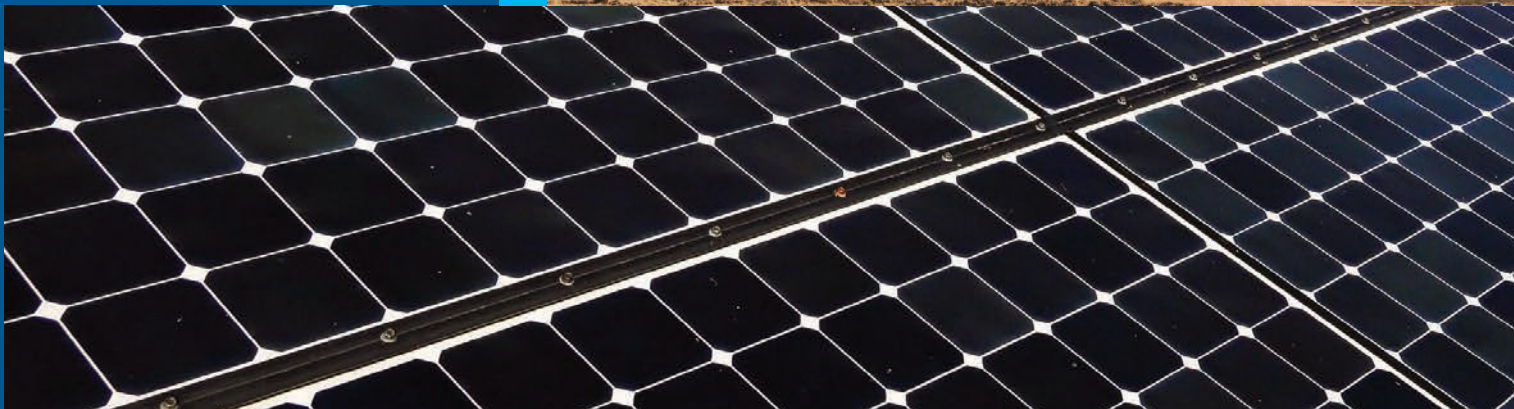


20
22 | Q4



CLEAN POWER QUARTERLY
Market Report



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Clean Power Definitions & Acronyms

Definitions

Advanced development: Projects not under construction, but with a PPA, firm equipment order, or moving forward with plans to be placed under utility ownership as of the end of the most recent quarter. For offshore wind, advanced development consists of projects that have secured offtake or have had successful bids in response to a state solicitation even if final offtake negotiations have not concluded.

Capacity: Project nameplate capacity. Unless otherwise stated, ACP reports capacity in MW-ac.

Clean power: For the purposes of this report, clean power includes land-based wind, offshore wind, utility-scale solar, and battery storage technology.

Decommissioned: Project is offline and is no longer delivering power to the grid on a permanent basis. Physical removal of equipment is not a requirement.

Duration: The amount of time, in hours, a battery can discharge its power capacity before depleting its energy capacity. For example, a 2 MW battery that has 4 MWh of energy capacity has a duration of 2 hours.

Full repowering: Full decommissioning of a utility-scale project. The original equipment is physically removed from the project site and replaced with new utility-scale equipment.

Inverter Loading Ratio (ILR): The ratio of installed DC capacity to the inverter's AC power rating. Also known as the AC-to-DC ratio.

Online: Project has reached commercial operation and is delivering electricity to the ultimate point of delivery.

Partial repowering, nacelle replacement: Complete replacement of a utility-scale wind turbine's nacelle, rotor, and blades. The tower and foundation are retained.

Partial repowering, major retrofit: Complete replacement of a utility-scale wind turbine's rotor and blades, along with the replacement of at least one major component within the nacelle, typically the gearbox or the generator.

Pipeline: Projects either under construction or in advanced development.

Repowered: Full or partial equipment replacement. Currently only wind repowering activity is tracked, but ACP will expand repowering activity tracked as the market progresses.

Under construction: Construction team has begun work on the ground at the project site. For offshore wind, under construction is defined as in-ocean construction.

Acronyms

AC	Alternating Current
C&I	Commercial & Industrial
CAISO	California ISO
DC	Direct Current
ERCOT	Electric Reliability Council of Texas
GW	Gigawatts
GWh	Gigawatt hours
ILR	Inverter Loading Ratio
IOU	Investor-Owned Utility
ISO	Independent System Operator
MISO	Midcontinent Independent System Operator
MW	Megawatts
MWh	Megawatt hours
NE-ISO	New England ISO
NYISO	New York ISO
OEM	Original Equipment Manufacturer
PJM	Pennsylvania-New Jersey-Maryland Interconnection
PPA	Power Purchase Agreement
RTO	Regional Transmission Organizations
SPP	Southwest Power Pool



2022 Q4 Highlights

2022 Q4 Highlights

Clean Power Project Installations

- The clean power industry finished 2022 with its strongest quarter of the year, but the lowest fourth quarter since 2019. There were 131 project phases that came online in the fourth quarter with a total capacity of 9.6 GW. These projects can power the equivalent of 5 million American homes.
- For the full year, the industry installed 25.1 GW of clean power capacity across the United States, representing a \$35 billion capital investment. 2022 installations mark a 16% decline from the record year in 2021 and a 12% decline from 2020. Difficulty sourcing solar panels, supply chain constraints, interconnection challenges, and policy uncertainty associated with the previous phase-down schedule of the PTC all proved to be barriers for projects.
- Developers commissioned 131 new projects in the fourth quarter across 36 states. Throughout the whole year, 451 projects were commissioned across 47 states and the District of Columbia. Texas, California, and Oklahoma led both Q4 and 2022 installations. Texas alone accounted for 44% of Q4 installations and 36% of annual installations.
- Solar led wind and storage power capacity quarterly installations with 4.7 GW brought online in the last three months of the year. For the full year, solar commissioned the most capacity of the three clean power technologies. 12.7 GW of solar was installed, a slight decline compared to 2021, and well short of the 30% growth expected for solar installations.
- Battery storage had a record year in 2022, shattering the 2021 record of 3 GW/9.5 GWh by commissioning 4 GW/12.2 GWh in 2022. Cumulative operating battery storage capacity increased 80% in 2022 and now stands at 9 GW.
- Land-based wind finished the year with its strongest quarter, commissioning 4 GW of new projects. Despite this, the 8.5 GW installed in 2022 represents a 37% year-over-year drop. Notably, this volume of wind additions was in line with prior expectations, largely due to the declining value of the production tax credit available to wind.

Clean Power Under Construction and in Advanced Development

- A record 135.2 GW of clean power capacity is in the pipeline, including 42.3 GW under construction and 93 GW in advanced development. The pipeline grew 2% since Q3, and 13% year-over-year. While a record amount of capacity is in the

pipeline, the growth rate is slowing. In 2021 the pipeline grew at an average of 12% each quarter, compared to just 3% quarterly growth in 2022.

- Substantially more capacity entered the pipeline in Q4 than in previous quarters in 2022. From October to December, 17.7 GW of capacity entered advanced development or started construction, nearly 6 GW more than any other quarter in the year.
- Texas continues to lead the pipeline with 24.5 GW in development, an increase of 3% from Q3. California and New York, ranked second and third for capacity in development, both decreased their pipeline capacity slightly compared to Q3. California now has 12.1 GW in development, and New York 10.5 GW.
- In early November, Avangrid Renewable's 806 MW Vineyard Wind project announced that offshore cable installation had commenced, making it the first commercial-scale offshore project to begin construction in the U.S.
- Overall, 2022 installations fell short of initial expectations. This is due, in part, to a large quantity of projects experiencing delays. More than 17.4 GW of clean power projects expected online in Q4 experienced delays. In total, ACP is tracking more than 53 GW of clean power projects that experienced delays and have yet to come online. Solar accounts for 64% of total delays, wind 21%, and battery storage the remaining 15%. Supply chain constraints, long interconnection timelines, and trade restrictions are a few of the reasons projects have been delayed.

Clean Power Procurement Activity

- The industry announced 39.8 GW of new clean power offtake this year, after an additional 9.9 GW of announcements in the fourth quarter. Power purchase agreements (PPAs) make up the majority, 73%, of annual announcements.
- Total announcements are down 12% compared to 2021, though announcements are up 32% compared to 2020. PPA announcements are down just 3% compared to 2021, claiming the second highest year on record.
- Corporate buyers announced 20 GW of new clean power contracts in 2022, while utilities announced 11.5 GW of new contracts or ownership. Specific to PPAs, corporate buyers announced 17 GW of new PPAs and utilities announced 8.1 GW.
- Solar accounts for 76% of clean power offtake announcements in 2022, and only 62% of announcements in the fourth quarter.



Clean Power Capacity Growth

Strongest quarter of the year; lowest Q4 since 2019

2022 Q4 installs

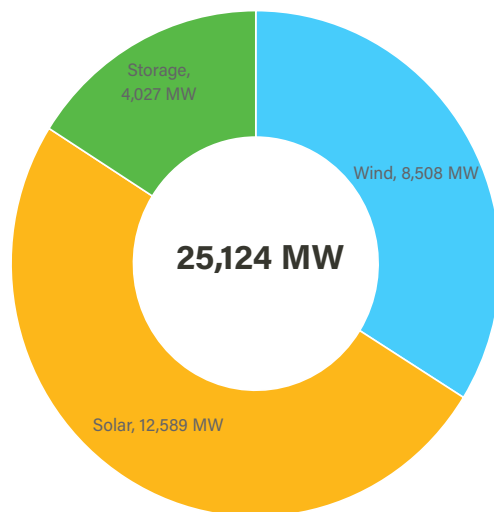
- New clean power commissioned in the final quarter of 2022 totaled 9,587 MW. While this is the strongest quarter of the year by a margin of more than 3 GW, it is the lowest fourth quarter installation volume the industry has seen since 2019.
- In total, 25,124 MW of clean power capacity came online in 2022. This is 16% lower than 2021, and 12% lower than 2020 installations. Every quarter in 2022 except Q1 saw lower installs than 2021.
- This quarter, developers commissioned 98 solar projects with a total capacity of 4,731 MW, bringing 2022 annual solar installs to 12,589 MW. 2022 solar installations are nearly flat compared to the 13 GW installed in 2021. While 2022 is the second highest solar year on record, short of the 30% growth anticipated prior to the start of the year.
- 2022 marks the strongest year on record for battery storage deployment. In the fourth quarter, 850 MW/2,375 MWh of new battery storage projects commissioned, bringing full year installations to 4,027 MW/12,155 MWh. 2022 battery storage installations increased the total operating MW capacity by 80%, and total operating MWh capacity by 93%.

- Land-based wind finished the year with its strongest quarter of the year at 4,006 MW, rebounding from installing just 358 MW in the third quarter. Despite this, 2022 represents the lowest year for land-based wind commissioning since 2018. The slowdown in wind installations was partially expected given the phase-down of the PTC prior to the passage of the IRA. Compounding this expected slowdown are lingering supply chain challenges as well as delays in approvals for synchronization with the grid.

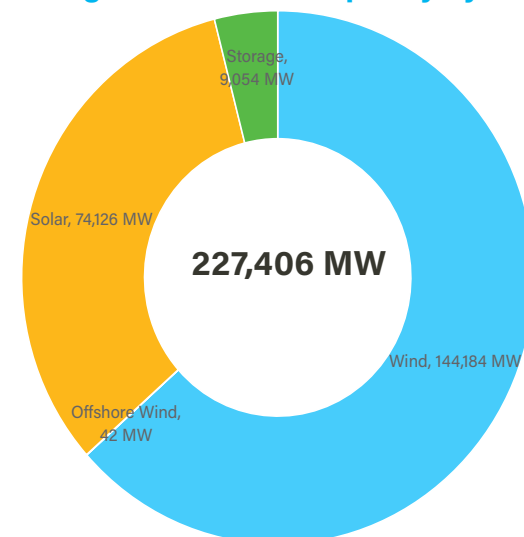
Cumulative operating clean power capacity

- In 2021, the industry celebrated surpassing 200 GW of operating clean power. In 2022, cumulative operating capacity is now 227,406 MW, enough clean energy to power 61 million American homes.
- Broken down by technology, operating clean power capacity is made up of 144,184 MW of land-based wind, 74,126 MW of solar, 9,054 MW/25,195 MWh of battery storage capacity, and 42 MW of offshore wind.

2022 Clean Power Installs by Technology



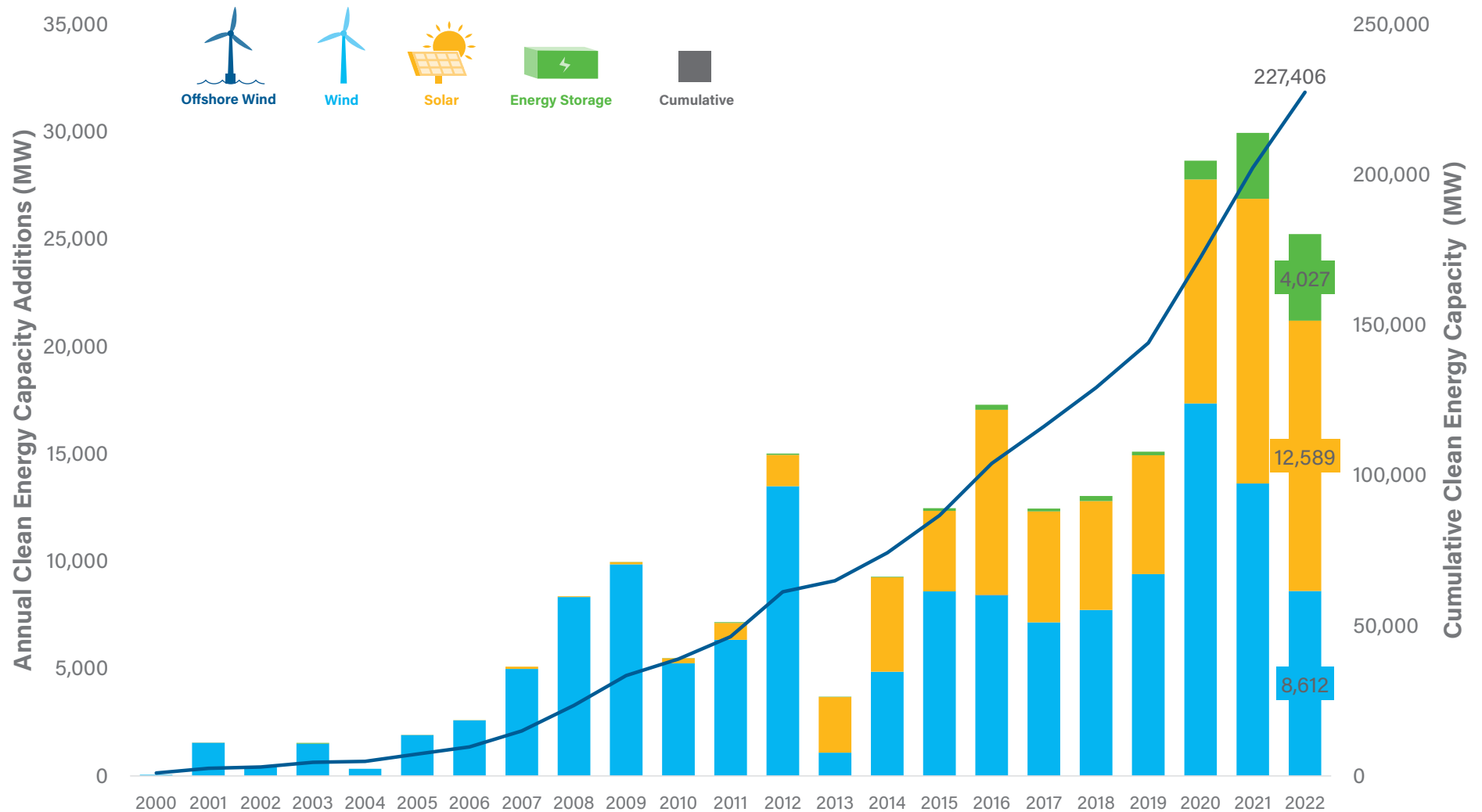
Total Operating Clean Power Capacity by Technology



CLEAN POWER CAPACITY GROWTH

Lowest quarter since Q4 2019 *(continued)*

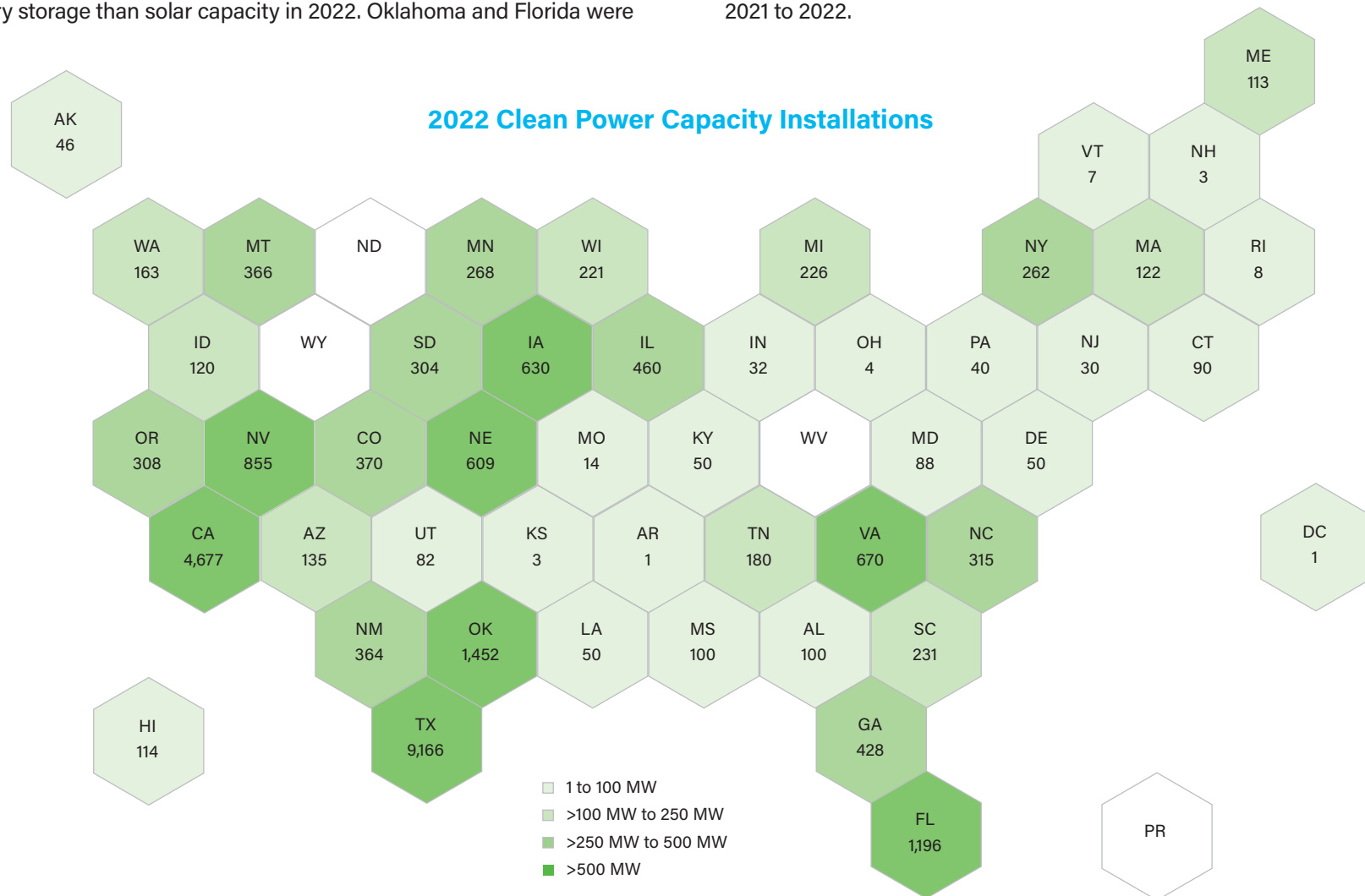
U.S. Annual and Cumulative Clean Power Capacity Growth



Solar capacity is reported in MWac units.
Land-based wind capacity includes partial repowerings.

Texas and California top annual installations

- In 2022, developers commissioned 451 project phases, after bringing online an additional 131 projects in the final quarter of the year.
- In 2022 California and Texas both had record years for new clean power installations; Texas installed 9.2 GW of new clean power capacity, accounting for 36% of the total additions across the country. California accounted for another fifth of installs, with 4.7 GW installed. Notably, California installed more new battery storage than solar capacity in 2022. Oklahoma and Florida were the only other states to top 1 GW. Oklahoma installed only wind projects, while Florida installed only solar and battery storage.
- Eighteen states installed more capacity in 2022 than in 2021. Six states that installed no new capacity in 2021, Delaware, Idaho, Kentucky, Louisiana, New Hampshire, and Tennessee, installed new capacity in 2022. Mississippi, Washington, and Hawaii saw the highest growth in annual installations from 2021 to 2022.

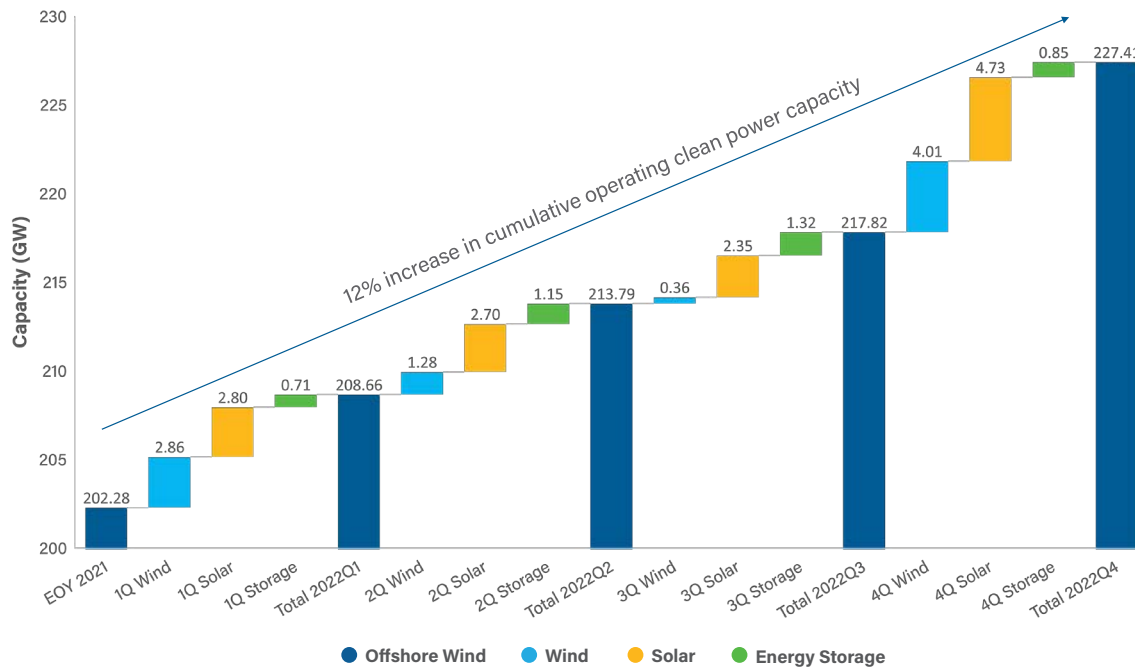


CLEAN POWER CAPACITY GROWTH

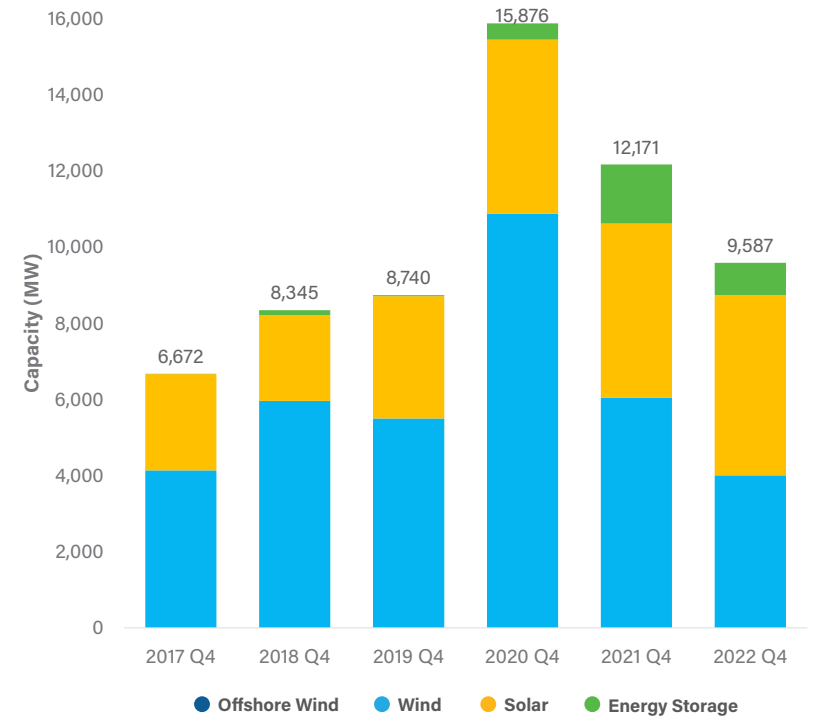
Quarterly clean power capacity growth

- Fourth quarter installations fell 21% compared to 2021, while annual installations dropped 16%. Wind is the primary driver of the overall decrease, with installations decreasing 37% year-over-year. Solar installations fell just 5%, and battery storage installations increased 31%.
- Supply chain challenges and the limited availability of solar panels continued to constrain the industry. Overall, fourth quarter and annual installations fell to the lowest levels the industry has seen since 2019.
- In the fourth quarter, developers commissioned 19 land-based wind projects, compared to 30 in the fourth quarter of 2021. With 8,508 MW of wind capacity commissioned, 2022 is the lowest year for land-based wind since 2018.
- The 98 solar projects with a total capacity of 4,731 MW installed in the fourth quarter bring total 2022 solar installations to 12,589 MW.
- 2022 represents battery storage's strongest year to date. After installing 850 MW/2,375 MWh of new capacity in the last quarter, total 2022 installs sit at 4,027 MW/12,155 MWh.

Clean Power Quarterly Capacity Growth

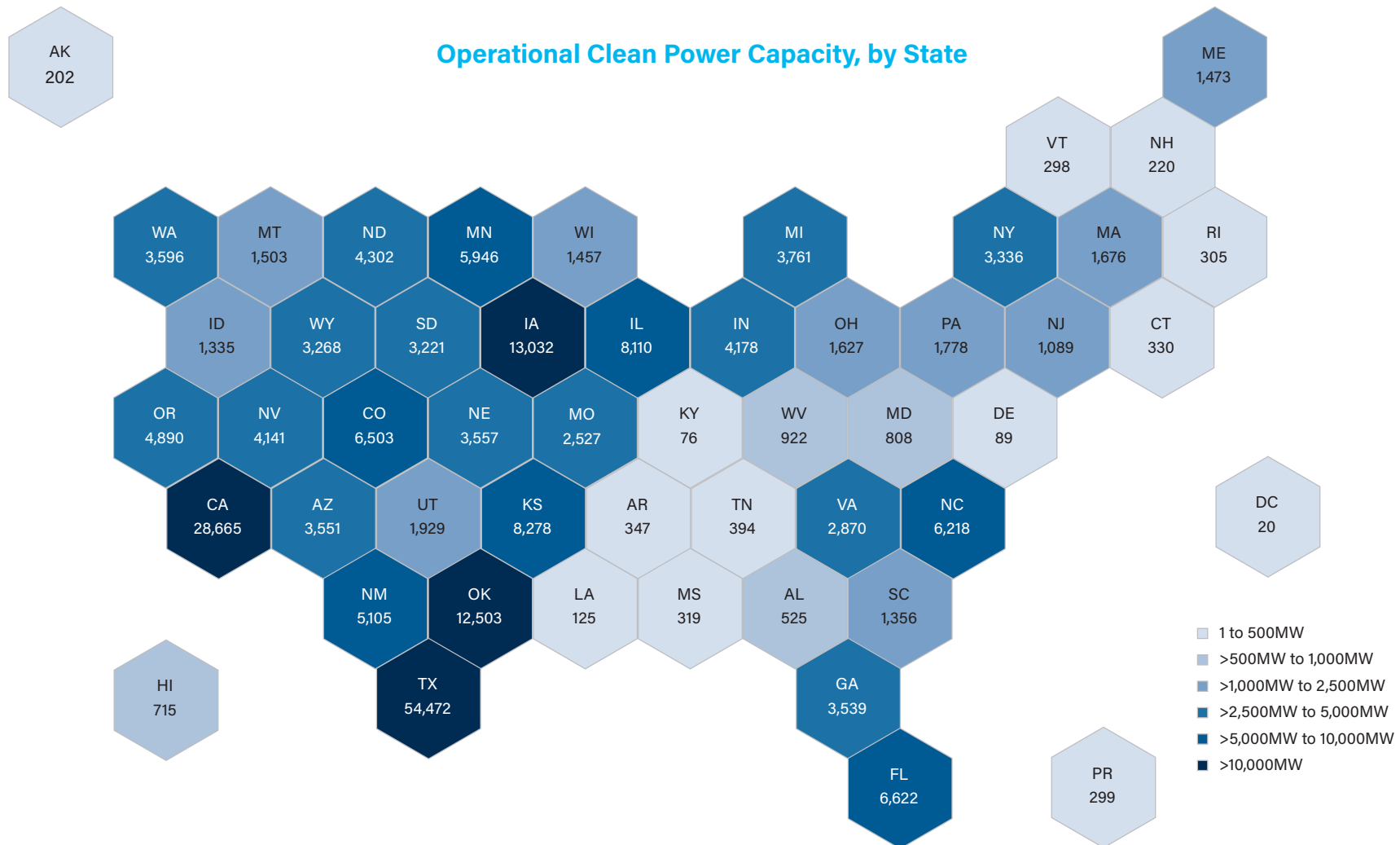


Q4 Clean Power Installations, 2017-2022



Operational clean power capacity

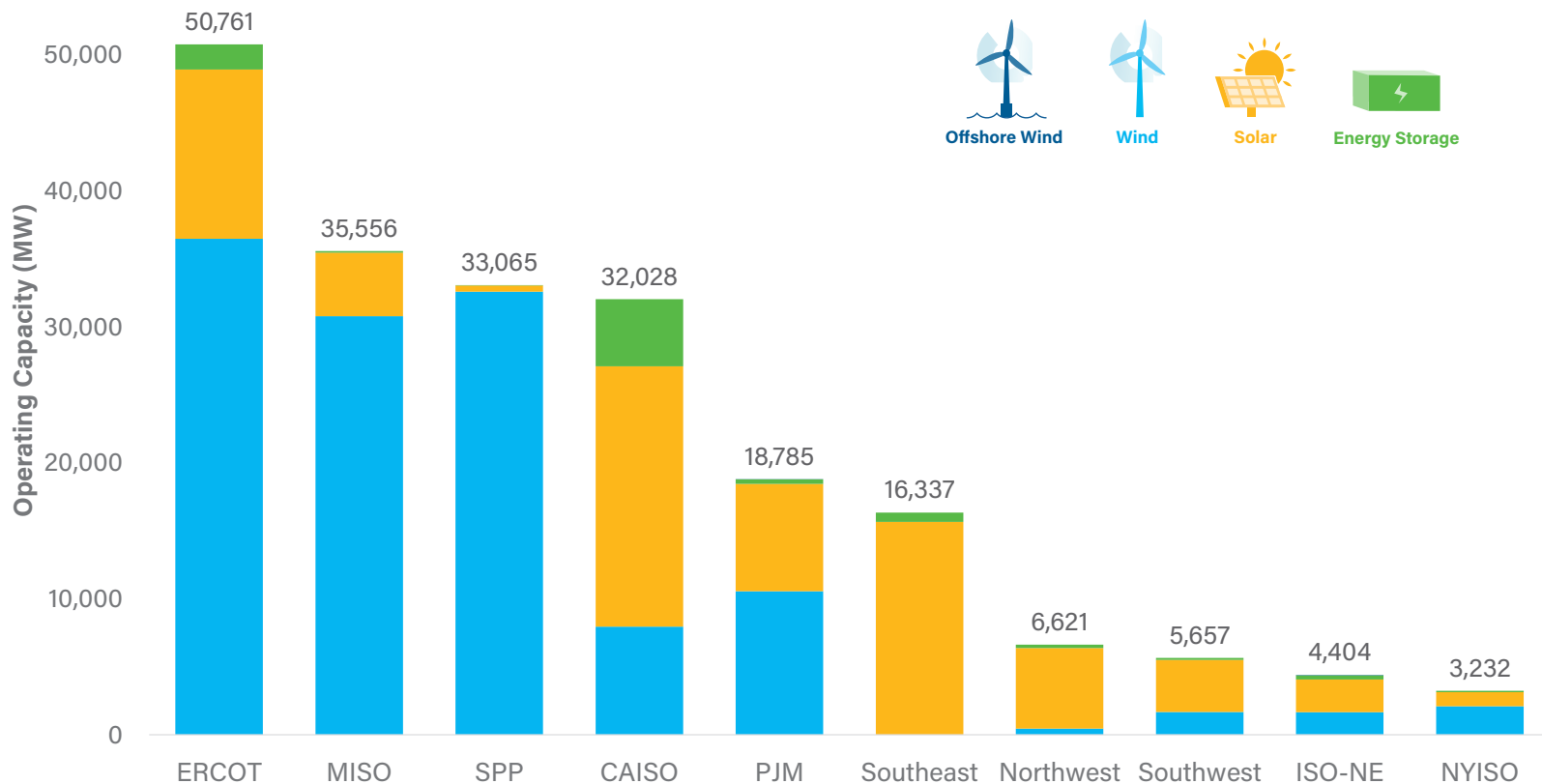
- There is clean power operating and powering American homes and businesses in every state in the country, as well as DC and Puerto Rico.
- Total operating clean power capacity has reached 227,406 MW, enough to power more than 61 million American homes.
- Texas leads the nation in terms of total operating clean power capacity (54,472 MW), as well as total land-based wind capacity (40,160 MW). California places second overall at 28,665 MW online, but first for solar (17,610 MW) and battery storage (4,938 MW). Iowa ranks third overall with 13,032 MW operating and second for wind (12,764 MW).



Operating clean power capacity by region

- On a regional basis, ERCOT takes the top spot for operating clean power capacity with nearly 50.8 GW online. ERCOT has been the leading region back through 2015, after taking the top spot from MISO.
- MISO ranks second with 35.6 GW operating, and SPP third with 33.1 GW online.
- Solar dominates the operating clean power portfolios of CAISO, the non-ISO Southeast, Northwest, and Southwest, as well as ISO-NE. The remaining regions primarily have wind operating within their footprints.
- The non-ISO Northwest had the highest percent increase in total operating clean power capacity in 2022, 26%, followed by ERCOT with a 20% increase.

Online Capacity by RTO/ISO or non-ISO Region



Region is based on capacity point of delivery.

Clean power pipeline by technology

Wind

- The land-based wind pipeline is comprised of 96 projects with a total capacity of 20,811 MW, including 10,402 MW under construction and 10,409 MW in advanced development.
- The land-based wind pipeline decreased by 8% from last quarter because of the larger volume of projects that came online in Q4. Overall, the land-based wind pipeline has decreased by 13% year-over-year due to the previous phase-down of the PTC and the need to replenish the pipeline of viable projects following record installation levels in 2020 and 2021.
- Texas accounts for nearly a fifth of the total land-based wind pipeline with 3,747 MW in development. Wyoming and Illinois each make up more than 10% of the land-based wind pipeline. There are 12 states with more than 500 MW of land-based wind in development.
- With numerous states setting offshore wind targets, the technology now accounts for a significant portion of the clean power pipeline in several states. Based on the state of power delivery, New York is leading the nation with 4,230 MW in development, followed by New Jersey with 3,758 MW in development. Massachusetts is in third with 3,242 MW followed by Virginia with 2,587 MW.

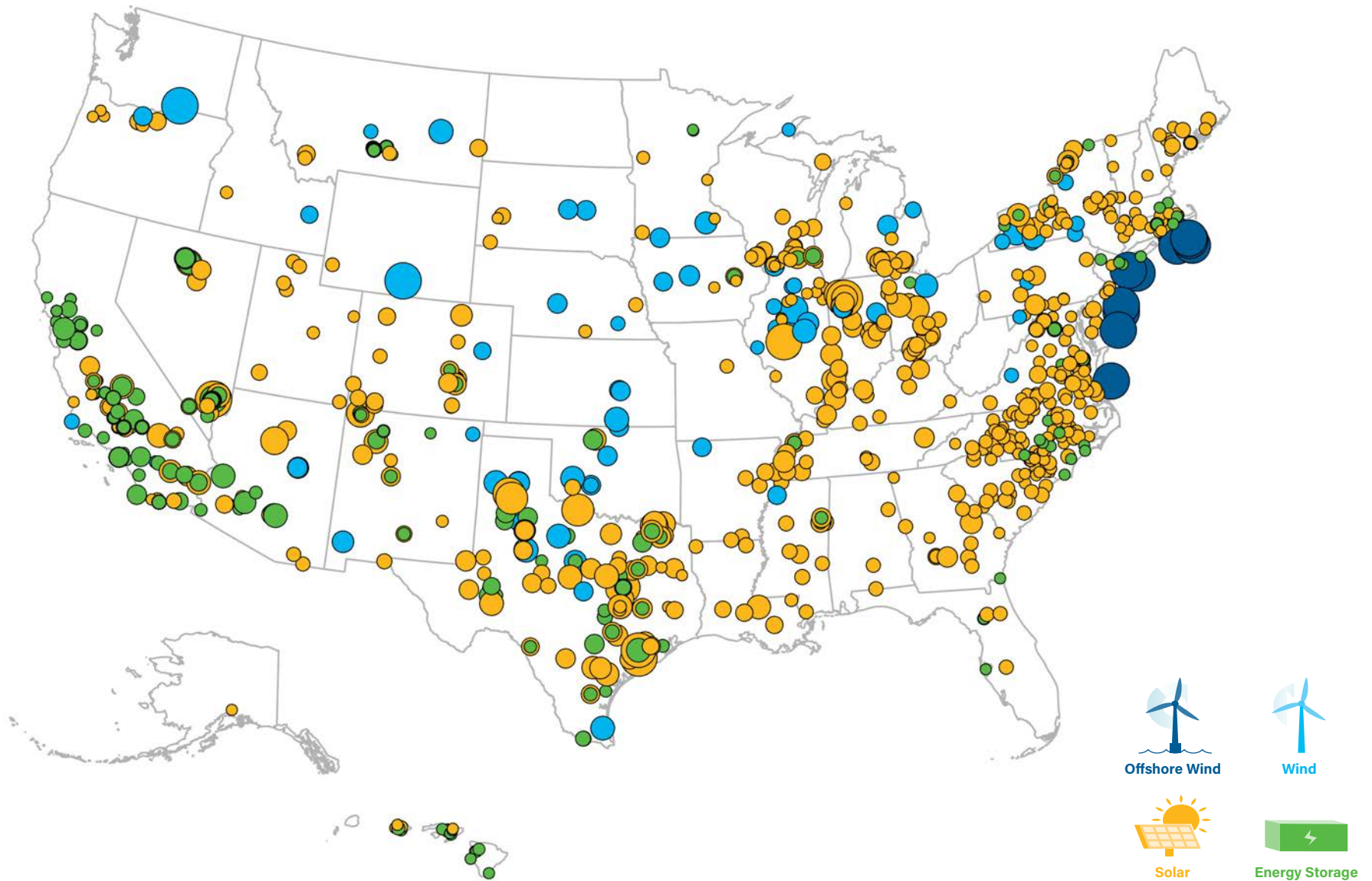
Solar

- Solar's share of the clean power pipeline increased by 4 percentage points since Q4 of 2021, now representing 59% of clean power capacity in development. There are now 80,197 MW of solar in the pipeline.
- Solar capacity in the pipeline increased 3% from last quarter, and 21% year-over-year. On average, the solar pipeline increased by 5% each quarter in 2022.
- All but two states, North Dakota and Kansas, currently have solar projects in development. Texas leads with 16,965 MW of solar in development, constituting 21% of the solar pipeline. This quarter California dropped out of second place in terms of solar capacity in development, usurped by Indiana with 6,254 MW in development. California has 6,044 MW of solar in its pipeline.

Battery Storage

- After experiencing slight declines in the second and third quarters of the year, the battery storage pipeline rebounded in the fourth quarter, increasing 17% from Q3. As of the end of December, there are 16,711 MW/45,638 MWh of battery storage capacity in development, a record for the battery storage pipeline.
- Nearly 70% of battery storage capacity in the pipeline is paired with wind or solar. This is a significantly higher portion than the 54% of operating storage capacity that is paired with another clean power technology.
- California dominates the battery storage pipeline with 5,846 MW in development, 35% of the total pipeline. Texas (3,802 MW), Arizona (1,911 MW), and Nevada (1,693 MW) join California with more than 1 GW of battery storage in development. In total, 25 states have battery storage capacity in development, including 14 that have 100 MW or more in the pipeline.

Projects in pipeline

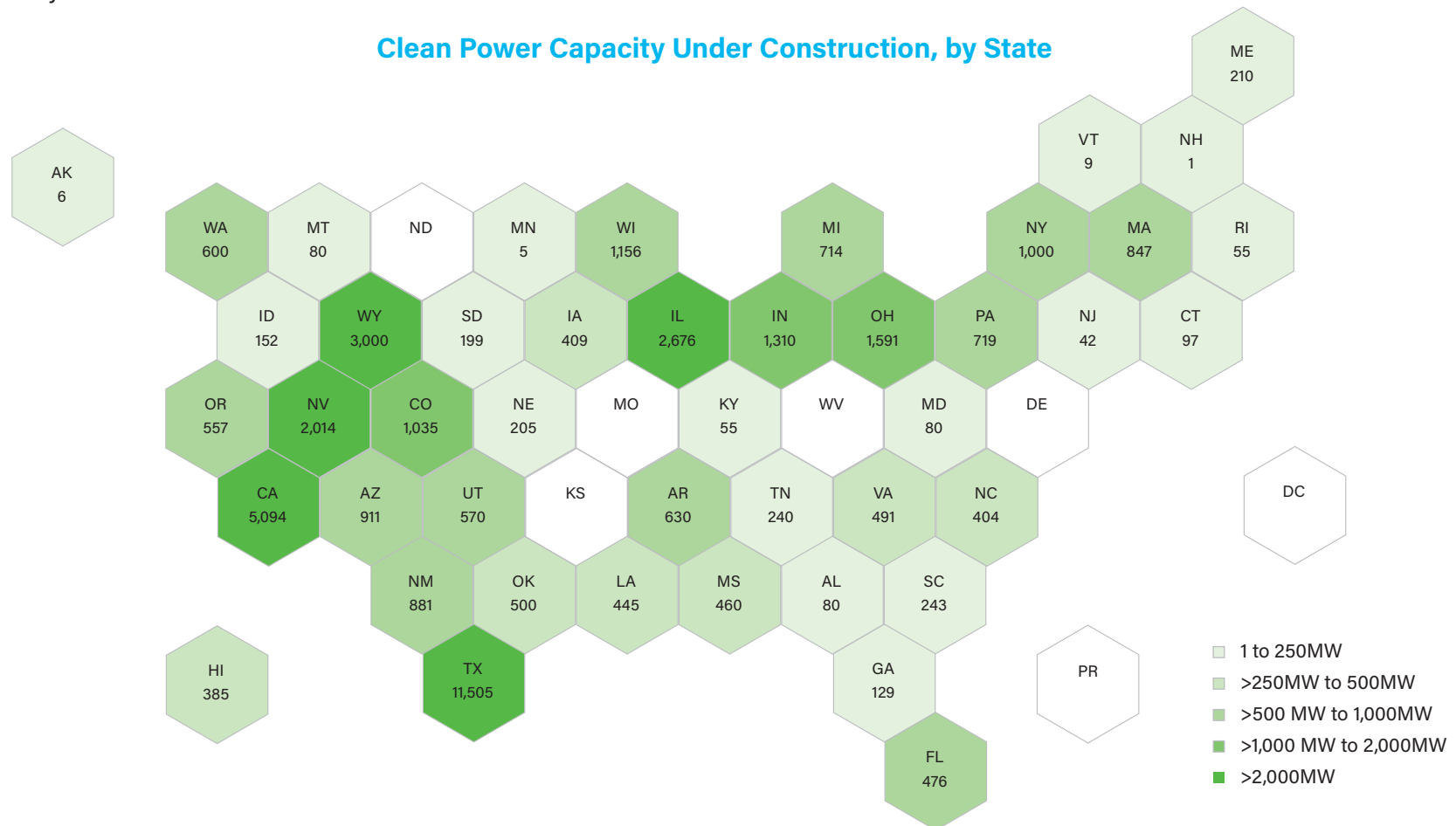


CLEAN POWER CAPACITY GROWTH

Project construction activity

- As of the end of 2022, there are 369 project phases under construction with a total capacity of 42,263 MW. By technology, there are 25,410 MW of solar, 5,645 MW of battery storage, 10,402 MW of land-based wind, and 806 MW of offshore wind under construction. Vineyard Wind is currently the only offshore wind project that meets ACP's under construction definition (offshore construction commenced).
- In the fourth quarter, 9,497 MW of clean power capacity started construction, more than double the amount of capacity to begin construction in any other quarter of the year.
- There are clean power projects with construction crews on the ground across 45 states. Texas, which led the quarter for capacity starting construction at 3,254 MW, also leads the nation for total capacity under construction, 11,505 MW. California, with 5,094 MW under construction, ranks second, and Wyoming (3,000 MW) ranks third.
- On a regional basis, after Texas, the Mountain West (8,411 MW) and the Midwest (6,269 MW) have the most capacity under construction. The top three regions account for 62% of capacity currently under construction.

Clean Power Capacity Under Construction, by State



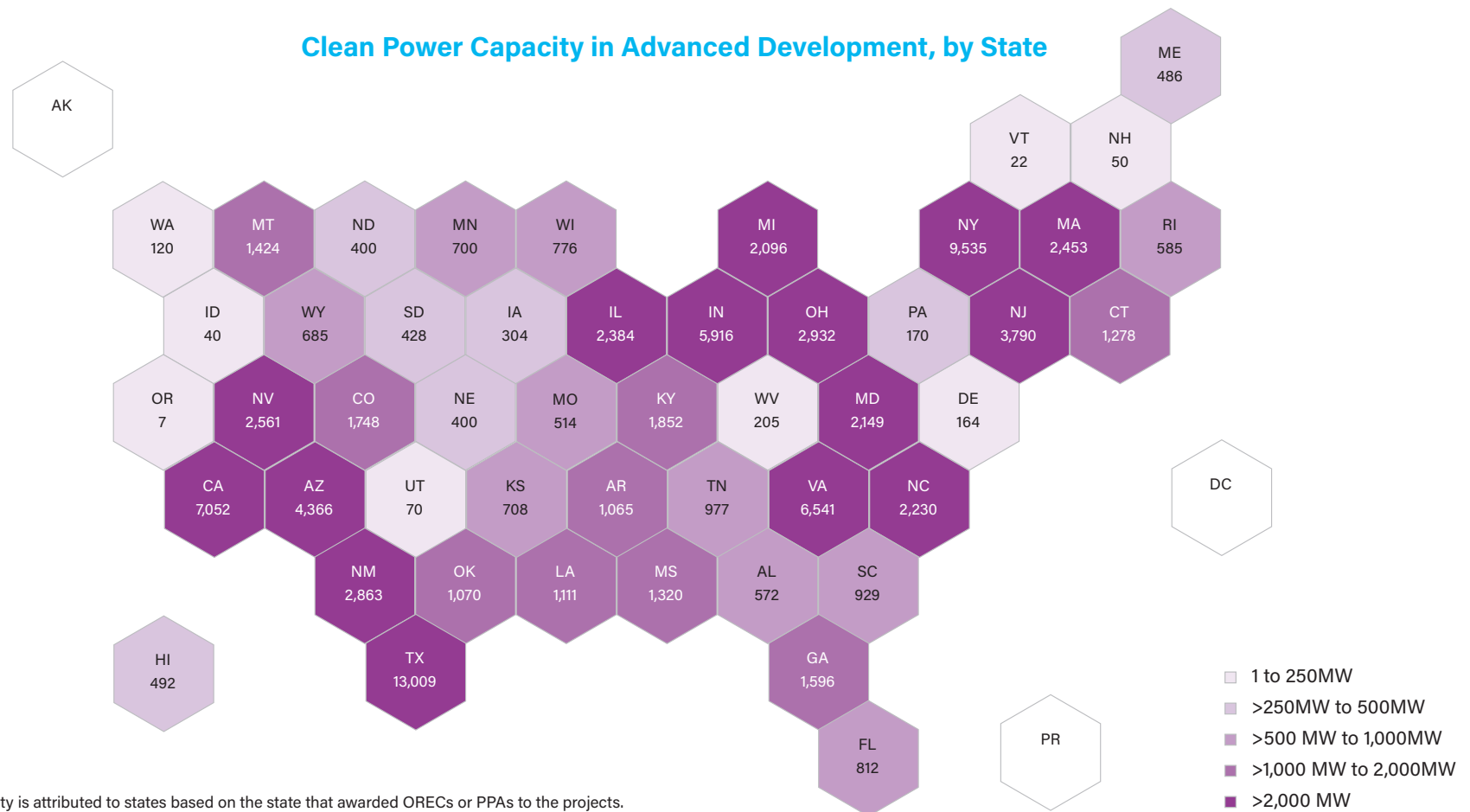
ACP defines under construction as the construction team beginning work on the ground at the project site.

Advanced development activity

- The advanced development pipeline of 92,958 MW spans 49 states and 751 project phases.
- Texas had the most capacity enter the advanced development phase this quarter (2,570 MW) and has the most total clean power capacity in advanced development, 13,009 MW. The Lone Star State also leads the nation for solar and land-based wind capacity in advanced development. New York ranks second for total capacity in advanced development at 9,535 MW and leads

for offshore wind capacity in development. California, the nation's leader for battery storage capacity in advanced development, ranks third overall with 7,052 MW in advanced development.

- By technology, the advanced development pipeline is comprised of 54,787 MW (59%) of solar capacity, 16,696 MW (18%) offshore wind, 10,409 MW (11%) land-based wind, and 11,066 MW (12%) battery storage.



Offshore wind capacity is attributed to states based on the state that awarded ORECs or PPAs to the projects.

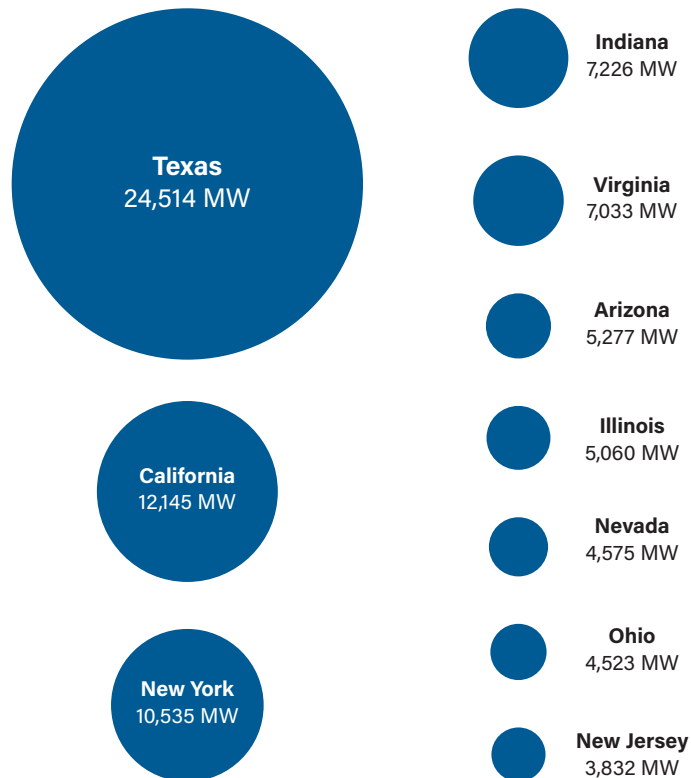
ACP defines advanced development as projects not under construction, but with a PPA, firm equipment order, or moving forward with plans to be placed under utility ownership as of the end of that quarter.

CLEAN POWER CAPACITY GROWTH

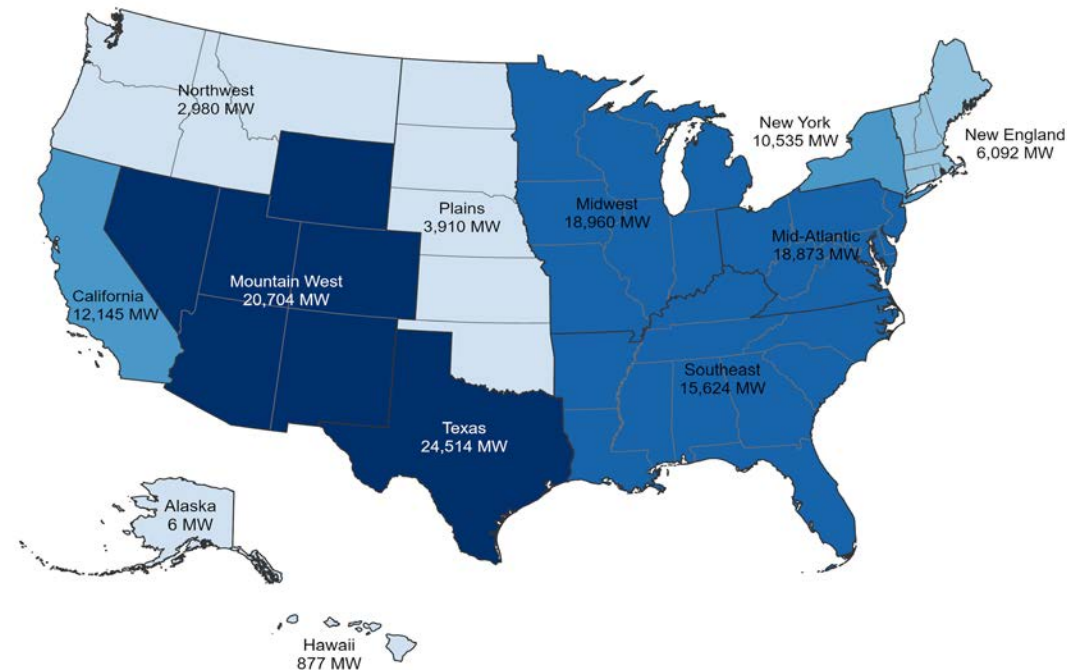
Clean power pipeline by state and region

- There are 135,221 MW of clean power capacity in development across all 50 states.
- Texas and California, which also lead the country for operating clean power capacity, sit at the top of the pipeline, with 24,514 MW and 12,145 MW in development, respectively. New York sits in third for capacity in development at 10,535 MW, 40% of which is offshore wind. Iowa, which ranks third for total operating capacity, is only 33rd for capacity in development.
- By region, Texas and the Midwest have both the most operating capacity and capacity in development. The Mid-Atlantic, with 18,873 MW in development, ranks third for capacity in the pipeline, but 8th in terms of operating capacity.

Top States with Capacity Under Construction and in Advanced Development



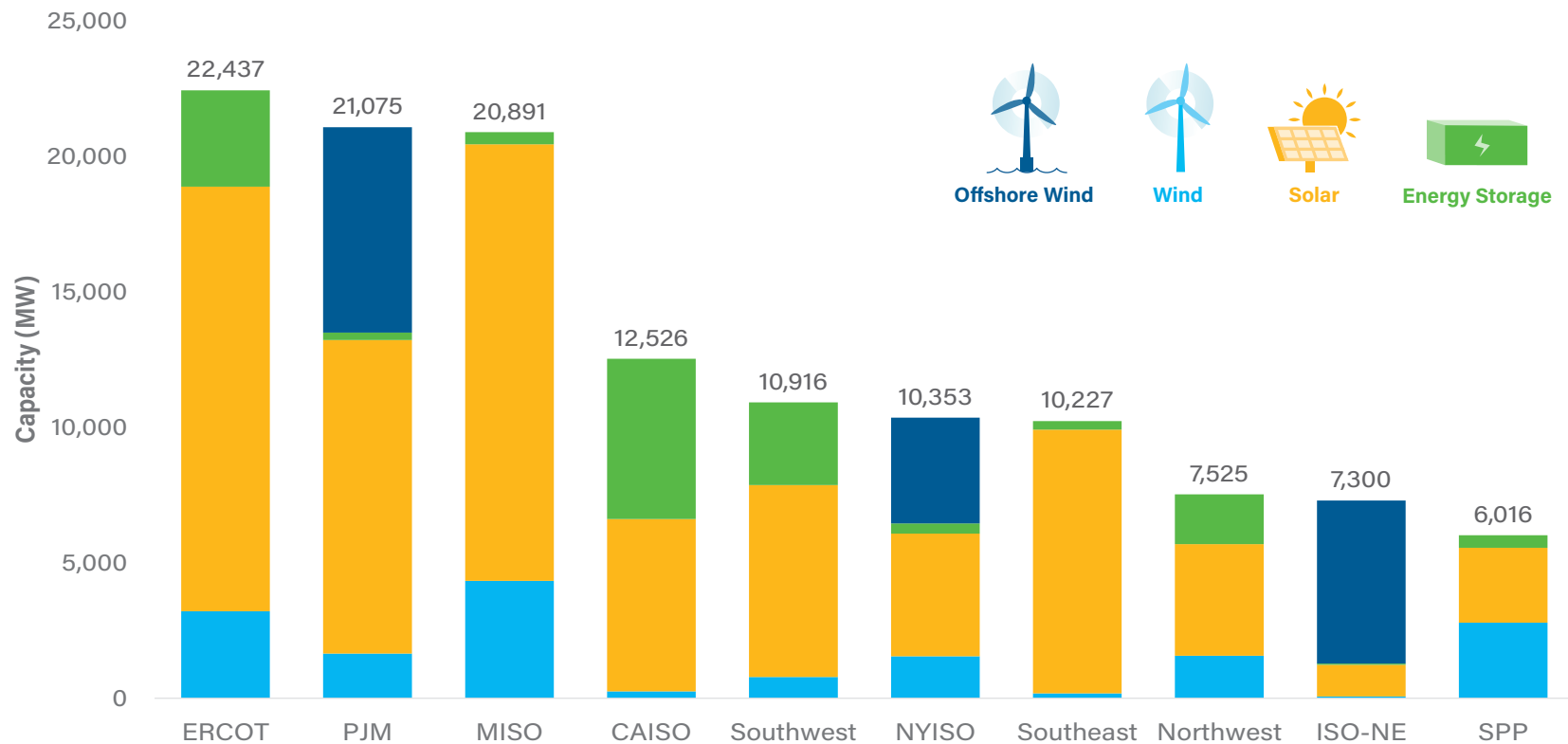
Capacity Under Construction and in Advanced Development by Region



Regional market clean power pipeline

- ERCOT has the most clean power capacity in development at 22,437 MW. PJM is close behind ERCOT with 21,075 MW in development, followed by MISO (20,891 MW), and CAISO (12,526 MW).
- PJM, NYISO, and ISO-NE all have 3.9 GW or more offshore wind capacity in development. Offshore wind makes up 82% of capacity in development in ISO-NE, 38% in NYISO, and 36% in PJM.
- Almost all, 95%, of the non-ISO Southeast's pipeline is solar, followed by MISO, whose pipeline is 77% solar. Solar makes up the smallest portion of the pipeline in ISO-NE at 16%.
- Of all the regions, wind makes up the highest share of the pipeline in SPP (46%).

Pipeline capacity by RTO/ISO



CLEAN POWER CAPACITY GROWTH

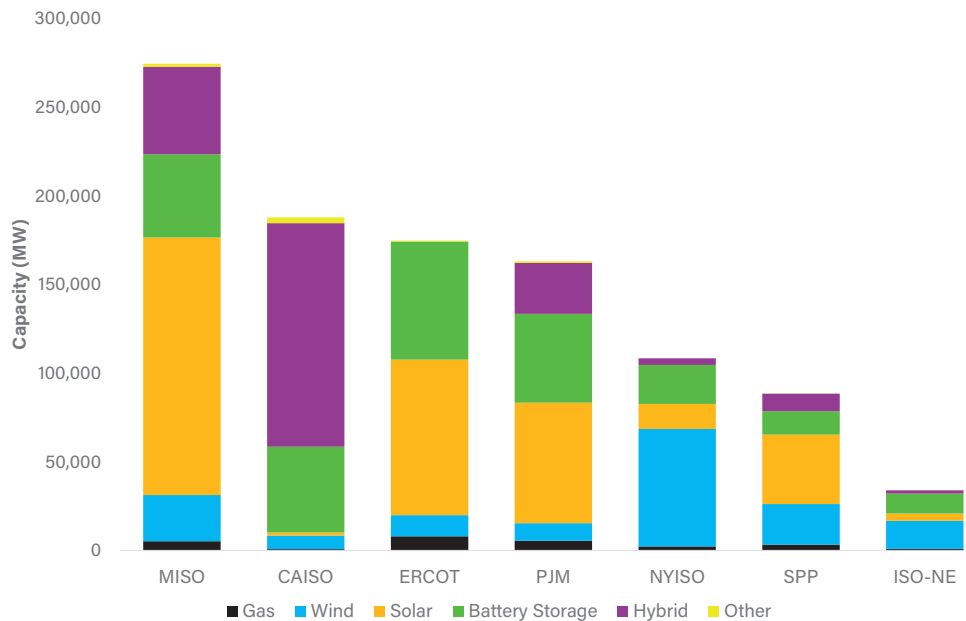
Interconnection Queues

- Examination of the interconnection queues provides a forward look at the larger clean power development landscape, including projects that are too early in development to qualify as advanced development under ACP's methodology.
- Following a record year in 2022 in terms of additions to the queue, MISO leads all RTO/ISOs with over 274 GW of capacity in its interconnection queue. CAISO and ERCOT follow with 188 GW and 175 GW, respectively.
- Solar projects are the most popular in MISO, ERCOT, PJM, and SPP. In CAISO, where there is already a large amount of solar capacity deployed, hybrid projects dominate. However, 89% of the hybrid projects in CAISO's queue are solar plus battery storage projects.
- ERCOT leads in standalone battery storage capacity in the queue with roughly

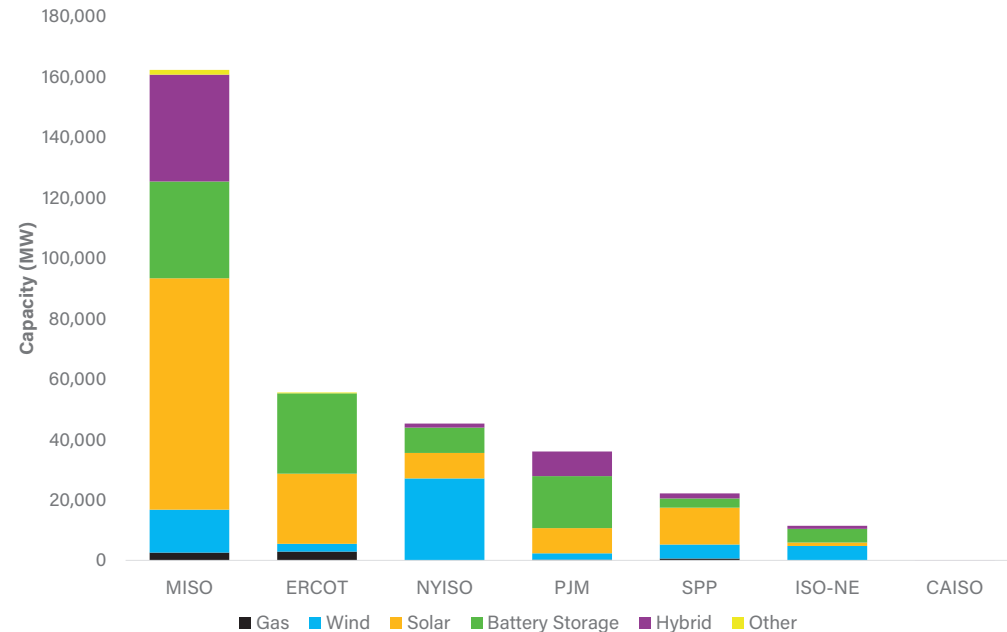
67 GW waiting to be interconnected. PJM and CAISO follow with 50 GW and 48 GW respectively. MISO follows closely behind with 47 GW of battery storage capacity in its queue.

- In NYISO and ISO-NE, wind projects make up the largest share of capacity in the queues, driven in part by offshore wind projects.
- Thanks in large part to the over 162 GW of projects added during MISO's 2022 queue cycle, nearly 333 GW of capacity was added to interconnection queues across the RTO/ISOs.
- CAISO added almost no capacity to the interconnection queue in 2022 because it declined to open a cluster study window due to the large number of requests for interconnection it received during the 2021 window.

Capacity in Interconnection Queues



Capacity Added to Interconnection Queues in 2022



Source: RTO/ISOs

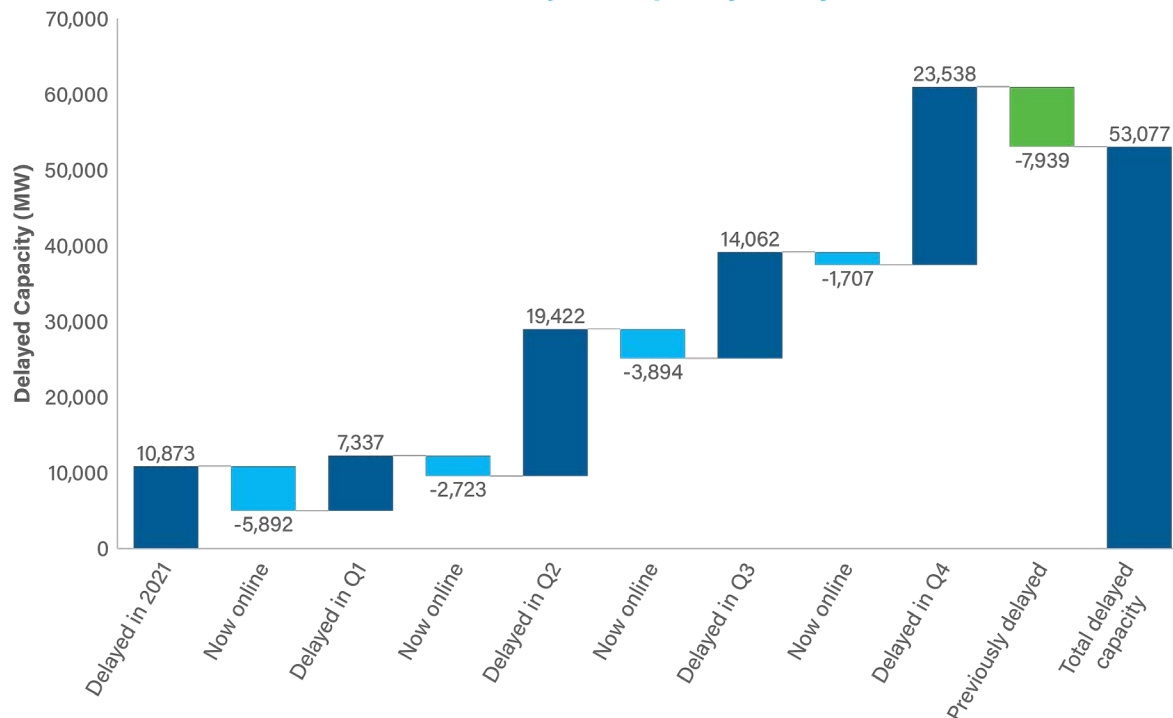
Clean power project delays

- The 16% decline in clean power installations in 2022 relative to 2021 can be explained in part by the mass of projects that have experienced delays in 2022. More than 48 GW of clean power projects reported delays in 2022 and have not yet come online.
- The final quarter of the year saw the lowest level of installations since 2019. There were 17.4 GW expected to come online this quarter that were delayed to 2023 or later. Another 6 GW of projects expected online after 2023 reported delays this quarter, bringing total delays reported in Q4 to 23,538 MW. Nearly 8 GW of capacity that reported delays in the fourth quarter had previously reported delays.
- Capacity delayed in previous quarters is still yet to come online. Of the 51.7 GW delayed between the end of 2021 and the third quarter of 2022, only 14.2 GW has since come online. More than half of the capacity delayed in the last

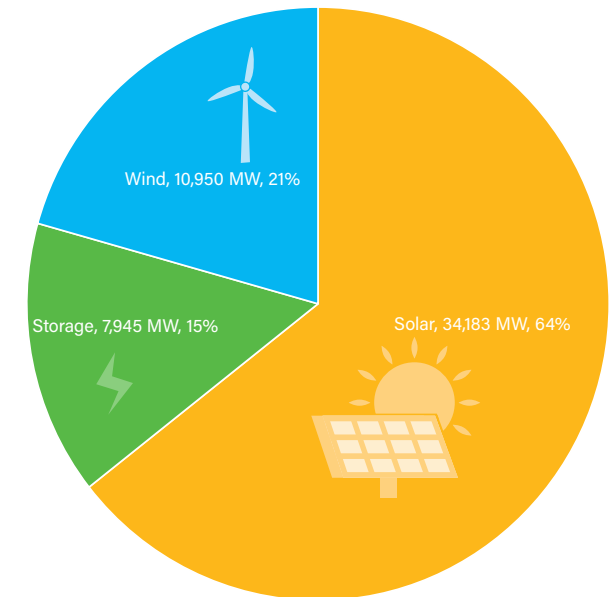
quarter of 2021 has come online, but only 37% and 20% of the capacity delays in Q1 and Q2 have come online. Total delayed capacity has now reached 53 GW.

- Solar accounts for 64% of delayed clean power capacity, due primarily to difficulty sourcing panels as a result of trade restrictions.
- Wind represents 21% of total delays. Causes of wind delays range from on-going supply chain constraints to grid interconnection delays.
- Battery storage projects are the least affected, making up just 15% of delays. Most delayed storage projects are co-located with delayed solar projects.
- In addition to capacity that has been delayed, more than 4 GW of clean power capacity has been terminated since the end of 2021.

Clean Power Project Capacity Delayed



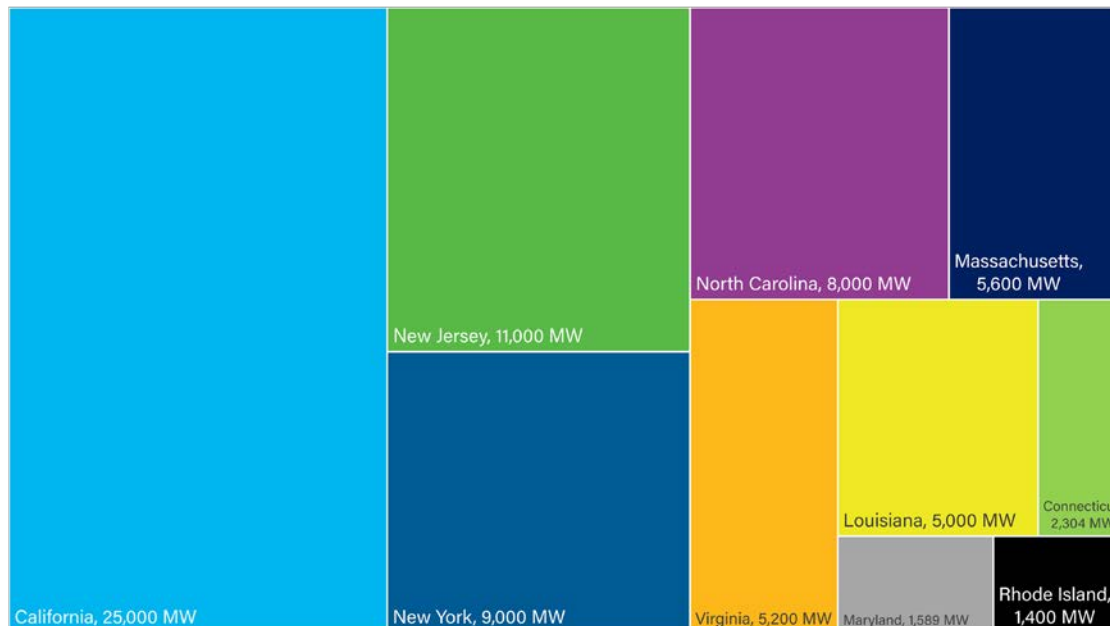
Total Clean Power Capacity Delayed, by Technology



State Updates

- In late October, Avangrid Renewables submitted a motion to suspend the proceedings to approve their Commonwealth Wind project's power purchase agreements with three utilities, citing rising project costs due to inflation, supply chain constraints, and other economic disruptions that cast doubt on the project's economic viability. A week later, the Mayflower Wind project (now called SouthCoast Wind), a joint venture of Shell and Ocean Winds (itself a joint venture of EDP Renewables and Engie) joined the case, before later withdrawing their motion after the utilities stated they did not intend to renegotiate the contracts. In November, the developers agreed to move forward with the power purchase agreements.
- However, in December, Avangrid Renewables asked the Commonwealth to dismiss their review of Commonwealth Wind's power purchase agreements, allowing the developer to rebid the project in an upcoming solicitation. Massachusetts declined, ultimately approving the agreements for both Commonwealth Wind and Mayflower Wind in early January 2023.
- In October, Rhode Island Governor Dan McKee announced the state's latest Request for Proposal (RFP) for between 600 MW and 1,000 MW of offshore wind. The RFP is set to close on March 13, 2023. The capacity procured through this RFP will have the potential to meet at least 30 percent of Rhode Island's estimated 2030 electricity demand.
- In November, New York Governor Kathy Hochul announced that the New York State Public Service Commission approved the transmission line that will deliver electricity from the Sunrise Wind Farm to the existing grid. The 25-mile line will bring electricity from the wind farm to an existing substation in Brookhaven, NY.
- The New Jersey Board of Public Utilities released a draft solicitation guidance document for public comment. The draft solicitation provides an upper limit of 4 GW for proposed guidance and an updated OSW solicitation schedule that reflects the state's new goal of 11 GW. The RFP is expected to be released in Q1 2023.
- To date, ten states have combined to set offshore wind procurement targets totaling more than 74,000 MW.

Offshore Wind State Targets

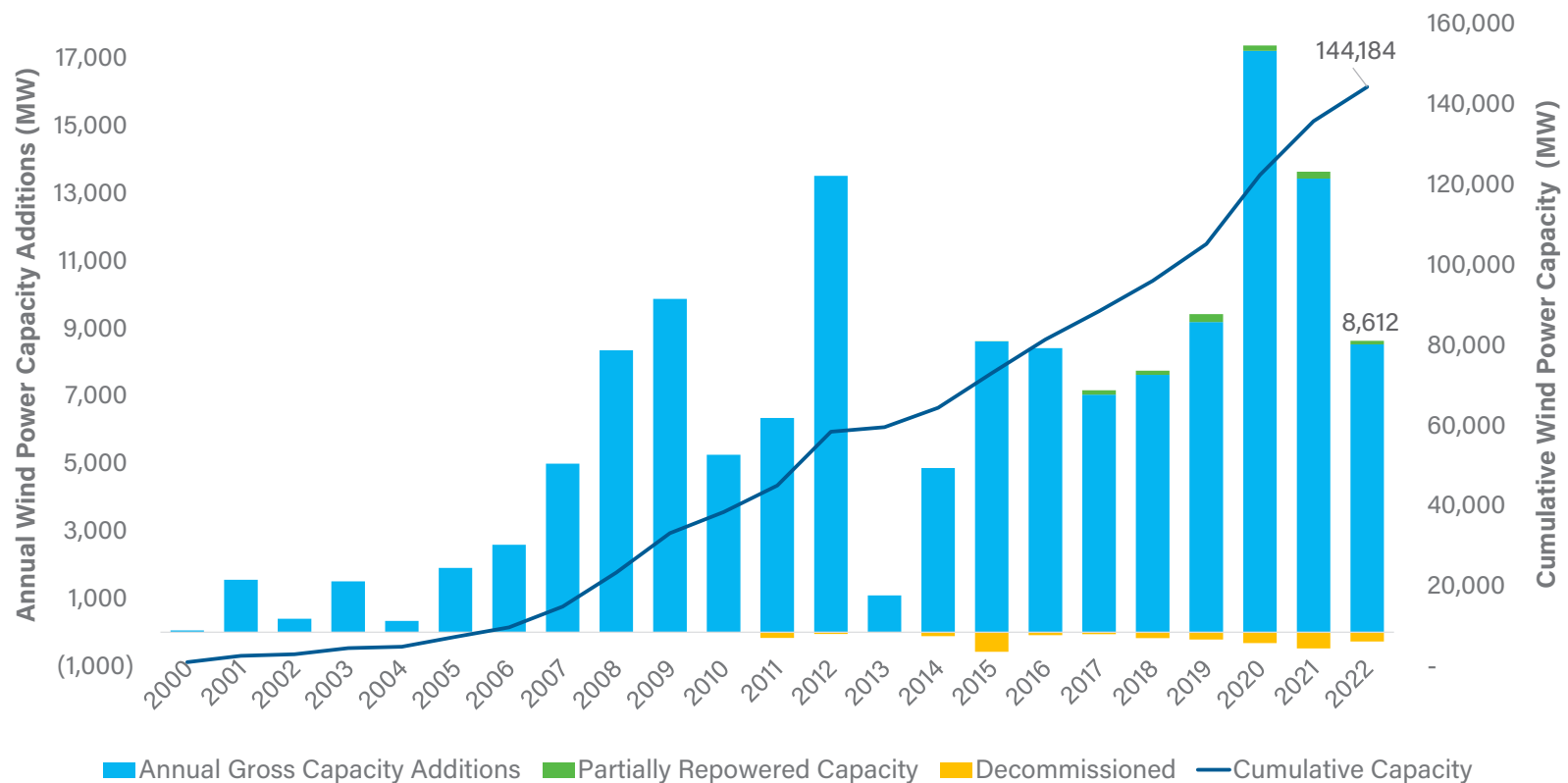


LAND-BASED WIND ACTIVITY

Slowest year for wind since 2018

- The wind industry finished out 2022 with its strongest quarter of the year, installing 4,006 MW of new wind capacity and 58 MW of partially repowered capacity. Despite Q4 being the strongest quarter of the year, quarterly wind installations were still down 35% compared to 2021.
- Annually, 8,612 MW of land-based wind capacity was commission in 2022, the lowest levels the industry has seen since 2018. Nearly 11 GW of land-based wind capacity has experienced delays, slowing the rate of installations. This is due in part to supply chain constraints and grid interconnection issues.
- The average size of project phases installed in 2022 is 363 MW, up from an average of 312 MW in 2021.
- NextEra's Great Prairie Wind project, which includes four phases, came online in the final quarter of the year with a total capacity of over 1 GW. The project has turbines located in Texas and Oklahoma.
- The Young Wind project, at 500 MW, was the largest single-phase wind project to commission in the fourth quarter.

U.S. Annual and Cumulative Land-based Wind Capacity Growth

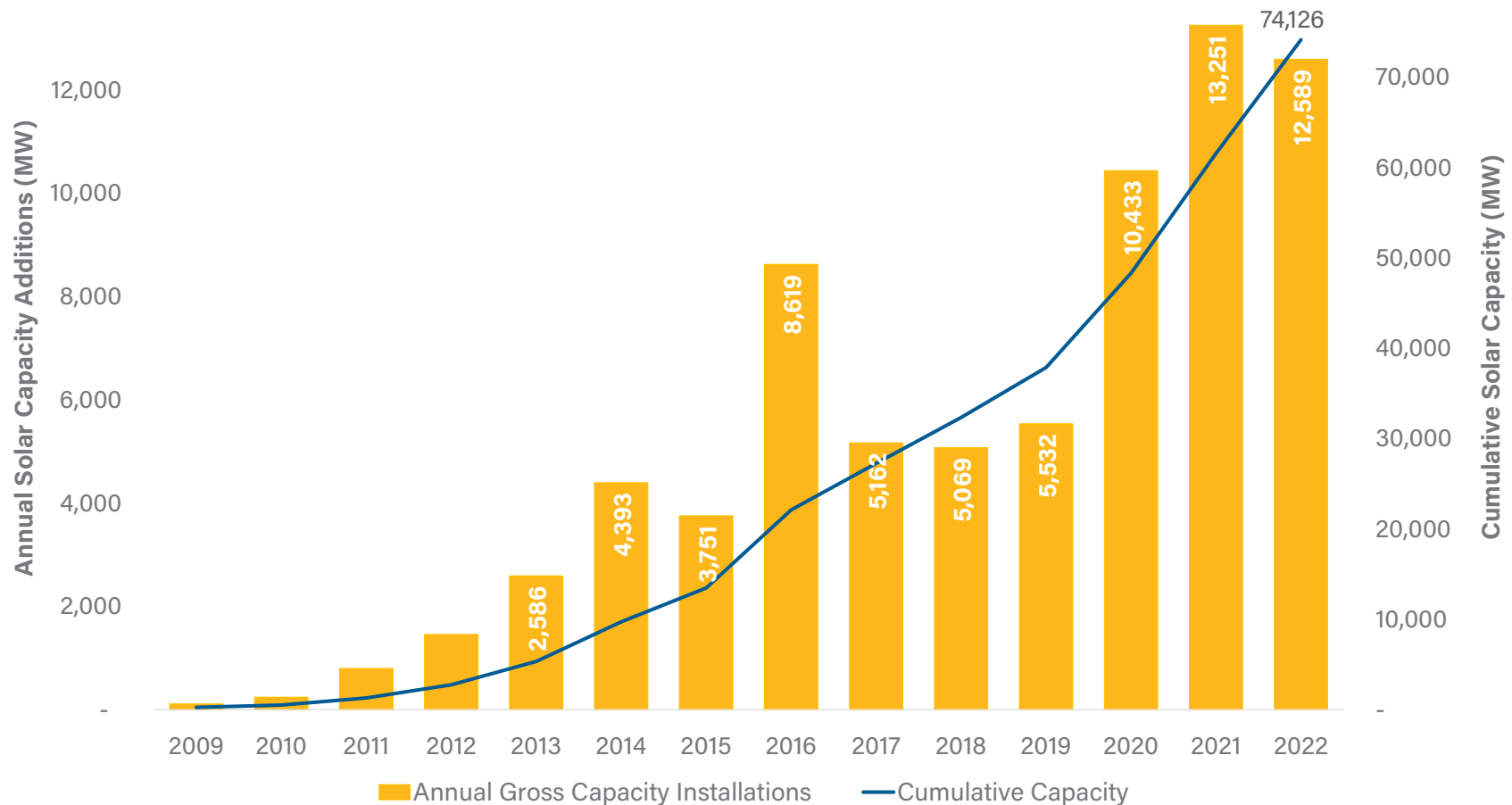


UTILITY-SCALE SOLAR

Record fourth quarter can't make up slow start to the year

- At 4,731 MW, solar installations in the fourth quarter of 2022 were 3% higher than the same period in 2021 and represent a new high-water mark. However, a slow first three quarters of the year set total 2022 installations 5% lower than 2021 installations.
- 2022 ranks second behind 2021 for the most solar installed in a year. Prior to the Withhold Release Order (WRO) and subsequent detentions, 2022 was expected to be a record year with upwards of 30% growth forecasted.*
- Three 250 MW solar projects, Pisgah Ridge, Sun Valley, and Samson III tie as the largest solar projects installed in the fourth quarter. Orsted's Old 300 Solar project in Texas, at 430 MW, is the largest solar project built in 2022.
- In total, there is now 74,126 MW of utility-scale solar operating across the nation. All fifty states and the District of Columbia currently host operating utility-scale solar farms.

U.S. Annual and Cumulative Utility Solar Power Capacity Growth



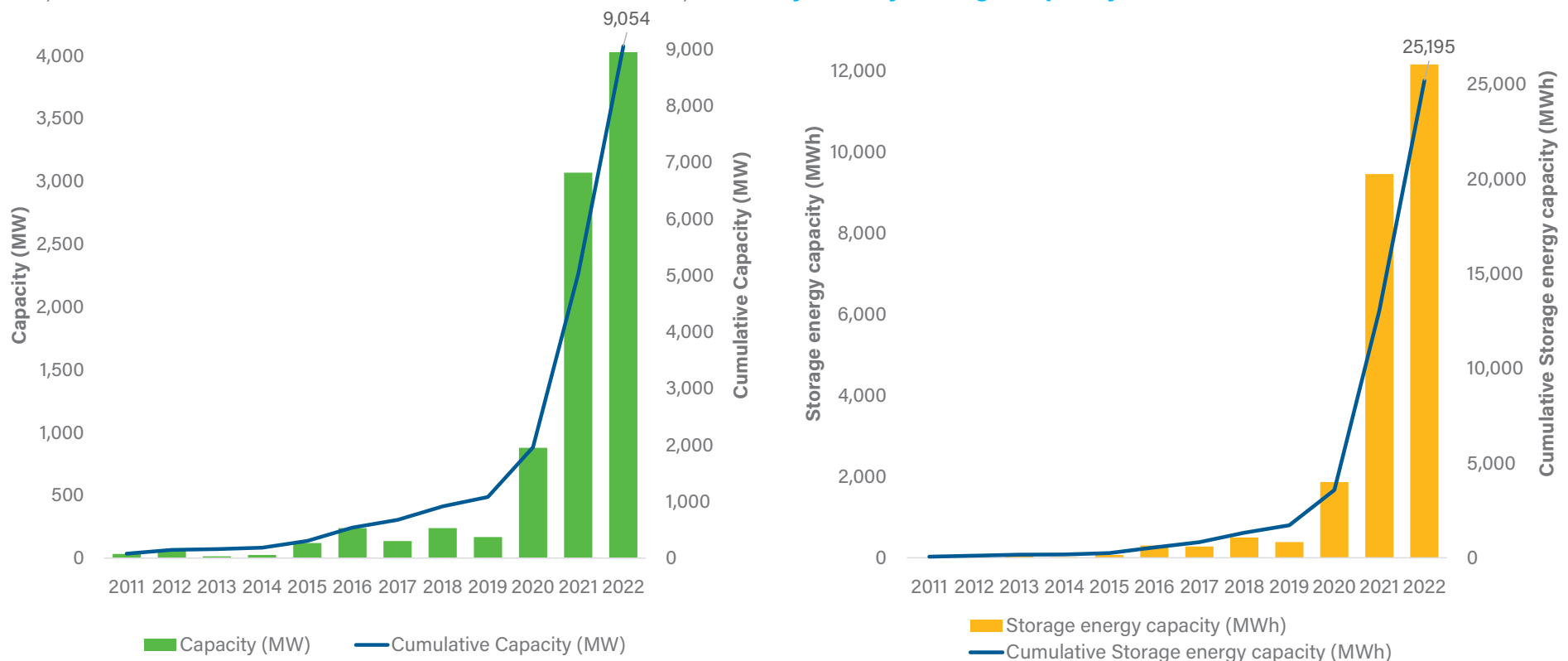
*Based on market outlooks from WoodMackenzie and BloombergNEF

UTILITY-SCALE BATTERY STORAGE

Record year for battery storage installations

- Battery storage capacity is tracked in terms of rated power capacity (MW), the maximum possible instantaneous discharge, and energy capacity (MWh), the maximum amount of stored energy.
- Fourth quarter battery installations total 850 MW/2,375 MWh, a decline of 45% compared to the same period in 2021. Despite this, 2022 represents a record year for battery storage installations, up 31% compared to 2021, the previous record year.
- Cumulative battery storage power capacity grew 80% in 2022, while cumulative storage energy capacity (MWh) grew 93%.
- Of the 88 battery storage projects commissioned in 2022, 48 are paired with solar or wind, while the remaining 40 are standalone projects.
- Byrd Ranch Storage, located in Texas, was the largest standalone storage project to commission this quarter. The 50 MW, 1-hour duration battery plant was developed by Glidepath Power Solutions.
- Crimson Battery Storage, which is part of Recurrent Energy's Crimson Solar + Storage project, is the largest battery storage project commissioned in 2022 in terms of MW and MWh capacity. The 350 MW lithium-ion battery system has a 4-hour duration and total energy storage capacity of 1,400 MWh. Crimson is tied for the second largest operational battery storage project in terms of MWh capacity.

U.S. Annual and Cumulative Utility Battery Storage Capacity Growth

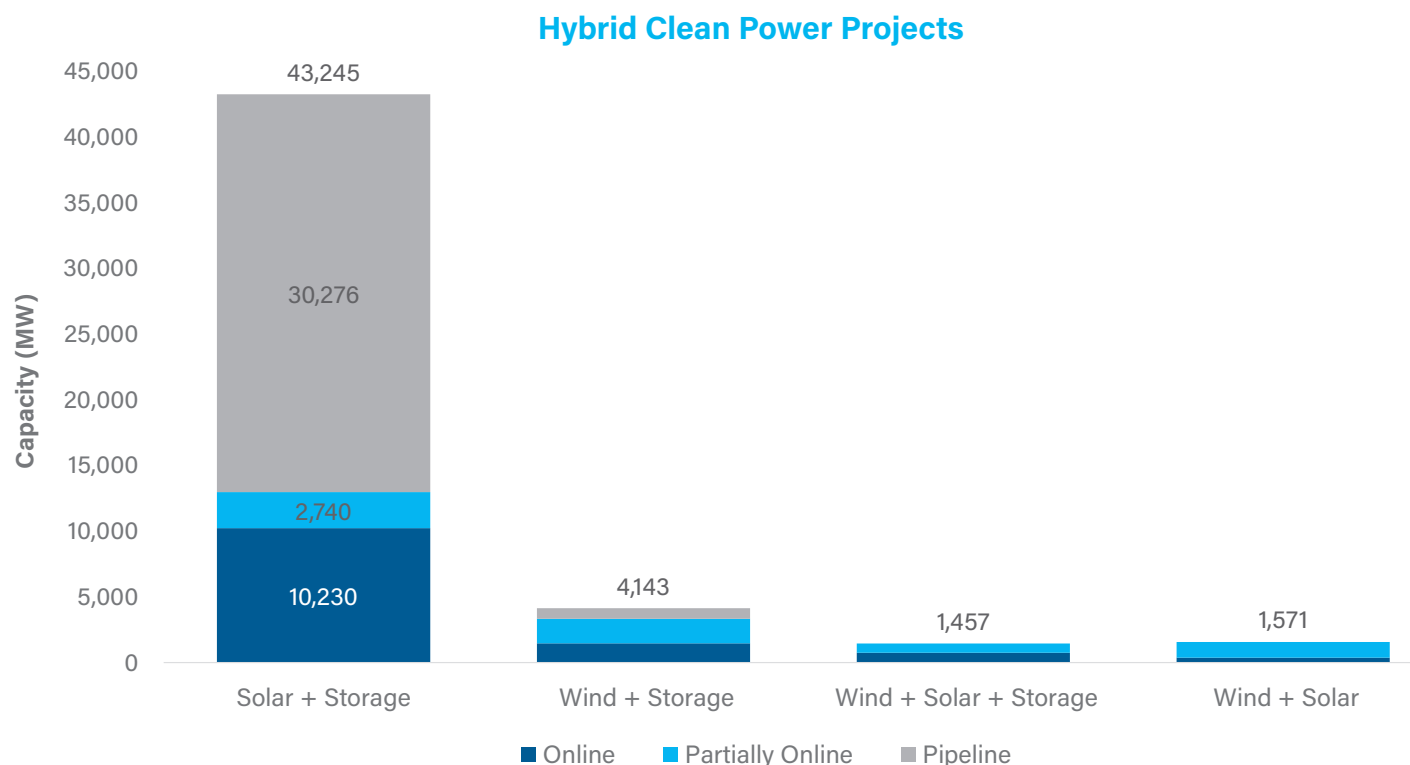


ACP is able to determine the MW capacity for all battery storage projects tracked, but the storage energy capacity cannot be determined for 4% of operating projects.

HYBRID PROJECTS

Nearly 6 GW of new hybrid capacity commissioned in 2022

- In the fourth quarter, 2,067 MW of hybrid clean power capacity was installed, all of which was solar + storage project capacity. In total, 5,852 MW of hybrid project capacity came online in 2022, 88% of which was solar + storage project capacity.
- Across the country, 12,826 MW of hybrid projects are fully operational, meaning all phases and technologies included in the project are operating. An additional 6,501 MW are partially online, meaning one or more phases/technologies are operating, but other phases or technologies within the project are still under development. Finally, 31,090 MW of hybrid projects are currently in the pipeline.
- The hybrid pipeline is 97% solar + storage capacity and 3% wind + storage. There are no wind + solar projects or projects combining all three technologies in the pipeline, though 1,194 MW and 701 MW of each hybrid type is partially online.
- As of the last quarter of the year, the Edwards & Sanborn Solar and Energy Storage project has 724 MW of solar capacity and 429 MW of battery storage capacity operating. The Terra Gen project aims to be the largest solar + storage project in the world, with a potential total capacity of 1,118 MW of solar and 2,165 MWh of battery storage.
- The Athos III solar + storage project, also known as Blythe Mesa, came fully online in the fourth quarter. The 224 MW solar + 112 MW/448 MWh California project was developed by Intersect Power.

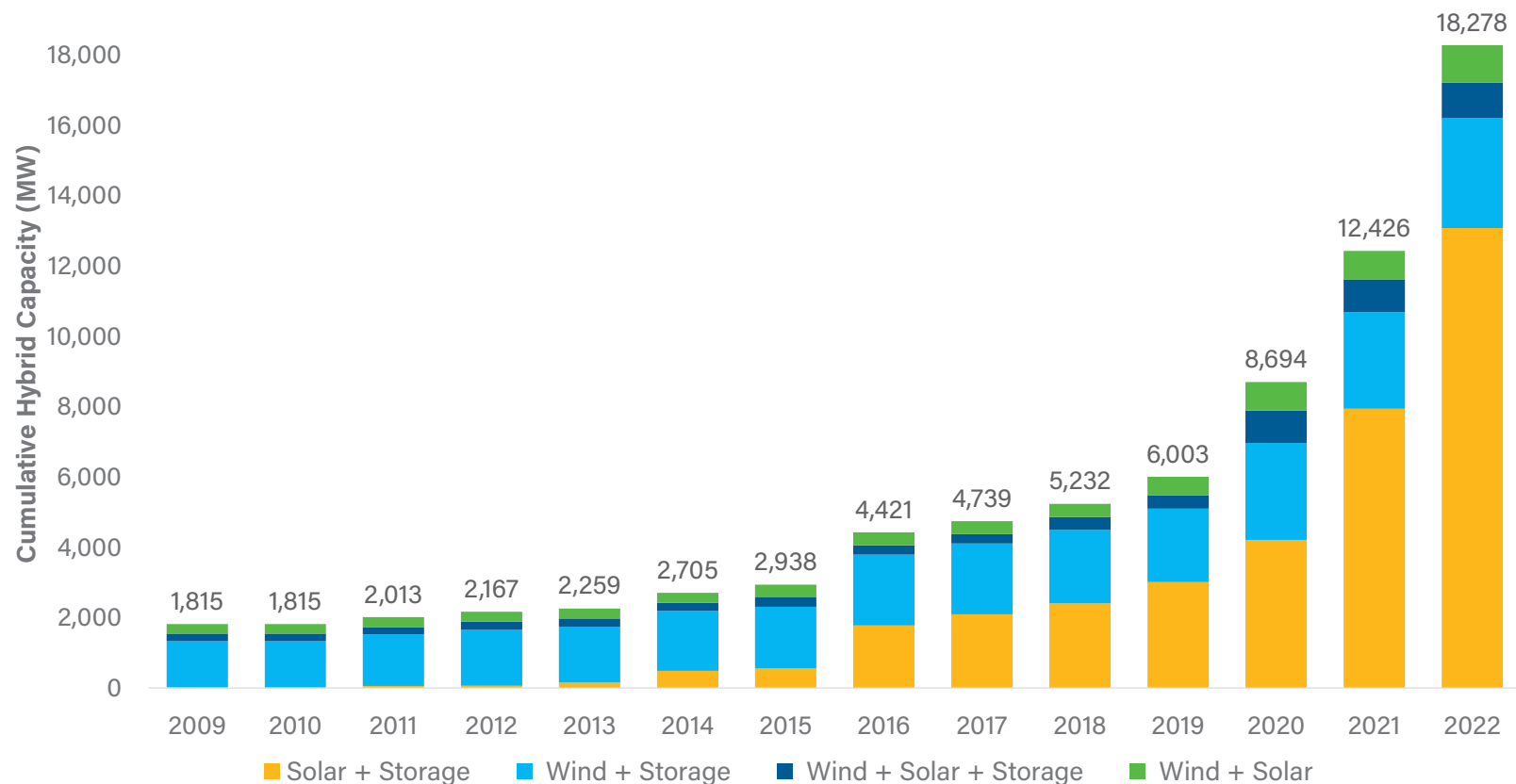


HYBRID PROJECTS

Over 18 GW of hybrid capacity online

- Operating hybrid capacity, including fully operational projects and phases of projects that are operating, is now 18,278 MW. Operating hybrid capacity increased by nearly 50% in 2022. On average, operational hybrid capacity has grown 32% each year for the past five years.
- Almost three-fourths of all operating hybrid capacity is part of a solar + storage project. That percentage increased by an average of 7% each year over the past decade. Wind + storage, which represented almost 75% of operating hybrid capacity a decade ago, now makes up just 17% of operational capacity.
- There are 13,073 MW of solar + storage capacity operating, 3,125 MW of wind + storage, 1,007 MW of wind + solar + storage capacity, and 1,703 MW of wind + solar project capacity operating.

Operational Hybrid Capacity Over Time





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