



# Clean Power Quarterly

## 2021 Q3



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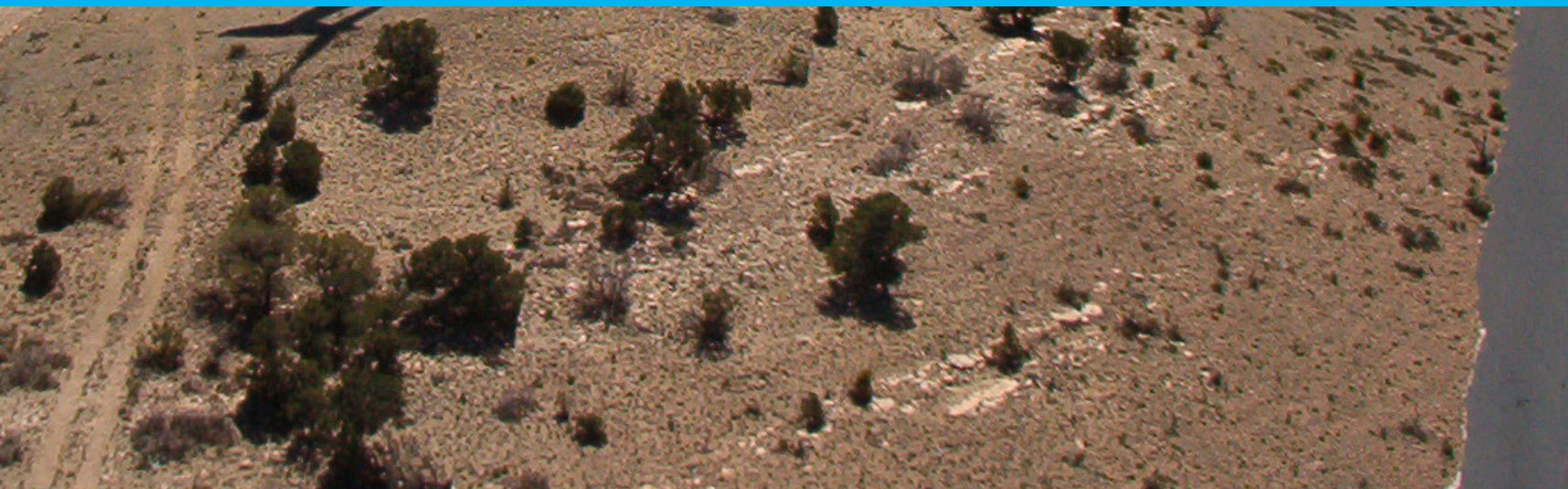
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## 2021 Q3 Highlights





# 2021 Q3 Highlights

## Clean Power Project Installations

- In the third quarter of 2021 the U.S. clean energy industry installed 3,336 MW of clean power capacity. Additions in the first three quarters of the year total 15,317 MW, surpassing 2020 as the most active first three quarters for installations by nearly 3,000 MW.
- Project owners commissioned 49 new projects across 20 states in the third quarter. Texas once again led with 1,679 MW installed, followed by California (389 MW), Wyoming (301 MW), Oklahoma (301 MW), and Alabama (227 MW).
- 1,565 MW of solar capacity was added this quarter, as well as 1,551 MW of land-based wind, and 220 MW of storage capacity.
- There is now 186,674 MW of operating clean power capacity in the United States.

## Clean Power Capacity Under Construction and in Advanced Development

- At the end of the third quarter the near-term development pipeline was comprised of 904 projects totaling 109,596 MW of capacity, including 38,122 MW under construction and 71,474 MW in advanced development. This is 28% higher than the first quarter of 2021 and 7% higher than the second quarter.
- Clean power projects totaling 4,882 MW started construction and 9,993 MW entered advanced development in the third quarter.
- Solar represents the largest share of capacity in the clean power pipeline, accounting for 54%, followed by land-based wind (23%), offshore wind (13%), and battery storage (9%).
- Texas is the top state representing 17% of the total development pipeline, followed by offshore wind projects in Federal Waters (13%), California (11%), Indiana (5%), New Mexico (4%), and New York (3%).

## Clean Power Procurement Activity

- Power purchasers and project developers reported 9,054 MW of new Power Purchase Agreements (PPAs) in the third quarter, bringing the 2021 year to date total to 17,442 MW. This is 16% higher than the total capacity of PPAs announced through the third quarter of 2020.
- Corporate customers have announced over 37,000 MW of clean power PPAs in total after signing up another 1,761 MW of clean power PPAs in the third quarter of 2021.
- Through 2021, PPA's account for 8,700 MW of online clean energy capacity, followed by direct utility ownership with 2,690 MW, green tariff offtake with 765 MW, and merchant offtake with 446 MW.
- 70% of PPA offtake capacity announced thus far in 2021 has been for solar energy, 18% from wind, and 13% from storage.





# Clean Power Capacity Growth



# Record installs in three quarters of the year

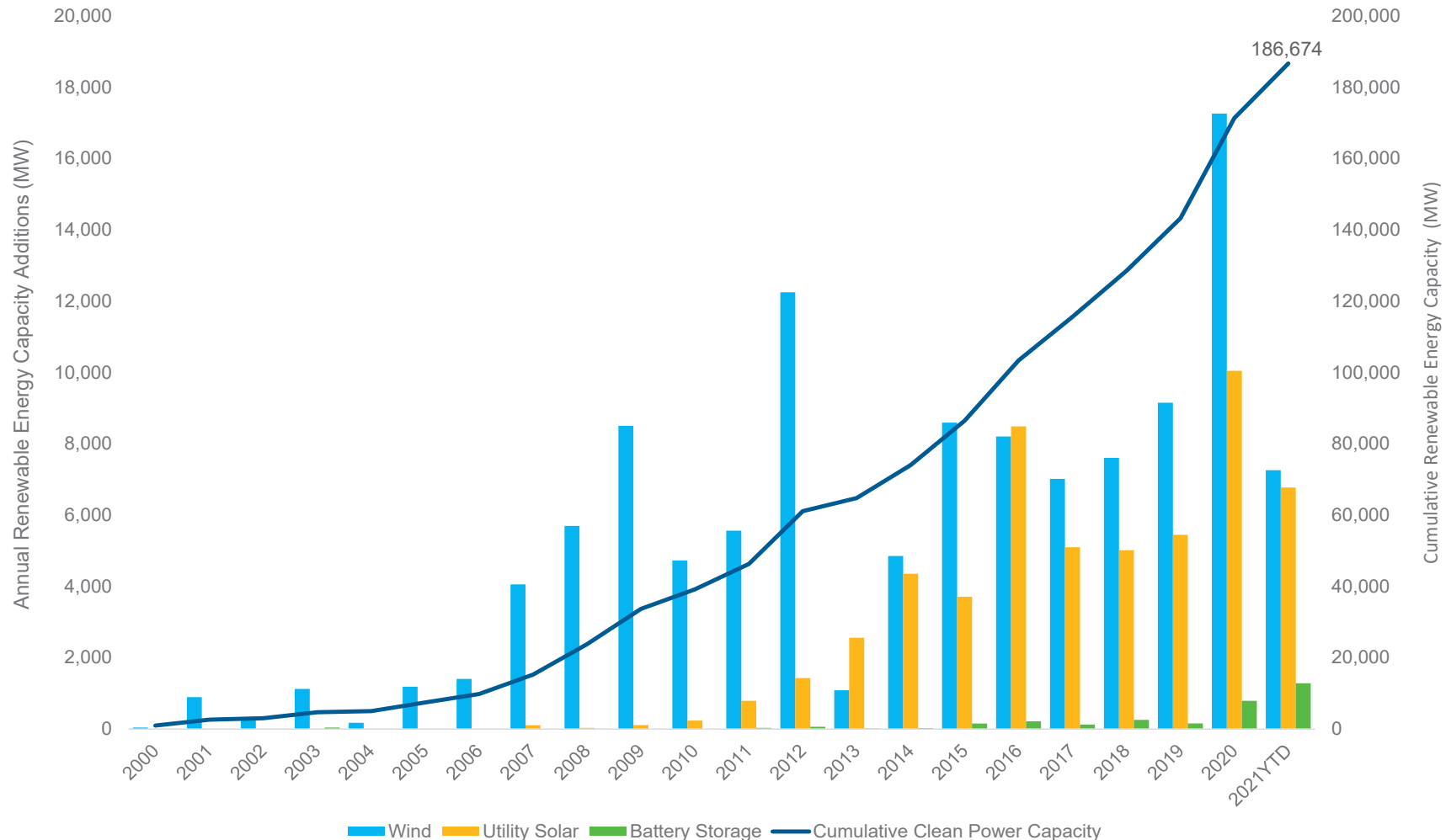
## Third quarter installations

- The industry commissioned 3,336 MW of new clean power capacity in the third quarter of 2021, bringing the total capacity installed in 2021 up to 15,317 MW. 47% of new additions in the third quarter were solar, 46% were wind, and 7% were storage.
- Clean power additions were up 23% in the first three quarters of 2021 compared to the same time period in 2020.
- Additions of clean power for the first three quarters of 2021 totaled 15,317 MW, a record for clean power installations through the first three quarters of the year.

## Clean Power surpasses 185 GW

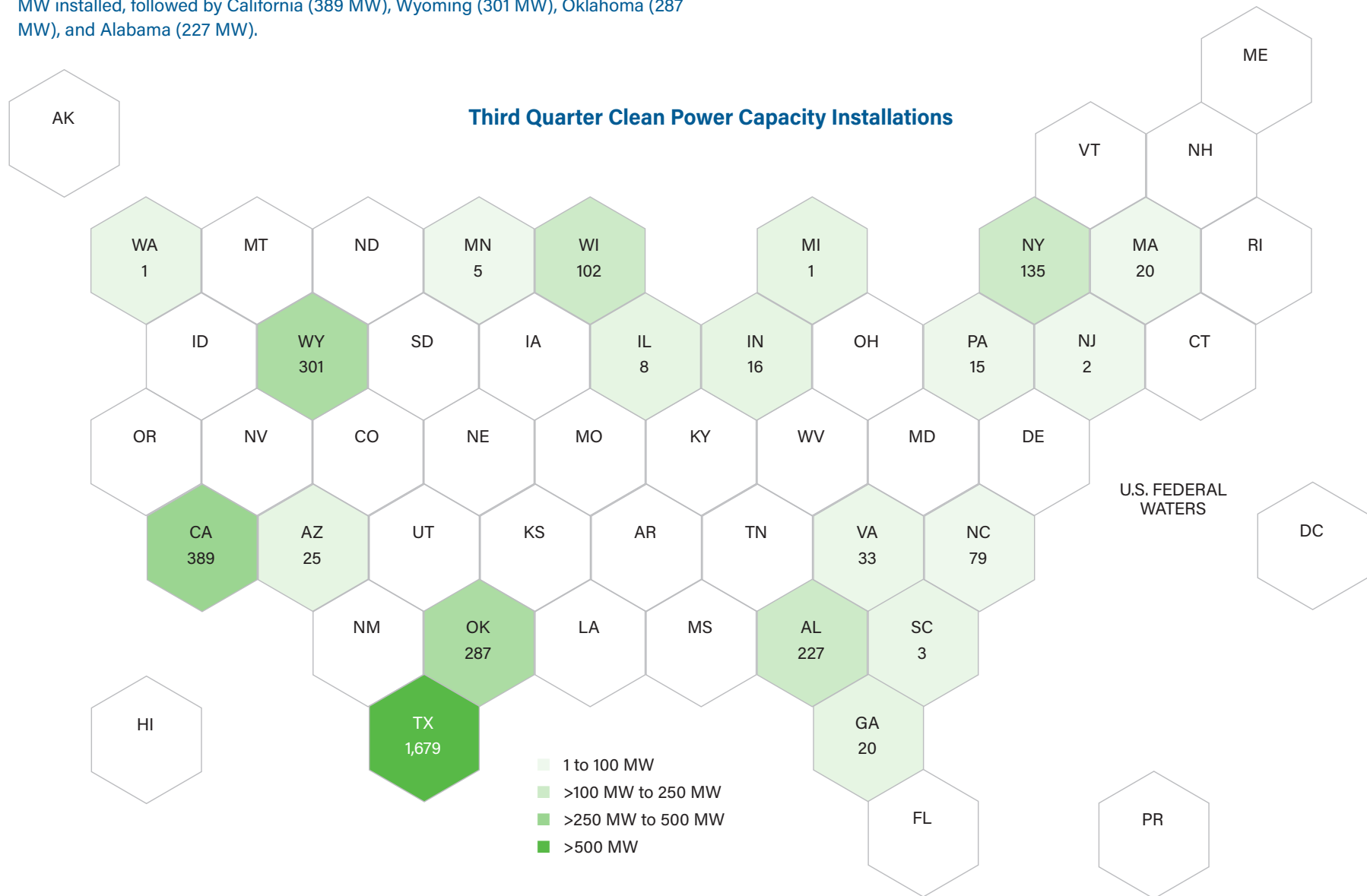
- There is now nearly 186,700 MW of operating clean power capacity in the U.S.
- Cumulative wind capacity increased by 1.2% over the quarter to 129,256 MW and represents the largest share of clean power capacity on the grid. Utility solar capacity makes up the second largest share of cumulative capacity with 54,209 MW, followed by battery storage with 3,167 MW.

U.S. Annual and Cumulative Renewable Energy Capacity Growth



# Grid adds 3,336 MW of clean power

- In the third quarter developers commissioned 49 new projects, totaling 3,336 MW across 20 states.
- The state with the highest capacity installations this quarters was Texas with 1,679 MW installed, followed by California (389 MW), Wyoming (301 MW), Oklahoma (287 MW), and Alabama (227 MW).
- As of the end of September, there is 186,674 MW of operating clean power capacity in the United States.



# Renewable quarterly capacity growth

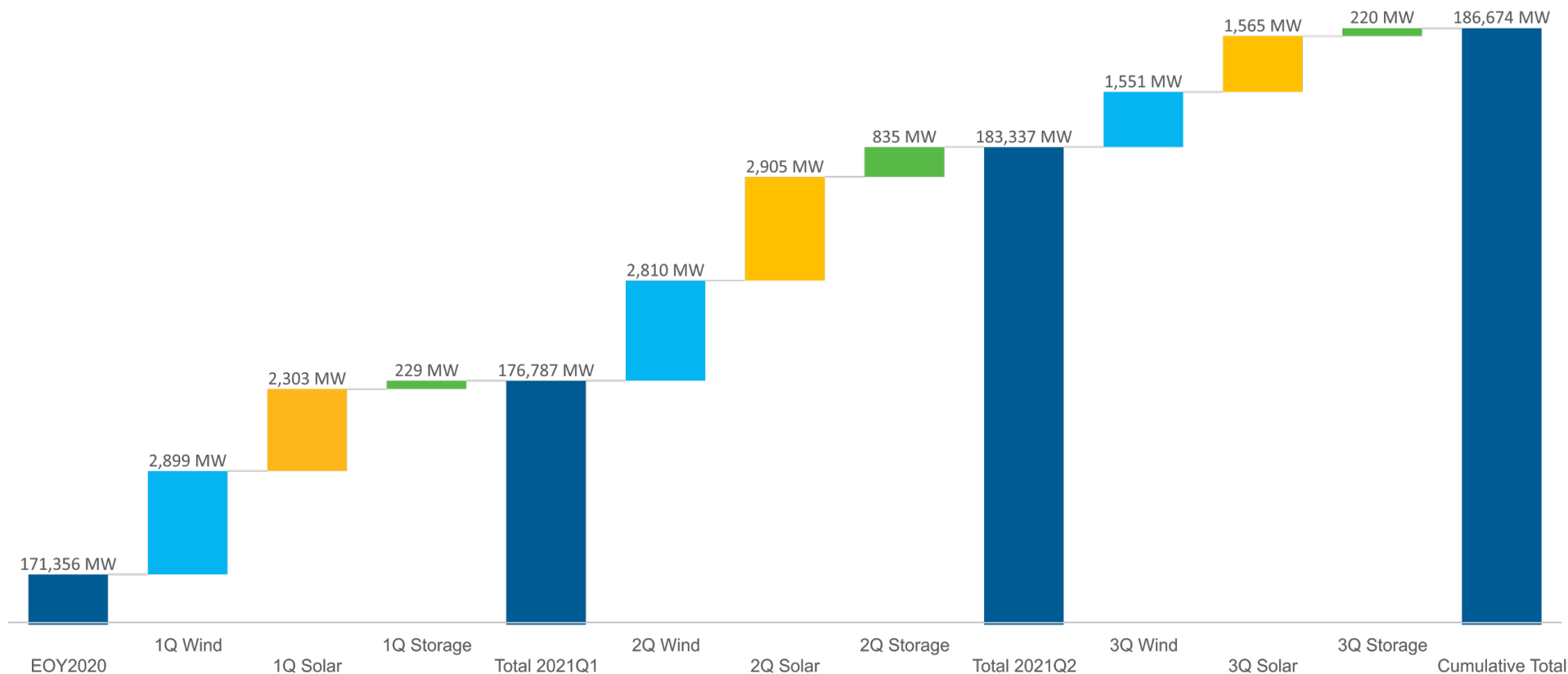
## 2021 additions outpacing 2020

- Battery energy storage continued to experience significant growth, adding 220 MW of newly installed capacity in the third quarter. Year-to-date storage capacity additions now total 1,283 MW, surpassing total storage installations in all of 2020 (791 MW).
- Utility solar experienced the most significant growth in the third quarter with 1,565 MW of new capacity installed. So far this year, solar additions total 6,774 MW.
- Wind additions this quarter were just slightly lower than utility solar installations, totaling 7,260 MW of year-to-date installations.
- Cumulative clean power capacity grew 2% in the third quarter compared to the second quarter.

## Top owners of Q2 installations

- Two companies added more than 300 MW of new capacity to their portfolios in the third quarter - Ørsted and Duke Energy.
- Ørsted brought over 360 MW of clean power online during the third quarter with its Western Trail wind project in Texas.
- Duke Energy brought seven projects online during the quarter, including six solar projects and one wind project across California and Texas for a total additional capacity of over 335 MW.

Renewable Quarterly Capacity Growth

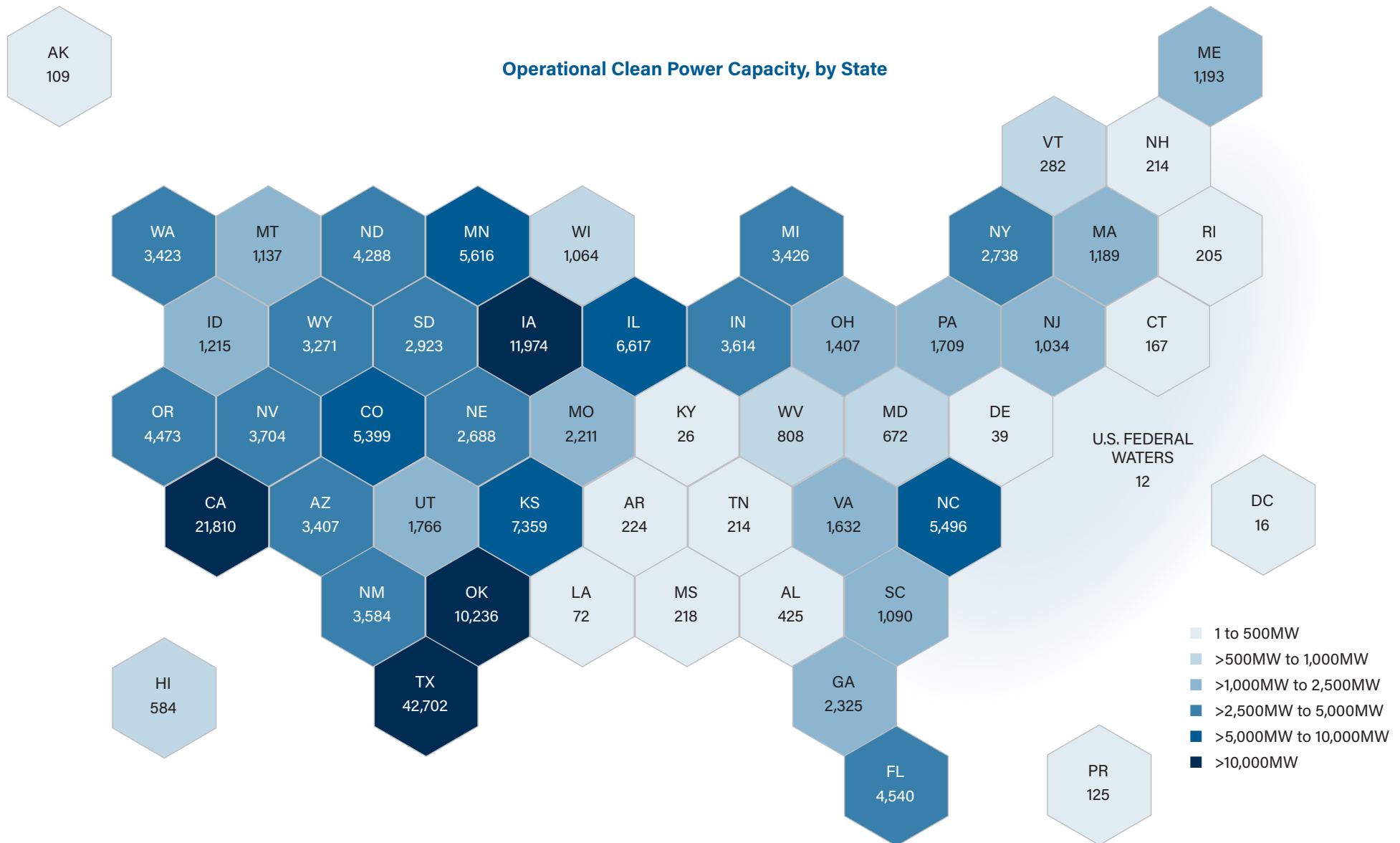


ACP has revised historical solar capacity addition amounts to reflect new information.



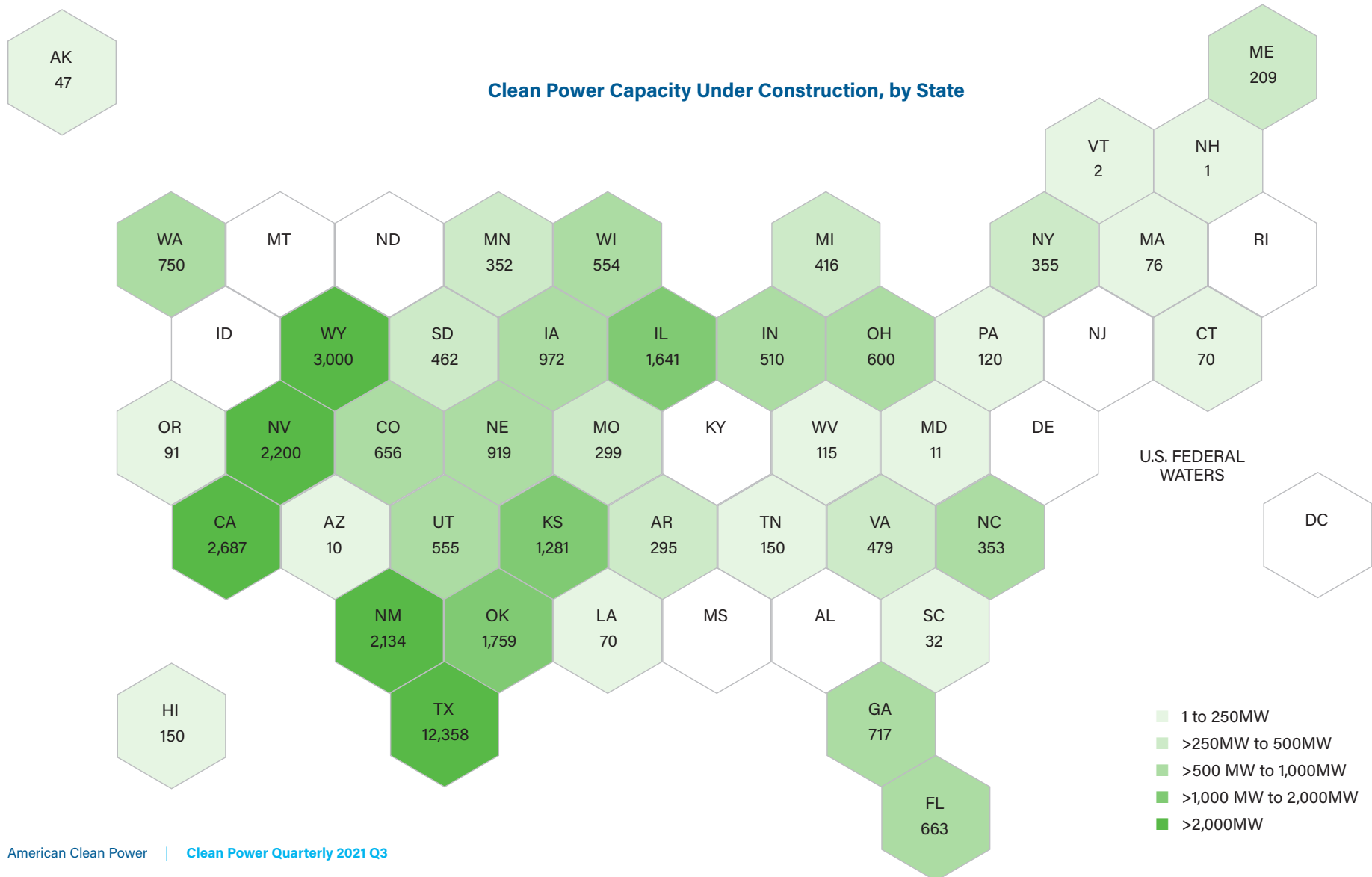
# Operational clean power capacity

- Over 15 GW of clean energy installed in the first nine months of 2021.
- Notably, Oklahoma now has over 10 GW of operating capacity and Wisconsin has reached 1 GW of operational capacity.
- In total, there are now 186,674 MW of clean power capacity operating in the U.S, enough to power over 52 million homes across the country.



# Project construction pipeline

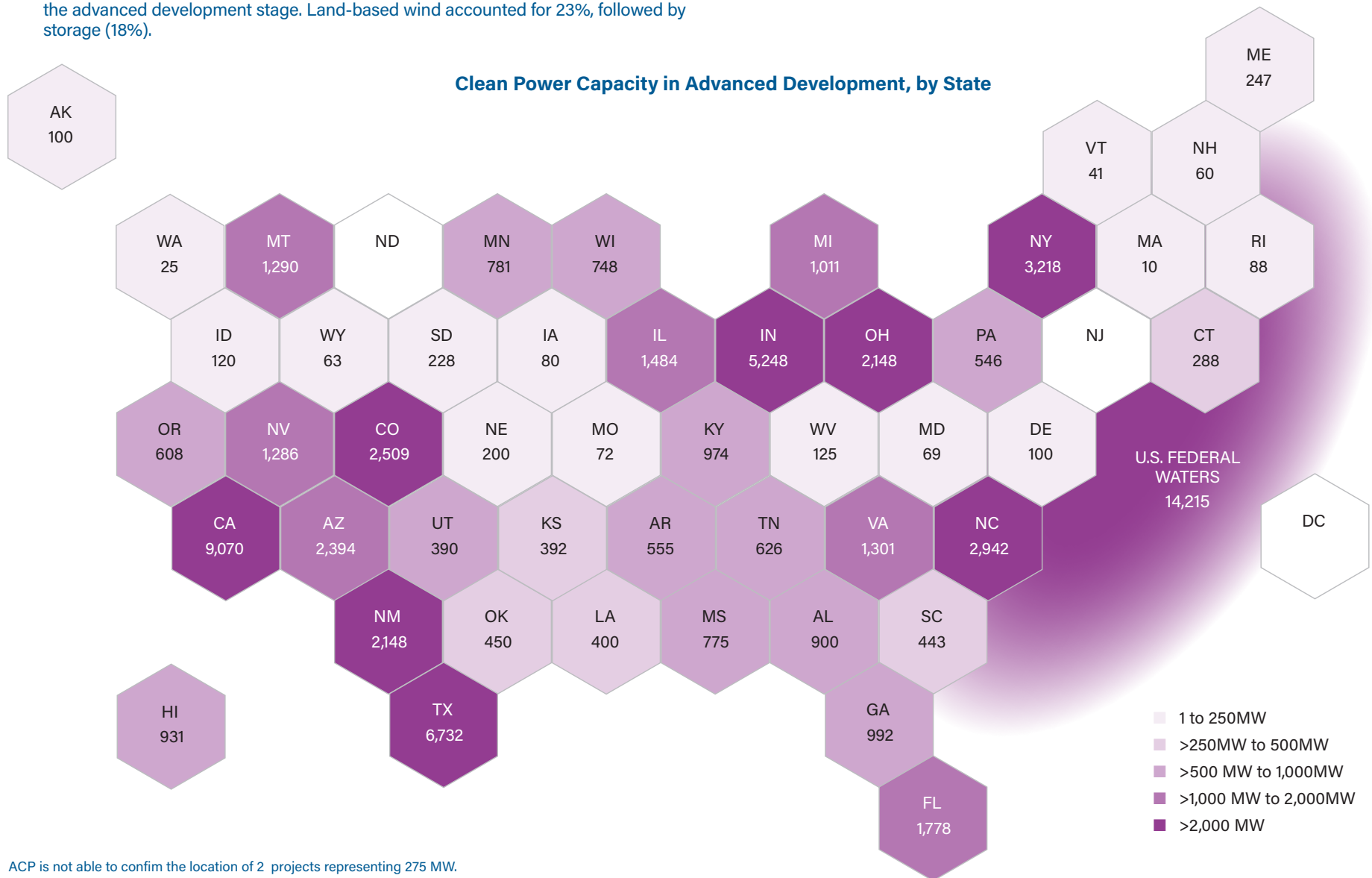
- At the end of the third quarter, there was 38,122 MW of clean power capacity under construction.
- Total construction activity spans 324 project phases in 41 states.
- In the third quarter, project developers started construction on 4,882 MW across 18 states.
- Of the 4,882 MW that began construction in the third quarter, wind accounts for 58%, followed by solar with 34%, and storage with the remaining 8%.
- Texas saw the largest uptick in projects entering the construction phase in the third quarter, where projects totaling 1,649 MW started construction. Kansas had 853 MW start construction, followed by New Mexico (784 MW), Iowa (444 MW), and Colorado (276 MW).
- On a regional basis, Texas led with 32% of total construction activity based on capacity, followed by Mountain West with 22%, and the Midwest with 12%.





# Advanced development activity

- Project developers reported 71,474 MW of clean power capacity in advanced development at the end of September.
- 9,993 MW of clean power projects entered the advanced development phase in the third quarter.
- In the third quarter of 2021, solar projects represented 59% of capacity that entered the advanced development stage. Land-based wind accounted for 23%, followed by storage (18%).
- Total advanced development activity spans 580 project phases across 48 states and 16 offshore wind projects in federal waters.
- California (2,538 MW) led new announcements for the quarter, followed by Texas with 1,925 MW and Indiana with 1,165 MW.

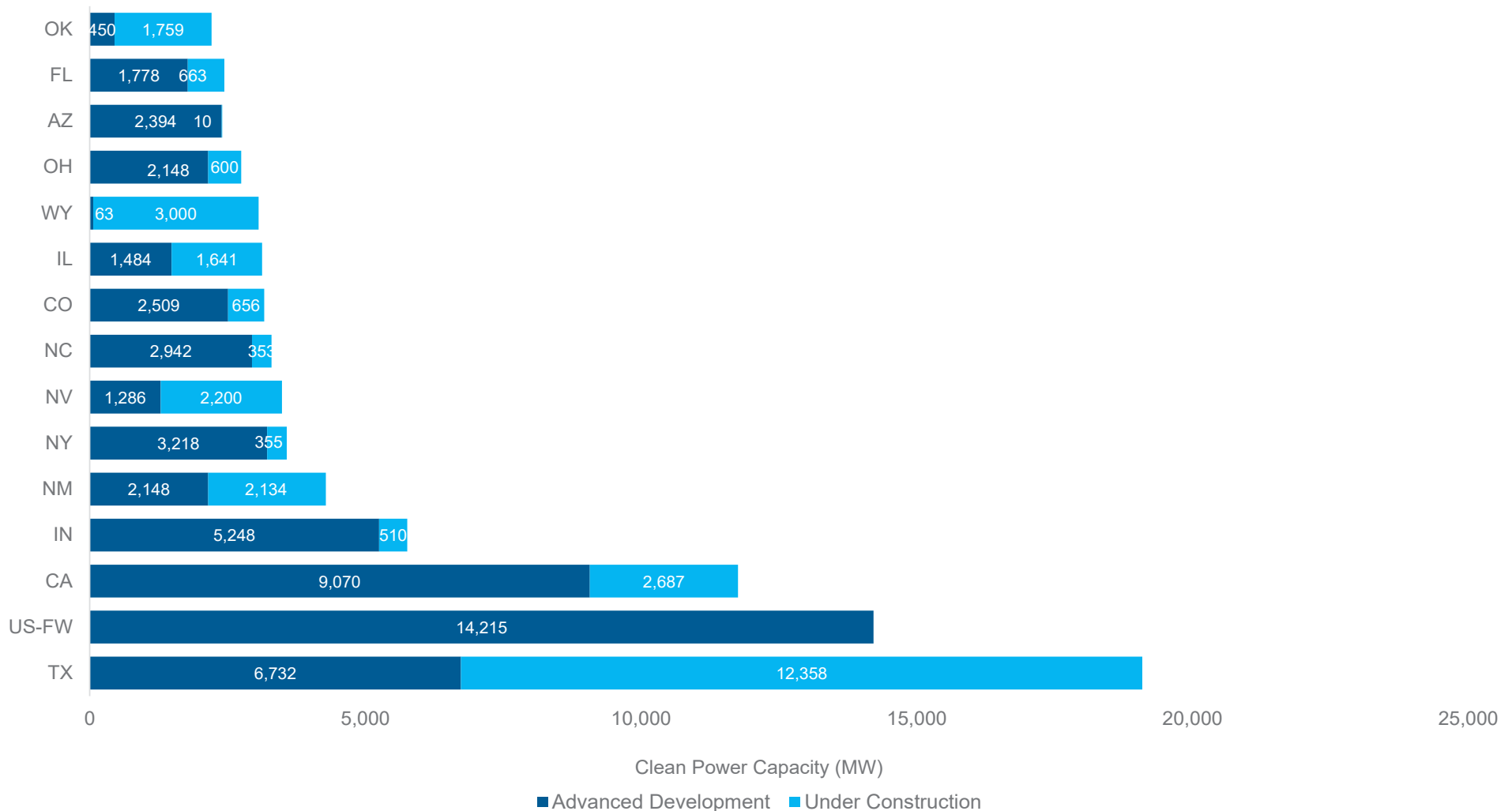


ACP is not able to confirm the location of 2 projects representing 275 MW.

# Clean power project pipeline

- The 109,321 MW of combined construction and advanced development activity is spread across 920 projects in 49 states, plus 16 projects in Federal Waters.
- Texas hosts more activity than any other state, representing 17% of the total development pipeline. Federal Waters comes in second (13%), followed by California (11%), Indiana (5%), and New Mexico (4%).
- A total of 11 states have more than 3,000 MW of clean power capacity in the pipeline.
- The capacity of clean power projects in the pipeline as of September 2021 (nearly 109 GW), is 8% higher than the end of the second quarter (102 GW), and 28% higher than at the end of the first quarter (85 GW).

Top States of Projects Under Construction and in Advanced Development





# Clean power project pipeline

## Wind

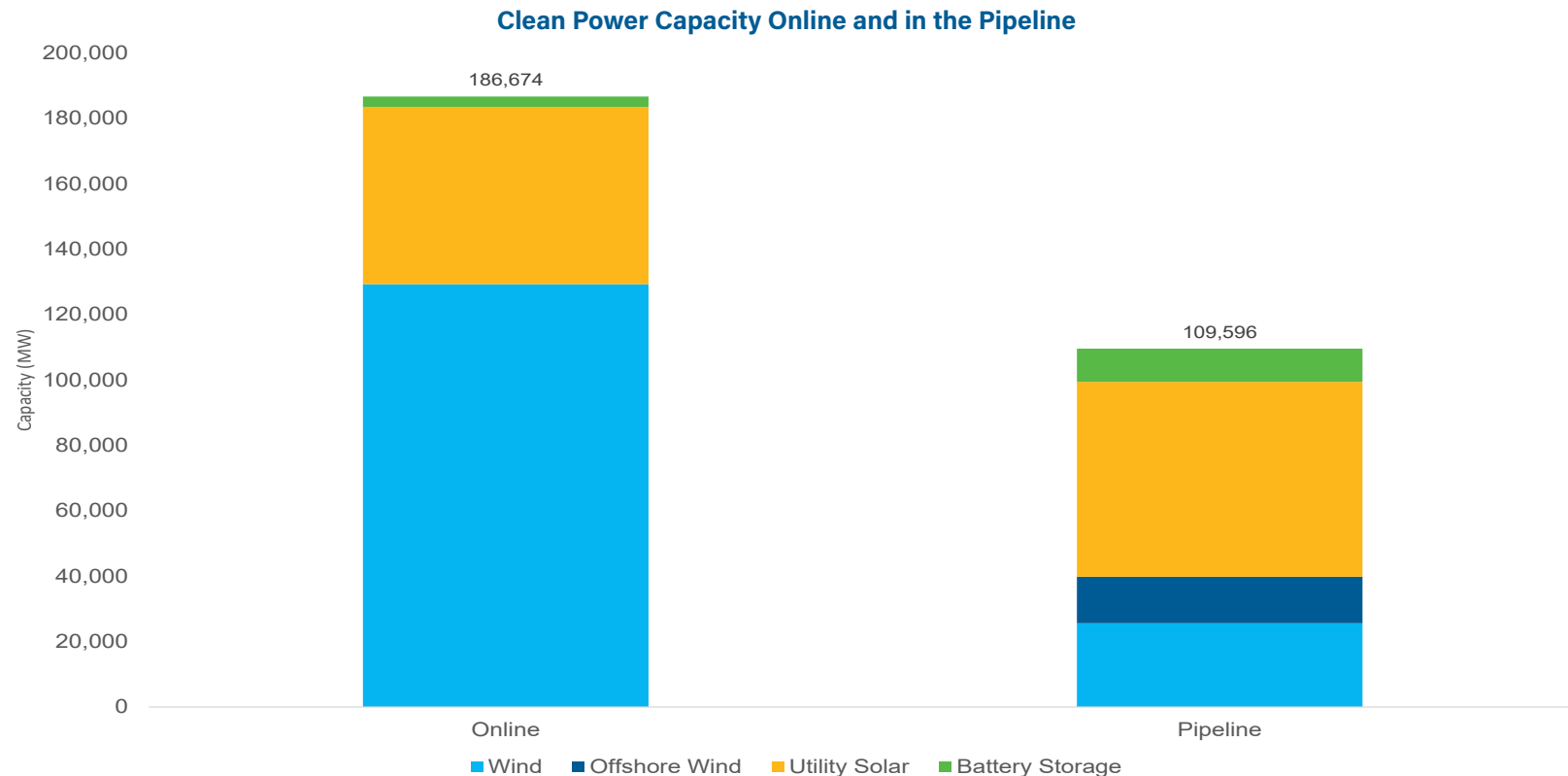
- The wind industry currently has 39,838 MW of total development activity, representing 36% of the pipeline.
- Total offshore wind capacity in development accounts for 36% (14,227 MW) of the total wind project pipeline.
- Texas has the most land-based wind in the near-term pipeline, representing 23% of the project pipeline, followed by Wyoming (12%), and Oklahoma (7%).
- Texas experienced the largest uptick in development activity with 1,320 MW entering advanced development.
- Kansas had the largest increase in projects starting construction in the third quarter of 2021 (853 MW).

## Solar

- Solar accounts for the largest share of development activity with 59,591 MW, representing 54% of the total pipeline.
- Solar capacity in the pipeline has increased by 9% since the second quarter, and 34% since the first quarter of the year.
- There are 447 solar projects in advanced development in 46 states.
- Texas once again hosts more activity than any other state with 20% of the total solar pipeline, followed by California with 13%, Indiana with 8%, and North Carolina with 6%.

## Storage

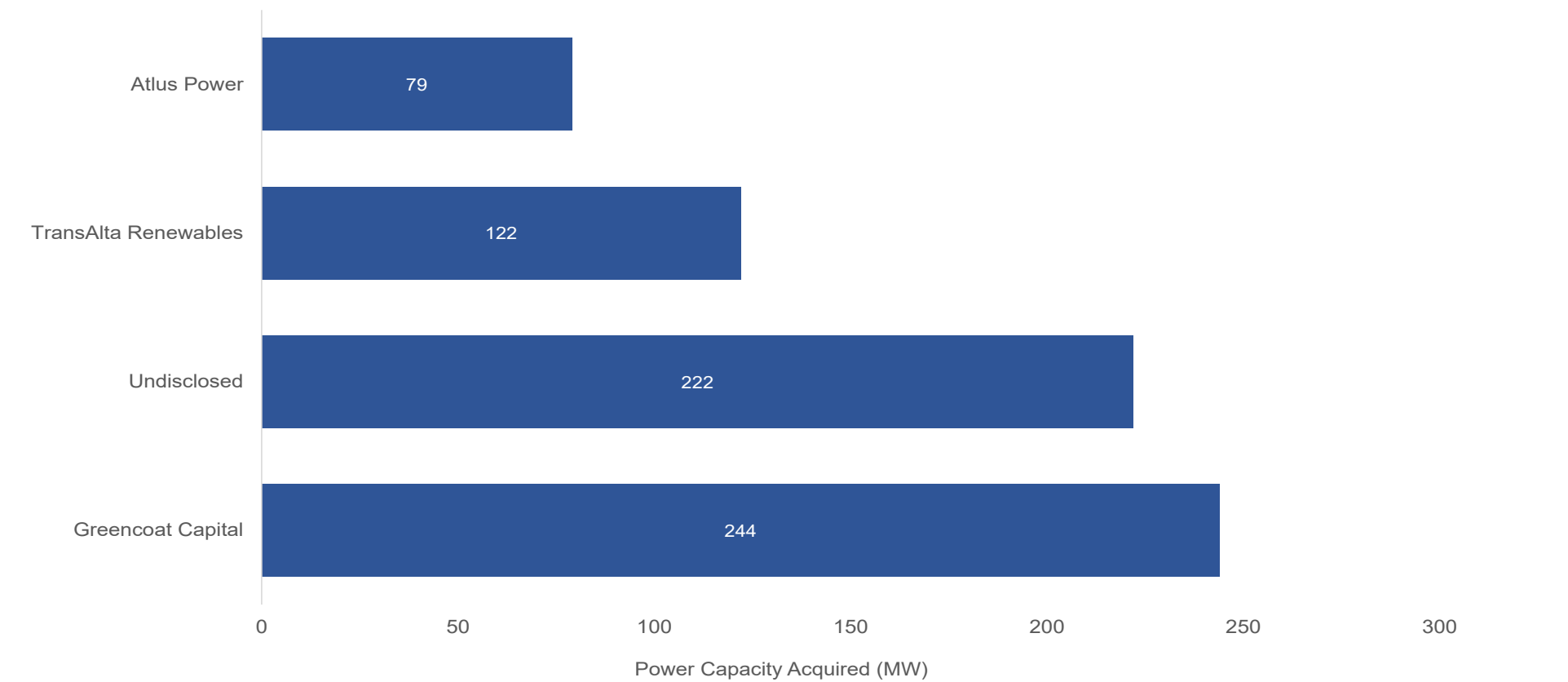
- There is currently 10,167 MW of battery storage capacity in the project pipeline, including 3,597 MW under construction and 6,570 MW in advanced development, representing 9% of total development activity.
- Total storage capacity in the pipeline has increased by 13% since the second quarter.
- Storage pipeline activity is spread across 146 project phases in 19 states.
- California leads with more battery storage activity than any other state, representing 39% of combined storage pipeline activity. Texas comes in second with 15%, followed by Arizona (11%), and Nevada(10%).



# M&A activity is up year-to-year

- The third quarter was slower for project acquisitions compared to the first half of the year with four companies acquiring a combined 667 MW in operating clean energy capacity. Acquisitions for the first nine months of the year total 4,892 MW, representing a 30% increase over the same period in 2020.
- Greencoat Capital led project acquisitions in the quarter after acquiring an 80% stake in two operating wind farms in Illinois with a combined capacity of 305 MW from EDP Renewables.
- At the end of the third quarter, Recurrent Energy finalized its sale of the 222 RE Maplewood Solar 2 project in Texas to an undisclosed buyer.
- TransAlta Renewables closed a deal with Copenhagen Infrastructure Partners to acquire a 122 MW solar portfolio in North Carolina. The portfolio consists of 20 operational solar projects, ranging between 3.2 MW and 6.7 MW.
- Altus Power finalized its acquisition of a 79 MW operating solar portfolio from True Green Capacity Management. The solar projects are in Connecticut, Massachusetts, New Jersey, New York, Rohde Island, Tennessee, and Vermont.

2021 Renewable Operation Project Acquisitions



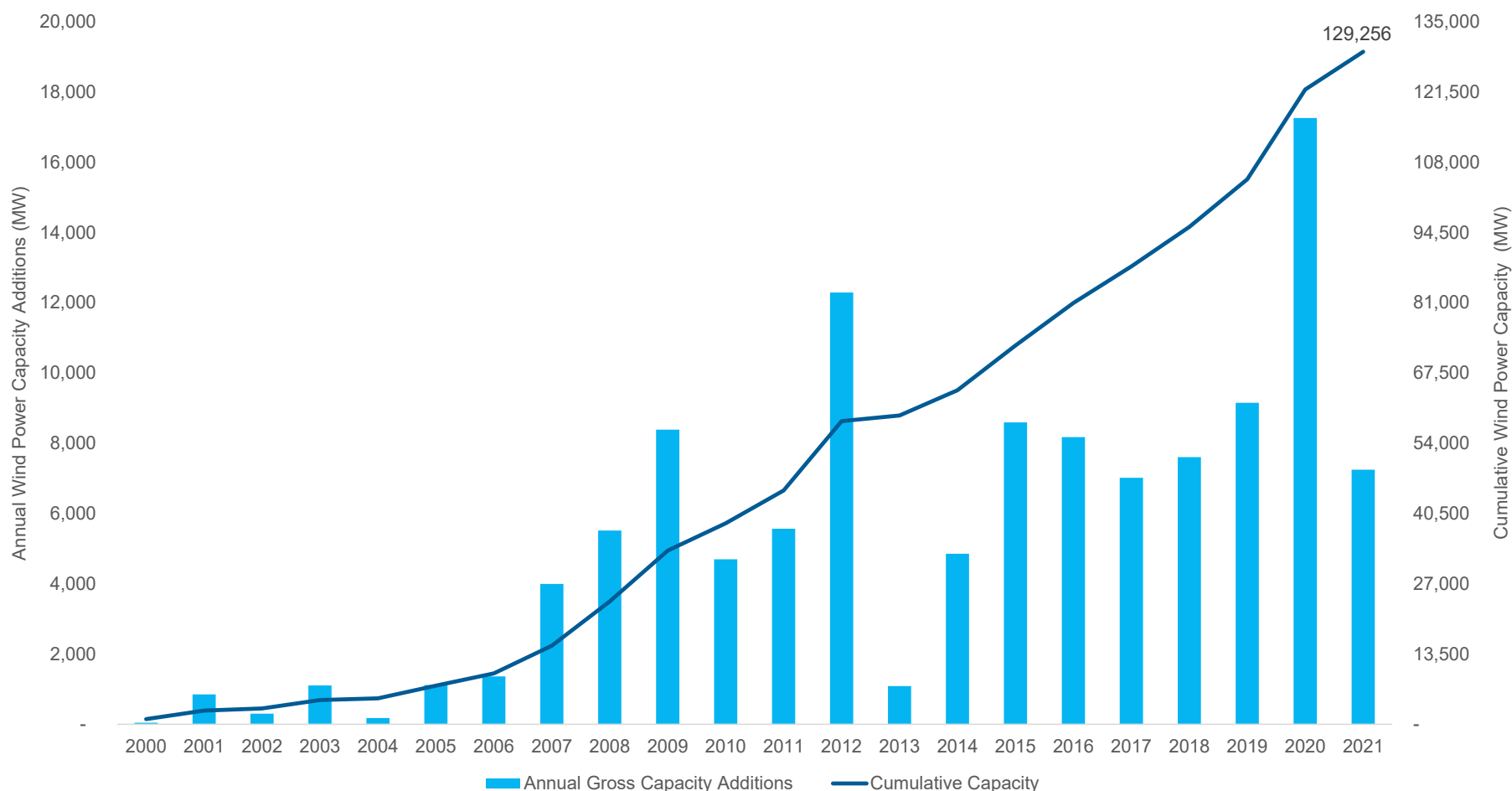


## LAND-BASED WIND ACTIVITY

# Over 1.5 GW of land-based wind online in Q3

- The wind industry installed 1,551 MW of new capacity. Total wind capacity installed in 2021 through September is now 7,248 MW.
- The volume of wind projects that came online in the third quarter is lower than previous quarters this year, and lower than third quarter installations in recent years. This is due to projects originally planned to be online in the third quarter being pushed to a later date. Some developers cited supply chain issues as the reason for this delay.
- Invenergy's nearly 290 MW Maverick Wind was the largest project to start commercial operation in the third quarter.
- Year-to-date the industry added 37 projects across 18 states totaling 7,248 MW, an increase of 15% compared to the first three quarters of 2020.
- The average size of wind projects installed in the third quarter was 129 MW.

U.S. Annual and Cumulative Wind Power Capacity Growth

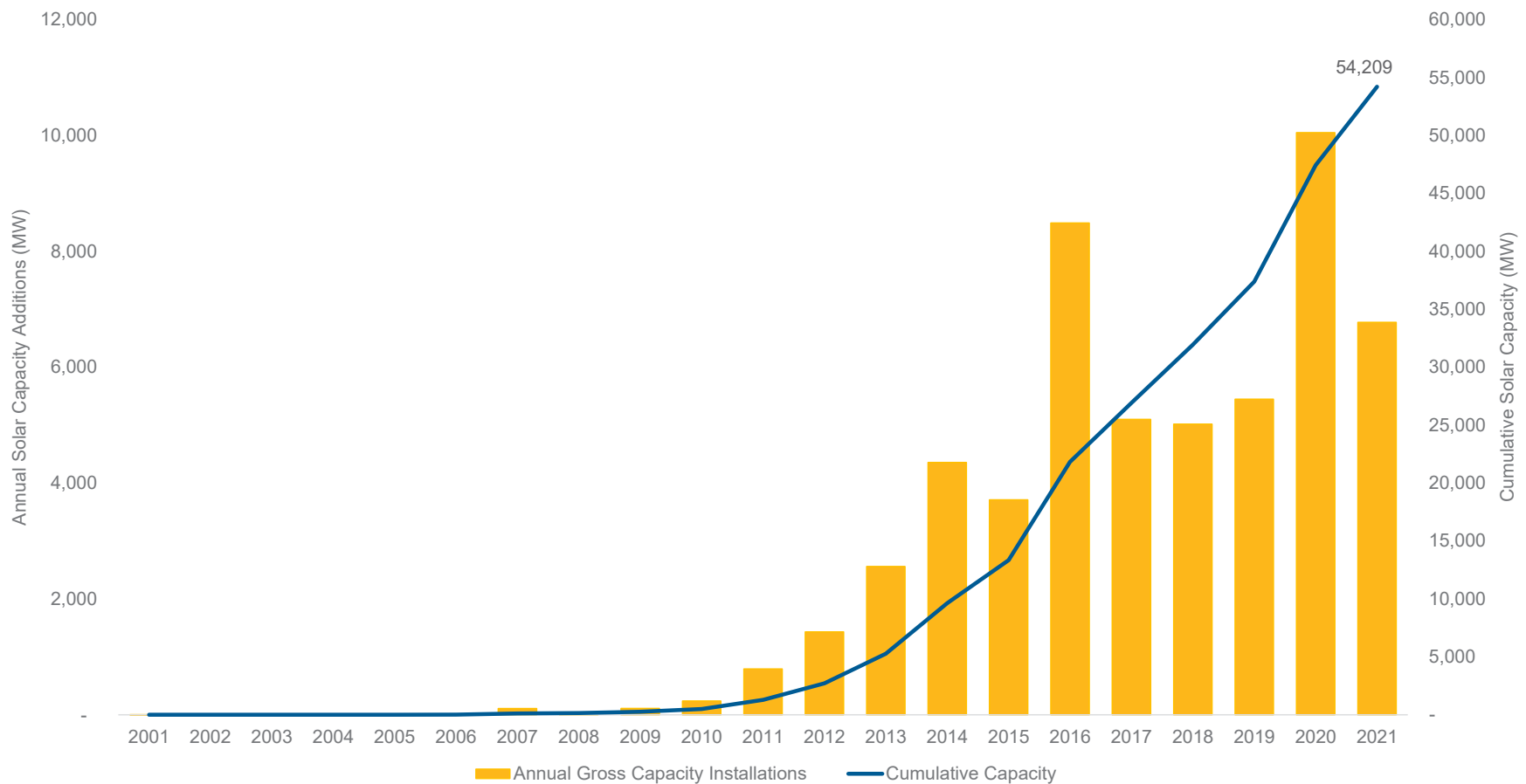


## UTILITY-SCALE SOLAR

# Solar capacity tops 54 GW

- The clean energy industry installed 1,565 MW solar capacity in the third quarter, bringing total solar capacity additions for the first three quarters of the year to 6,774 MW.
- Solar capacity additions are up by 18% compared to the first nine months of 2020, when the industry installed 5,732 MW.
- Forty-six states and D.C. have operational utility solar power capacity. California leads the solar industry with over 14 GW of installed capacity, almost double second placed Texas.
- Nearly 26% of installed utility solar power is in California, followed by Texas (14%), North Carolina (10%), Florida (8%), and Nevada (6%).

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



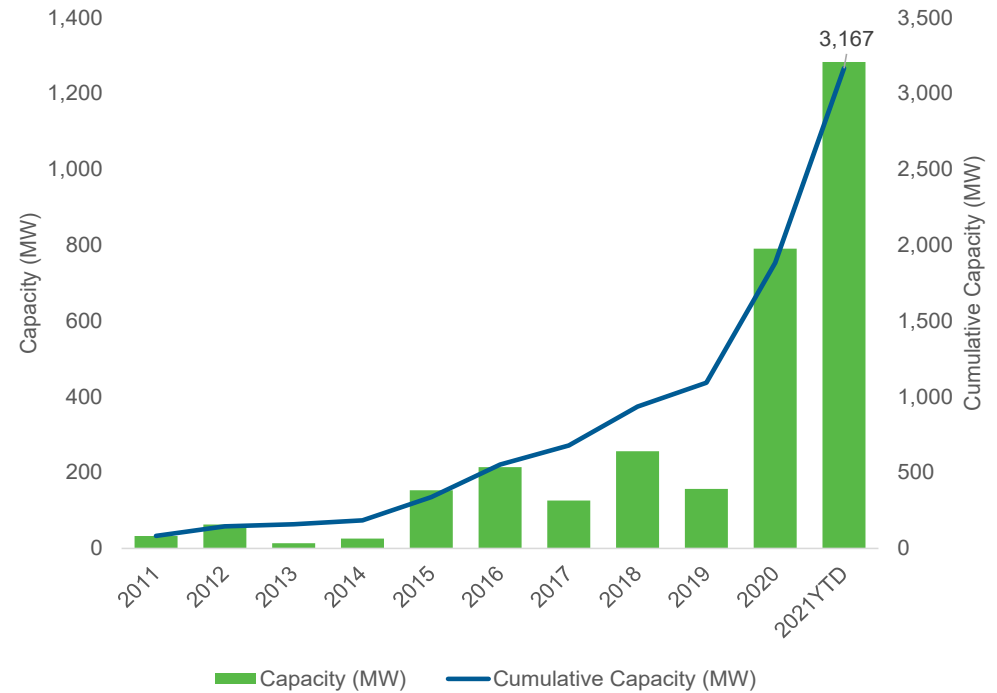
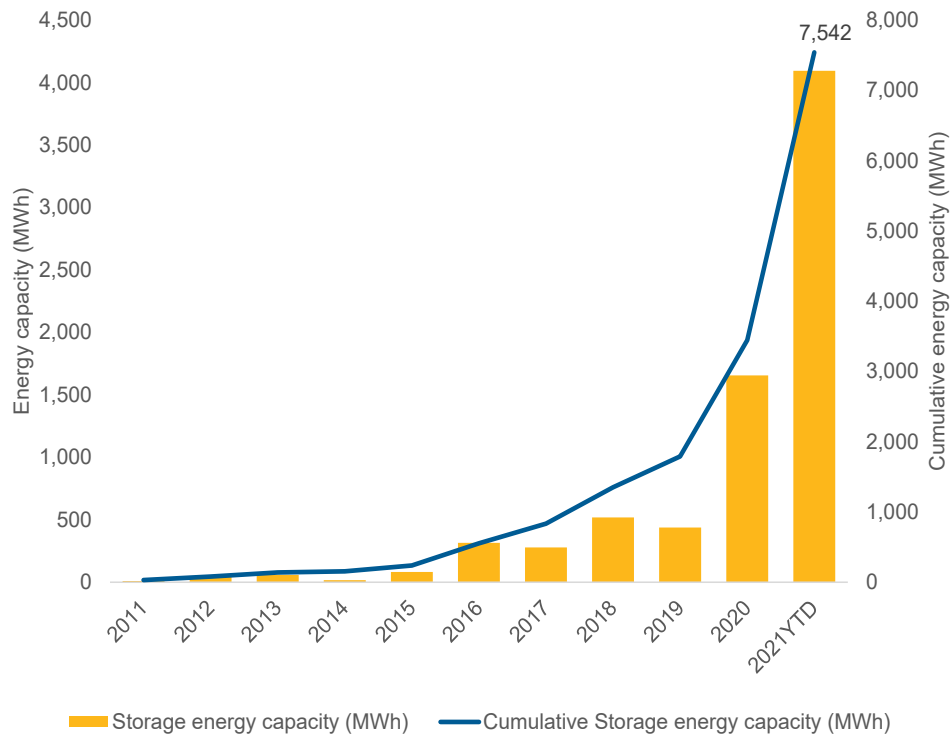
ACP has revised historical solar capacity addition amounts to reflect new information

ACP reports solar capacity in MWac

# Storage capacity continues to grow

- In the third quarter, storage power capacity additions totalled to 220 MW, bringing the bringing year-to-date installations to 1,283 MW. This is 243% higher than at the end of the third quarter of 2020.
- In the third quarter, California installed the most storage capacity (188 MW), followed by Arizona (25 MW), Massachusetts (6 MW), and Washington (1 MW).
- There are currently 241 operating battery storage projects across 35 states. California hosts the most battery storage with over 1.8 GW (57%) of installed capacity, followed by Texas with 405 MW (13%), Illinois (133 MW, 4%), Massachusetts (101 MW, 3%), and Arizona (97 MW, 3%).
- Year-to-date the industry added 4,096 MWh in storage energy capacity. This bring total storage energy capacity to 7,542 MWh.

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





# Hybrid Projects



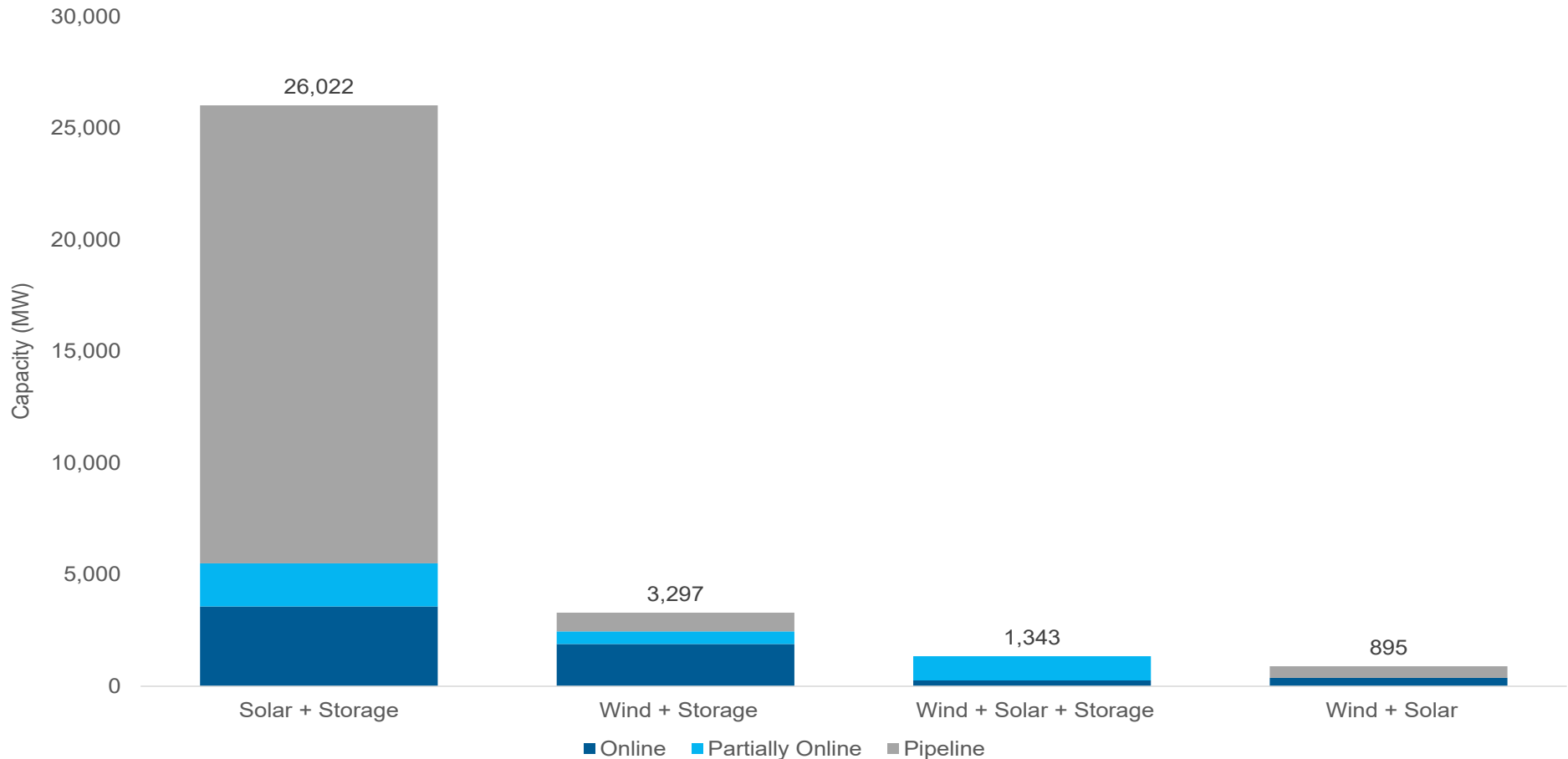


## HYBRID PROJECTS

# 2.4 GW of solar + storage added in 2021

- In 2021, 2,443 MW of solar-plus-storage capacity has been added to the grid.
- Solar-plus-storage projects are the most common operating hybrid projects with 3,574 MW on the grid, 1,931 MW partially online, and 21,185 MW in the pipeline. Wind-plus-storage is the second largest operating hybrid class with 1,892 MW online.
- Hybrid projects are considered partially online if one technology is online, and the other is still under construction or in advanced development. Nearly 3,600 MW of hybrid projects are partially online with their total capacity expected to become fully operational in coming months. Of those 54% are solar-plus-storage, 16% are wind-plus-storage, and 30% are wind plus solar-plus-storage.
- Over 22,500 MW of hybrid project capacity is in the pipeline, made up primarily of solar-plus-storage projects.

Hybrid Power Projects

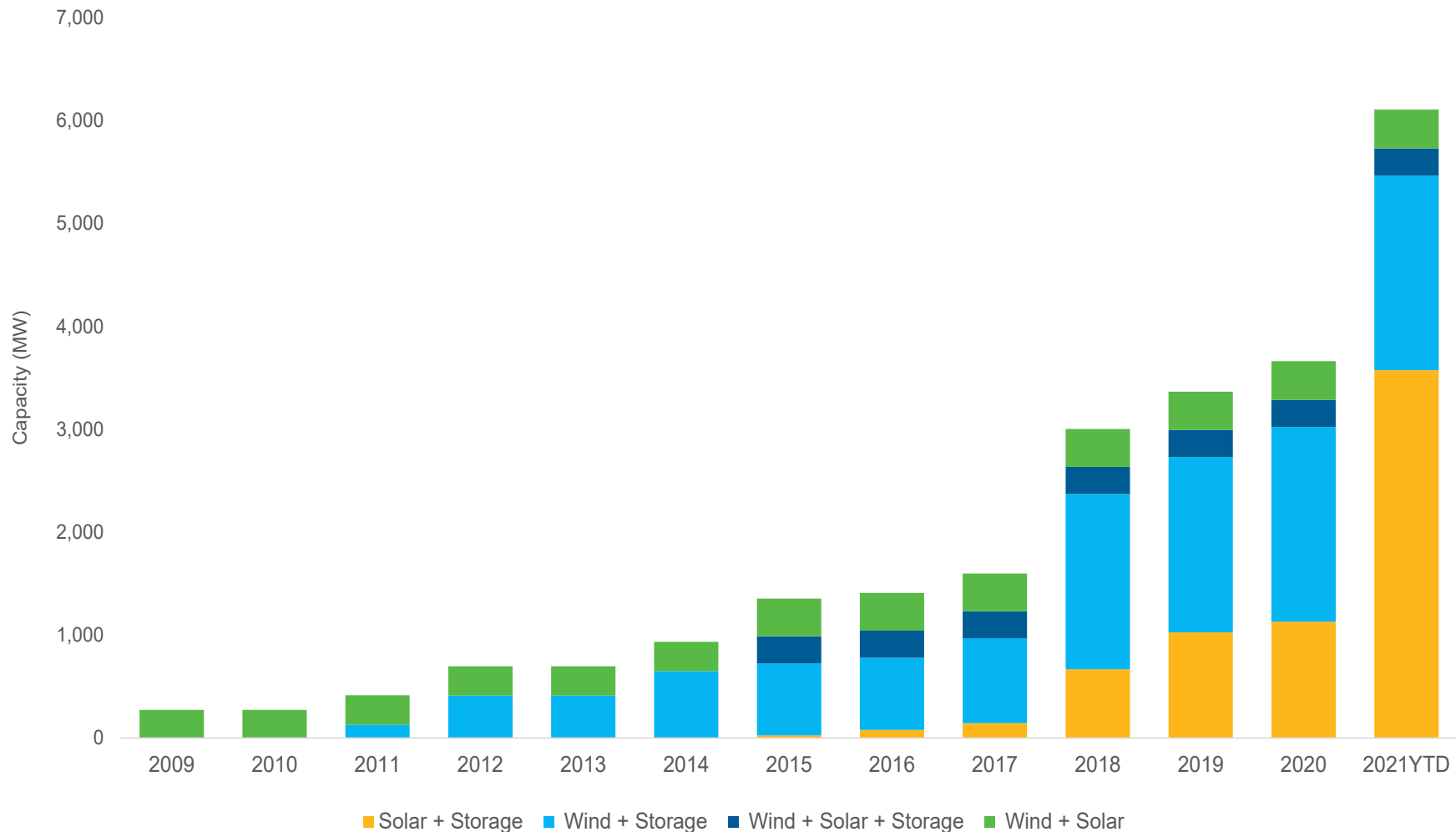


## HYBRID PROJECTS

# 6 GW of operating hybrid projects

- In total, there are over 6 GW of hybrid projects (projects including a combination of wind, solar, and storage) currently operational in the U.S. including over 3.5 GW of solar plus storage projects, nearly 1.9 GW of wind plus storage, 263 MW of wind plus solar plus storage, and 377 MW of wind plus solar.
- In 2021, over 2.4 GW of solar plus storage capacity has been added to the grid. The second quarter saw the most solar plus storage capacity added (over 2.1 GW). In the third quarter, another 290 MW of operational capacity was added.

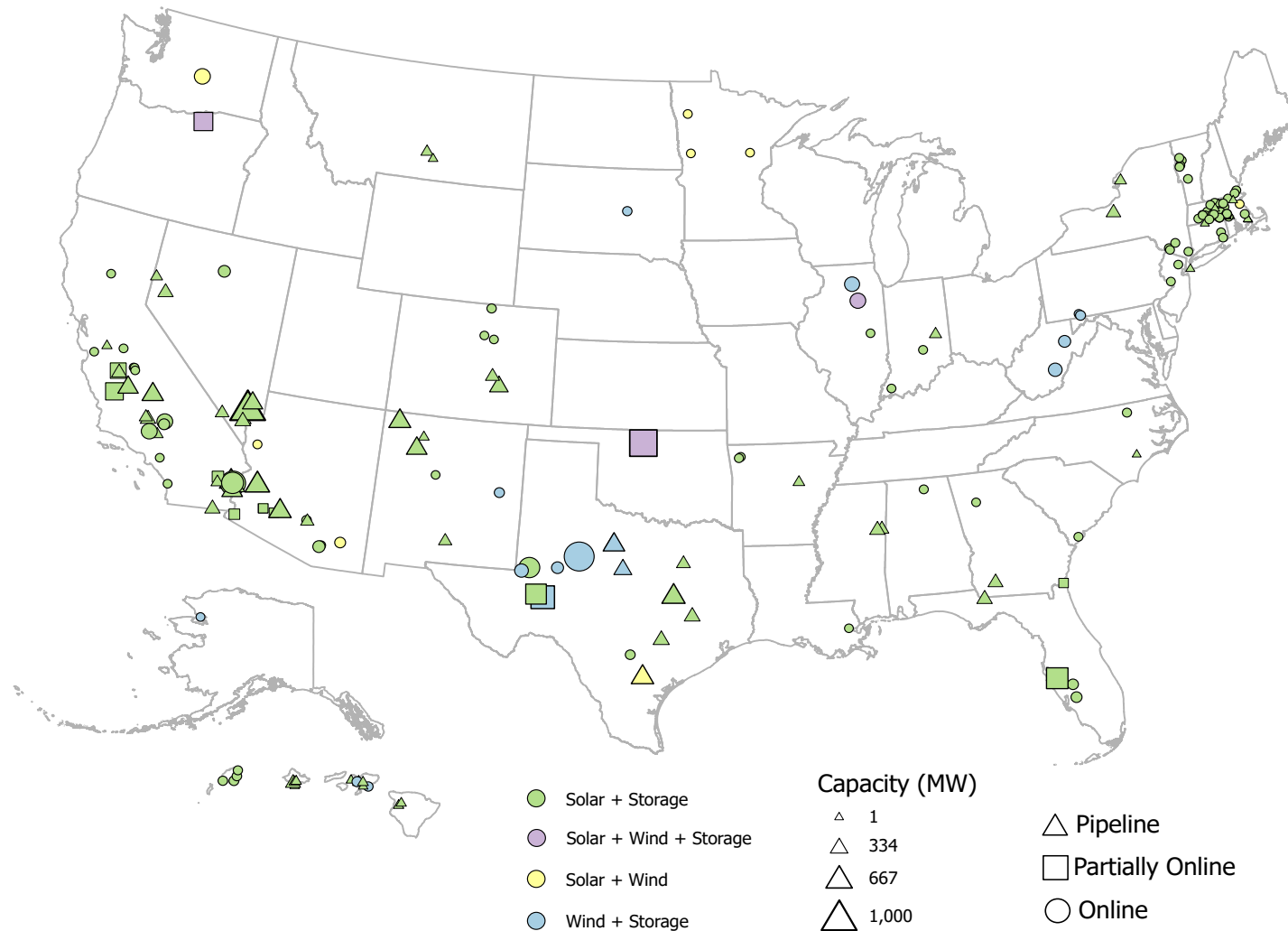
**Cumulative Operational Hybrid Project Capacity**



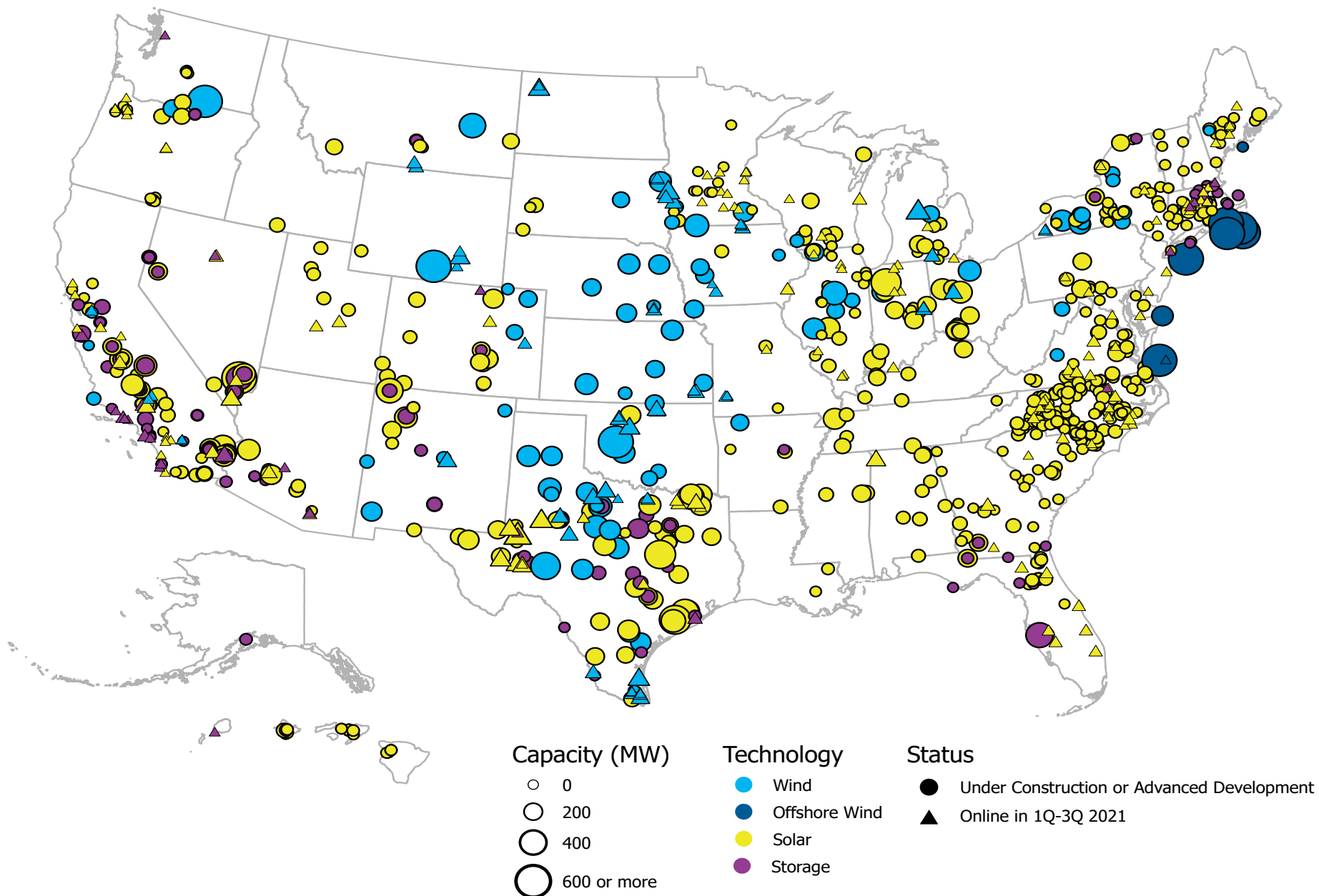
# Hyrbids grow across the country

- California leads the country in terms of hybrid capacity installed with almost 2 GW of solar-plus-storage currently operating.
- Texas comes in second for operational hybrid capacity with almost 700 MW of solar-plus-storage and 1.1 GW of wind-plus-storage installed.
- California has the most hybrid capacity in the pipeline or partially online, with over 8.2 GW of solar-plus-storage capacity, followed by Texax, which has over 2 GW of solar-plus-stoage, 1.4 GW of wind-plus-storage, and 518 MW of wind-plus-solar capacity in the pipeline or partially online.
- Texas, Oklahoma, and Oregon are the only states with wind hybrid projects in the pipeline or partially online.

**Cumulative Operational Hybrid Project Capacity**



# Map of Projects Online in 2021





American Clean Power is the voice of companies from across the clean power sector that are powering America's future, providing cost-effective solutions to the climate crisis while creating jobs, spurring massive investment in the U.S. economy and driving high-tech innovation across the nation. We are uniting the power of America's renewable energy industry to advance our shared goals and to transform the U.S. power grid to a low-cost, reliable, and renewable power system. Learn more about the benefits clean power brings to America at [www.cleanpower.org](http://www.cleanpower.org).



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