

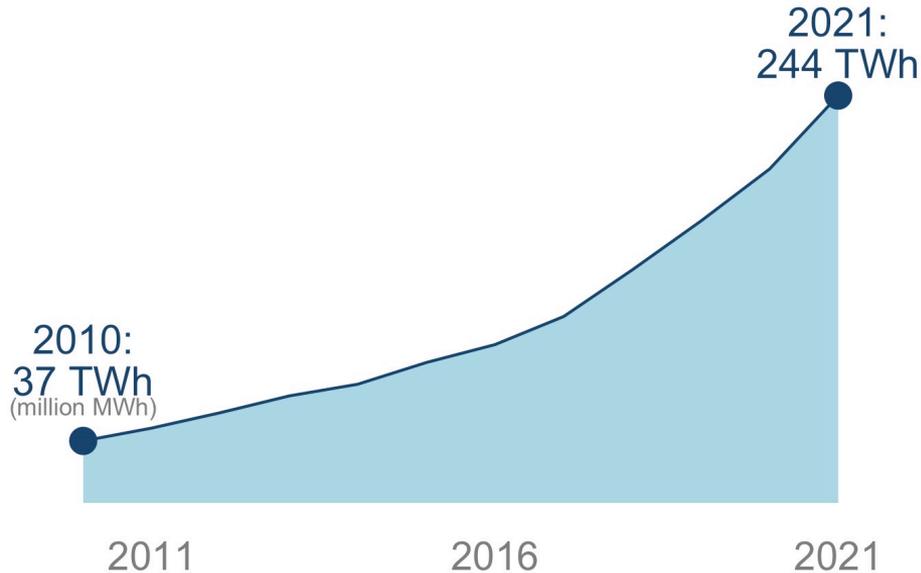
Status and Trends in the Voluntary Market (2021 Data)

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Renewable Energy Markets Conference

The Big Picture

In 2021, about **8 million customers** procured about **244 million MWh** of renewable energy through green power markets.



That represents about:

1 in 20

U.S. retail electricity customers

6%

of U.S. retail electricity sales

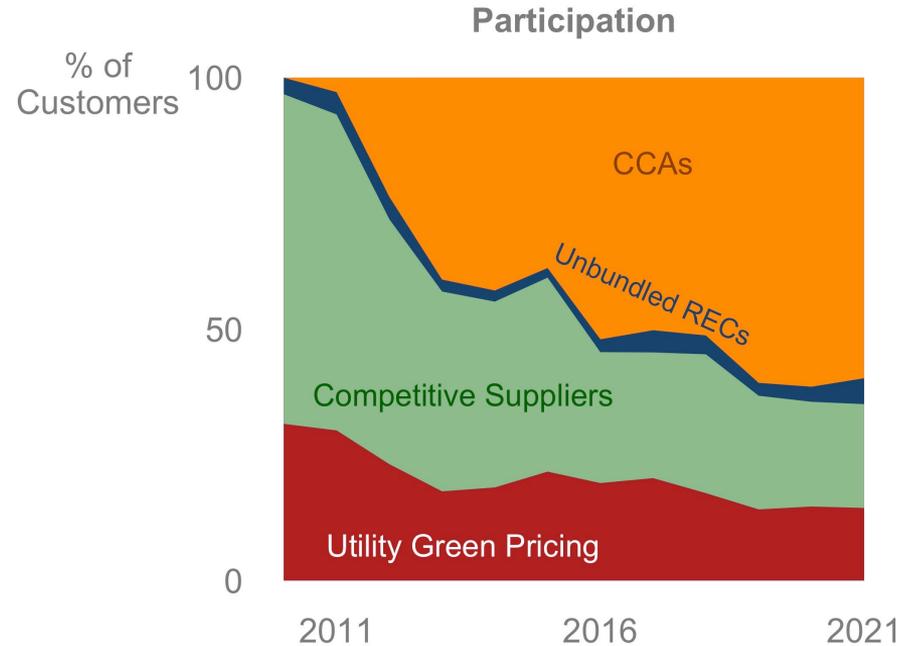
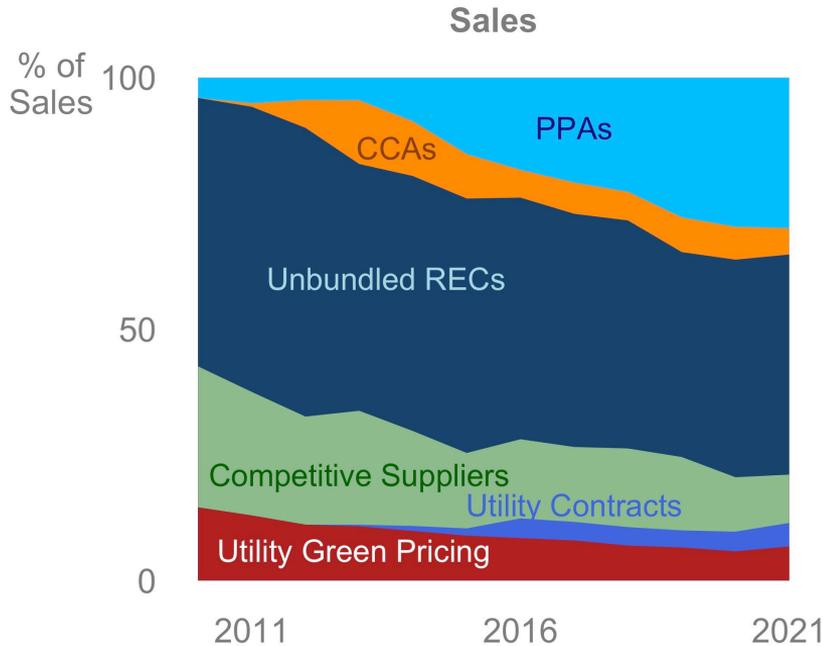
38%

of U.S. non-hydro renewable energy generation

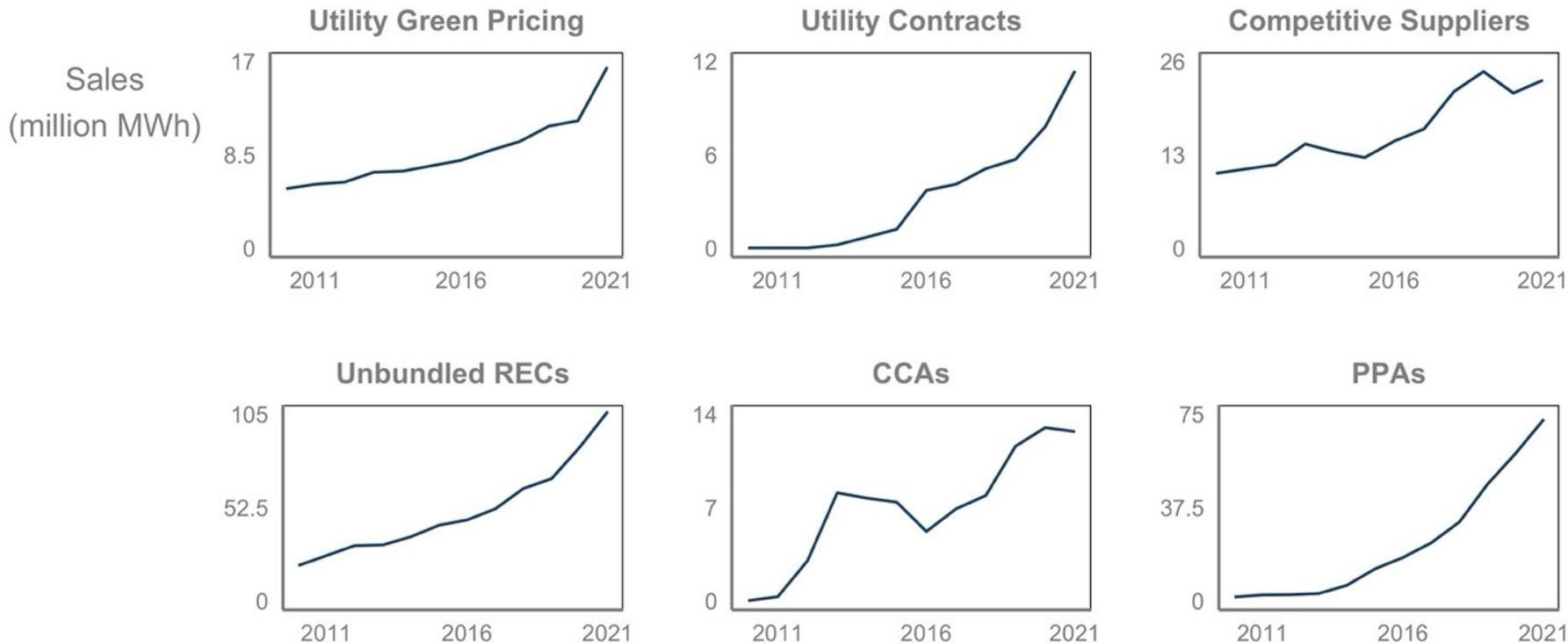
Total green power sales 2010-2021 (million MWh)

Green Power Sales and Customers by Mechanism

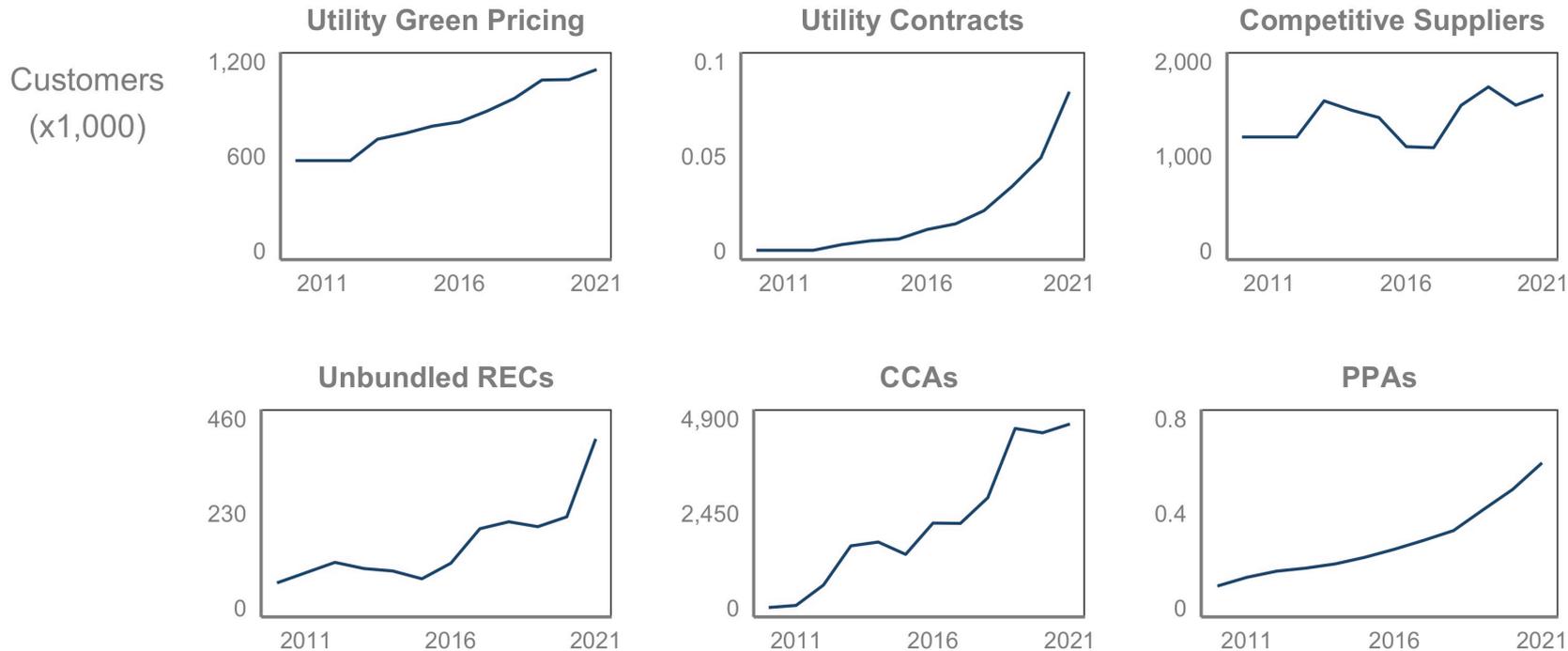
In 2021, the most voluntary sales were via unbundled RECs, while the most customers were via community choice aggregation (CCA) programs.



Voluntary Sales Continue to Increase



Voluntary Customers Grew in Most Market Segments



Top 10 Rankings Published

- NREL has [published](#) its annual “Top 10” rankings of utility green pricing programs

Green Power Sales Rate (as of December 2020)

Rank	Utility	Green Power Sales Rate
1	Portland General Electric (Green Future Choice)	21.39%
2	Silicon Valley Power	11.40%
3	PacifiCorp (Blue Sky Usage & Habitat)	7.50%
4	Portland General Electric (Green Future Enterprise)	7.49%
5	River Falls Municipal Utilities	6.55%
6	Waterloo Utilities	5.86%
7	Alameda Municipal Power	5.43%
8	Grand Marais Public Utility Commission	4.85%
9	Farmers Electric Cooperative	3.83%
10	Puget Sound Energy	3.38%

Green Power Sales (as of December 2020)

Rank	Utility	Green Power Sales (MWh)
1	Portland General Electric	2,593,869
2	PacifiCorp	1,519,326
3	Xcel Energy	950,674
4	Austin Energy	727,711
5	Puget Sound Energy	638,855
6	Silicon Valley Power	426,316
7	Dominion Energy Virginia	389,413
8	Tennessee Valley Authority (TVA)	335,524
9	AES Indiana	218,278
10	Consumers Energy	200,430

Green Power Participation Rate (as of December 2020)

Rank	Utility	Green Power Sales (MWh)
1	Portland General Electric	26%
2	Farmers Electric Cooperative	19.21%
3	River Falls Municipal Utilities	11.93%
4	Alameda Municipal Power	10.29%
5	PacifiCorp (Blue Sky Usage & Habitat)	9.13%
6	Silicon Valley Power	6.76%
7	Puget Sound Energy	6.12%
8	Muscoda Utilities	5.38%
9	Naperville Public Utilities - Electric	4.83%
10	Stoughton Utilities	4.57%

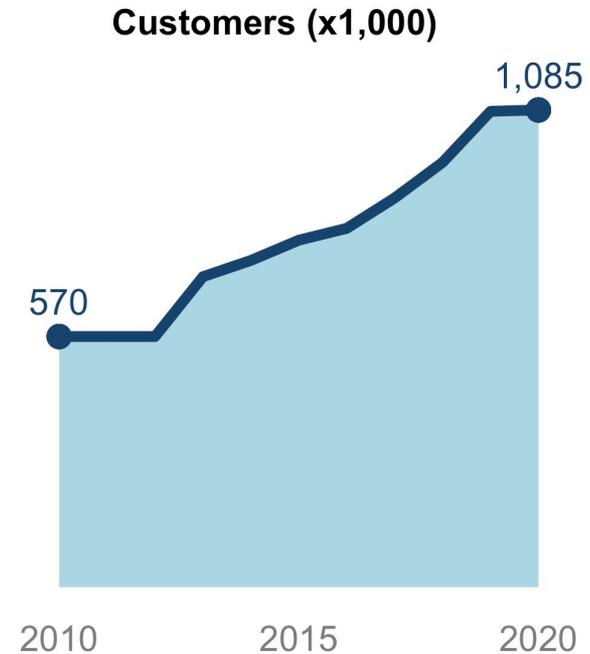
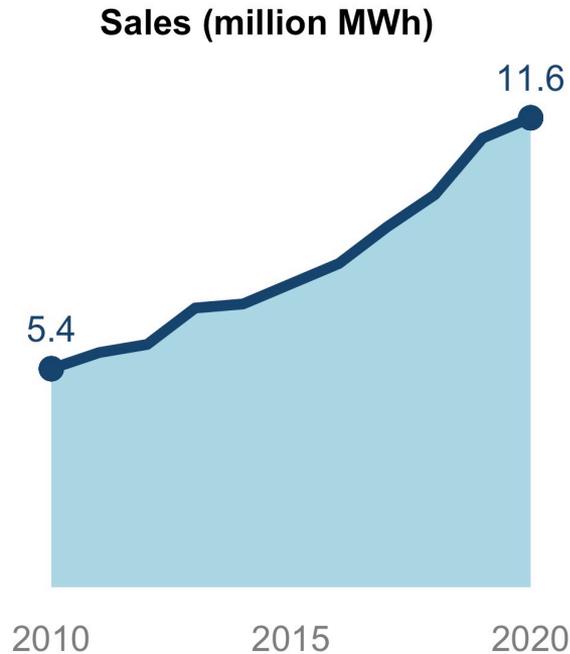
Green Power Customers (as of December 2020)

Rank	Utility	Green Power Customers
1	Portland General Electric	232,129
2	Xcel Energy	151,783
3	PacifiCorp	142,879
4	Puget Sound Energy	72,131
5	Dominion Energy Virginia	36,655
6	Austin Energy	24,835
7	DTE Energy	23,647
8	Consumers Energy	18,476
9	National Grid	14,511
10	We Energies	12,455

Voluntary Market Trends by Market Segment

Utility Green Pricing Trends

About **1,085,000 customers** procured about **11.6 million MWh** of voluntary green power through utility green pricing programs in 2020. The relatively slow growth in 2020 may reflect program marketing challenges related to the Covid-19 pandemic.



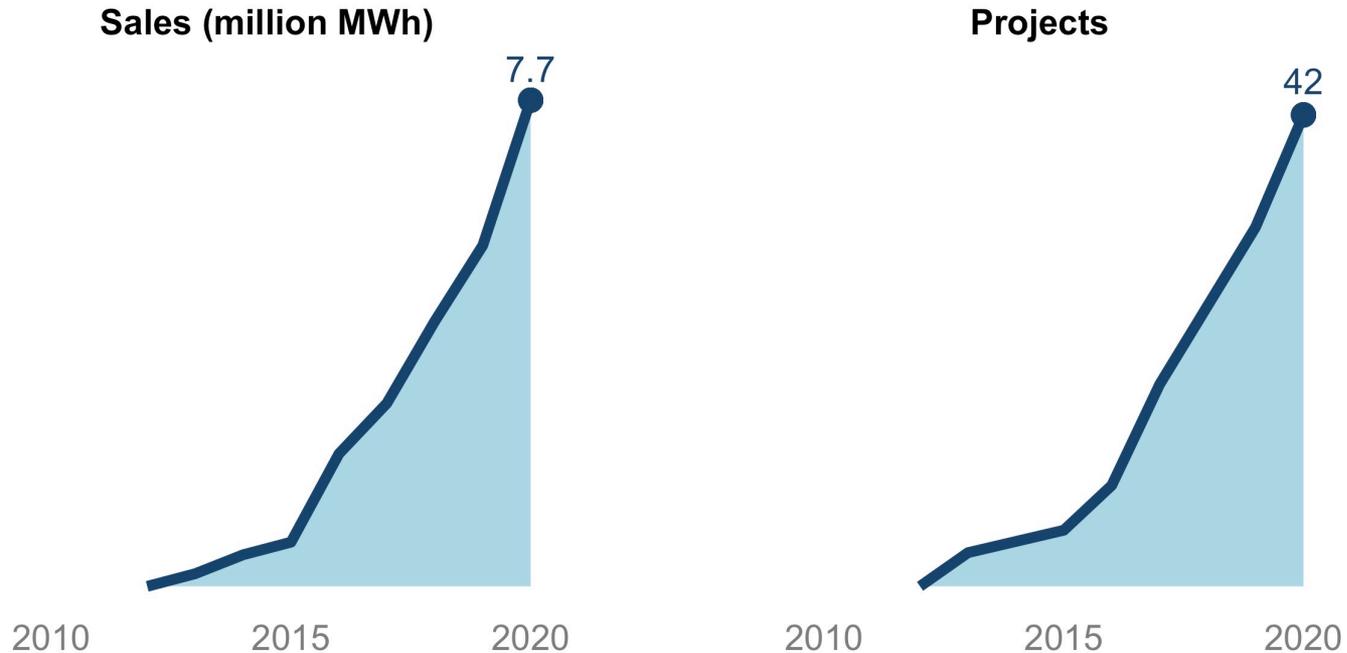
Utility Green Pricing Programs Challenged by COVID

Impacts on Marketing Strategies

- We asked utility survey participants about the impacts of the pandemics on their programs
- Most programs that responded reported slight reductions in sales and participation from expected levels, typically around a 5% decrease.
- Survey participants attributed reduced participation to the reduced ability of utilities to actively market their programs, particularly through in-person marketing (e.g., door-to-door, in-person events).
 - Some utilities noted that other extreme events such as wildfires have caused similar disruptions to program marketing in recent years
- At the same time, some utilities reported increased interest from proactive customers, perhaps because more time at home led to more interest in residential green power.

Utility Renewable Contract Trends

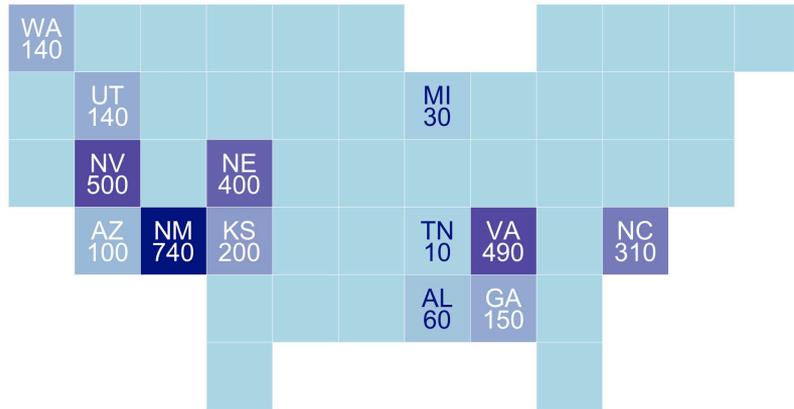
About **7.7 million MWh** of renewable energy was procured through **42 utility renewable contracts** through utility green pricing programs in 2020.



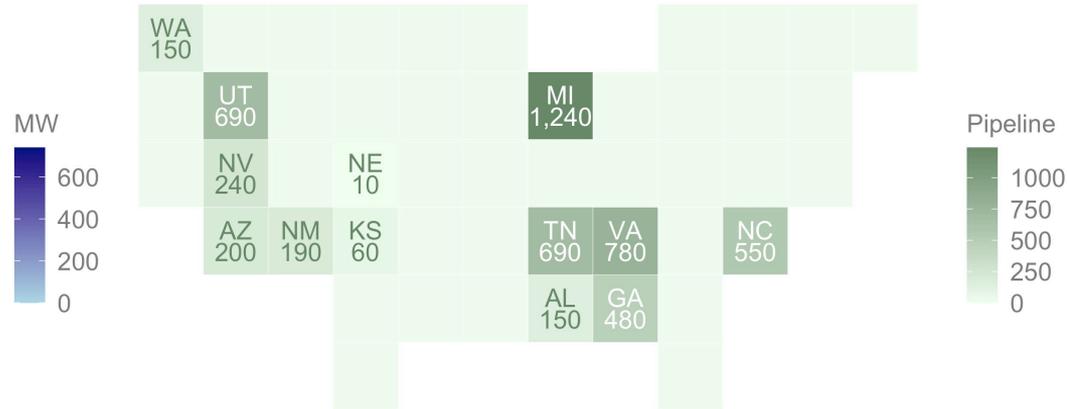
Large Pipelines of Utility Contracts Exist Across the Country

There is about twice as much capacity in the utility contract pipeline as currently operational capacity. Utility renewable contracts are poised for significant growth, especially in Michigan, Virginia, Tennessee, and Utah.

Operating Capacity

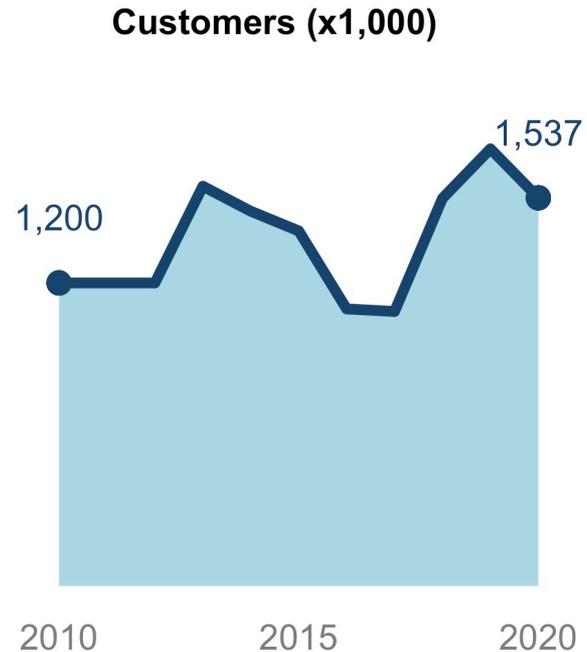
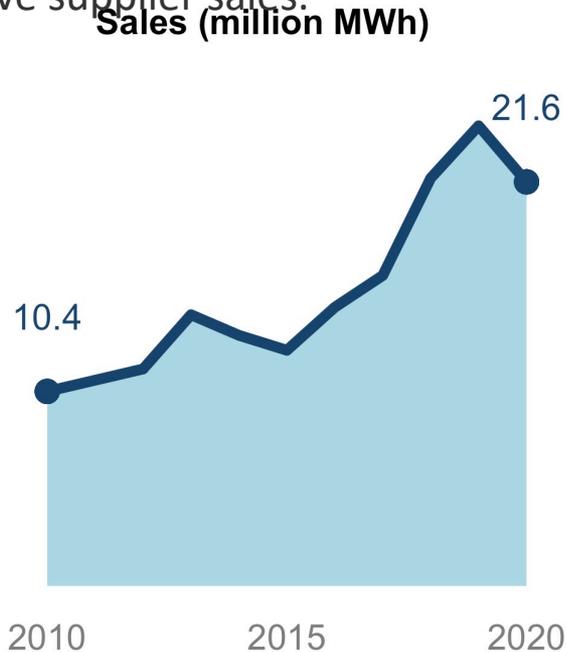


Pipeline Capacity



Competitive Supplier Trends

About **1.5 million customers** procured about **21.6 million MWh** of voluntary green power through competitive suppliers in 2020. The year-over-year fall in sales likely reflects two trends: 1) a drop in electricity sales overall in 2020 due to the Covid-19 pandemic; and 2) ongoing increases in RPS requirements that reduced the green power portion of competitive supplier sales.

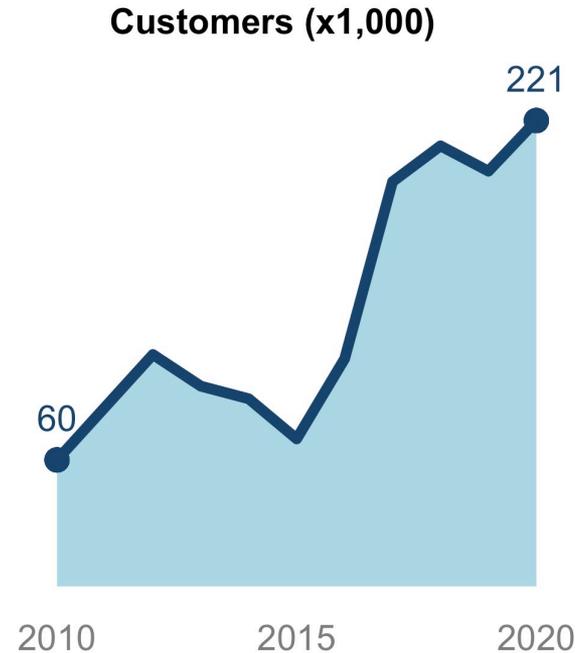
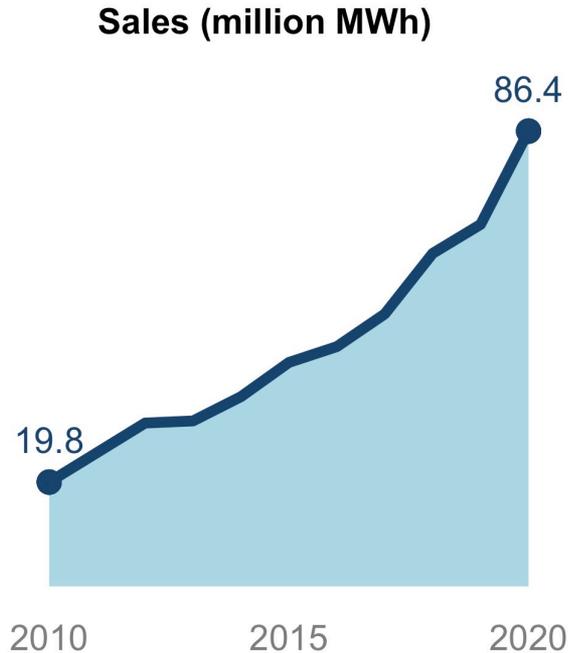


Competitive Suppliers are Providing New Options

- Some suppliers have begun to offer **long-term green power contracts** similar to utility green tariffs. The supplier procures green power from a specific resource (e.g., through a PPA) on behalf of their customers, minimizing expenses and time that the customer would need to spend to make their own power purchase.
 - For instance, NRG has created the Renewable Select program, a retail contract that makes it easier for business customers to obtain off-site green power from specific resources. Currently, the program includes 36 large commercial and industrial customers, providing renewable electricity to more than 345 offices, financial centers, and ATMs in Texas. It has an output of 3 TWh annually, and a collective 600 MW peak load. NRG plans to expand this program in the future to include smaller customers as well.
- Competitive suppliers have also begun to offer **community solar with RECs retired on behalf of subscribers**.
 - For instance, MP2 Energy has a community solar program partnership with Local Sun, a 1.5 MW solar project, which will power 300 homes and eliminate the need for long-term contracts. If customers need more power than can be supplied by the array, MP2 buys 100% renewable energy from other Texas sustainability projects.

Unbundled RECs

About **221,000 customers** procured about **86.4 million MWh** of voluntary green power through unbundled RECs in 2020.

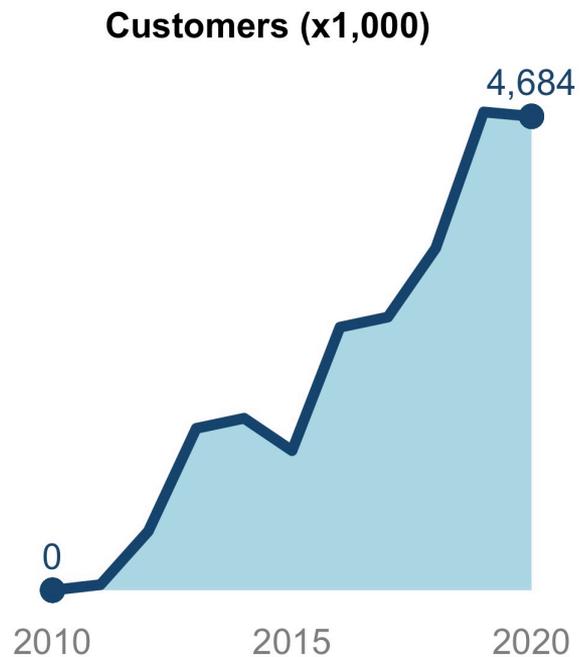
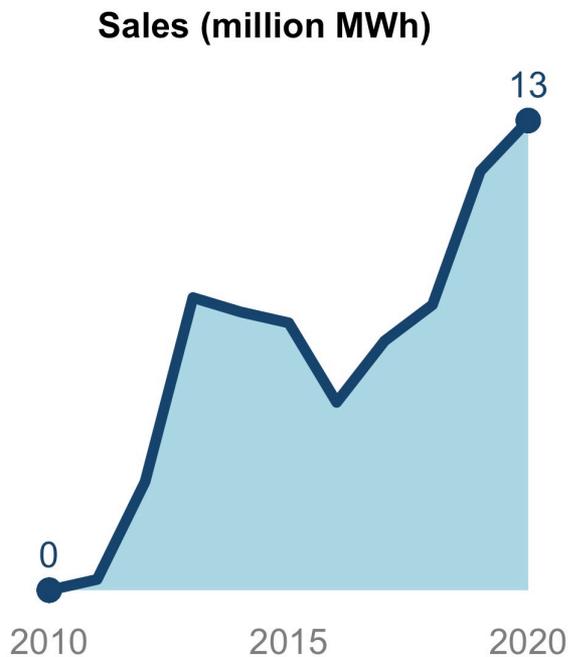


Unbundled REC Prices Continue to Climb

- From December 2020 to August 2021, REC prices (nationally sourced, Green-e Eligible) increased from \$1.50/MWh to \$6.60/MWh.
 - Previously, these RECs were <\$1/MWh since ~2015
- Market players have many questions about what is causing the increase in price and how purchasers might respond
 - Is the increase due to market tightening? ERCOT factors? Other issues?
 - Will purchasers look for other options? Will they purchase smaller quantities of unbundled RECs?

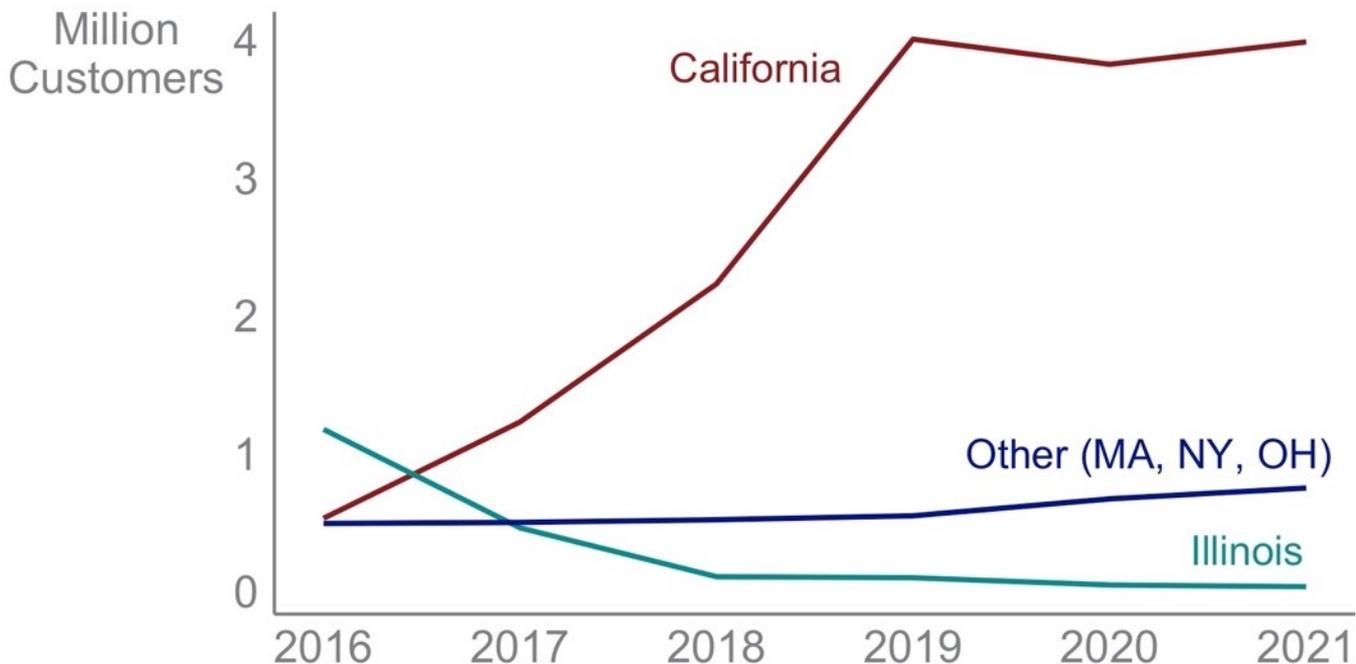
CCA Trends

About **4.7 million customers** procured about **13 million MWh** of voluntary green power through CCAs in 2020.



CCA Trends

About **4.8 million customers** procured about **12.8 million MWh** of voluntary green power through CCAs in 2021; largely the same as in 2020.



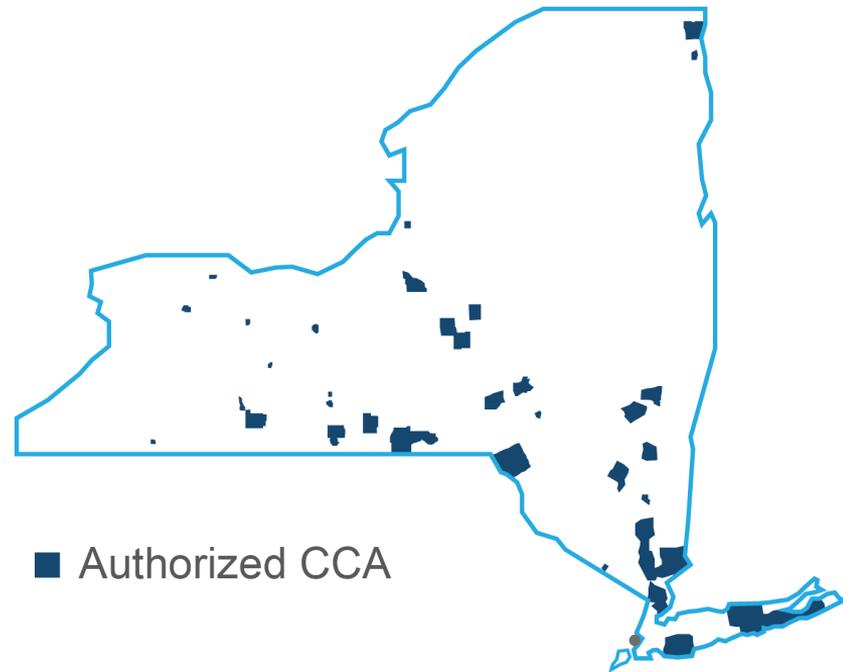
California Continues to Dominate CCA Green Power Sales and Customers

State	Green Power Sales (MWh)	Green Power Customers
California	9,632,000	3,888,000
Illinois*	336,000	45,000
Massachusetts	1,580,000	507,000
Ohio	693,000	111,000
New York	745,000	133,000
TOTAL	12,986,000	4,684,000

* Methodology for Illinois CCA estimation changed from 2019 to 2020, see data book for updated historical estimates for previous years.

CCAs in New York

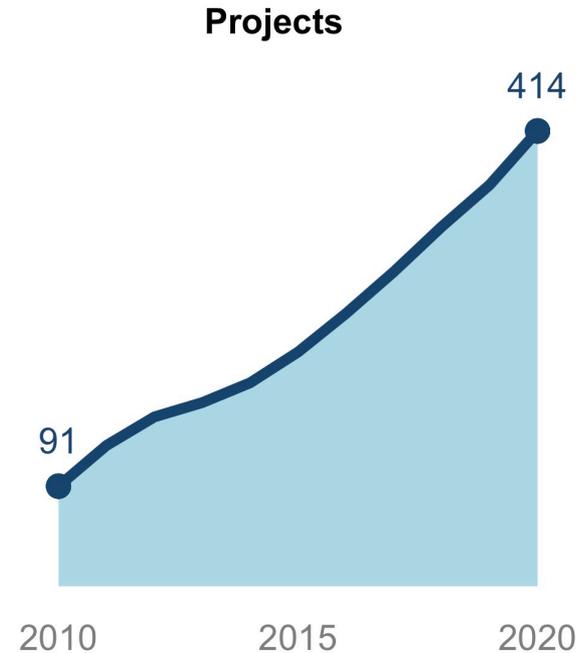
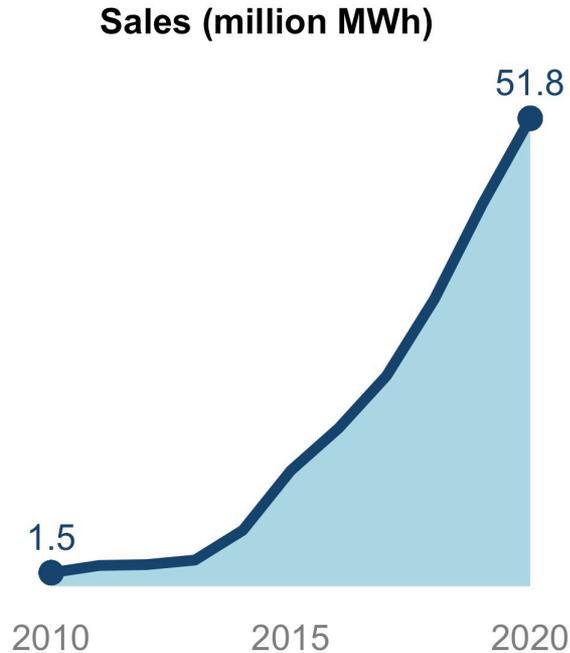
- In 2014, Westchester County formed New York's first CCA. Since then, three other aggregators have emerged forming CCAs throughout the state.
- Many New York communities have chosen to provide 100% renewable energy by default (opt out), and all aggregators offer opt-in green power products.
- New York CCAs are also innovating. Several CCAs offer their own community solar programs, and one aggregator (Joule Assets) offers a unique opt-out community solar product to eligible CCA customers.



Map modified from New York Department of Public Service “Community Choice Aggregations” map, accessed 8/23/2021.

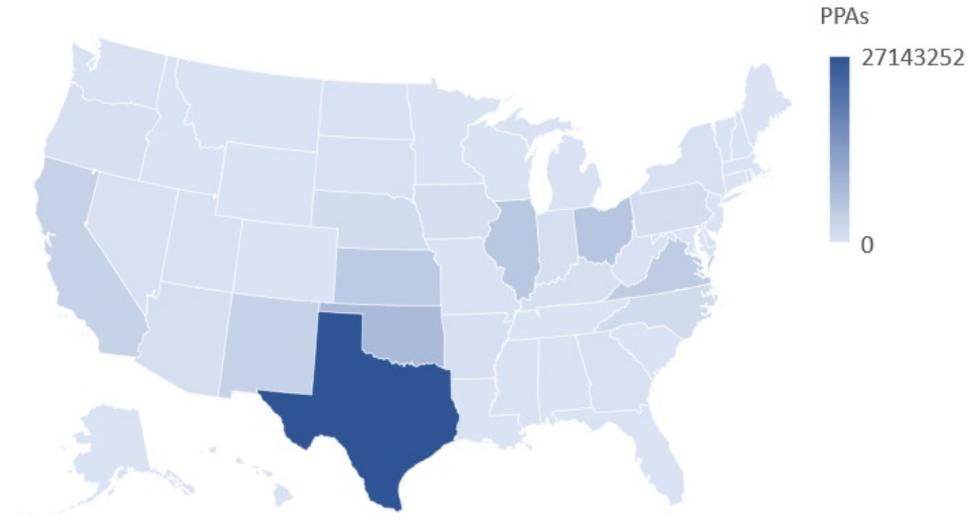
PPA Trends

About **414 oftakers** procured about **51.8 million MWh** of voluntary green power through PPAs in 2020. These figures include only PPA sales where we estimate that the purchaser has retained the RECs.



PPA Trends

- More than **600 offtakers** procured about **73.0 million MWh** of voluntary green power through PPAs in 2021.
- These figures include only PPA sales where we estimate that the purchaser has retained the RECs.
- Sales grew by around 23% from 2020 to 2021.
- Texas continues to dominate PPA supply, serving



2021 Summary Trends

- Market sales grew 22% and customers grew by 8% in 2021
- Unbundled REC purchasing represents 44% of market sales and continues to grow, despite higher prices than in previous years
- Community choice aggregation (CCA), which greatly expanded residential customer access, has flatlined in California, the leading CCA market
- Utility renewable contract (“green tariffs”) supply is similar in scale to green pricing, but far behind the power purchase agreement supply.

Other 2021 Trends

- **Purchasing:** Executive Order for federal purchasing: 100% carbon pollution-free electricity by 2030; 50% of that on a 24/7 basis
- **Disclosure:** SEC proposed climate-related disclosure requirements for public companies
- **Impact:** Increasing interest in purchasing with *social* impacts
- **New Focus Areas:** Renewable fuels (renewable natural gas, green hydrogen), international procurement, supply chain products

Additional NREL Resources

Find additional resources at the NREL Voluntary Green Power Procurement landing page:

www.nrel.gov/analysis/green-power.html

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