

# Green Power Access Analysis in the United States

Evaluating the Nationwide Availability of Renewable  
Energy through Different Procurement Options

2018



# Table of Contents

- 01** Objectives of Analysis
- 02** Main Takeaways
- 03** Deep Dive on Procurement Options

- 04** Assumptions
- 05** Key Resources

## Objective

# Determine customer access to green power through various available Renewable Energy procurement options

### Questions answered:

- How many consumers in the U.S. have access to each green power supply option?
- What percentage of consumers have access to different green power options?
- Which customers have access to different green power options in each state?
- What percent of total utility electricity sales could be covered by each option?

# Key Takeaways

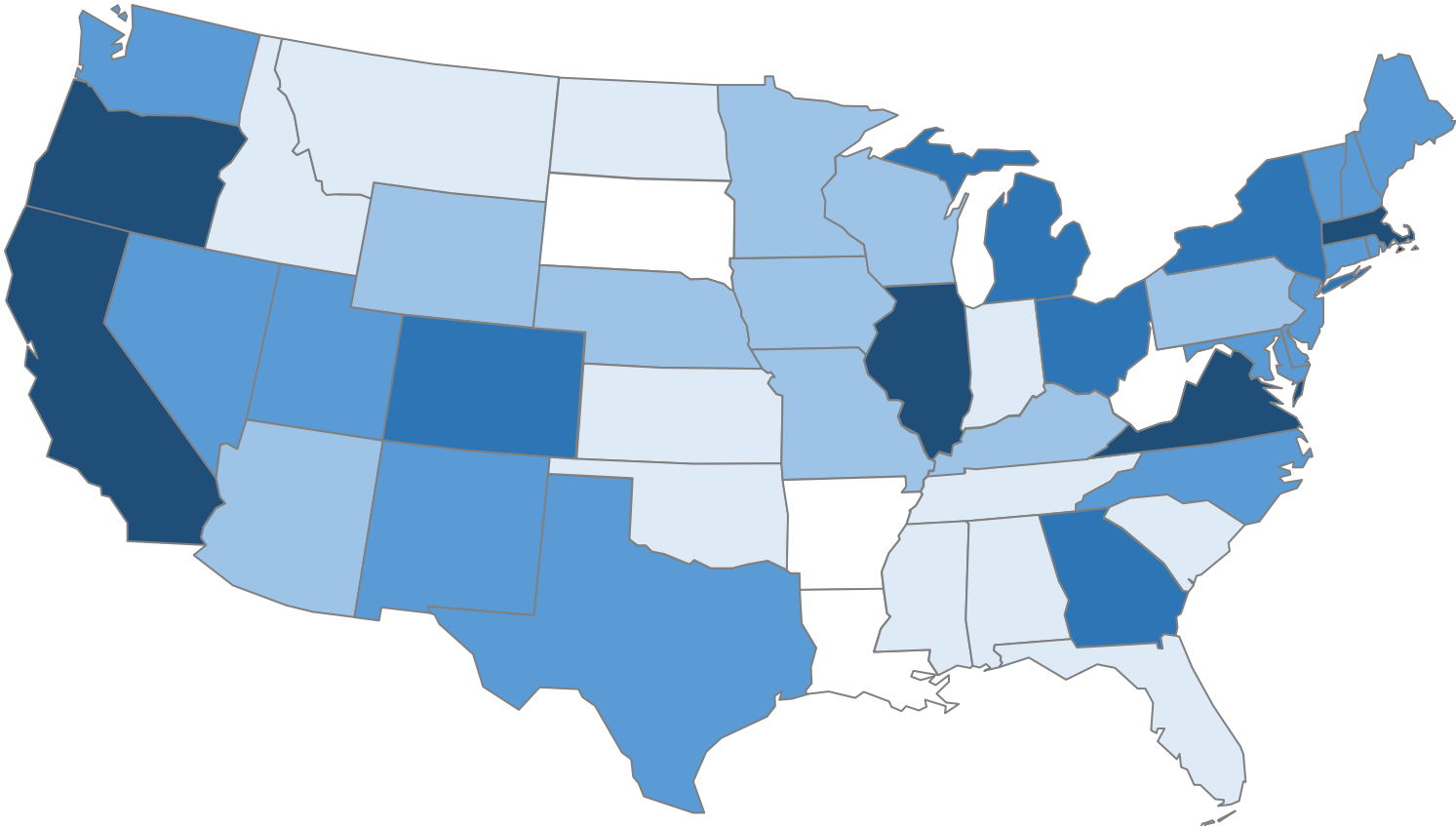
## Non-Residential

- **78%** of non-residential customers have access to green power (excluding retail RECs).
- 4 states – Arkansas, Louisiana, South Dakota and West Virginia, can access green power *only through* Financial PPAs or self-generation options.
- States with ~100% RE Access:
  - California, Vermont, and the District of Columbia

## Residential

- **84%** of residential customers have access to green power (excluding retail RECs).
- 4 states – Arkansas, Louisiana, South Dakota and West Virginia, have *no* access to renewable energy through policy-based mechanisms.
- States with ~100% RE Access:
  - Illinois, Maine, Maryland, New Hampshire, New Jersey, New York, Oregon, Rhode Island, Tennessee, Texas, Vermont, Washington and District of Columbia

# Key Takeaway Number of Policy-based\* Green Power Access Options by State

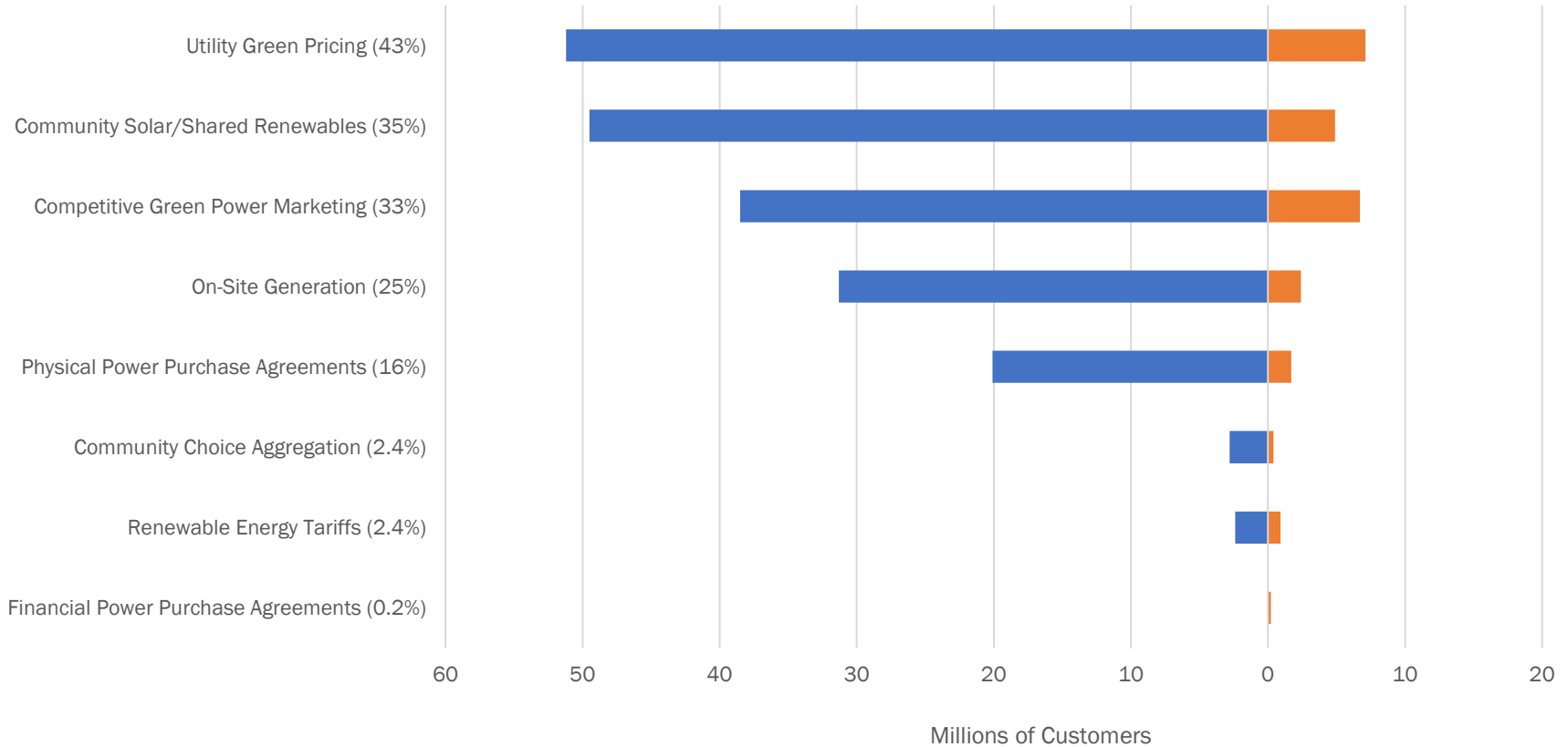


Number of applicable policy-based\* options

0	1	2	3	4	5
---	---	---	---	---	---

\* Financial PPAs, On-site generation, and Unbundled RECs are not included, as they are not considered to be policy-based options

# Key Takeaway Green Power Access By Potential Customers

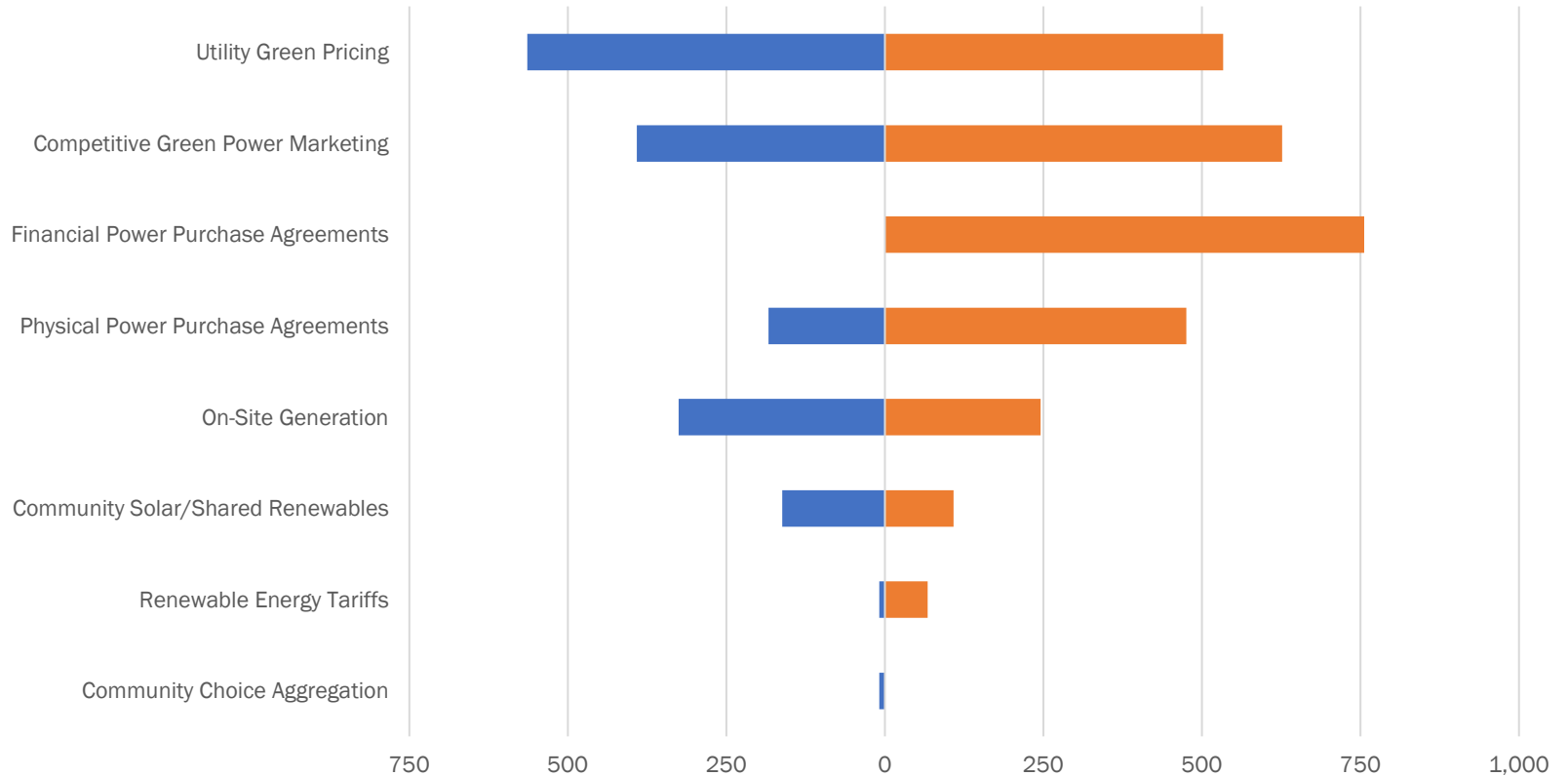


Total residential consumption: 1,300 terawatt-hours (TWh)

Total non-residential consumption: 1,860 TWh

■ Residential ■ Non-Residential

# Key Takeaway Green Power Access By Potential Consumption



Total residential customers: 120 million

Total non-residential customers: 17 million

Electricity Consumption (TWh)

■ Residential

■ Non-Residential

# Key Takeaway Summary of Renewable Energy Access by Procurement Option

In this table, access to renewable energy is combined for residential and non-residential customers.

Procurement Option	Number of States with RE Access	Total RE Access by Supply Option		Total RE Access Compared to Total U.S. Electricity Consumption	
		Customers (in millions)	Electricity Sales (TWh)	Percent of Total U.S. Electricity Customers	Percent of Total U.S. Electricity Sales
Renewable Energy Tariffs	16	3.2	76	2.4%	2.4%
Utility Green Pricing Programs	37	58.3	1,097	43.0%	35.0%
Green Power Marketing Products	19	45.2	1,017	33.0%	32.2%
Physical Power Purchase Agreements	27	21.8	659	15.9%	20.9%
Financial Power Purchase Agreements	50	0.21	756	0.2%	23.9%
Community Solar/Shared Renewables	17	54.3	270	40.0%	8.6%
Community Choice Aggregation	7	3.3	9	2.4%	0.3%
On-Site Generation	48*	33.7	570	24.7%	18.1%

\* On-site generation excludes Hawaii and Alaska (data available for continental U.S. only)



## Key Takeaway

# Retail RECs as the only Green Power Access Option

Retail RECs are available in all states, and they are the only green power option for around **20%** of U.S. customers.

- For non-residential customers, retail RECs are the only green power option for:
  - Estimated 22% of U.S. non-residential customers (3.7 million organizations)
  - Estimated 15% of total U.S. non-residential electricity sales (277 TWh of potential)
- For residential customers, retail RECs are the only green power option for:
  - Estimated 16% of total U.S. residential customers (19.2 million customers)
  - Estimated 22% of total U.S. residential electricity sales (286 TWh of potential)

---

“Increased access to available supply options could lead to higher green power market participation, as consumers will be more likely to find options that fit their needs.”

---

# Deep Dive

Procurement Options

# Renewable Energy Tariffs

**Definition:**

Renewable energy tariffs are utility offerings for individual customers to enter into a long-term contract to purchase green power from a renewable generator. Also called “green riders” or “sleeved contracts”.

# Deep Dive Renewable Energy Tariffs

Currently limited to 16 utility offerings, primarily targeting large commercial and industrial customers.

Estimated 2.4% of total U.S. customers (3.2 million)

Estimated 2.4% of total U.S. electricity sales (76 TWh)

Provide an accessible option for large customers in traditional, regulated markets to procure green power.

Current program caps can place severe limits on total permitted RECs.

# Deep Dive Renewable Energy Tariff Access by State

State	Utility	Limitations	Access to Renewable Tariffs		Percent of Total State Sales (MWh)
			Customers	Electricity Sales (MWh)	
Colorado	Xcel Energy (Public Service Co. of Colorado)	Program cap: 50 MW, all customers eligible (including residential)	1,441,980	87,886	0.2%
Georgia	Georgia Power	Program cap: 200 MW, >3 MW peak demand per customer	470	330,595	0.2%
Kentucky	Kentucky Power	>1 MW peak demand per customer	30	2,358,459	3.2%
Michigan	Consumers Energy Company	>1 MW peak demand per customer	705	13,823,333	14.7%
Minnesota	Xcel Energy (Northern States Power - MN)	Program cap: 75 MW, all customers eligible (including residential)	1,269,407	8,729,308	13.4%
Missouri	Ameren Missouri (Union Electric Co. - MO)	Program cap: 400 MW, >2.5 MW peak demand per customer	162	627,673	0.8%
Nebraska	Omaha Public Power District (OPPD)	High Voltage transmission customers, >20 MW peak demand	5	651,995	2.2%
Nevada	NV Energy (Nevada Power + Sierra Pacific Power Co.)	Program cap: 250,000 MWh, >3,500 or 10,000 kWh monthly (regional)	153,677	250,000	0.8%
New Mexico	Public Service Company of New Mexico (PNM)	New customers only, >10 MW demand (currently only Facebook)	unknown	0	0.0%
North Carolina	Duke Energy (Duke Energy Carolinas + Duke Energy Progress)	Program cap: 600 MW, >1 MW demand per customer	1,506	928,941	0.7%
Oregon	Portland General Electric (PGE)	Program cap: 300 MW, >30 kW demand per customer	2,009	464,470	1.0%
Utah	Rocky Mountain Power (PacifiCorp)	Two programs: 1) >2 MW customers with 300 MW cap, 2) >5 MW customers with no cap	61	6,803,684	23.0%
Virginia	Dominion Energy (Virginia Power and Electric Company)	Multiple programs: 1) >5 MW customers with 200 MW cap, 2) 1-5 MW customers, no cap, 3) smaller C&I customers with limited enrollment	256,414	40,668,414	36.5%
Washington	Puget Sound Energy	Program cap: 75 MW, > 10,000 MWh per customer	116	105,120	0.1%
Wisconsin	Madison Gas & Electric (MGE)	Program cap: 25 MW for existing customers	20,343	36,087	0.1%
Wyoming	Black Hills Energy	New customers with >13 MW demand (currently only Microsoft)	2	277,207	1.7%

# Utility Green Pricing Program

**Definition:**

Utility green pricing programs are off-the-shelf products that allow customers to procure RE from their utility. Often these products are offered as blocks of kWh or as a percentage of monthly consumption at a premium.

# Deep Dive **Utility Green Pricing Programs**

Currently offered by more than 450 utilities across 37 states, primarily targeting residential and commercial customers.

Estimated 43% of total U.S. customers (58.3 million)

Estimated 35% of total U.S. electricity sales (1,097 TWh)

Provide an option for residential and commercial customers, from their local electricity service provider.

Primarily offered in states with regulated, vertically integrated utilities, but some programs are offered by smaller utilities in deregulated states.





# Competitive Green Marketing Products

**Definition:**

Competitive green marketing products provide customers the option to procure RE from a competitive retail electricity supplier, who is not their default utility supplier. These products are available in states with restructured or competitive electric markets.

# Deep Dive **Competitive Green Marketing Products**

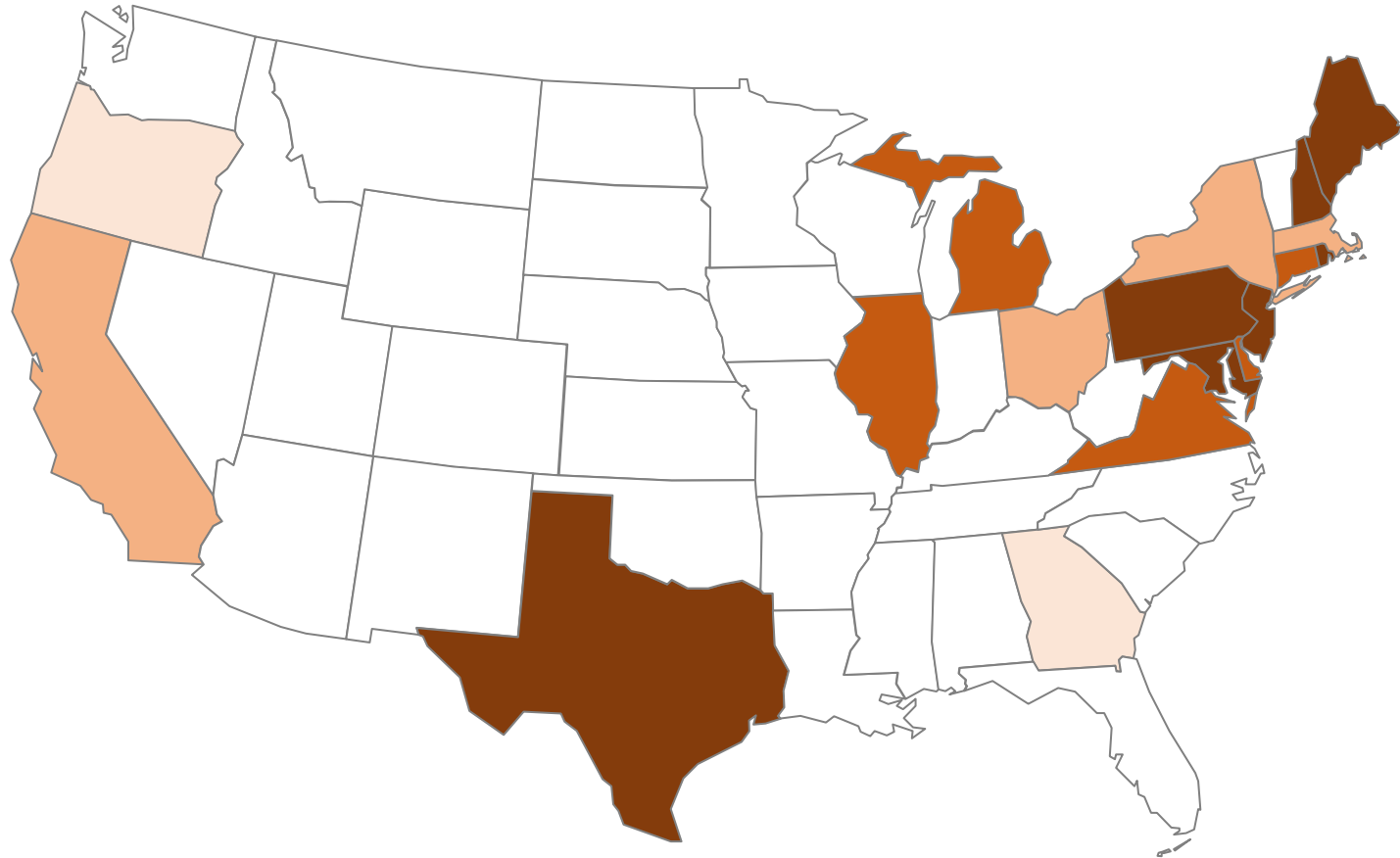
Currently an option in 19 states.

Estimated 33% of total U.S. customers (45.2 million)

Estimated 32.2% of total U.S electricity sales (1,017 TWh)

Provide an accessible option for all customer segments to procure electricity from alternate electricity service provider.

## Deep Dive **Competitive Green Marketing Products Access by State**



Percent of State  
Electric Sales

0%

1-50%

51-70%

71-90%

>90%

**section 03**

# Physical Power Purchase Agreements

**Definition:**

Physical power purchase agreements (PPAs) for green power are contracts for the consumption of power and associated RECs from a specific renewable energy generator (the seller) to a purchaser of renewable electricity (the buyer). The project may be located on-site or off-site.

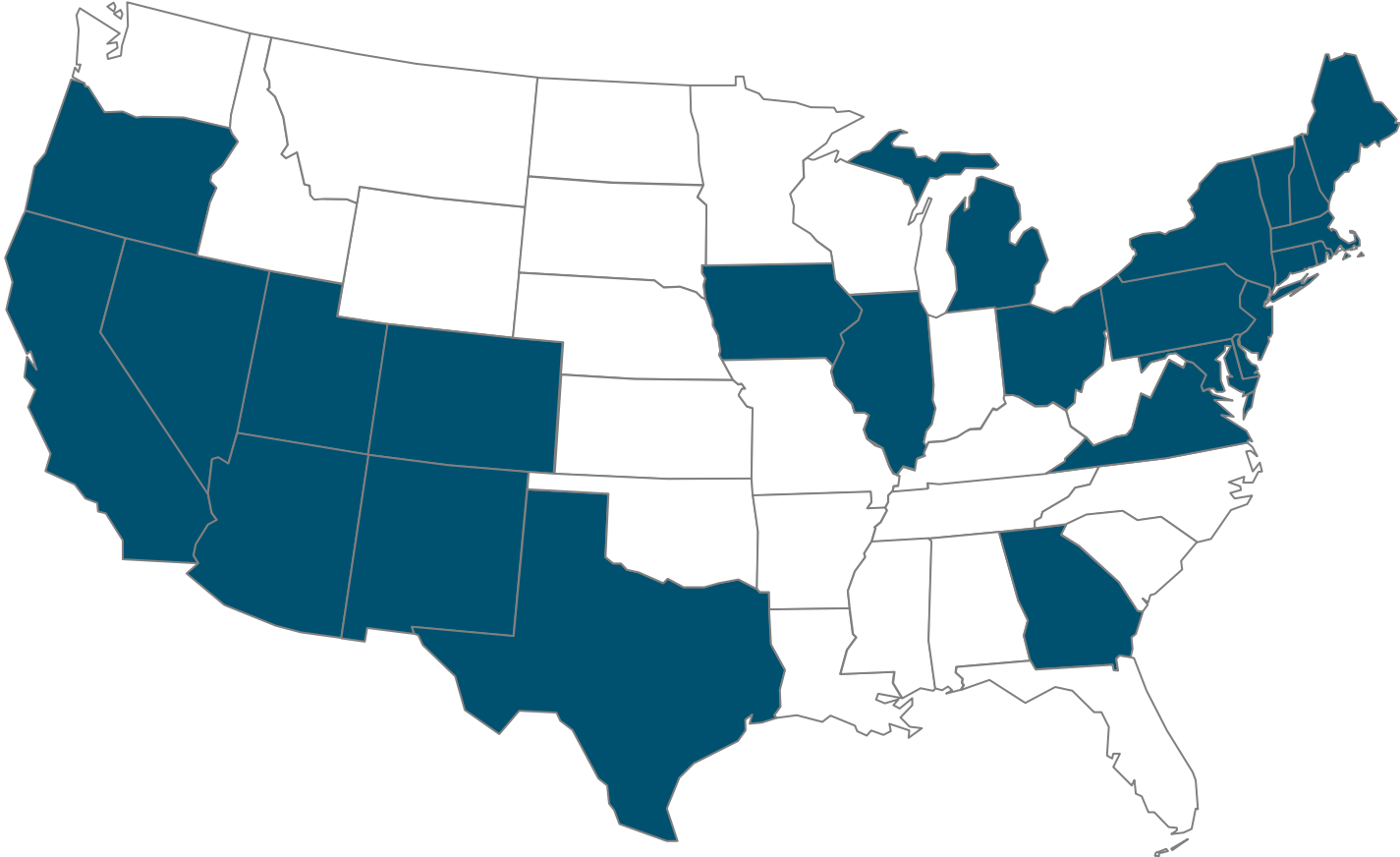
# Deep Dive **Physical Power Purchase Agreements**

An option in 27 states, mainly restructured states.

Estimated 15.9% of total U.S. customers (21.8 million)

Estimated 20.9% of total U.S. electricity sales (659 TWh)

# Deep Dive States Allowing Physical PPAs



■ State allows physical PPAs

# Financial Power Purchase Agreements

**Definition:**

Financial power purchase agreements (PPAs) for green power are financial contracts between a renewable energy generator (the seller) and a consumer of renewable electricity (the buyer), which allows for the ownership of RECs, without the electricity being directly delivered to the buyer.



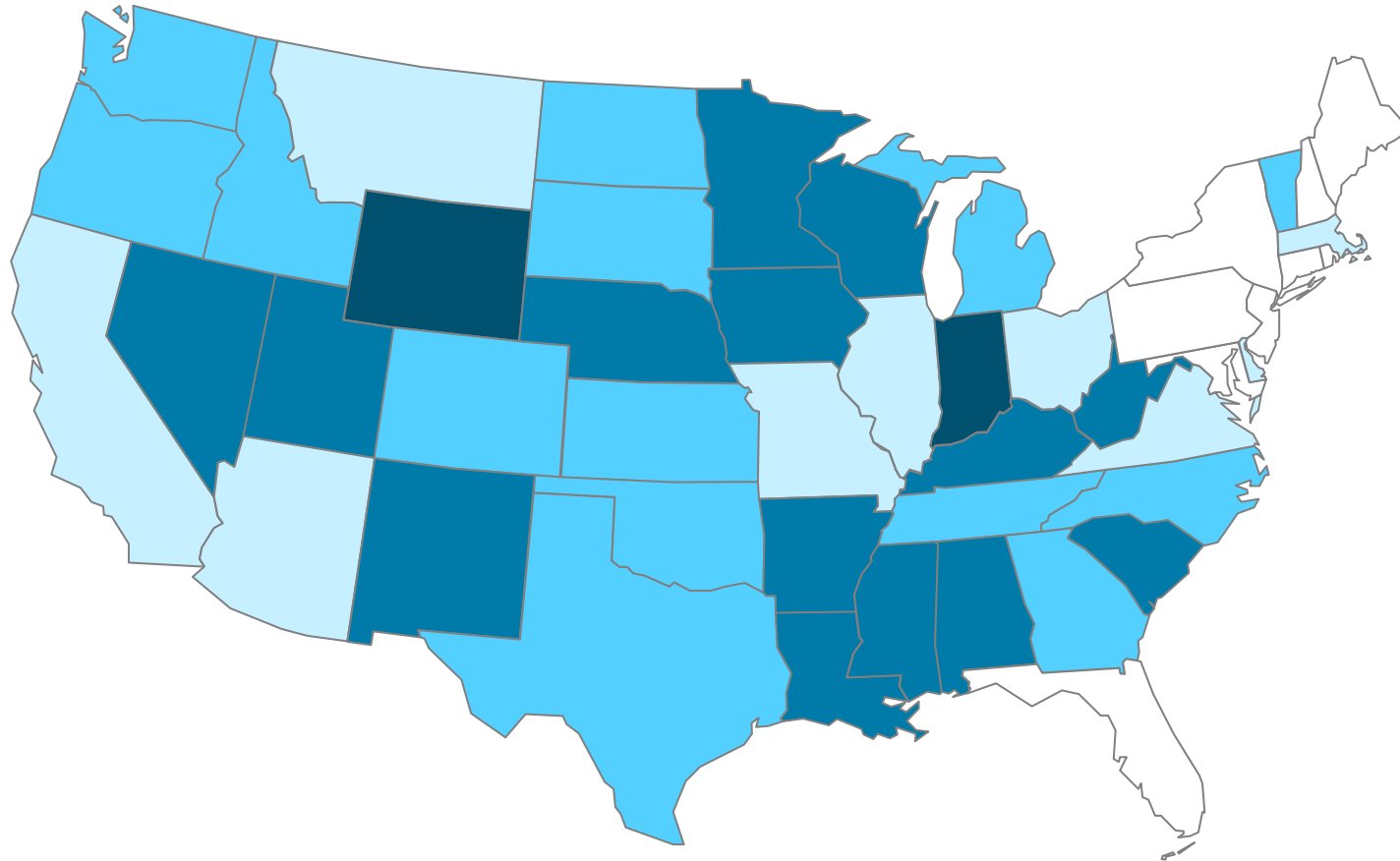
# Deep Dive **Financial Power Purchase Agreements**

Available in all states.

Estimated 0.2% of total U.S. customers (212,000)

Estimated 23.9% of total U.S. electricity sales (756 TWh)

# Deep Dive **Financial PPAs Access by State**



Percent of State  
Electric Sales



0-9%



10-19%



20-29%



30-39%



40-50%

**section 03**

# Community Solar

**Definition:**

Community solar/shared renewables are supply options that allows multiple customers to buy, lease, or subscribe to a portion of a shared renewable electricity project that is located away from their home or business. They can be local community-owned, utility-owned/facilitated, or third-party owned programs.

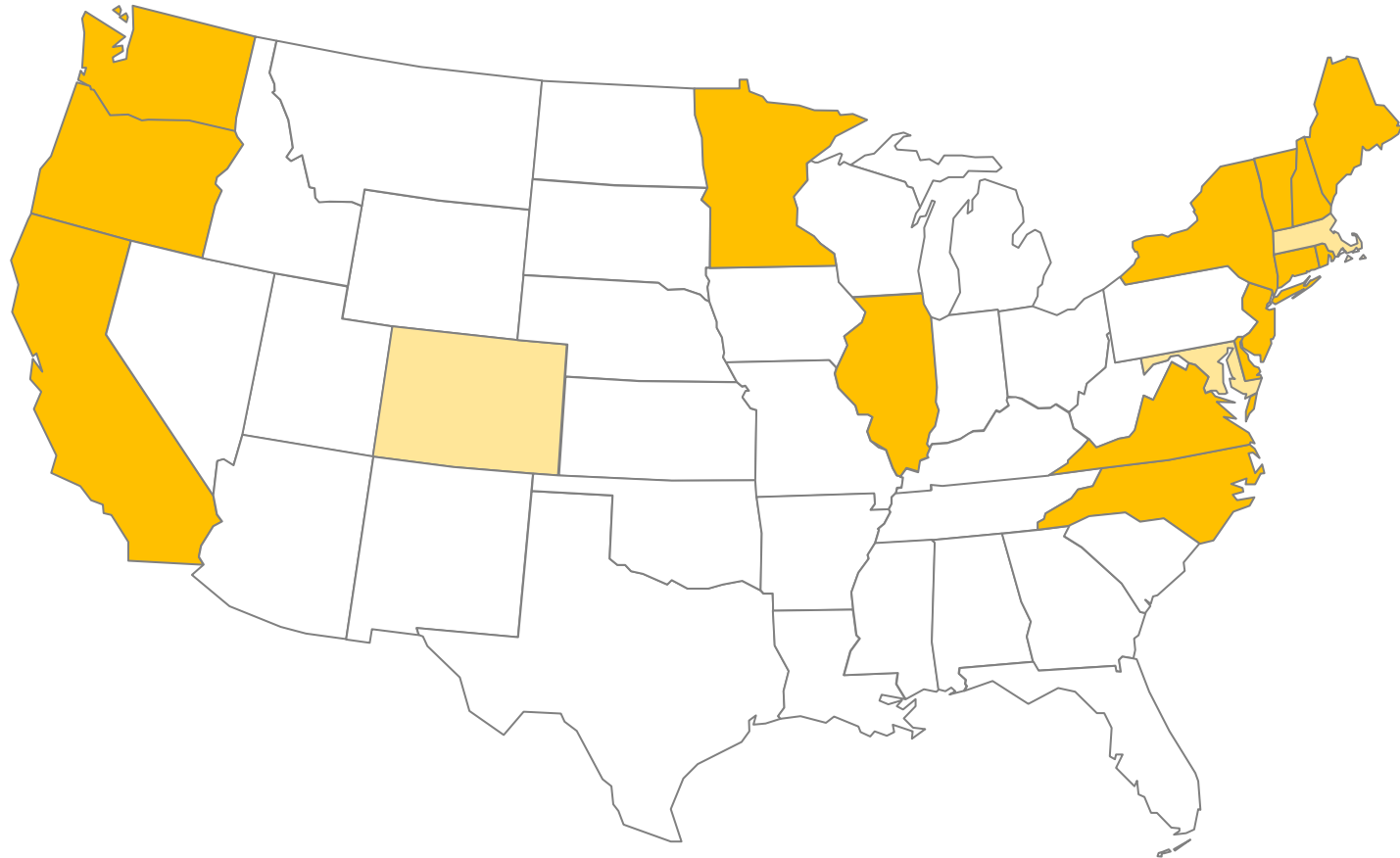
# Deep Dive **Community Solar**

An option in 17 states, with few states not allowing the customers to retain REC ownerships.

Estimated 40% of total U.S. customers (54 million)

Estimated 8.6% of total U.S electricity sales (270 TWh)

# Deep Dive **Community Solar State Policies**



REC Ownership Status



RECs can be owned by project sponsor/customer



RECs prohibited from being owned by project sponsor/customer

## section 03

# Community Choice Aggregation

**Definition:**

Community choice aggregation programs allow local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while still receiving transmission and distribution service from their existing utility provider.

# Deep Dive **Community Choice Aggregation**

An option in only 7 states, with only 5 states currently providing green power options through CCAs.

Estimated 2.4% of total U.S. customers (3.3 million)

Estimated 0.3% of total U.S. electricity sales (8.7 TWh)

# Deep Dive Community Choice Aggregation Access by State

State	Number of CCA Programs with Green Power Procurement	Limitations	CCA Green Power Sales and Participants		EIA Total Data	
			Customers	Electricity Sales (MWh)	Total State Sales (MWh)	Percent of State MWh
California	4+ programs	Program Type: Opt-out Local Referendum: Not Required CCA not offered in cities operating municipal utilities	528,000	2,574,000	222,847,103	1.2%
Illinois	62 programs	Program Type: Opt-out Local Referendum: Yes	1,909,997	4,972,000	47,343,523	10.5%
Massachusetts	17 programs	Program Type: Opt-out Local Referendum: Not Required	673,000	430,000	21,474,454	2.0%
New York	1 program	Program Type: Opt-out Local Referendum: Not Required Counties not allowed to form CCA but individual groups of cities and towns can form CCAs	106,473	248,500	67,501,089	0.4%
Ohio	2 programs	Program Type: Opt-out Local Referendum: Yes	119,000	513,000	47,601,140	1.1%



# On-Site Generation

**Definition:**

A generator on consumer premises that is either owned or leased by the consumer or the consumer purchases the output and the RECs.

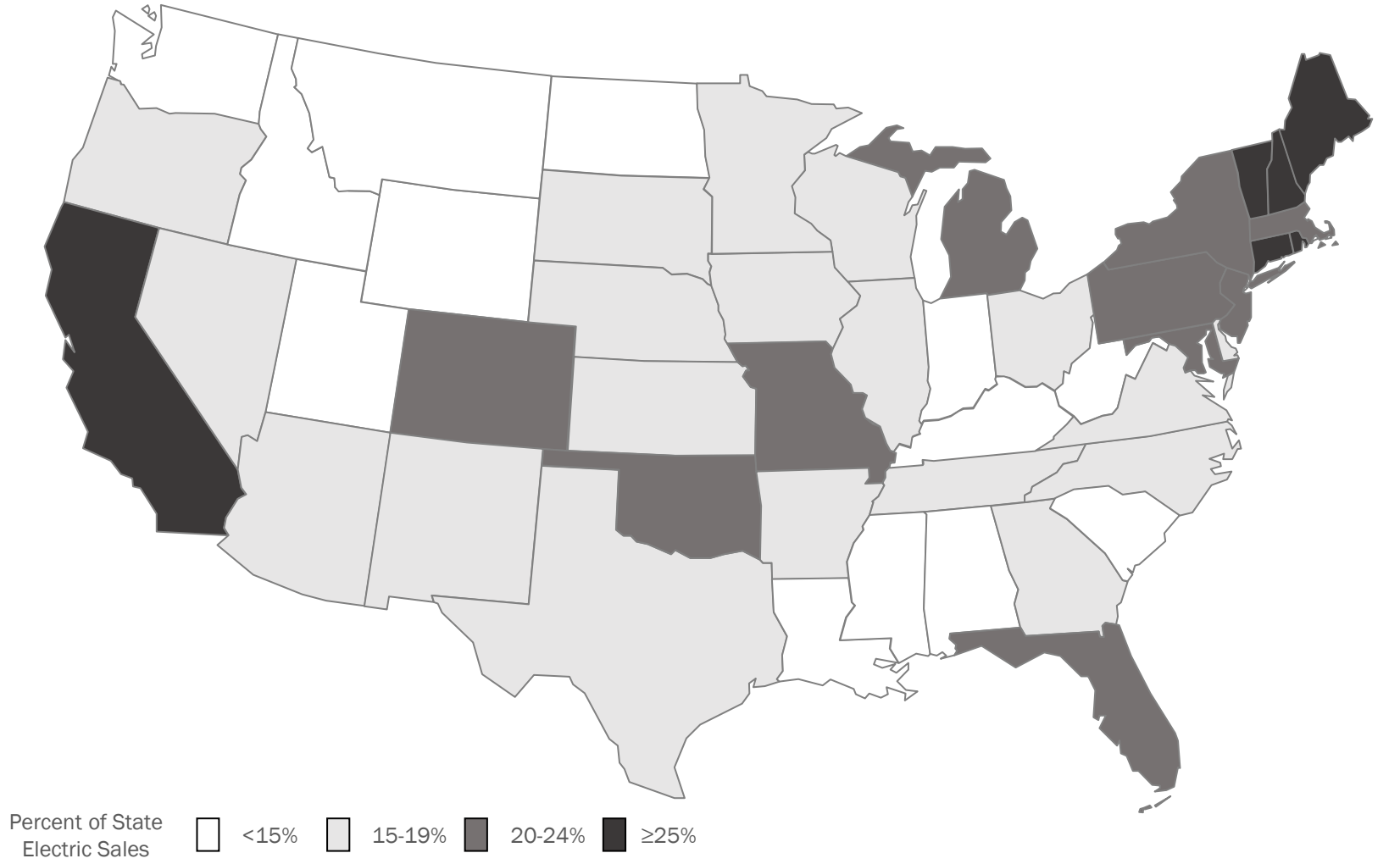
# Deep Dive **On-Site Generation**

An option available across all states.

Estimated 24.7% of total U.S. customers (33.7 million)

Estimated 18.1% of total U.S electricity sales (570 TWh)

# Deep Dive **On-Site Generation Access by State**



# Assumptions

- The analysis measures only potential access to green power.
  - Evaluated policies, mandates, and regulations that either permit or place limits on customer access
  - Report does not consider economic considerations, incentives, social factors, motivation, etc. that may influence the customer's decision to purchase
- The report aims to quantify current access to green power options, and does not provide any analysis or recommendations for policy or regulatory actions.
- Unbundled RECs are a procurement option available to all customers, without restrictions across the United States, thus have been omitted from this analysis.

# Key Resources

- **U.S. Energy Information Administration (EIA)**
  - Data of 2016 electricity sales and number of customers by utility segment, utility, and state
- **ICF Combined Heat and Power (CHP) Technical Potential Database**
  - Estimated site-by-site loads (annual kWh) for buildings throughout the U.S. that can support a CHP installation – data was used to identify customer loads that meet certain size requirements
- **National Renewable Energy Laboratory (NREL)**
  - Voluntary REC market, utility green pricing, community solar REC ownership, etc.
- **World Resource Institute (WRI)**
  - Renewable energy tariffs
- **Center for Resource Solutions (CRS)**
  - Green-e programs
- **Database of State Incentives for Renewables and Efficiency (DSIRE)**