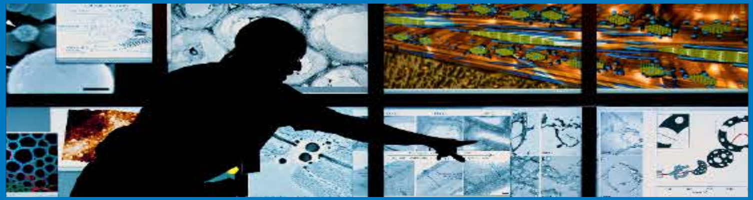
Status of the Voluntary Green Power Market

Eric O'Shaughnessy

January 27th, 2016

Outline

- Key Numbers
- Market Summary
- Utility Green Pricing
- Competitive Suppliers
- Unbundled RECs
- Community Solar
- Community Choice Aggregations
- PPAs
- Market Outlook

Key Numbers

74M

MWh sales

26%

of U.S. non-hydro RE sales

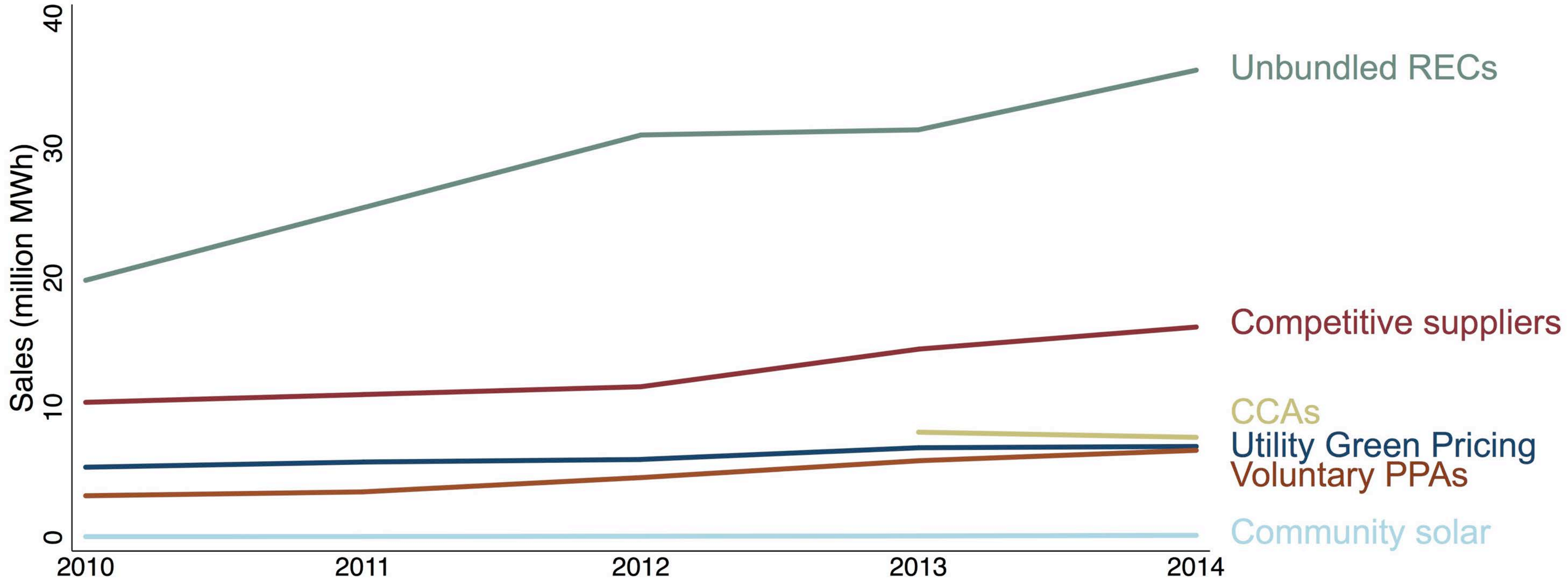
4.9M

customers

10%

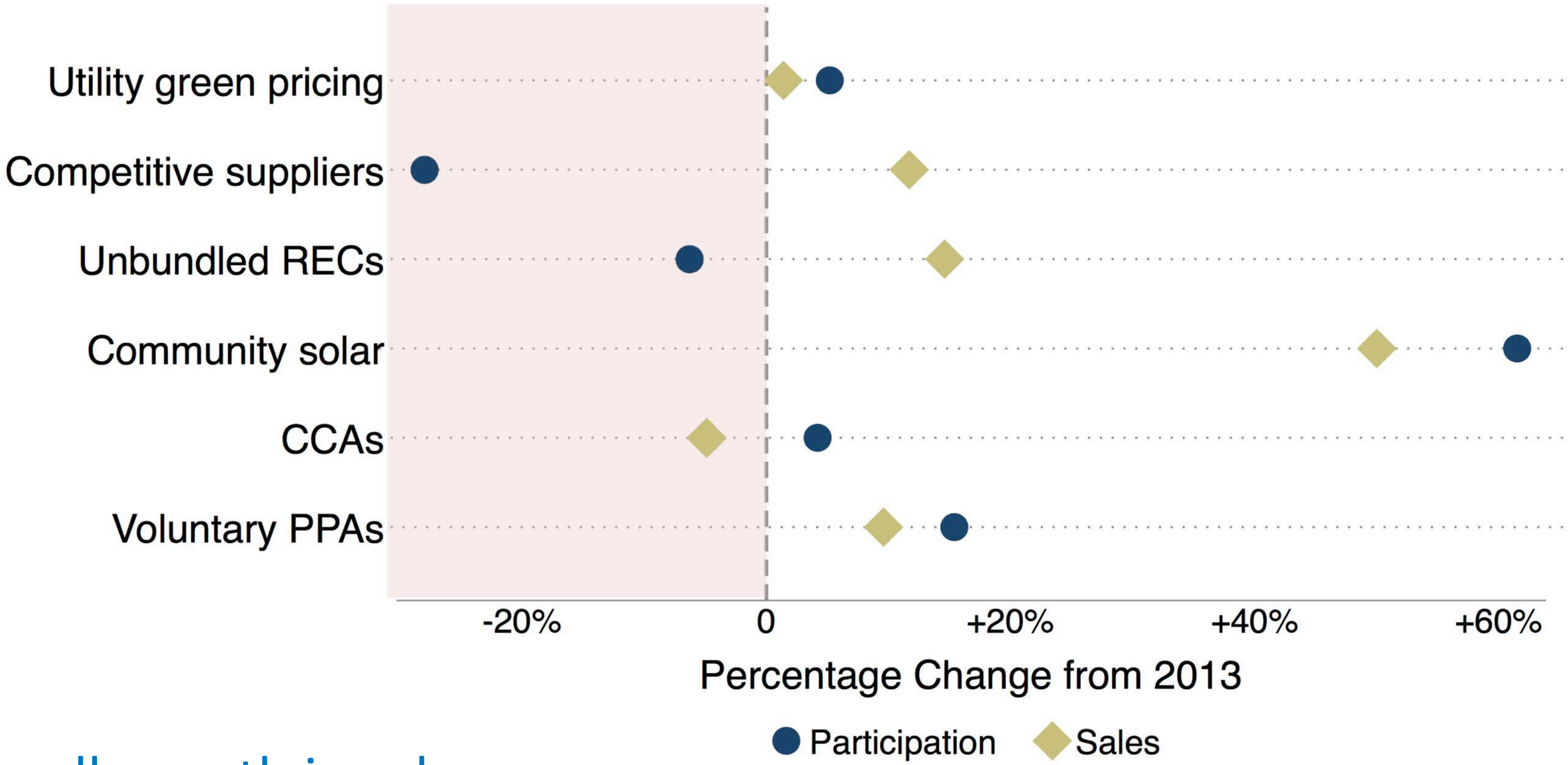
increase in sales from 2013 to 2014

Market Summary



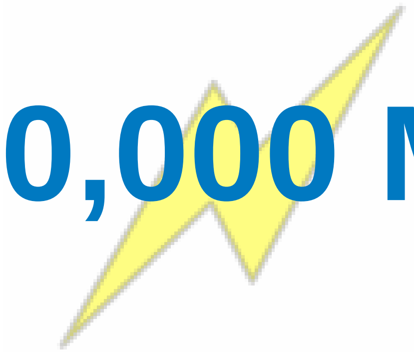
Continued sales growth, reaching 74 million MWh in 2014

Market Summary



- 10% overall growth in sales
- 9% drop in participation, driven by dynamics in the competitive supply market

Utility Green Pricing



7,040,000 MWh

1%

743,000 customers

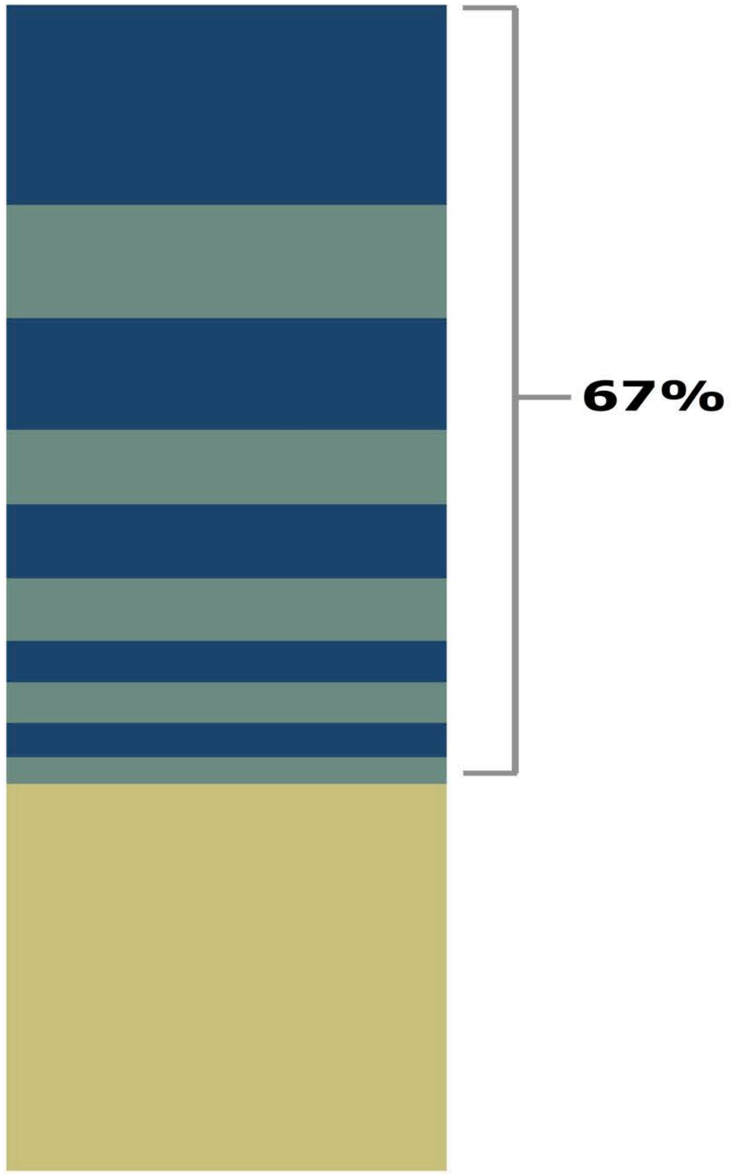
5%

40 states

No change

The top 10 utility green pricing programs, by sales, represented 67% of the green pricing market in 2014

Program	Sales (MWh)
1.Portland General Electric	1,171,978
2.Austin Energy	683,986
3.PacifiCorp	673,977
4.Puget Sound Energy	450,191
5. Sacramento Municipal Utility District	446,995
6. Xcel Energy	377,480
7. Eversource/United Illuminating	250,456
8. Dominion Virginia Power	244,853
9. Tennessee Valley Authority	206,522
10. CPS Energy	170,931
All other programs	2,336,981

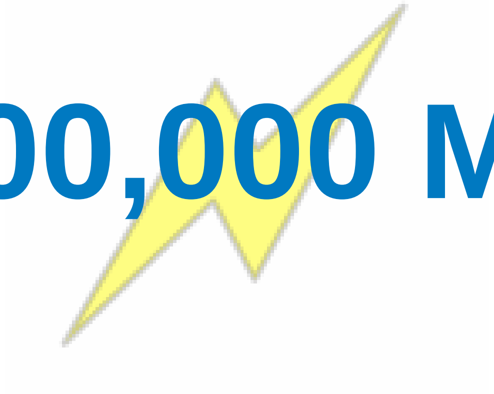


Green pricing sales growth is driven by a few large programs

About 60% of green pricing programs reduced sales in 2014

Seven of the 10 largest programs increased sales

Competitive Suppliers



16,200,000 MWh

12%

1,584,000 customers

28%

15 states

No change

Unbundled RECs

36,047,000 MWh

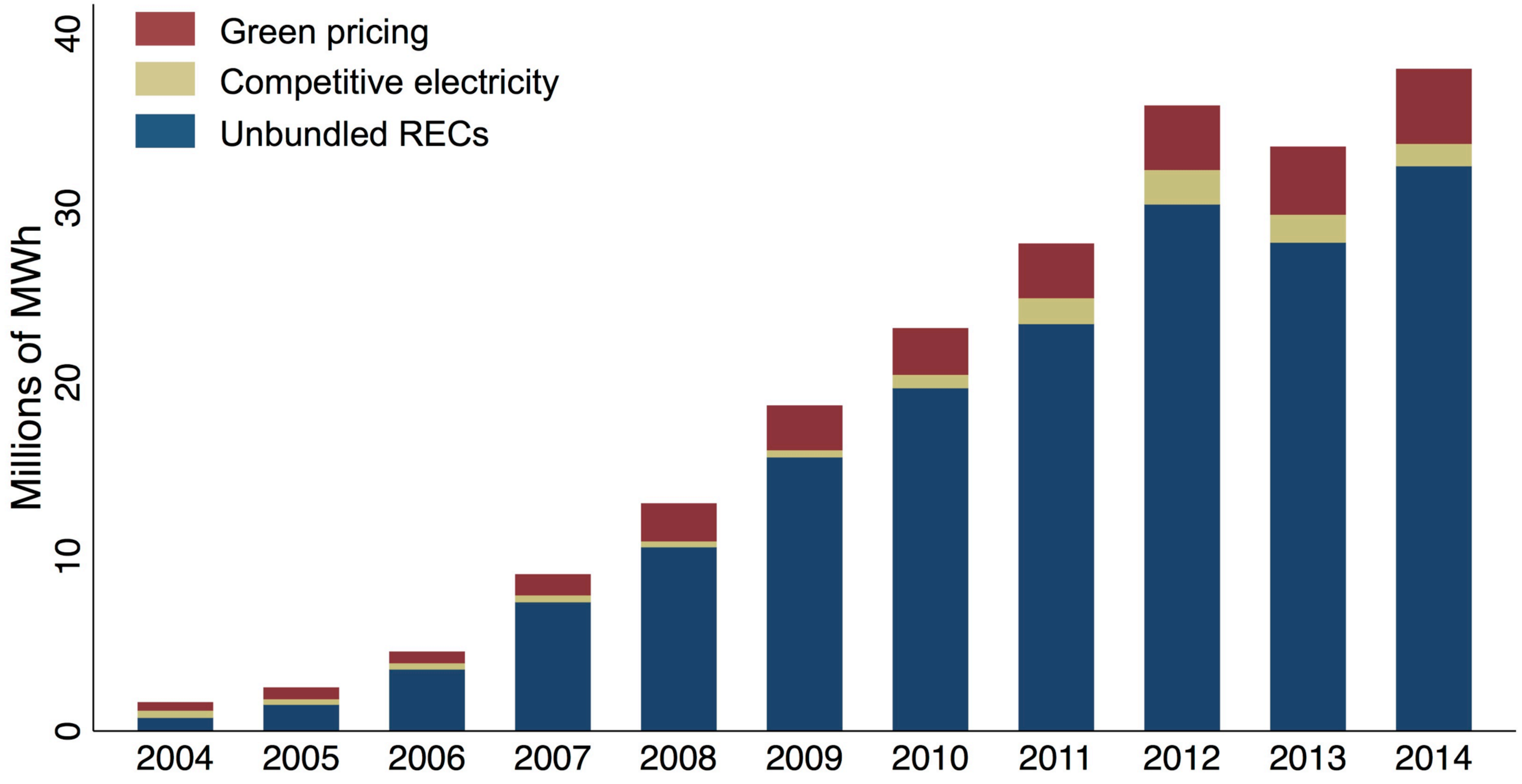
15%

88,608 customers

6%

50 states

Green-e Certified Sales



Total retail sales of Green-e certified renewable energy
Source: Terada 2015

Community Solar

150,000 MWh

50%

42,000 customers

62%

25 states

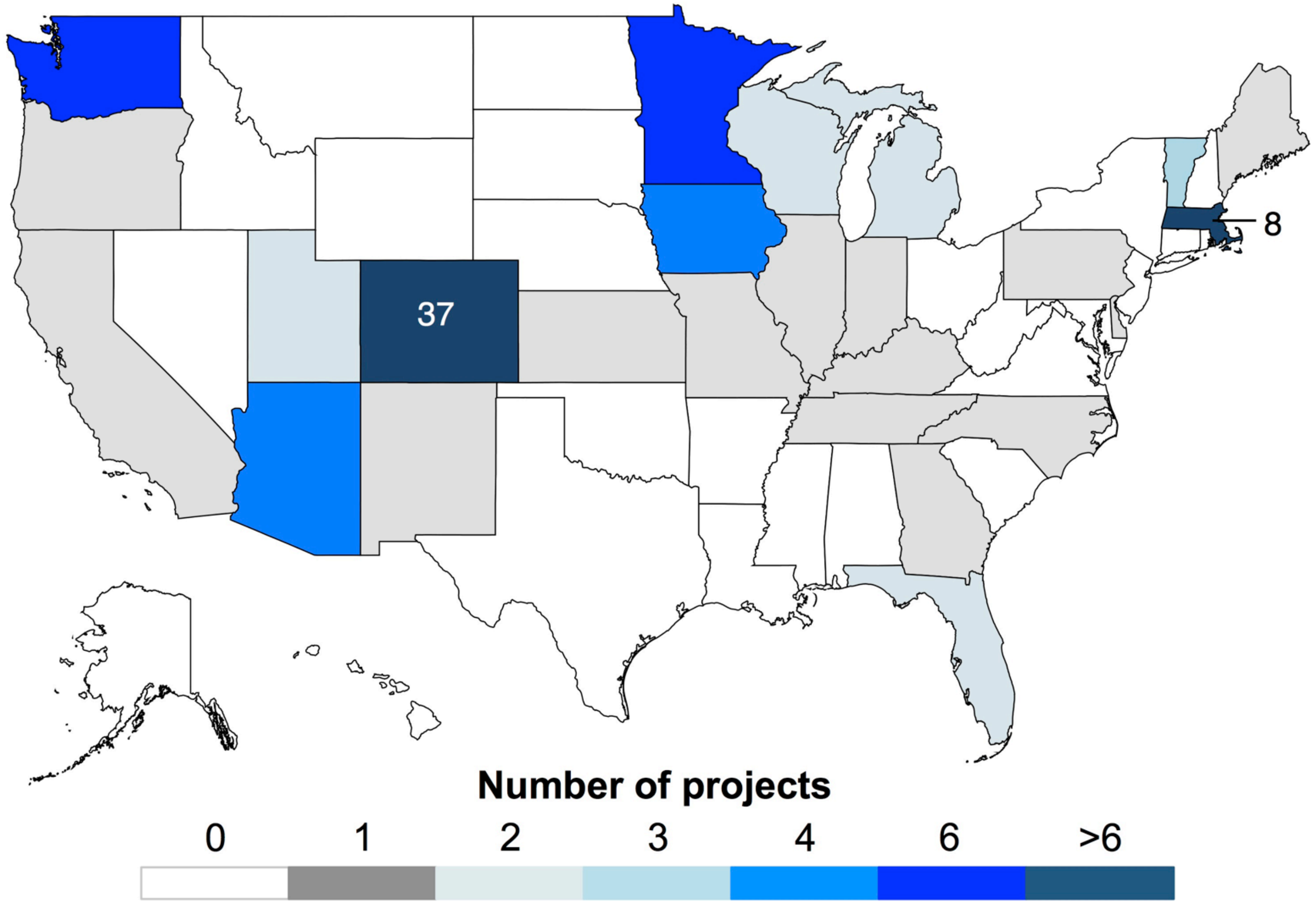
+7 states

The Geographic Expansion of Community Solar

States with new community solar projects

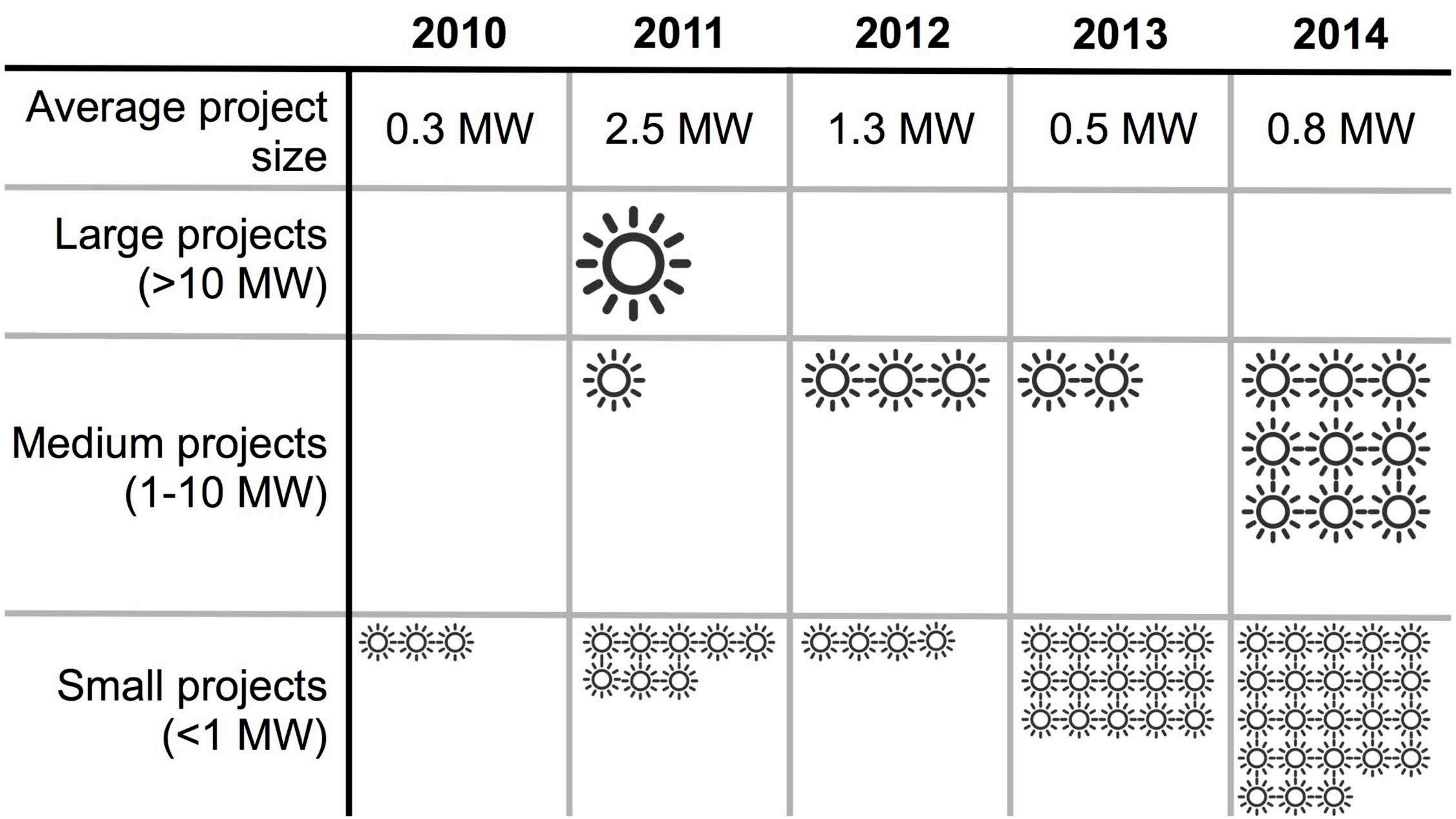
	2006		2008		2010		2012		2014	
	WA	OR	CA, UT	CO	CO, FL	AZ, CO, GA, KY, WA	AZ, CO, MA, NM, PA, UT	CO, FL, IA, MI, MN, TN, VT	AZ, CO, DE, IA, IL, IN, KS, MA, ME, MI, MN, MO, VT, WA, WI	CO, MA, MN, NC, WA
WA			MA	ME	CO, DE			CA, DC, MN, NH	VT	CT, HI, MD, NY, OR

States with new community solar legislation

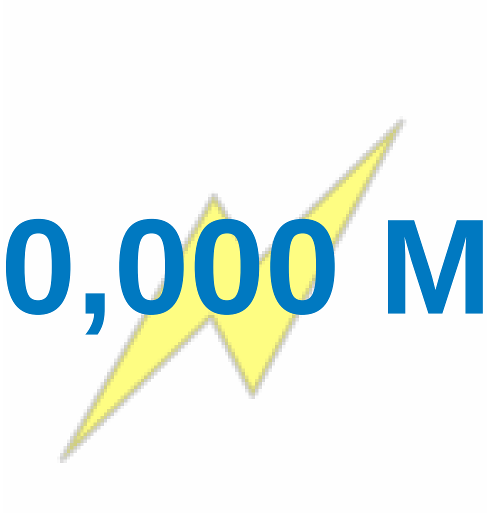


Staying Community Scale

- Project size hasn't increased over time
- Some state policies include size limits (e.g., 2 MW in Colorado)
- Developers may focus on re-purposed sites with size constraints
- Access to credit may limit project size



Community Choice Aggregations



7,700,000 MWh

5%

2,500,000 customers

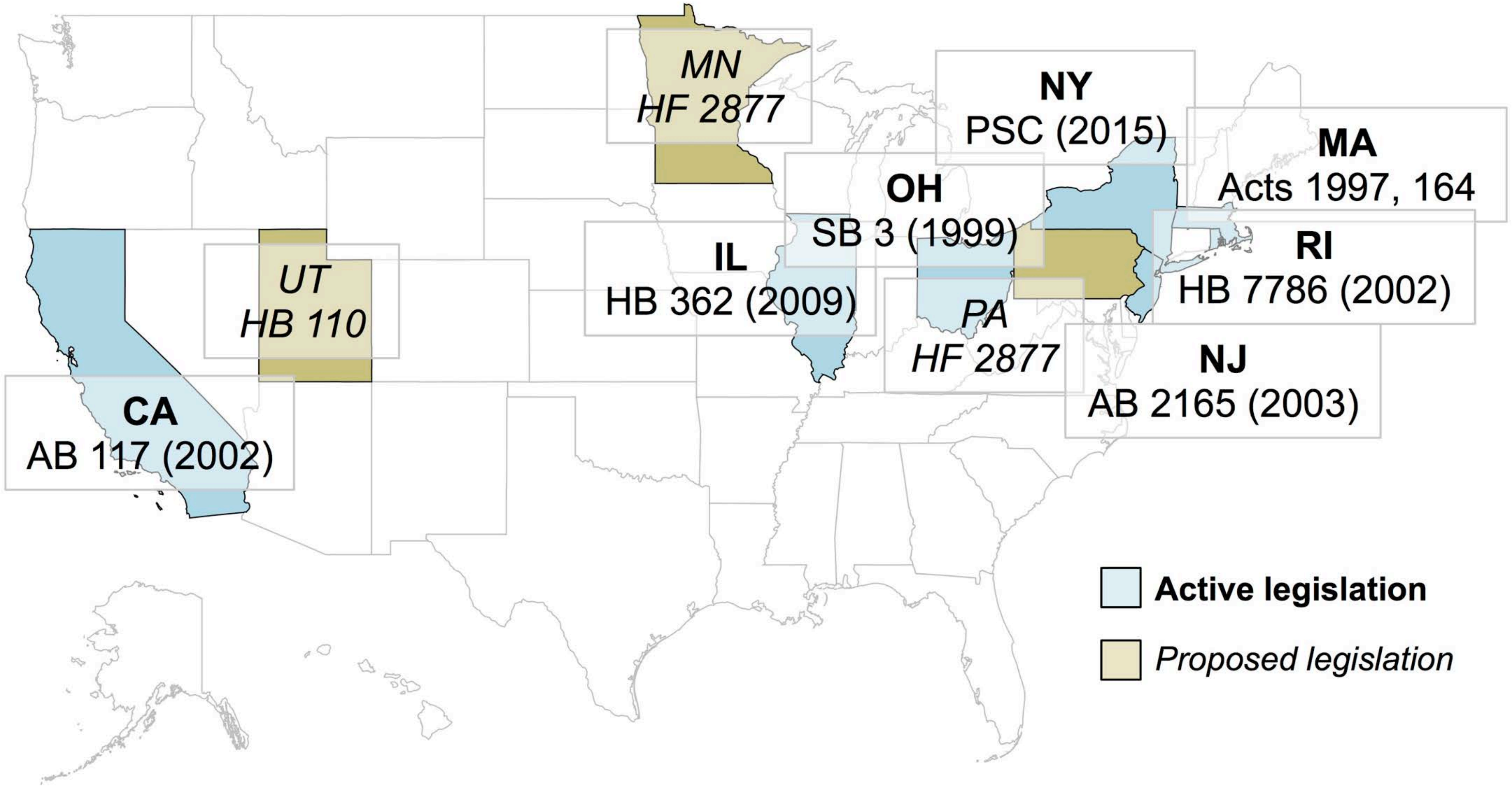
4%

7 states

+1 state

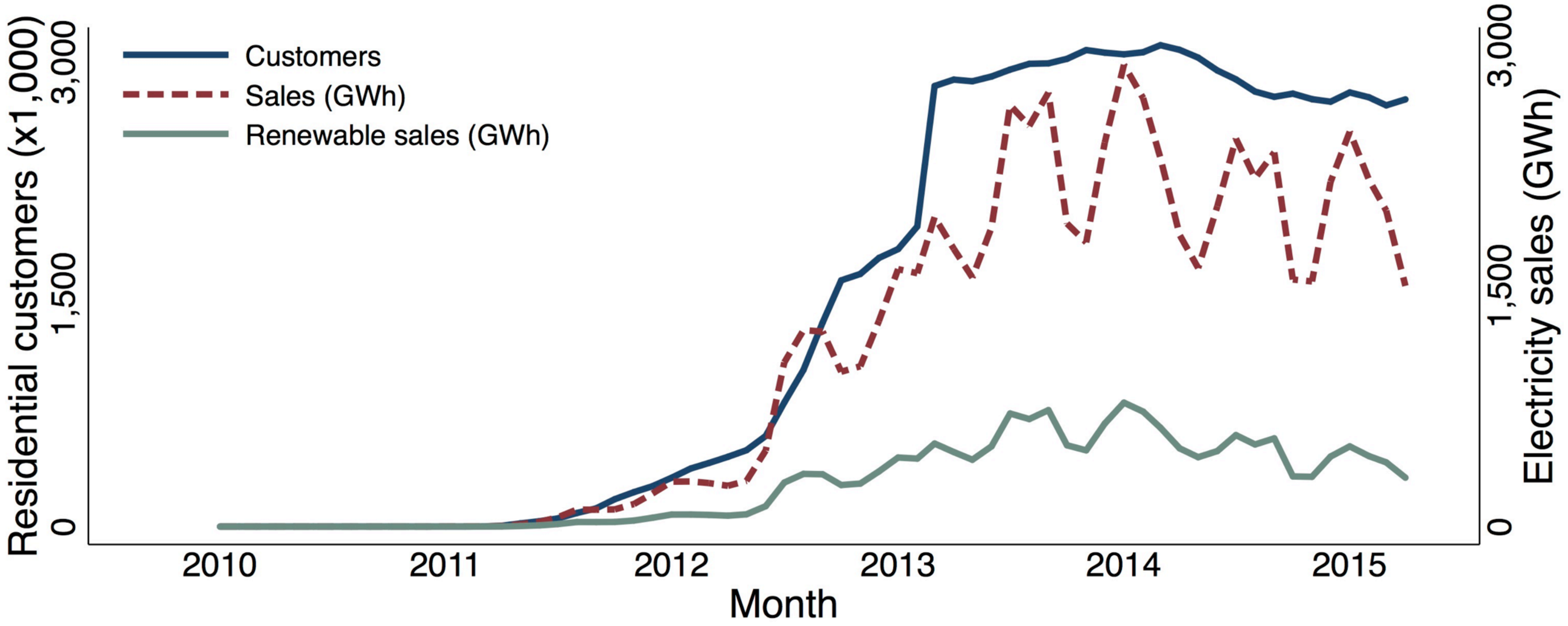
CCAs: Limited by Legislation

- New York became the 7th state to allow CCAs
- Communities in CA, IL, MA, and OH have used CCAs to deliver green power products



CCAs: Plateauing in Illinois

- Illinois CCAs peaked at 68% of residential market in early 2014
- About 27% of CCAs deliver a green power product
- In response to falling “prices to compare,” at least 35 CCAs discontinued renewable products in 2014



Number of customers and electricity sales associated with Illinois CCAs by month
Source: NREL estimates based on ICC 2015

Voluntary PPAs

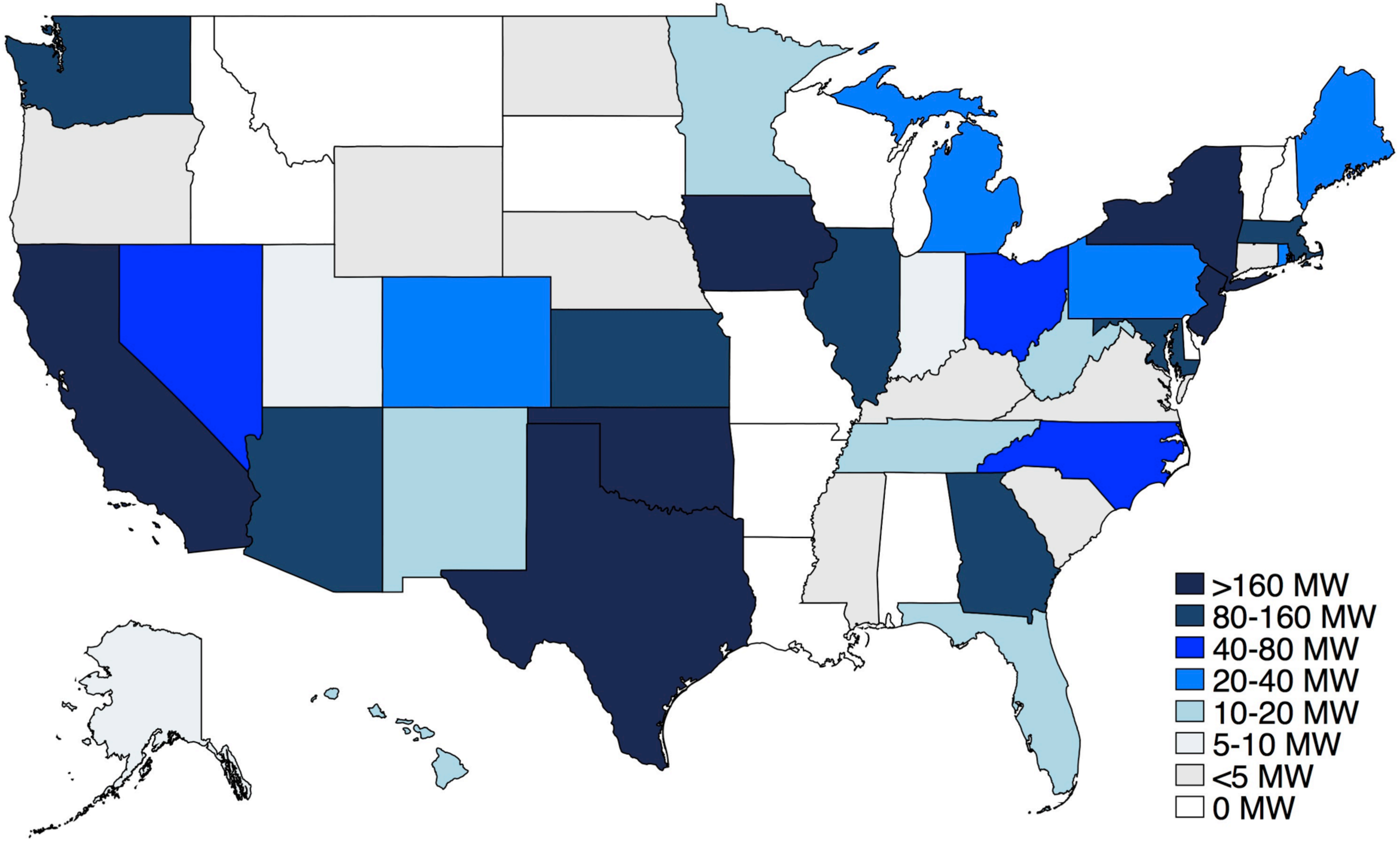
6,700,000 MWh

14%

295 customers

15%

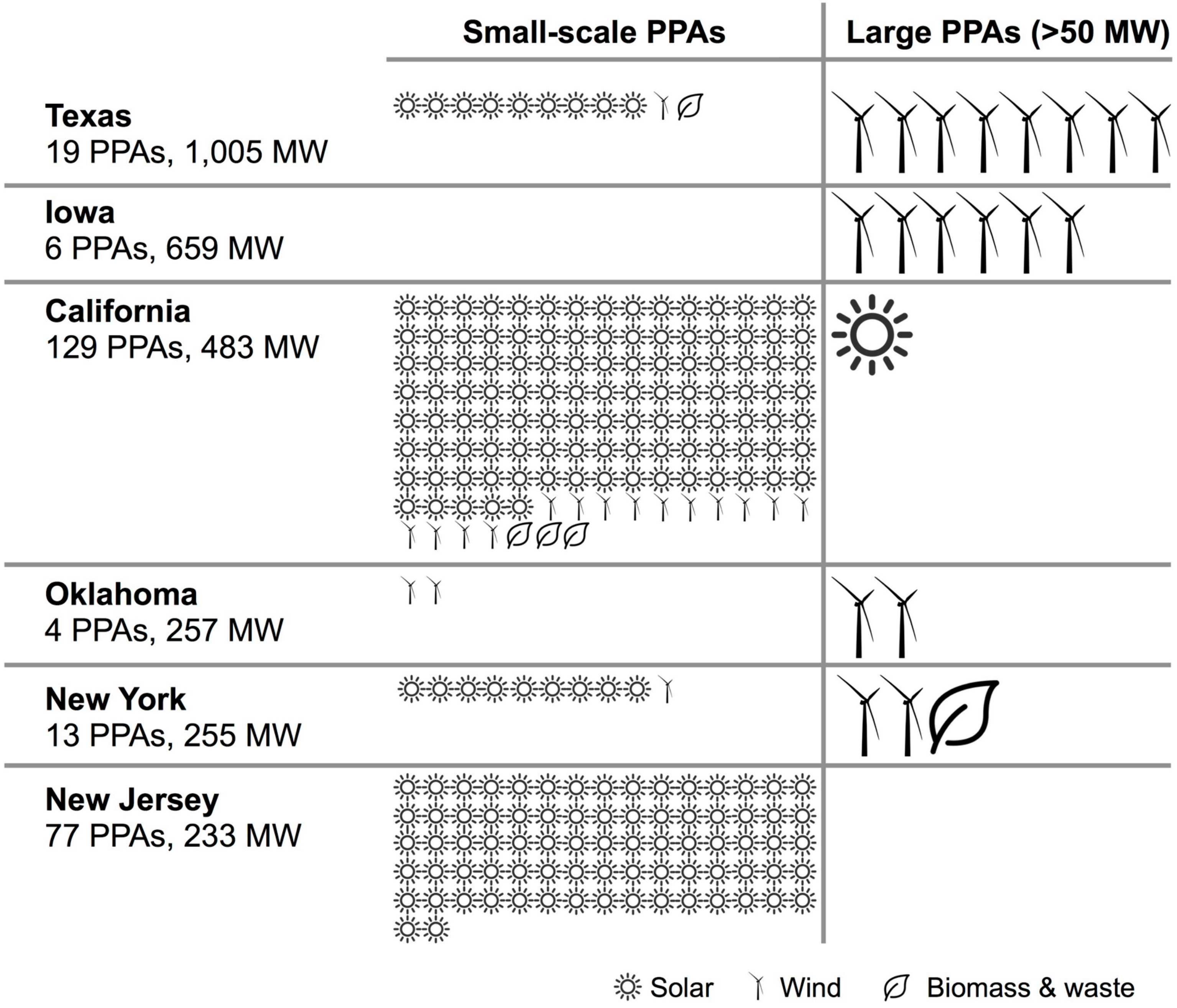
Voluntary PPAs by State



Source: Data from BNEF

Voluntary PPA Resources

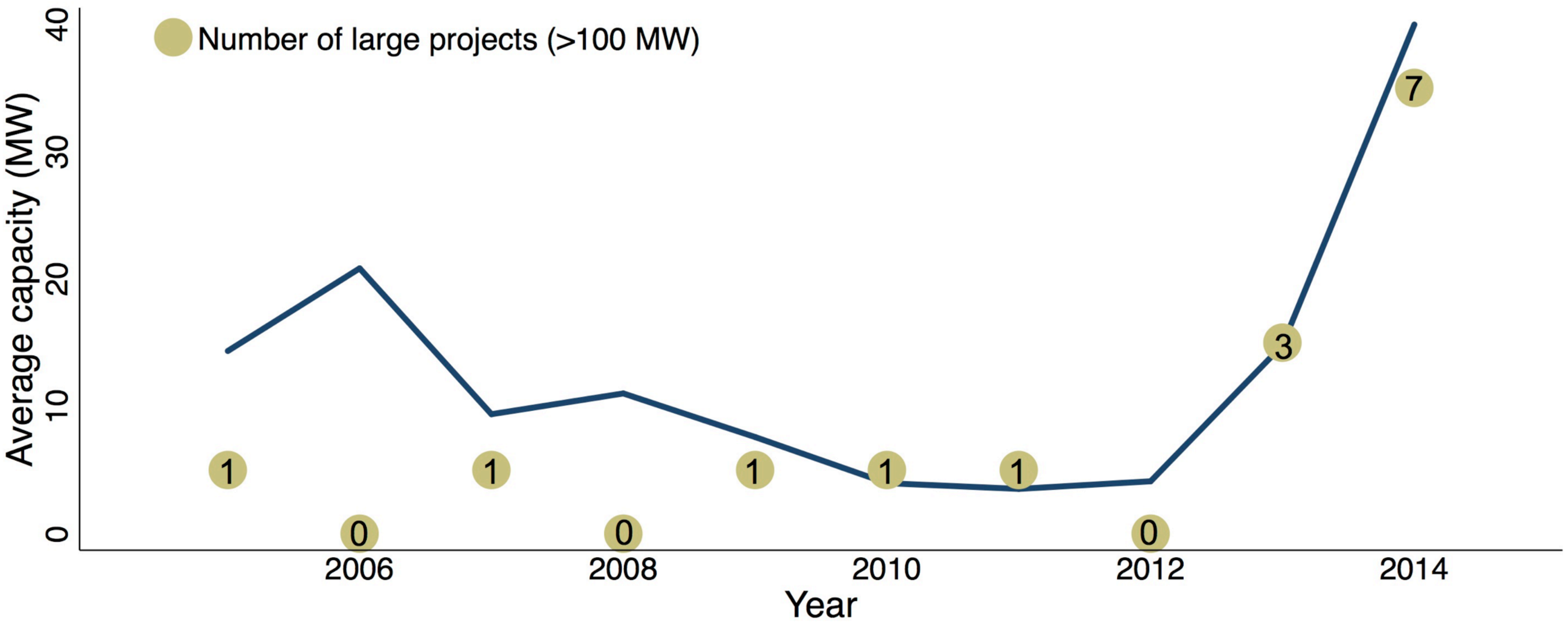
- Solar is the primary PPA resource in terms of number of projects
- Wind is the primary PPA resource for large projects



Source: Data from BNEF

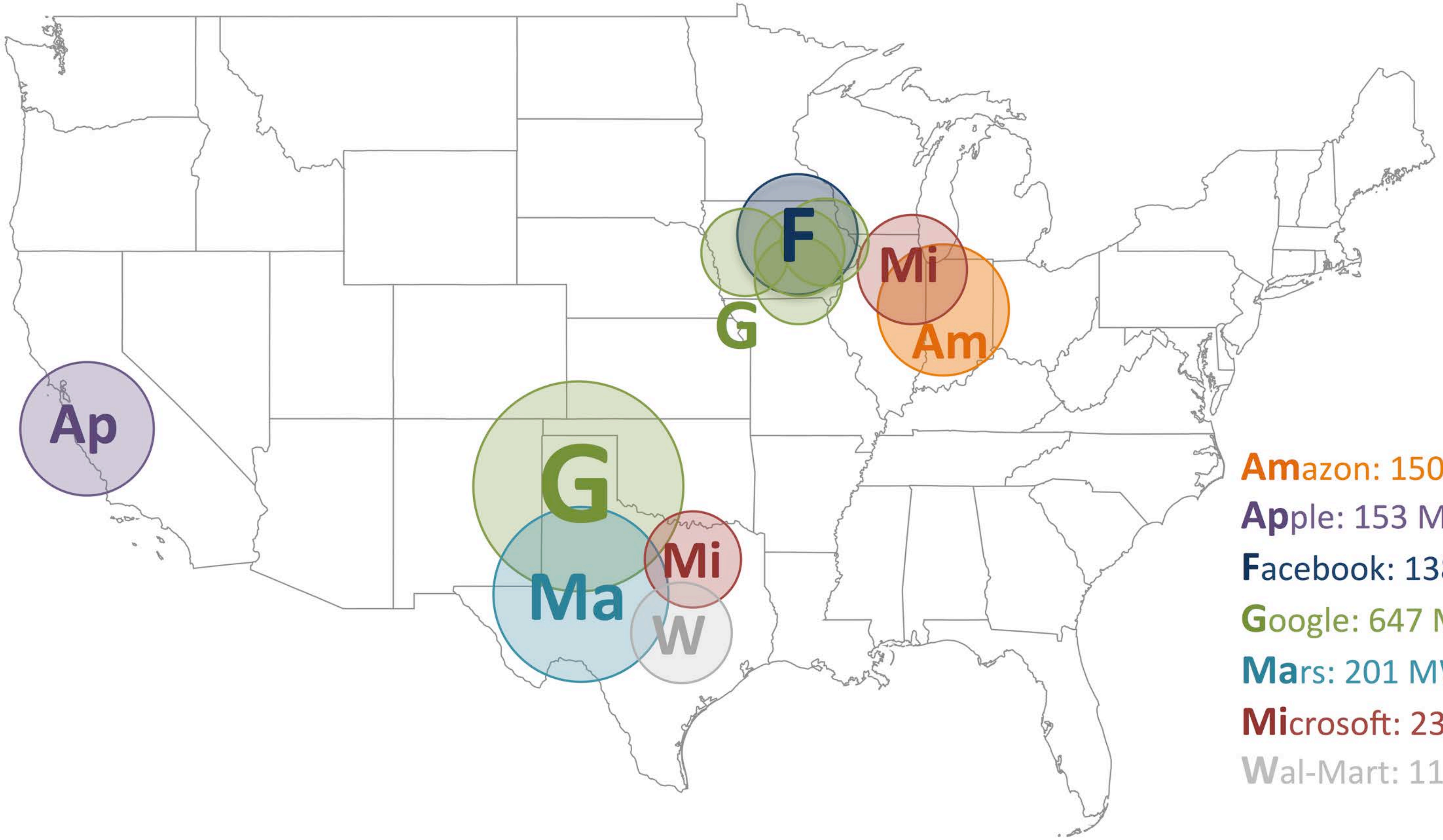
Trending toward Large Projects

- Average PPA capacity increased from 15 MW in 2013 to 40 MW in 2014
- The number of >100 MW PPAs nearly doubled in 2014
- 5 of the 7 >100 MW PPAs were signed by the ICT sector



Average capacity and number of large projects
Source: Data from BNEF

The Large-Scale PPA Landscape



Amazon: 150 MW
Apple: 153 MW
Facebook: 138 MW
Google: 647 MW
Mars: 201 MW
Microsoft: 235 MW
Wal-Mart: 116 MW

Source: Data from BNEF

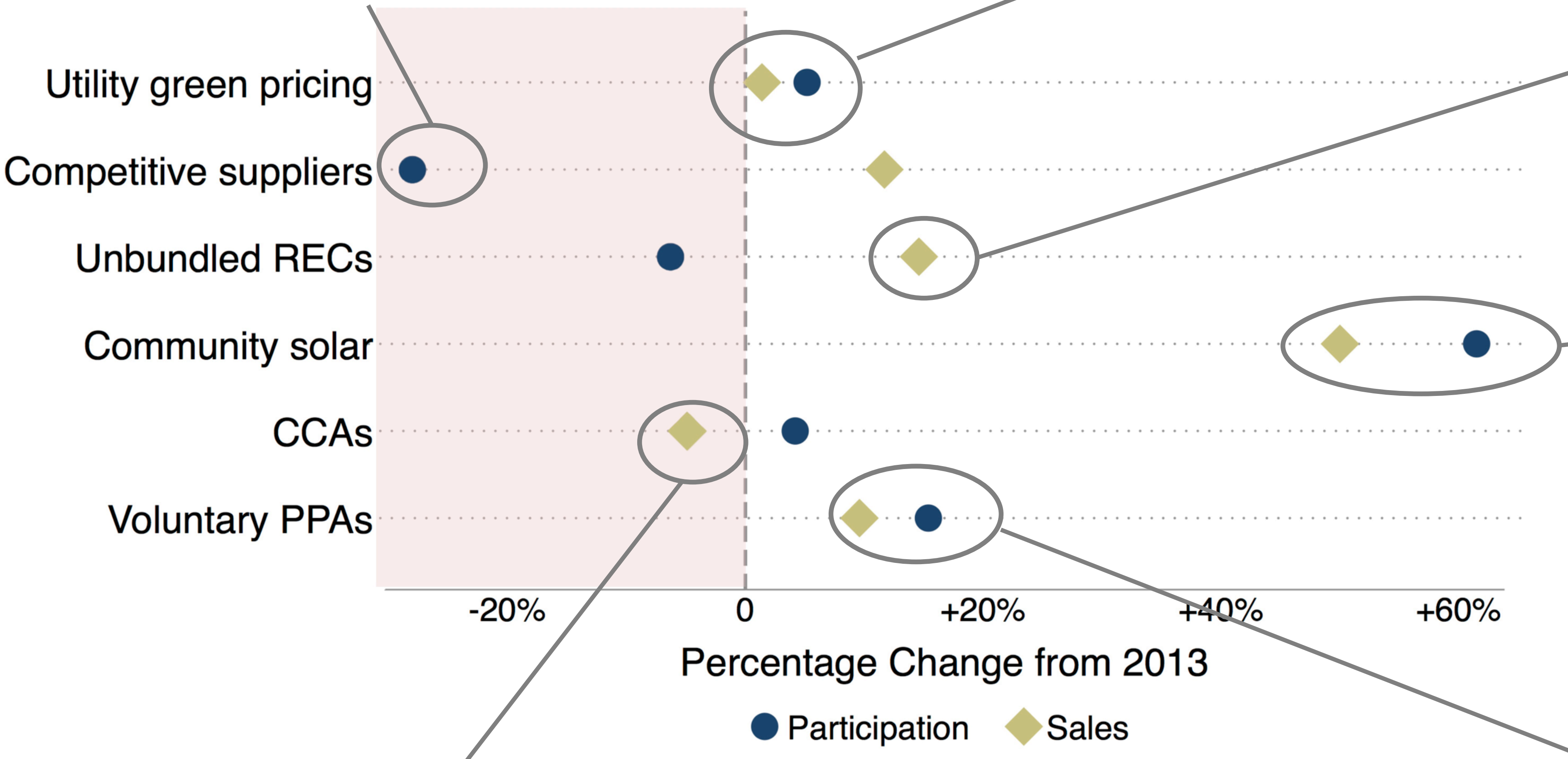
Using 2014 trends to forecast future trends

Will participation in competitive markets rebound in 2015?

Are utility green pricing programs satiated?

Will low REC prices increase unbundled REC sales?

Projections for continued strong growth in community solar

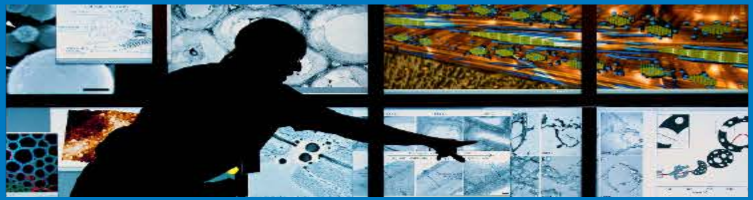


Will CCA renewable energy sales in Illinois rebound with rising utility rates? What will we see in California?

Will voluntary PPAs continue to get bigger?

Full report available:

http://www.nrel.gov/docs/fy16osti/65252.pdf



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