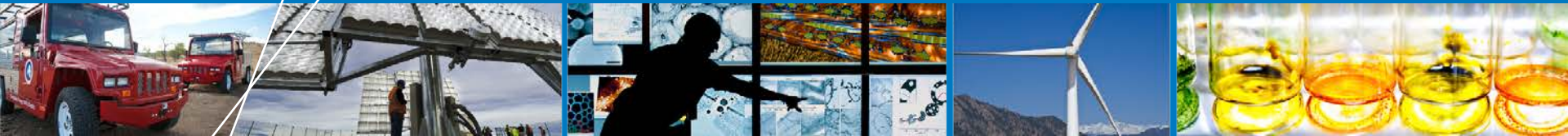


Solar Renewable Energy Certificate (SREC) Markets: Status and Trends



**Renewable Energy Markets
Conference 2011**

San Francisco, California

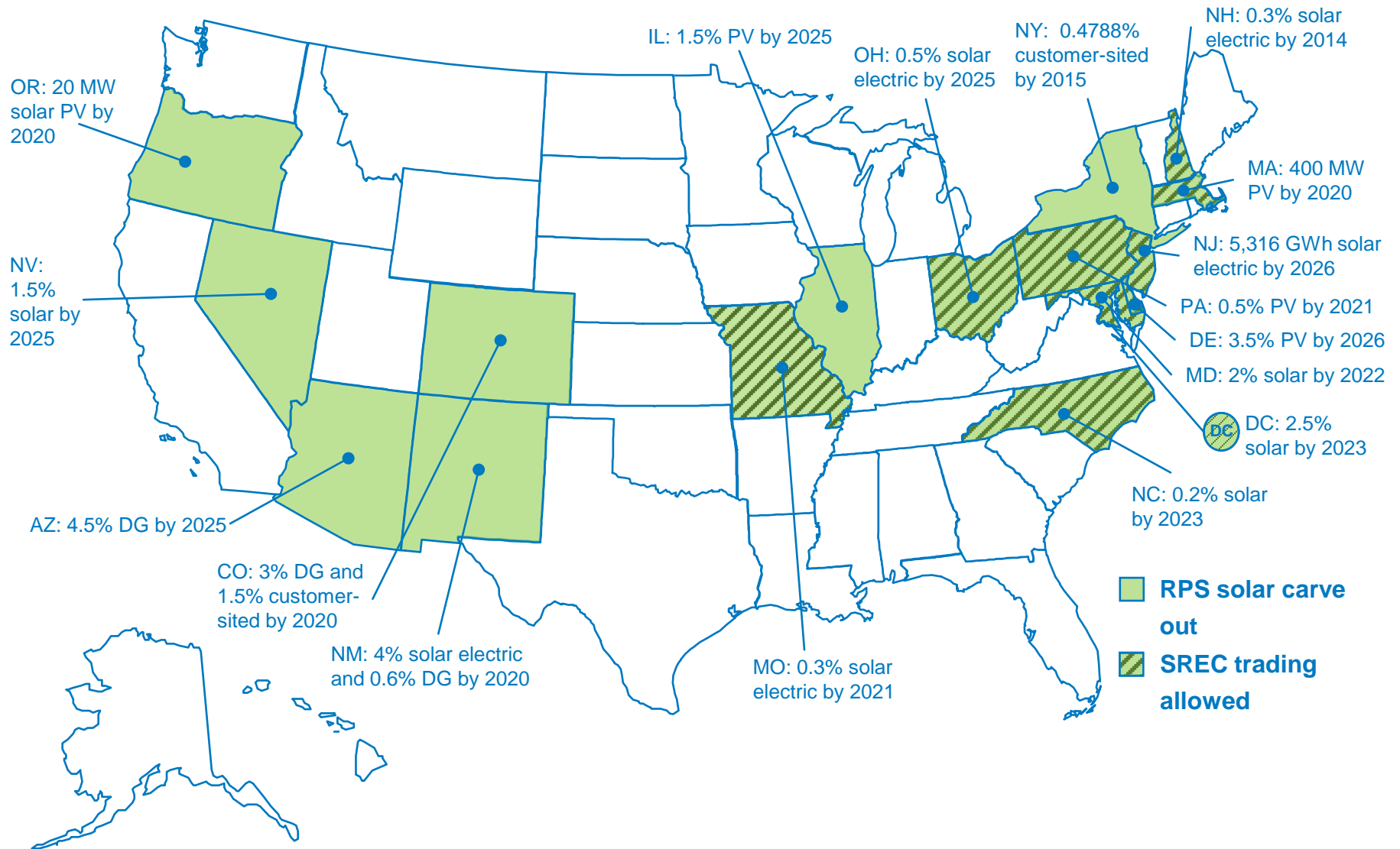
Lori Bird

November 17, 2011

Overview

- **Market size and scope**
- **Key market design features**
 - Eligibility, ACPs, rate caps, long term contracting provisions, etc.
- **Market trends**
 - Trading and installations
 - System sizes and location
 - SREC Pricing
- **Future Outlook**

SREC Markets Young; Expanded to 9 Jurisdictions



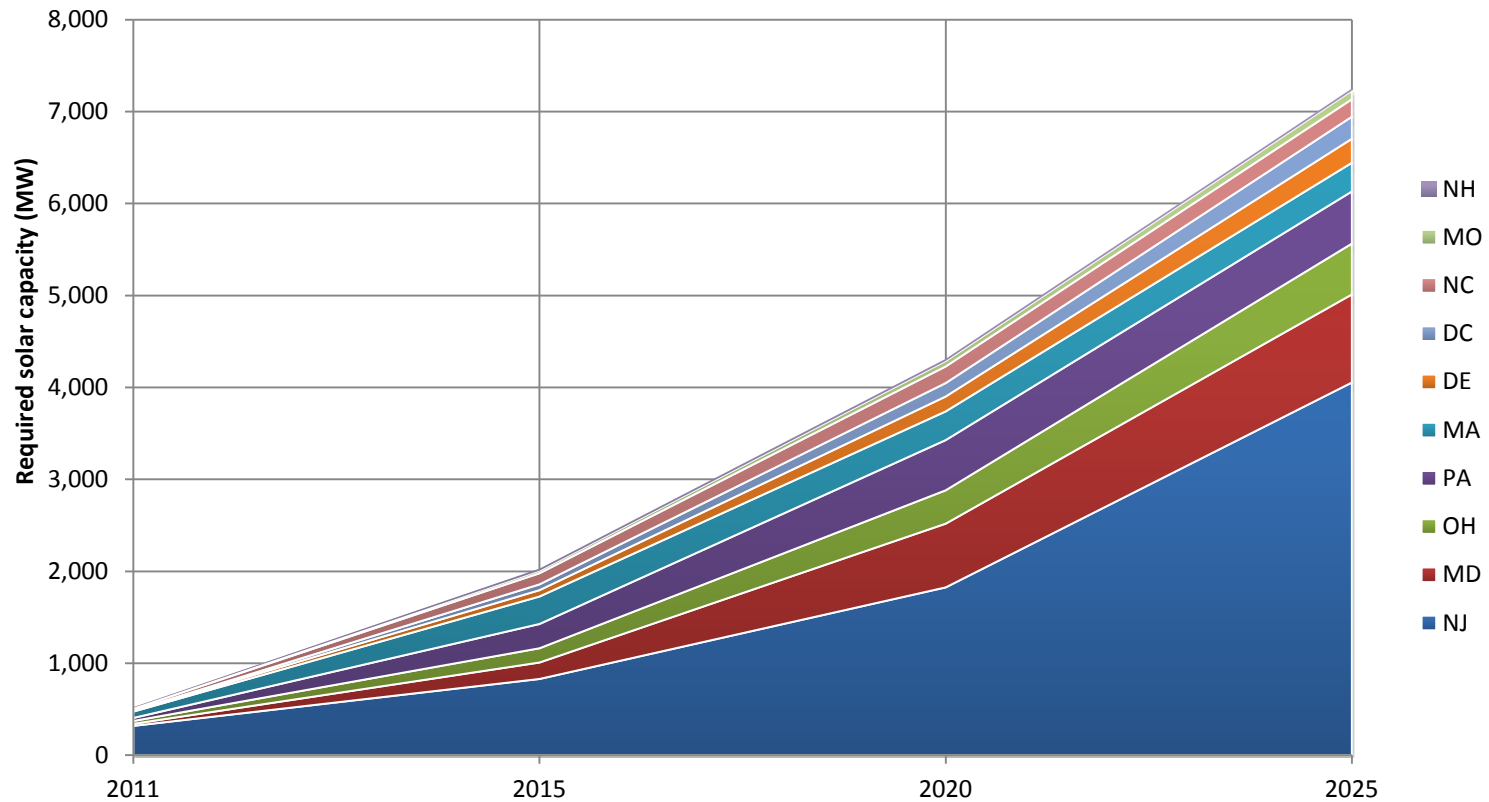
Each Jurisdiction has Unique Policy

State	Initial compliance year	Target (% of Retail Sales)	Obligated Entities
DC	2007	2.5% by 2023	All EDCs and EGSs
DE	2007	3.5% by EY 2026	All EDCs and EGSs; Munis/coops can set own schedule
MA	2010	400 MW PV*	All EDCs and EGSs
MD	2008	2% by 2022	All EDCs and EGSs, munis, coops
MO	2011	0.3% by 2021	All IOUs**
NC	2010	0.2% by 2018	All IOUs, municipals, coops
NH	2010	0.3% by 2014	All IOUs and retail suppliers, excluding munis
NJ	2005	5,316 GWh by EY 2026	All EDCs and EGSs
OH	2009	0.5% by 2024	All EDCs and EGSs
PA	2005	0.5% by 2021	All EDCs and EGSs, voluntary participation by munis, coops

Targets for solar generation vary from 0.2% to 3.5% of retail electric sales.

Markets Young but Expected to Grow Rapidly

Capacity required in SREC markets (in MW)



SREC markets are scheduled to grow from 500 MW in 2011 to more than 6,700 MW in 2025.

SREC Market Dominated by PV, But Solar Thermal Eligible

State	Solar PV	Solar Thermal
DC	Yes	Yes
DE	Yes	Yes, but must generate electricity
MA	Yes	No
MD	Yes	Solar water heating, but must be installed on or after June 1, 2011
MO	Yes	Yes, but must generate electricity
NC	Yes	Yes*
NH	Yes	No**
NJ	Yes	No
OH	Yes	Yes, but must generate electricity
PA	Yes	No***

Source: SREC Trade 2011a.

*Eligible solar thermal resources include solar absorption cooling, solar dehumidification, solar thermally driven refrigeration, and solar industrial process heat.

** Solar water heating that displaces electricity is eligible for Class I of New Hampshire's RPS (Epsen 2011).

***Solar thermal is eligible for Tier 1 of Pennsylvania's RPS.

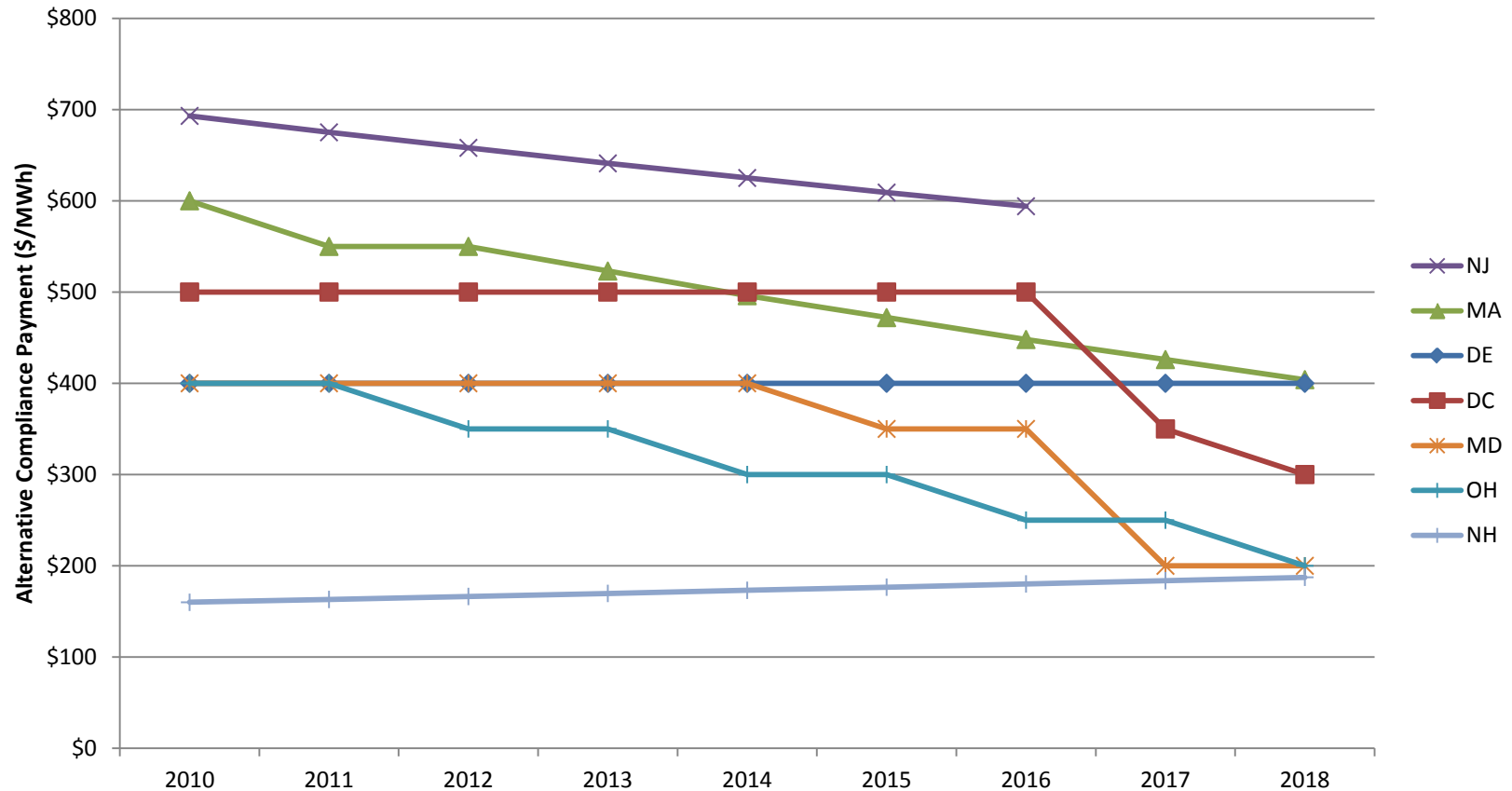
Geographic Eligibility Rules Define Markets

State	Geographic Eligibility
DC	In-district or in locations served by a distribution feeder serving DC
DE	Customer-sited solar must be located in state; non-customer sited solar can be located with PJM, or show import capabilities into PJM
MA	In-state
MD	Solar resources must be connected with the distribution grid serving Maryland. On or before December 31, 2011, solar resources not connected to the Maryland grid are eligible if electricity suppliers were unable to contract for in-state SRECs
MO	Out-of-state eligible (anywhere)
NC	25% from out-of-state eligible (anywhere)
NH	Within New England or New York
NJ	In-state
OH	50% of SRECs must be generated by in-state resources; bordering states (DC, IN, KY, MD, MI, PA, WV) eligible for 50%
PA	Out-of-state eligible (within PJM, or PA areas within MISO)

Several states limit eligibility to in-state development, while a few allow SRECs from a broader geographic region.

Solar ACPs Set Price Ceiling

Solar ACPs are scheduled to decline over time reflecting expectations of declining PV costs.



Note: Massachusetts solar ACP levels for 2010 and 2011 are fixed; levels for 2012 and beyond have been proposed by the Department of Energy Resources but are not yet finalized

Lack of Long-Term Contracts a Challenge

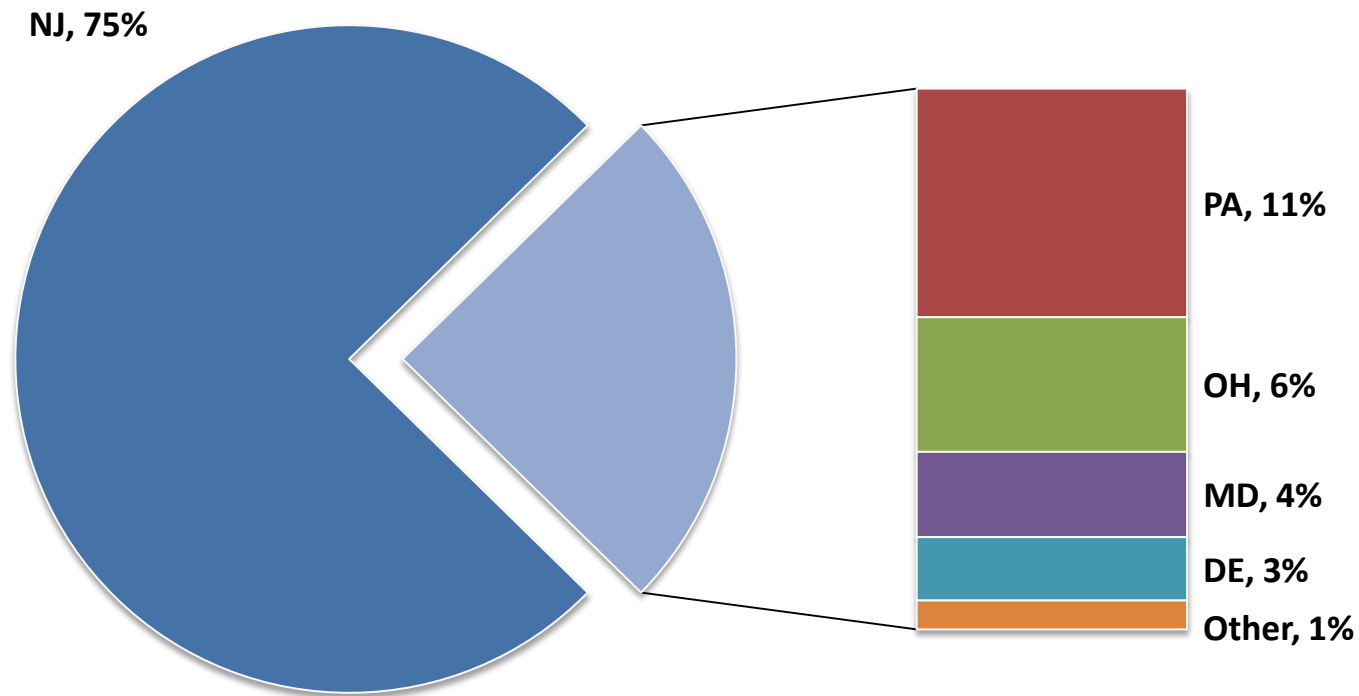
- Lack of long-term contracts has been a barrier to project developers obtaining financing in some markets.
- Several states have instituted long-term contracting requirements or price floors to try to overcome these challenges.
- The New Jersey program in particular has led to a large number of long term contracts, which has facilitated project development. However, the drop in SREC prices may mean that ratepayers must make up the difference between spot and contract prices.
- The price floor mechanism in Massachusetts has not been fully tested, but investors appear to be gaining comfort with this mechanism.

Rate Caps Have Yet to Be Reached

Rate Cap on RPS	Rate Cap on Solar Set-Aside	No Rate Cap
OH: 3% increase in generation costs	DE: 1% increase in retail rates (combination of solar set-aside, rebates, and solar ACPs together)	
NC: Caps on annual cost per account for incremental RPS costs; varies by customer class and year	MD: 1% increase in retail rates (solar set-aside only); allows for 1-year delay in meeting solar RPS	DC, PA, MA, NH, NJ
MO: 1% increase in retail rates		

Rate caps exist in some form in five SREC markets, but have not been reached or are yet to be evaluated. The modest size of most solar carve outs suggests that it is not likely that rate caps will be reached in the near term.

SREC Trading Dominated by New Jersey



*NJ is largest market; trading is expanding as other markets increase
Based on issued volume data from PJM GATS*

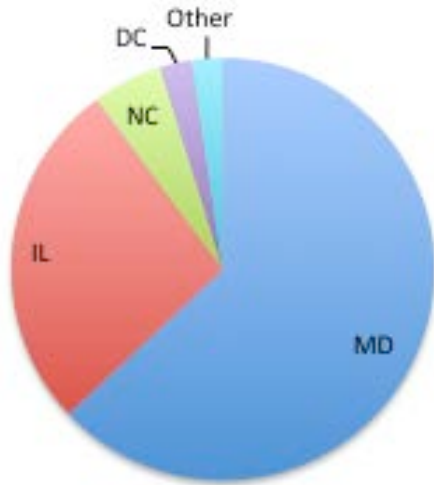
Solar Capacity Additions by State

State	2009 PV Additions MW _{DC}	2010 PV Additions MW _{DC}	Cumulative Installed Capacity MW _{DC}
DC	0.3	3.5	4.5
DE	1.4	2.4	5.6
MA	9.6	20.4	38.2
MD	4.7	3.4	10.9
MO	0.1	0.5	0.7
NC	6.6	28.7	40.0
NH	0.5	1.3	2.0
NJ	57.3	132.4	259.9
OH	0.6	18.7	20.7
PA	4.4	46.5	54.8

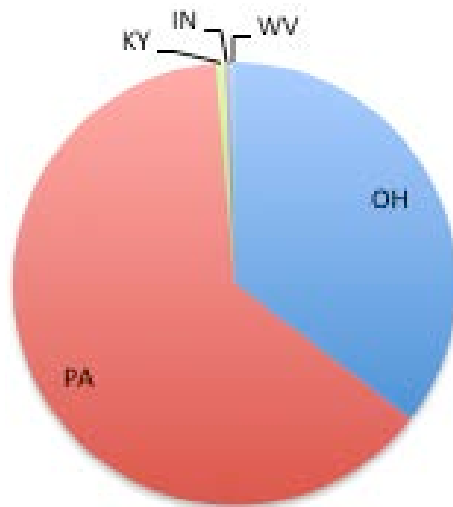
New Jersey leads by far, with nearly 260 MW cumulative installed capacity; Pennsylvania follows with nearly 55 MW.

In-State versus Out-of State Sourcing

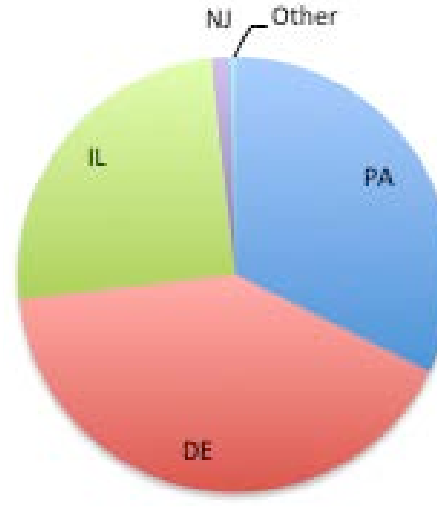
Source of SRECs retired for 2010 compliance



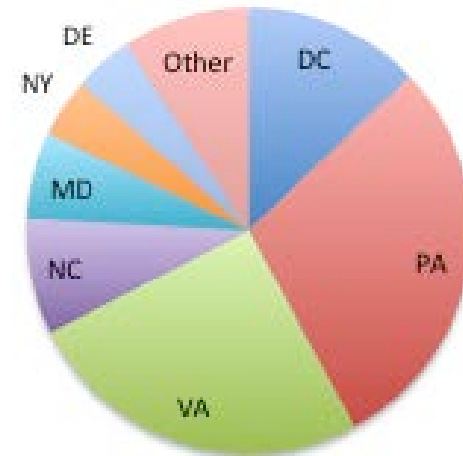
Maryland:
68% in-state



Ohio:
35% in-state



Pennsylvania:
32% in-state

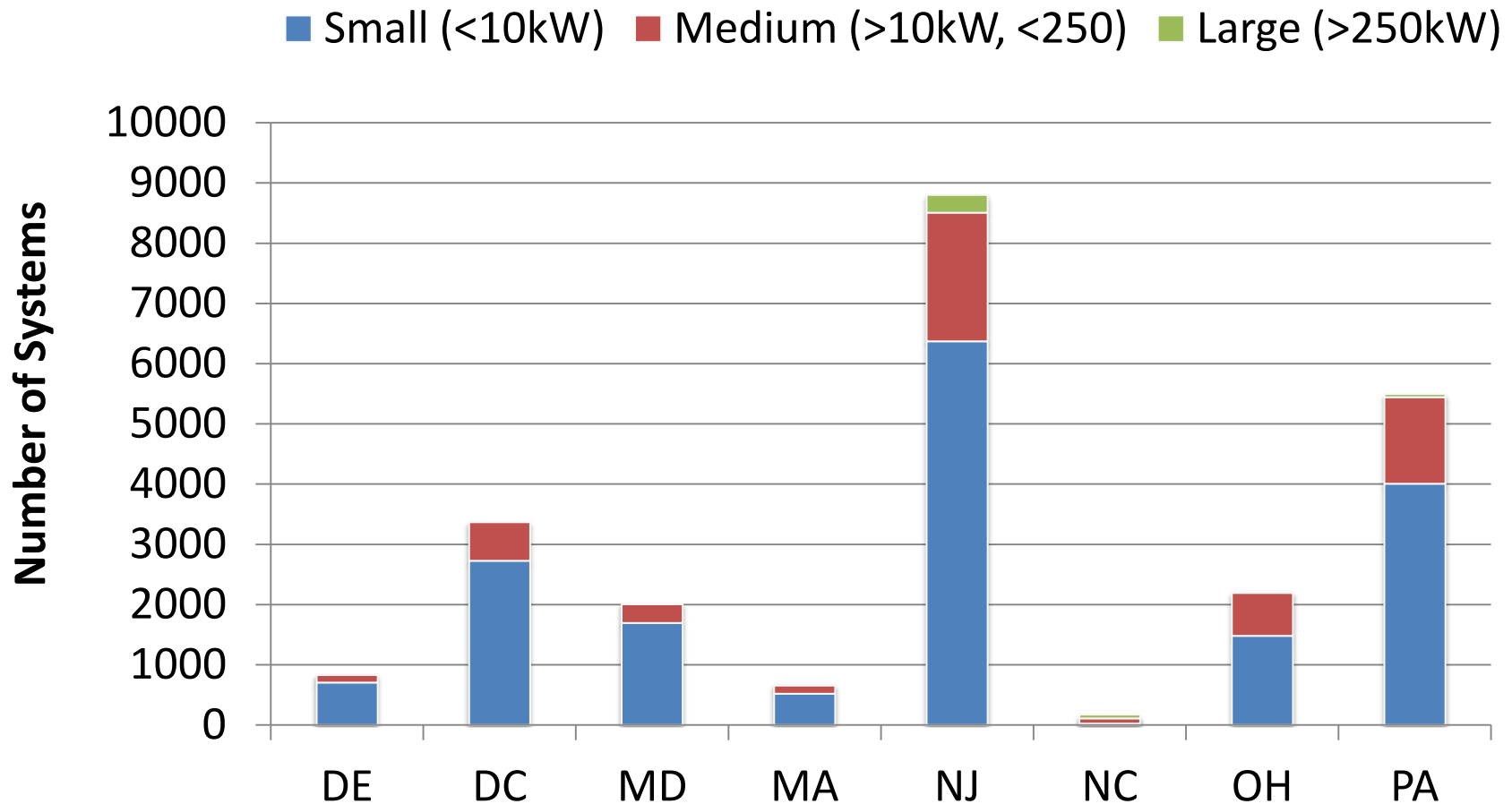


DC:
13% in-state



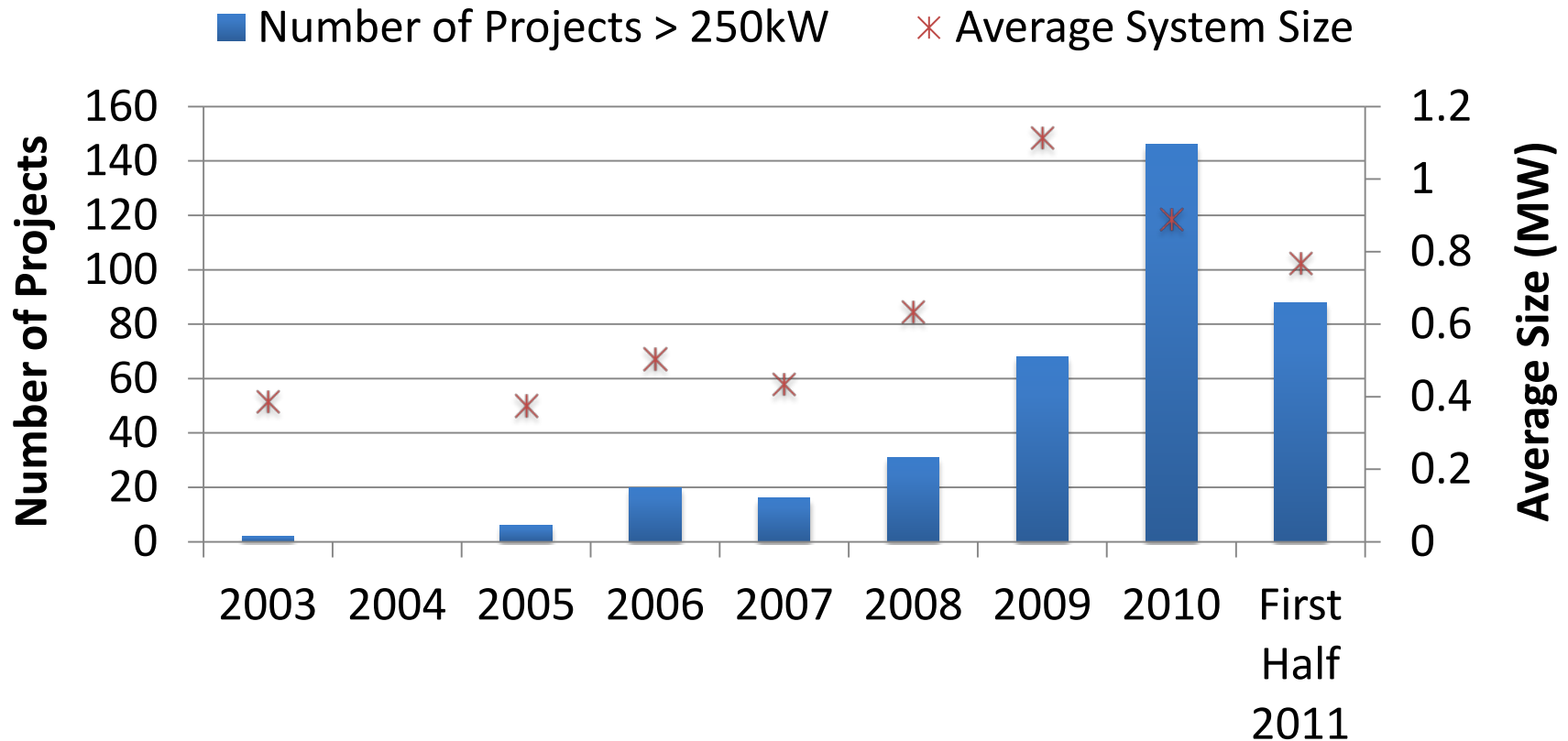
*Several States Are Sourcing SRECs Primarily from In-State Systems, While Others Are Sourcing More Broadly
Rules changing in Maryland and DC*

Mix of PV System Sizes Installed



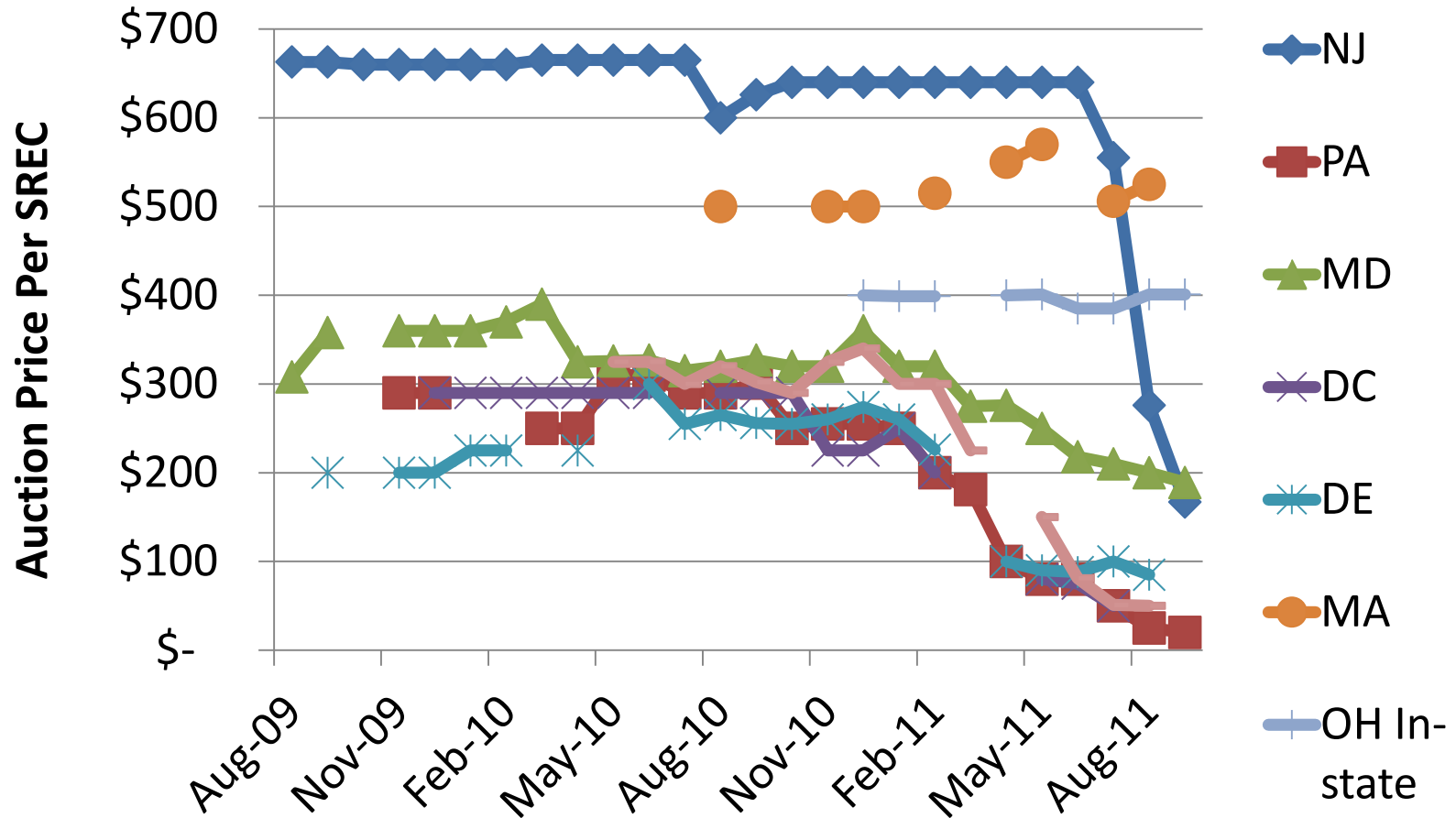
SREC Markets Are Supporting a Mix of Solar PV System Sizes

System Size Trending Larger



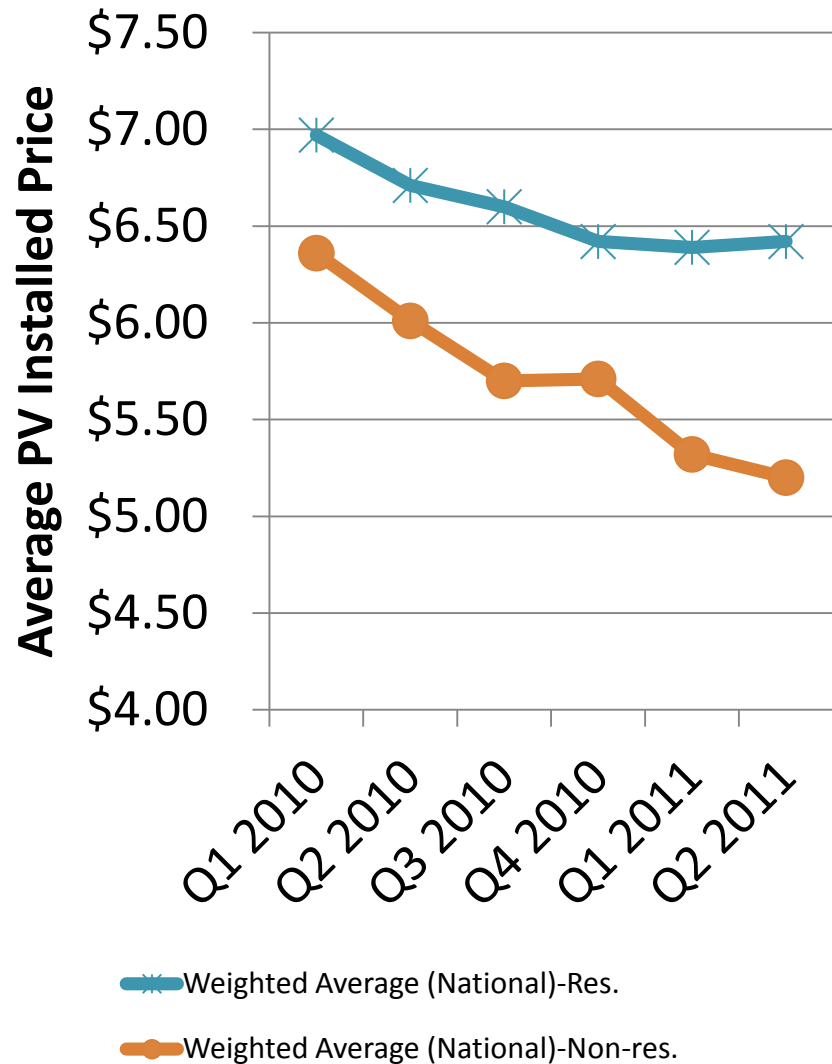
The number of systems greater than 250 kW has grown cumulatively from just two in 2003 to nearly 400 through the first half of 2011. Since 2008, the average size of projects in this class has been greater than 600 kW.

SREC Spot Pricing, Recently Trending Down

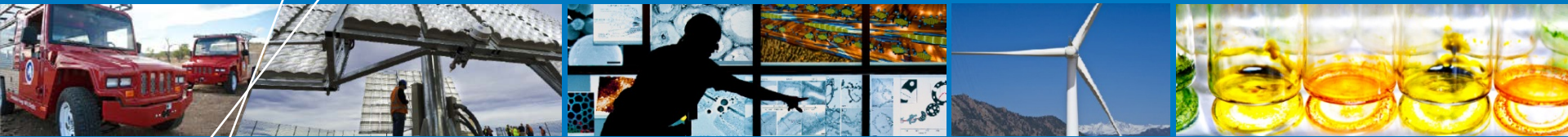


New Jersey has Historically Experienced the Highest Prices; Recent or Forward Prices Have Dropped Significantly in Most Markets

Future Outlook



- 30% drop in module prices in last year. Installed costs fell by smaller amount.
- Federal Treasury 1603 cash grant program expiration creating rush.
- Introduction of more utility-scale projects.
- Oversupply in many state markets currently.
- Policy revisions under consideration in some markets.



Full NREL report:

SREC Markets: Status and Trends

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