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# Renewables Portfolio Standards: An Opportunity for Expanding State Solar Markets

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# Presentation Overview

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1. Overview of State RPS Policies
2. The “Problem” for Solar Electricity
3. Supporting Solar within State RPS Policies
4. Conclusions

*Focus is on solar photovoltaics and solar thermal electric, and not solar hot water, solar heating/cooling, day-lighting, etc.*

# What Is a Renewables Portfolio Standard?

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## **Renewables Portfolio Standard (RPS):**

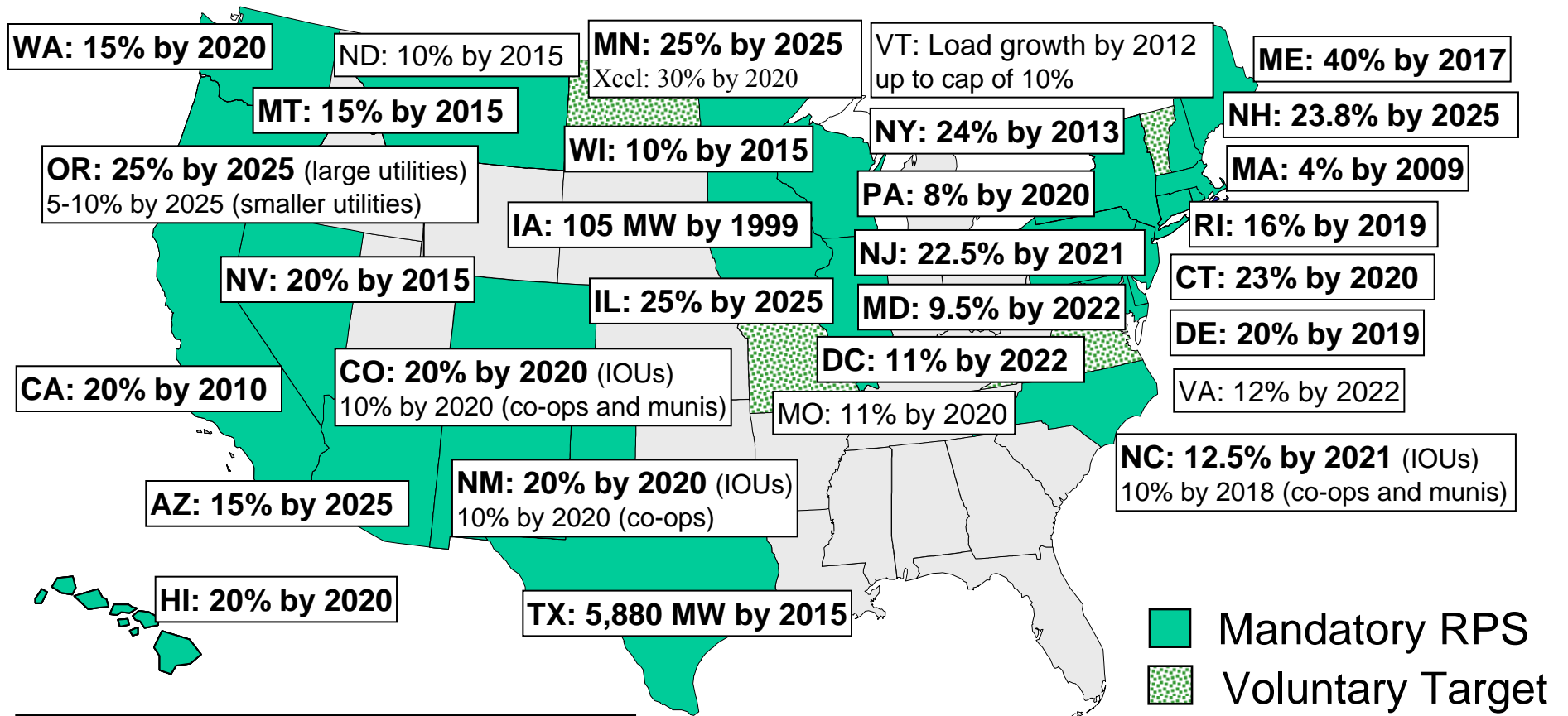
- A requirement on retail electric suppliers...
- to supply a minimum percentage or amount of their retail load...
- with eligible sources of renewable energy.

**Typically** backed with penalties of some form

**Often** accompanied by a tradable renewable energy credit (REC) program, to facilitate compliance

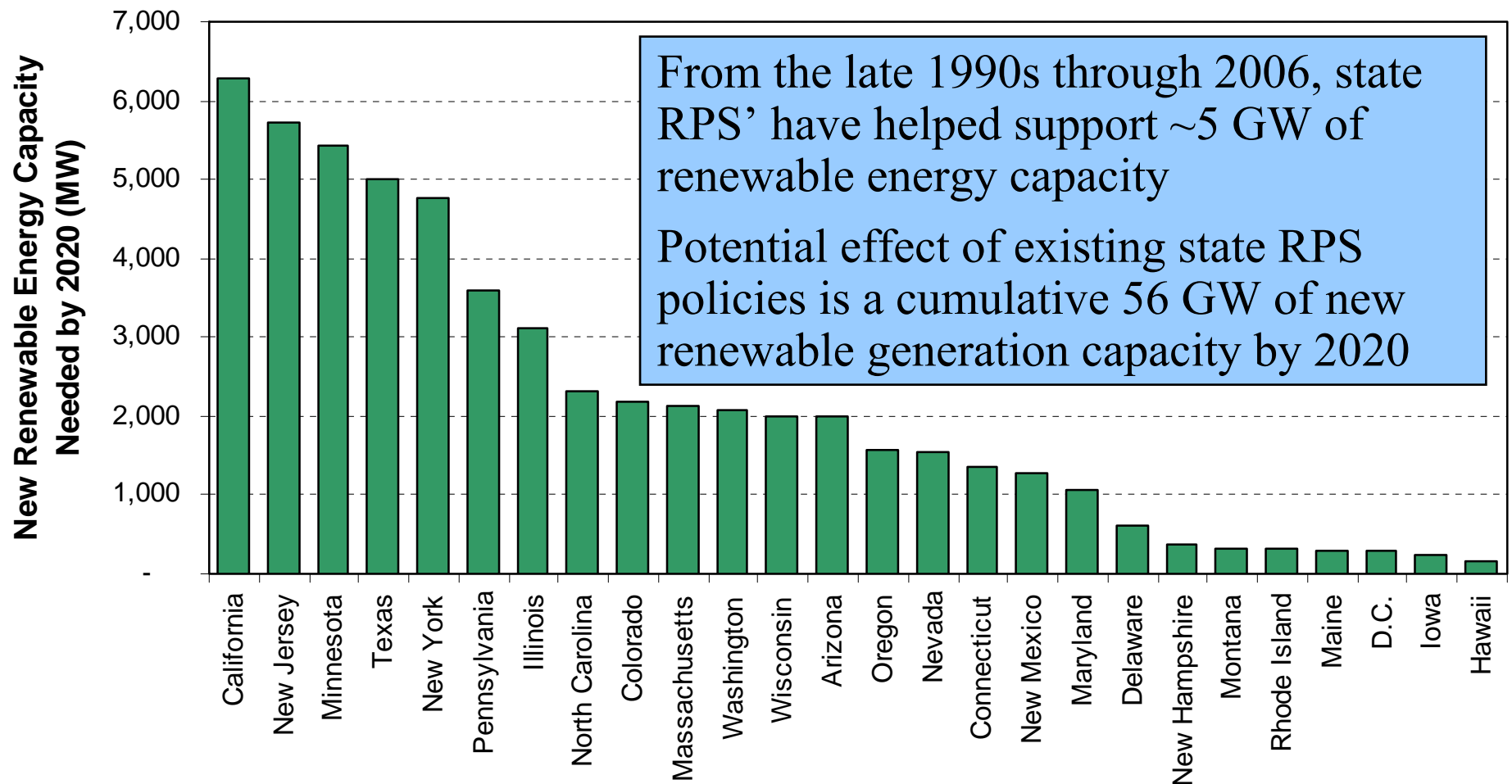
**Never** designed the same in any two states

# State RPS Policies: 25 States and D.C.



State RPS policies cover ~50% of U.S. electric load

# Actual and Expected Impacts of State RPS Policies Are Sizable



Source: Union of Concerned Scientists

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# The Problem for Solar Electricity Under Traditional RPS Policies

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- Traditional RPS, whereby all eligible resources compete, can be effective in supporting least-cost projects
- But is not likely to provide adequate support for emerging technologies, and smaller projects:
  - Cost and solicitation barriers
- 13 of 26 RPS policies provide no differential support for solar/distributed energy; experience shows that:
  - ➔ These policies are unlikely to provide meaningful support to customer-sited or even utility-scale PV in the near term
  - ➔ With the exception of the Southwest, these policies are unlikely to greatly benefit solar thermal electricity

# California: An Exception to the Rule

Only state where meaningful solar activity is occurring within an RPS that does not differentially support solar/DG

Separate from the RPS, the state is also strongly supporting customer-sited PV, which is not included in the table

Contracted Capacity with Large Investor-Owned Utilities, Under RPS		
UTILITY	SOLAR THERMAL	PHOTO-VOLTAICS
SCE	500 - 850 MW	1 MW
PG&E	731 MW	7 MW
SDG&E	399 - 999 MW	0 MW
TOTAL	1453 - 2403 MW	8 MW

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# For Solar to Succeed Within an RPS, the Following Factors Must Be Considered

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- **Eligibility**

- Are all forms of solar electricity eligible?
- Are customer-sited generators eligible?
- Are metering/tracking systems in place?

- **REC Ownership**

- Do owners of solar systems “own” their RECs?
- Do mechanisms exist to trade small quantities of RECs?

- **Differential Support for Solar**

- Does the RPS contain a solar share or credit-multipliers?
- How are these mechanisms implemented?

# States that Provide Differential Support for Solar within an RPS Do So in Two Ways

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## **Solar Share/Set-Aside**

- A requirement that some portion of the RPS come from solar specifically, or DG more broadly

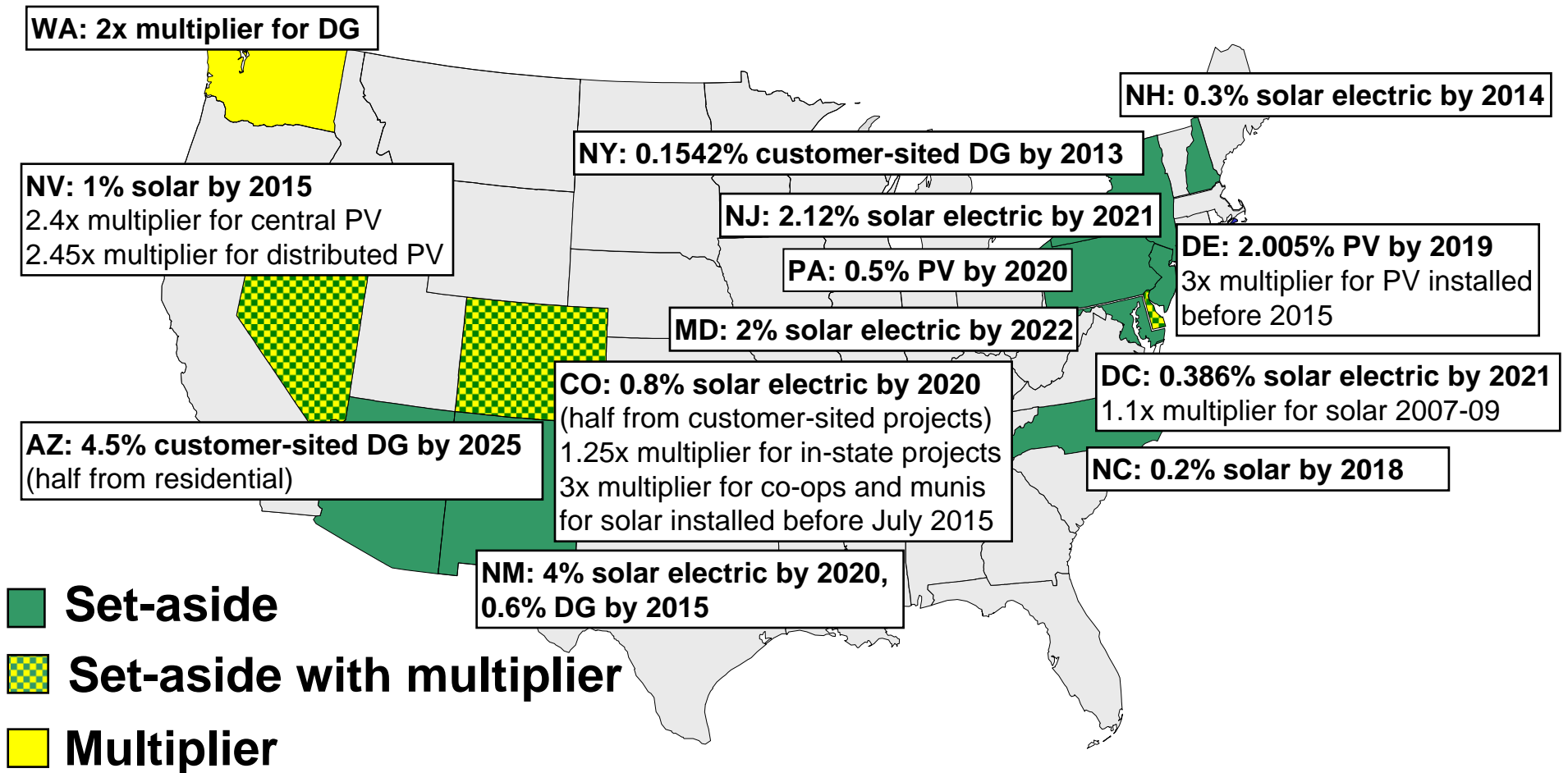
## **Solar Multiplier**

- Provides solar electricity more credit than other forms of generation towards meeting the RPS

Recent move towards set-asides (away from multipliers) due to greater success with these instruments

*State governments may also use direct financial incentives to encourage solar power either separate from an RPS (CA) or to support an RPS (NJ, NY)*

# Solar Incentives: Set-Asides in 11 States (and D.C.), Credit Multiplier in 1 Additional State



Solar thermal heating: counts towards RPS in HI, NV, AZ, TX, IL, PA, NH, DE, NC, and against solar/DG set-asides in AZ, NV, NC

# State RPS Set-Asides Can Be and Are Designed in Multiple Ways

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- Percentage targets and timeframes
- Solar-specific or broader DG eligibility
- Solar technology eligibility
  - Photovoltaics
  - Photovoltaics and solar thermal electric
  - Inclusion of solar heating and cooling
- In-state vs. out-of-state eligibility
- Requirements for customer-sited capacity
- Use of multipliers in addition to set-asides
- Cost caps, alternative compliance payments, etc.
- Oversight on contracting and incentives

# Select Design Elements of State Solar and DG Set-Asides

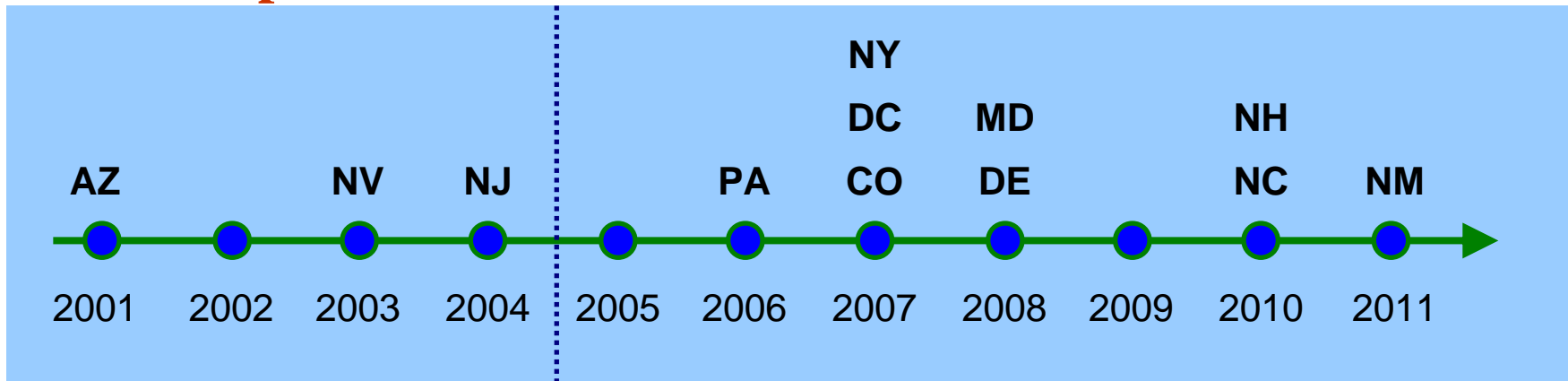
State	Year of First Compliance	Resource Eligibility			
		Photovoltaics	Solar Thermal Electric	Solar Heating and/or Cooling	Non-PV Dist. Generation
Arizona	2001	●	●	●	●
Colorado	2007	●	●		
Delaware	2008	●			
Maryland	2008	●	●		
Nevada	2003	●	●	●	
New Hampshire	2010	●	●		
New Jersey	2004	●	●		
New Mexico	2011	●	●		●
New York	2007	●			●
North Carolina	2010	●	●	●	
Pennsylvania	2006	●			
Washington D.C.	2007	●	●		

# Development of State RPS Set-Asides: Experience Remains Limited

**Only three states have had more than two years of experience with a solar/DG set-aside so far:**

- Arizona
- Nevada
- New Jersey

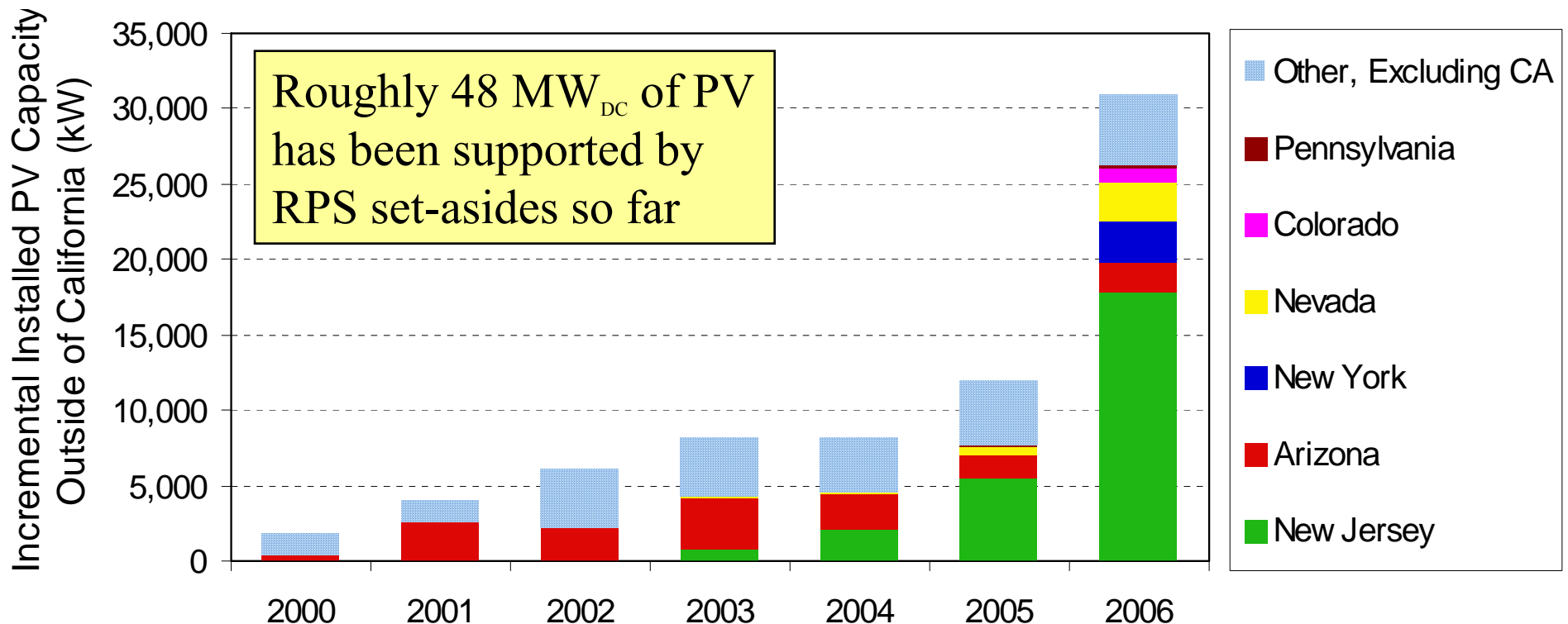
## First Compliance Year of State RPS Set-Asides



# Impact of State RPS Set-Asides on PV Has Already Been Substantial

Excluding CA, **67%** of 2000-06 PV additions (and 85% of 2006 additions) came from states with an active solar RPS (including CA, figures drop to 16% cumulative and 26% in 2006)

**Annual PV Additions Driven by Solar Share Requirements,  
Compared to Other (non-California) PV Installations**



# State RPS Set-Asides Have Kick-Started Solar Thermal Electric Development

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**Arizona:** 1 MW Saguaro Solar Station came online in 2006; nation's first parabolic trough power plant built since 1990

**Nevada:** 64 MW Nevada Solar 1 was commissioned in 2007 to help meet the Nevada RPS

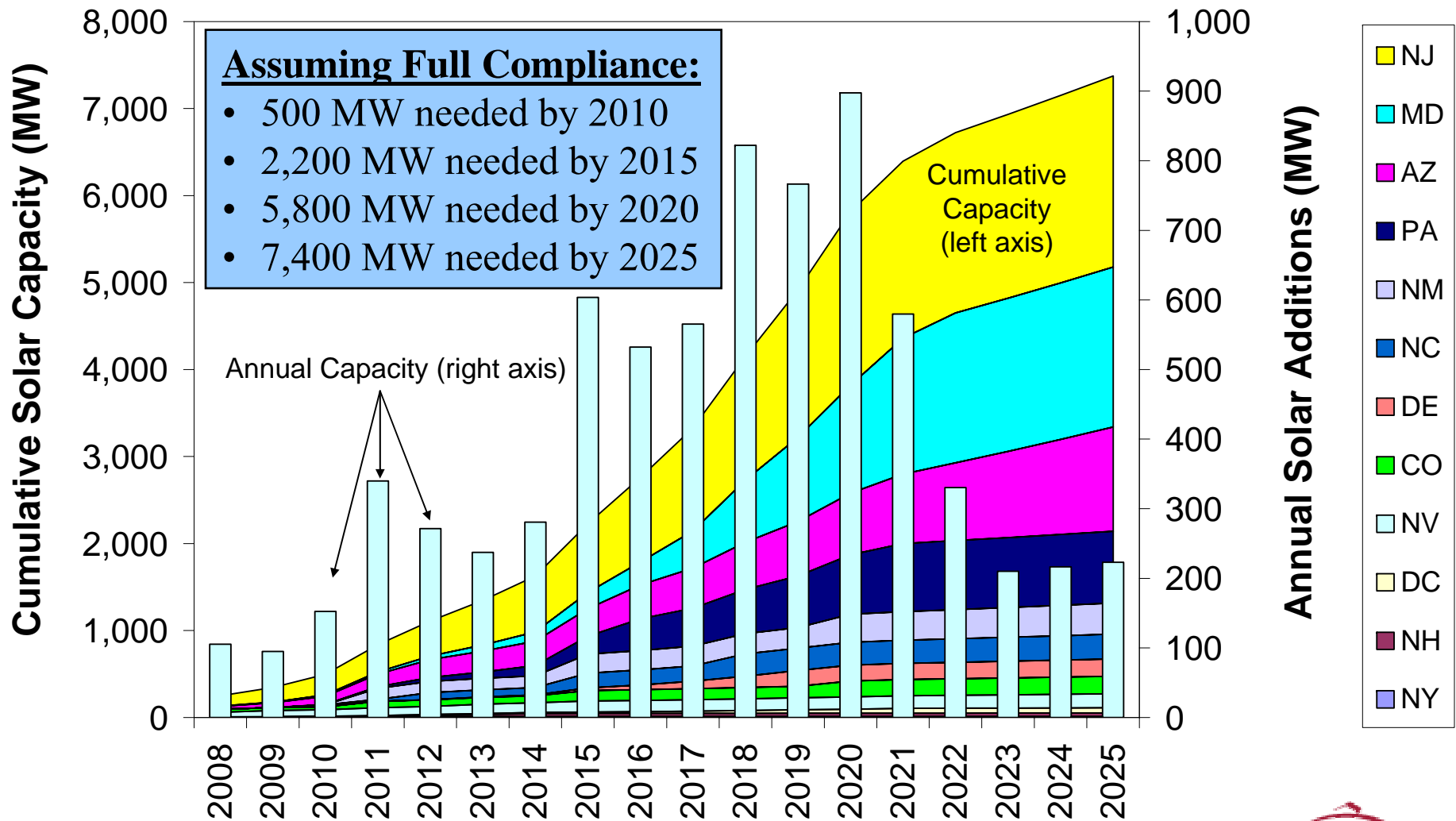


# Status of Utility-Scale Solar-Thermal Electric Facilities Proposed in the U.S.

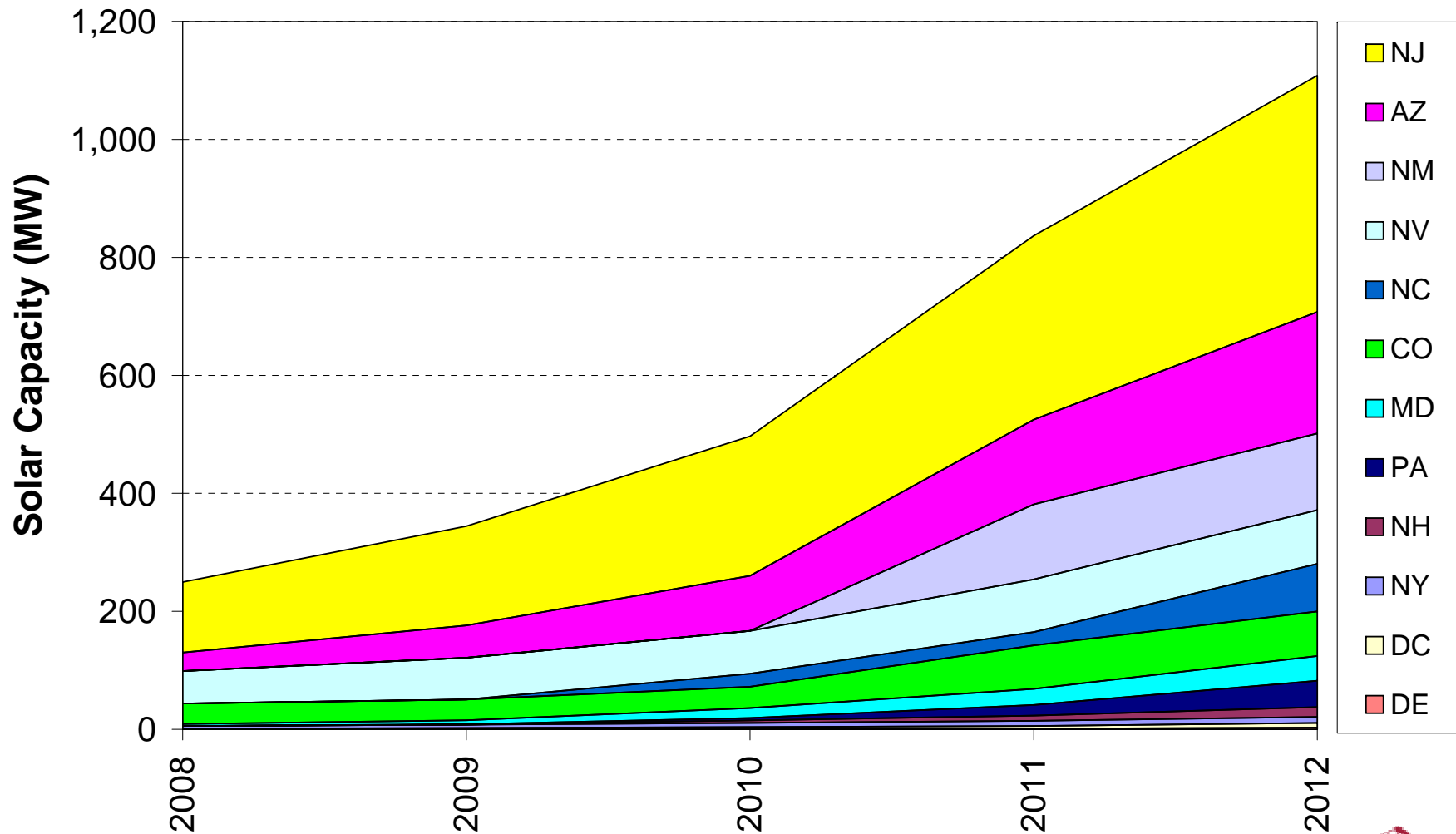
Most projects motivated by a solar set-aside or, in California, by a traditional RPS design

Purchaser	Developer	State	Project Size	Status	Motivation
Nevada Power	Acciona	Nevada	64 MW	Operational	Solar set-aside
Arizona Public Service	Acciona	Arizona	1 MW	Operational	Solar set-aside
Pacific Gas & Electric	Solel	California	554 MW	Contracted	General RPS
Pacific Gas & Electric	Ausra	California	177 MW	Contracted	General RPS
Southern California Edison	Stirling Energy Systems	California	500 – 850 MW	Contracted	General RPS
San Diego Gas & Electric	Stirling Energy Systems	California	300 – 900 MW	Contracted	General RPS
San Diego Gas & Electric	Bethel	California	49 MW	Contracted	General RPS
San Diego Gas & Electric	Bethel	California	49 MW	Contracted	General RPS
Pacific Gas & Electric	BrightSource	California	500 MW	Announced	General RPS
Florida Power & Light	Ausra	Florida	10 – 300 MW	Announced	Not stated

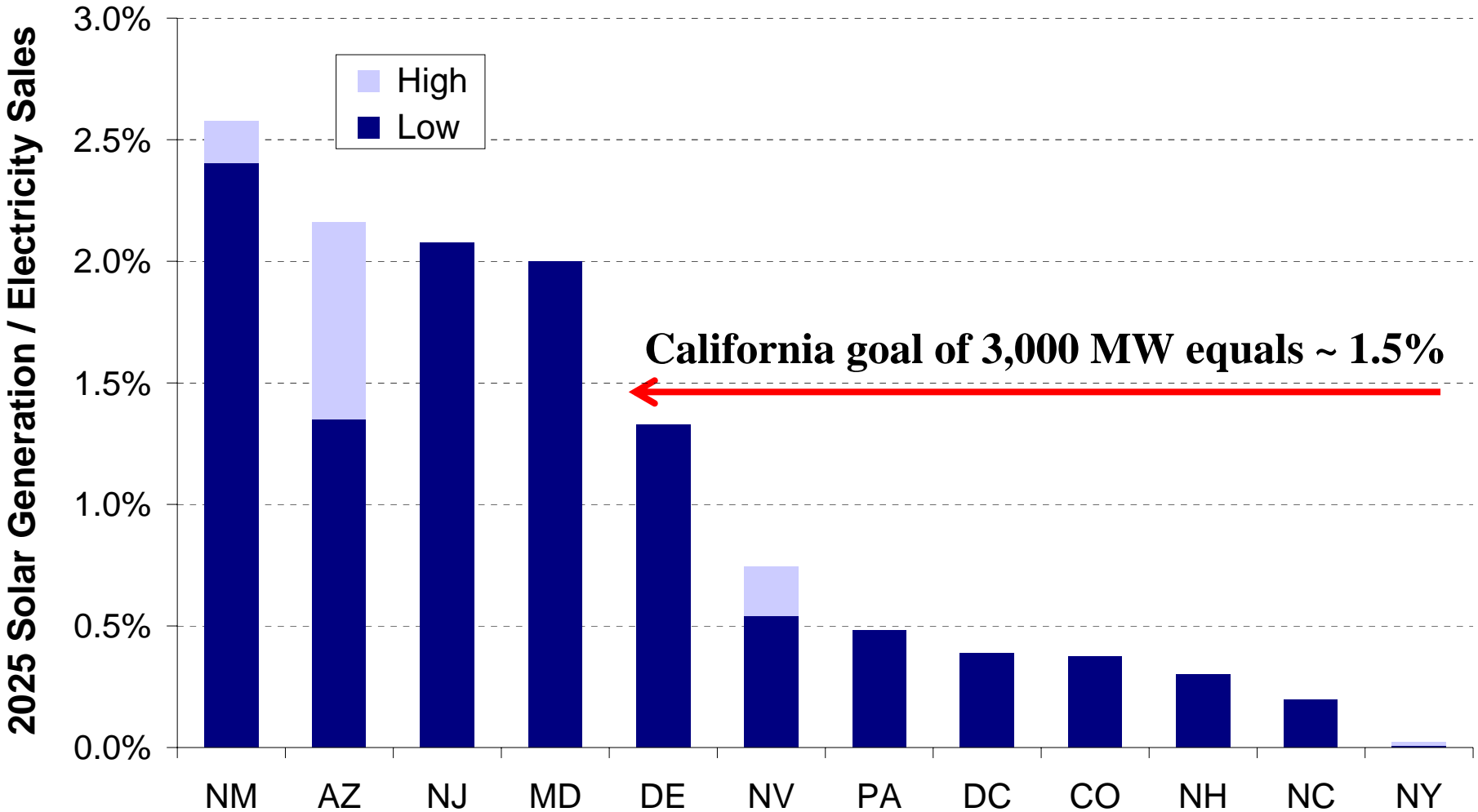
# The Future Impact of Existing State RPS Set-Asides on Solar Could Be Sizable



# Largest RPS Markets for Solar in Near-Term Include NJ, AZ, NM, NV, NC, CO



# Most Aggressive States, in Required Solar as a % of Sales, Include NM, AZ, NJ, MD



# Without Careful Design of Set-Asides, this Solar Growth May Not Occur

Major design considerations that impact the effectiveness and cost of solar under a set-aside include...

Broader DG set-aside	Competition with other resources makes market size for solar uncertain (AZ, NY)
Cost caps/ACPs/limiters	Required target may not be achieved (NH, DE, DC, MD ACP; NC, NJ, CO, MD, NM cost cap; PA, NV force majeure; NY, AZ funding limit)
Credit multipliers	Reduces effective solar % (NV, DE, CO)
Eligibility of solar thermal electric	Affects fate of PV (PA and DE only allow PV; NV provides extra credit to PV)
Eligibility of utility-scale solar	Affects fate of customer-sited installations (AZ, CO, NM, NY all have DG requirements)

# Contracting and Incentive Policies Are Critical to the Success of a Set-Aside

Reliance on short-term REC purchases to meet solar RPS likely to be costly and ineffective, given political risk; of most concern in states with retail electric competition

- **Long-term REC contracting**
  - Implicit Encouragement: NJ (8 year ACP schedule; investigate securitization)
  - Strict Requirements: MD (>15 yrs), NC (as long as needed by generator), CO (>20 yrs), NV (>10 yrs)
- **Up-front payments for smaller PV systems**
  - CO, NV, AZ, NJ, NY, MD

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# Conclusions

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- Traditional RPS designs will do little to support customer-sited PV in the near term
- State RPS policies that include solar or DG set-asides are becoming more popular, and are increasingly driving solar development
- RPS policies that only have credit multipliers for solar have not yet seen significant solar additions
- Importance of RPS for the solar industry suggests need for greater focus on design details