
The Treatment of Solar Electricity in Renewables Portfolio Standards

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Presentation Overview

1. Overview of RPS Policies and Proposals
2. The “Problem” for Solar Electricity
3. EIA Analysis of Federal RPS Proposals
4. State RPS Experience with Solar
5. Conclusions

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

What Is a Renewables Portfolio Standard?

Renewables Portfolio Standard (RPS):

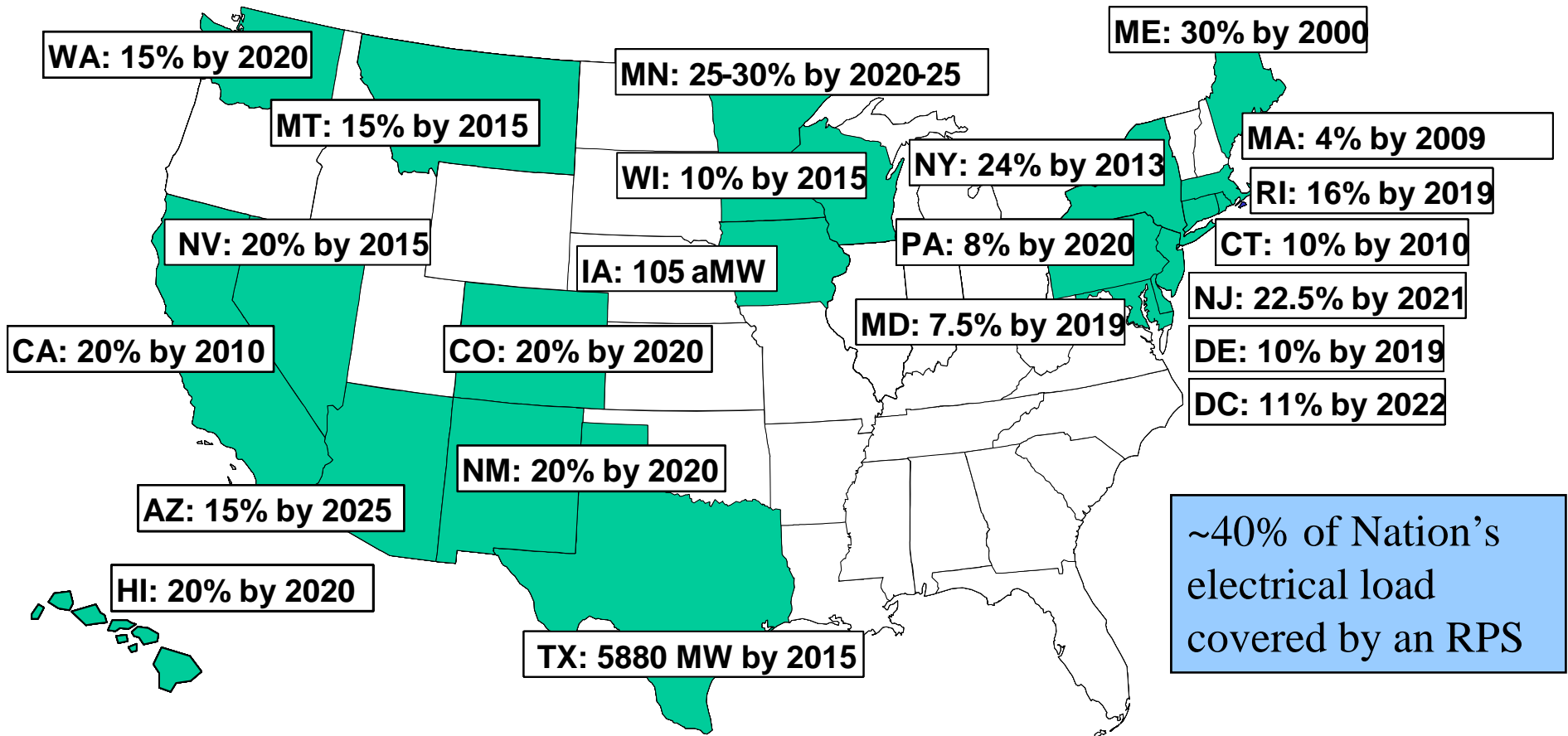
- A requirement on retail electric suppliers...
- to supply a minimum percentage or amount of their retail load...
- with eligible sources of renewable energy.

Typically backed with penalties of some form

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

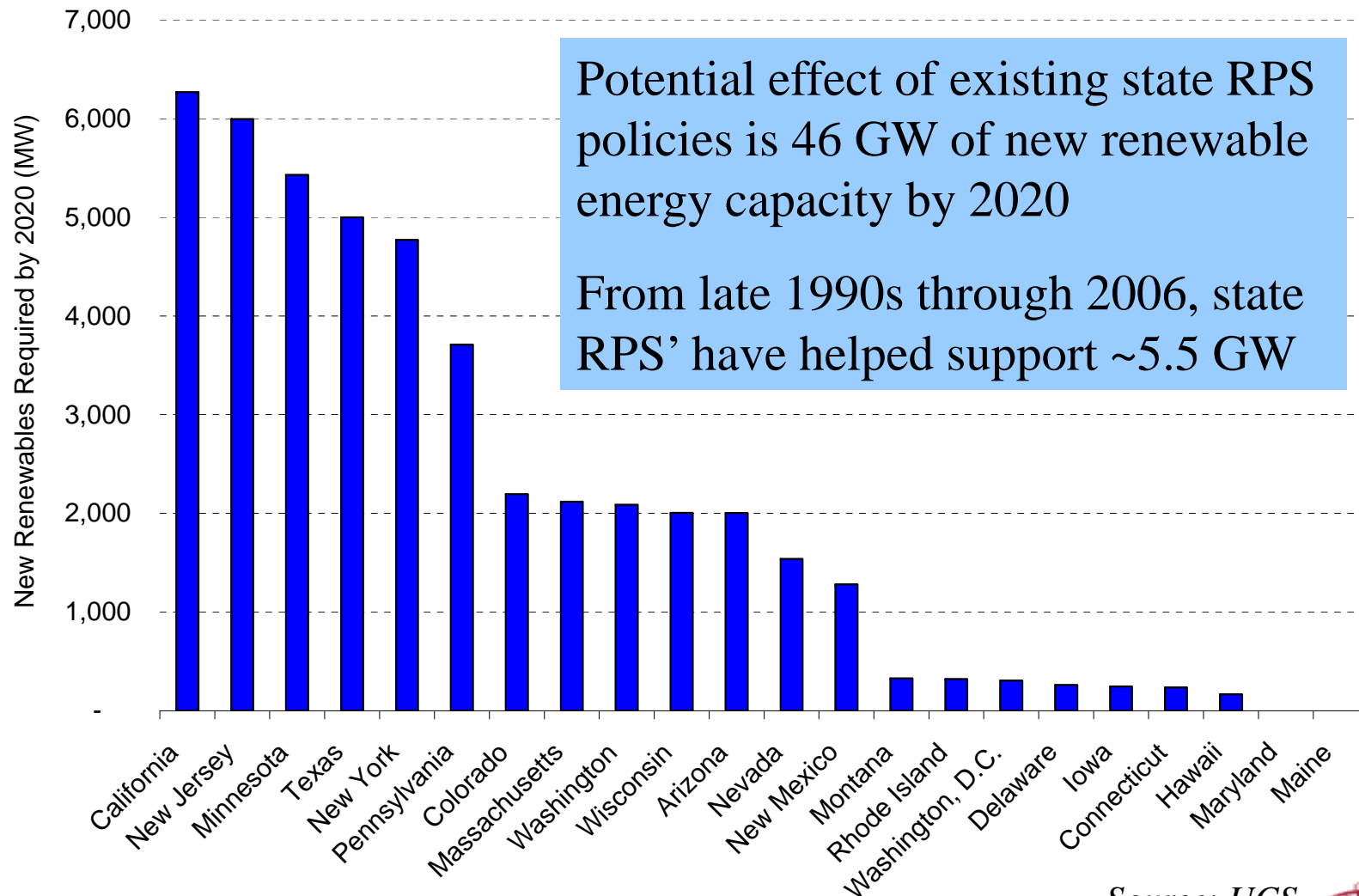
Never designed the same in any two states

State RPS Policies: 21 States and D.C.



Additional renewable energy “goals” established in IL, IA, VT, and ME

Actual and Expected Impacts of State RPS Policies on Renewable Energy Are Sizable



Source: UCS

Federal RPS Proposals

- Federal RPS policies have been proposed on numerous occasions, and by many different parties, but have not been signed into law
- Sen. Bingaman federal RPS proposals have passed Senate on multiple occasions
- Standard levels of 10-20% have been discussed, but with numerous exemptions
- Design details vary among Federal RPS proposals, but result could be far more renewable energy additions than under state RPS policies alone

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The Problem for Solar Electricity Under Traditional State or Federal RPS Policies

- RPS can be effective in supporting the least-cost renewable energy projects
- Traditional RPS design is not likely to provide adequate support for emerging technologies, and smaller projects, due to...
 - Cost barriers
 - Solicitation barriers
- Unique aspects of solar therefore imply that a traditional RPS is unlikely to provide much support for customer-sited solar, in particular

Issues Associated with the Treatment of Solar Electricity in RPS Requirements

- 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 efficient mechanisms exist to trade small quantities of RECs?

- Solar Support

- Does the RPS contain a solar share or credit-multipliers?

Presentation assumes that these issues are adequately resolved

Remainder of presentation focuses on this, as these issues critically affect how solar fares under an RPS

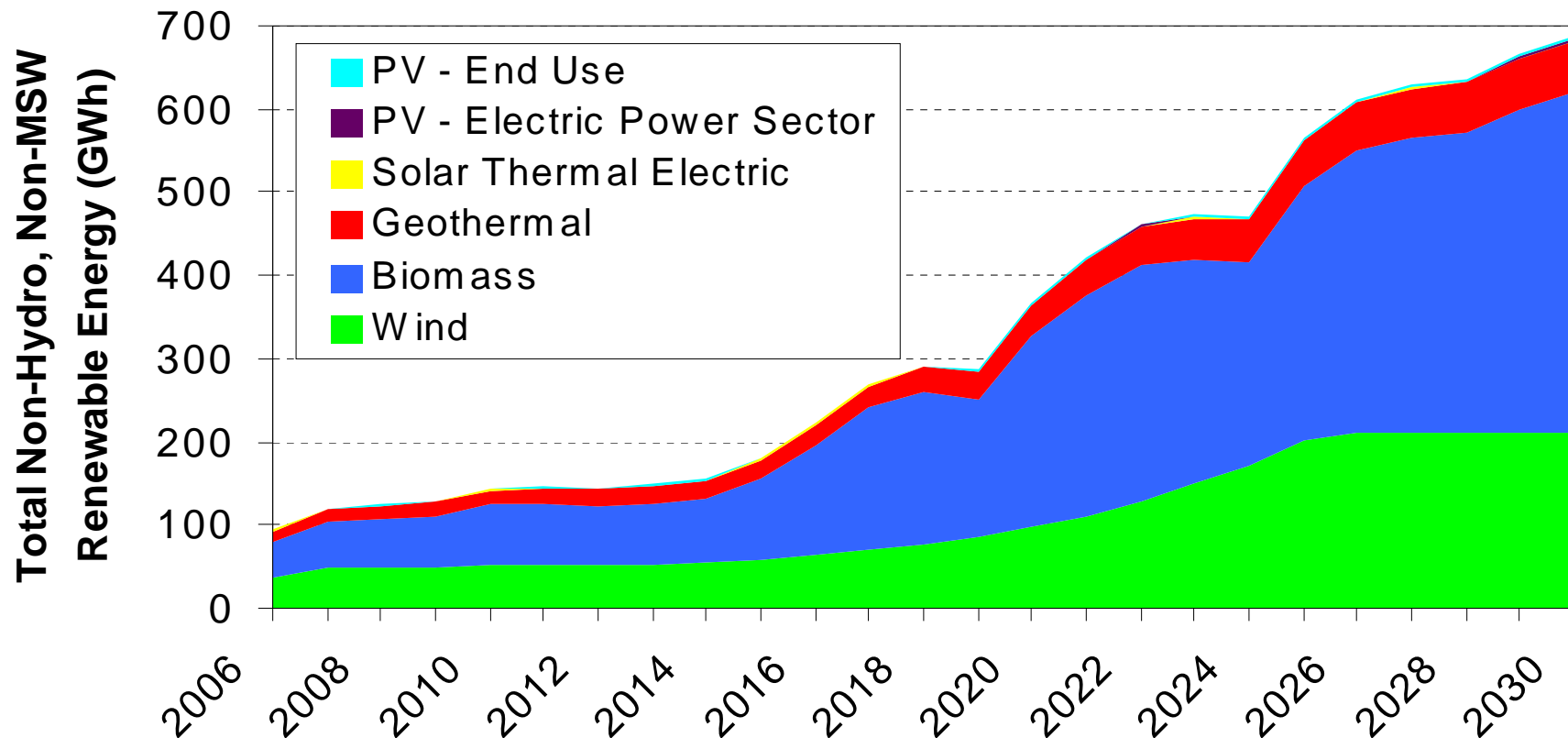
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EIA Analysis of Federal RPS Proposals

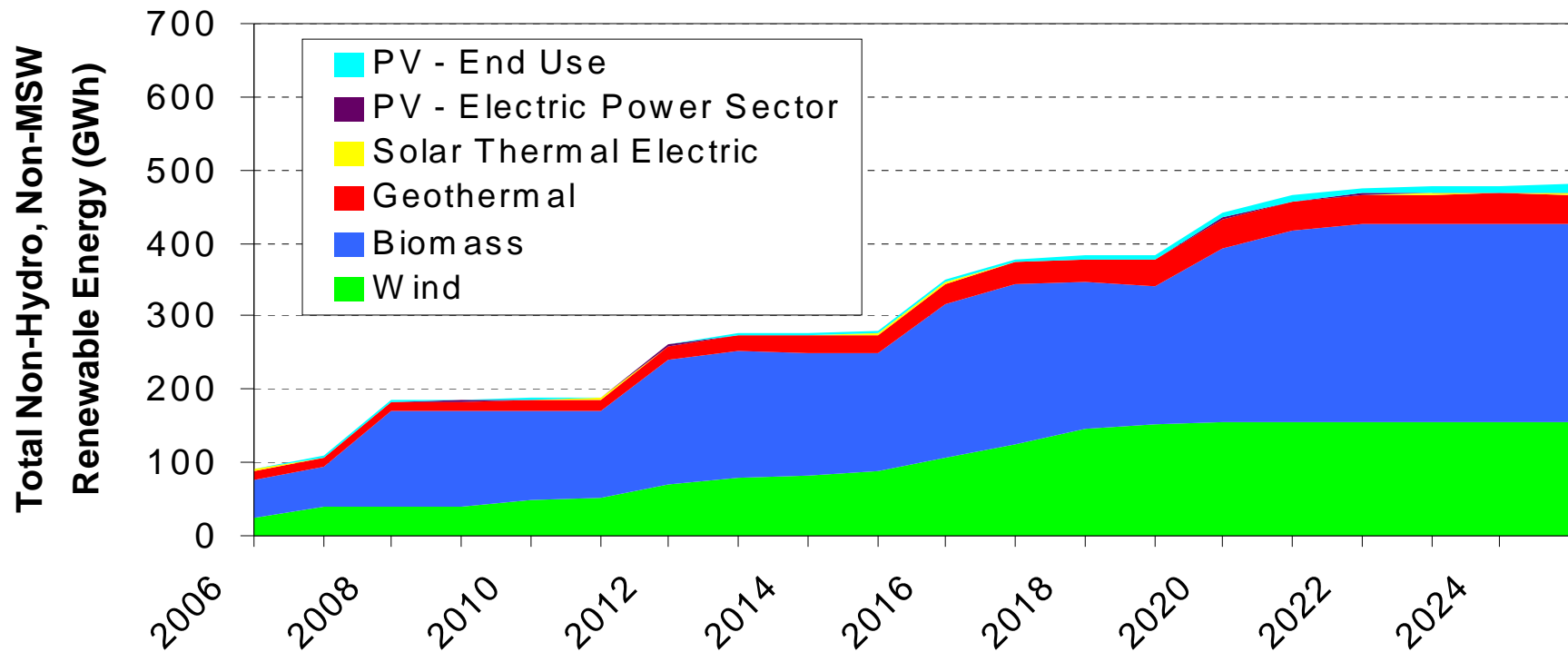
- U.S. Energy Information Administration (EIA) has analyzed potential impacts of Federal RPS proposals, including:
 - 2007 analysis of proposed clean energy standard from Sen. Coleman
 - 20% standard includes renewable energy, nuclear, carbon capture-and-storage, carbon sequestration; no special treatment for solar
 - 2005 analysis of proposed RPS from Sen. Bingaman
 - 10% standard for renewable energy; 3x credit for small distributed generation projects, including solar
- Both separate potential impacts into three categories:
 - solar thermal electric
 - central-station PV used in the electric power sector
 - end-use PV used in grid-connected customer applications
- Both analyses show that solar is unlikely to fare well under a traditionally designed Federal RPS

Coleman Clean Energy Standard: Virtually No Incremental Solar Generation



By 2030, EIA estimates just 1.7 GW of end-use PV, 0.4 GW of utility-scale PV, and 0.6 GW of solar-thermal electric capacity under Coleman proposal; no incremental capacity or generation relative to AEO 2006 reference case

Bingaman Renewables Portfolio Standard: Little Incremental Solar Generation



By 2025, EIA estimates just 5.5 GW of end-use PV, 0.4 GW of utility-scale PV, and 0.5 GW of solar-thermal electric capacity

Higher estimates of distributed PV than Coleman because of triple credit provided for end-use PV

Conclusions from Federal RPS Analysis

- Federal RPS could substantially increase renewable energy supply, but...
- Traditionally designed RPS unlikely to yield substantial increases in solar electric generation
- Credit multipliers, such as Bingaman's 3x credit for distributed solar, can increase the chances that solar will benefit from an RPS, but even this proposal yields relatively little incremental solar because the credit multiplier is not high enough to spur large increase in sales

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Standard State RPS Designs Provide Little Support for Solar Energy

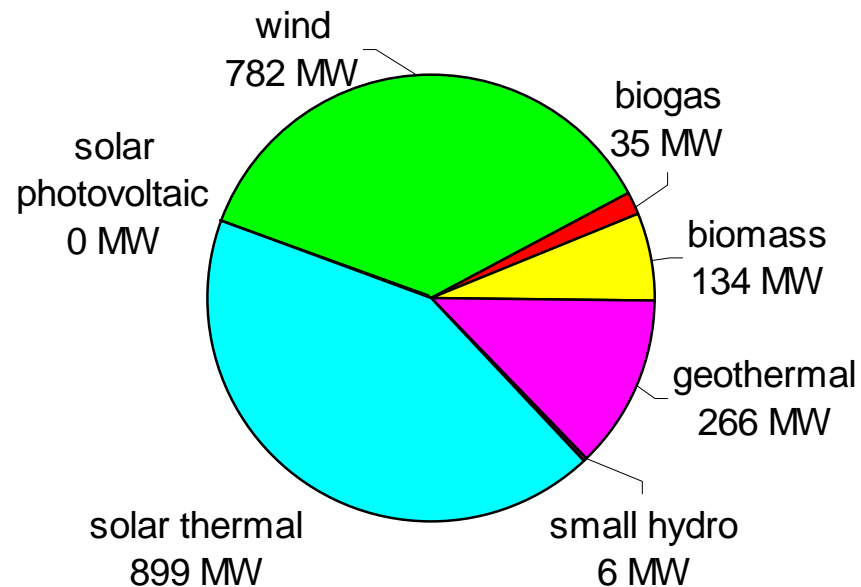
- 10 of the 22 state RPS policies in place today provide no differential support for solar/distributed energy
- Operational experience with these state policies largely confirms the EIA findings for Federal RPS proposals
 - ➔ RPS policies with no differential support for solar are unlikely to provide meaningful support to customer-sited or utility scale photovoltaics
 - ➔ With the exception of the desert Southwest, RPS policies with no differential support for solar are also unlikely to greatly benefit solar thermal electric generation

California: An Exception to the Rule?

The only state where meaningful solar activity is occurring *within an RPS that does not differentially support solar* is California, where the state's utilities have signed contracts with 899 MW + of solar thermal electric capacity [none yet built]

Separate from the RPS, the state is also aggressively supporting solar PV; this support, however, is not driven by the RPS

New, Repowered, or Re-Started Capacity, by Technology (minimum MW)



States that Support Solar within an RPS Do So in Two Ways

- **Solar Share/Set-Aside**

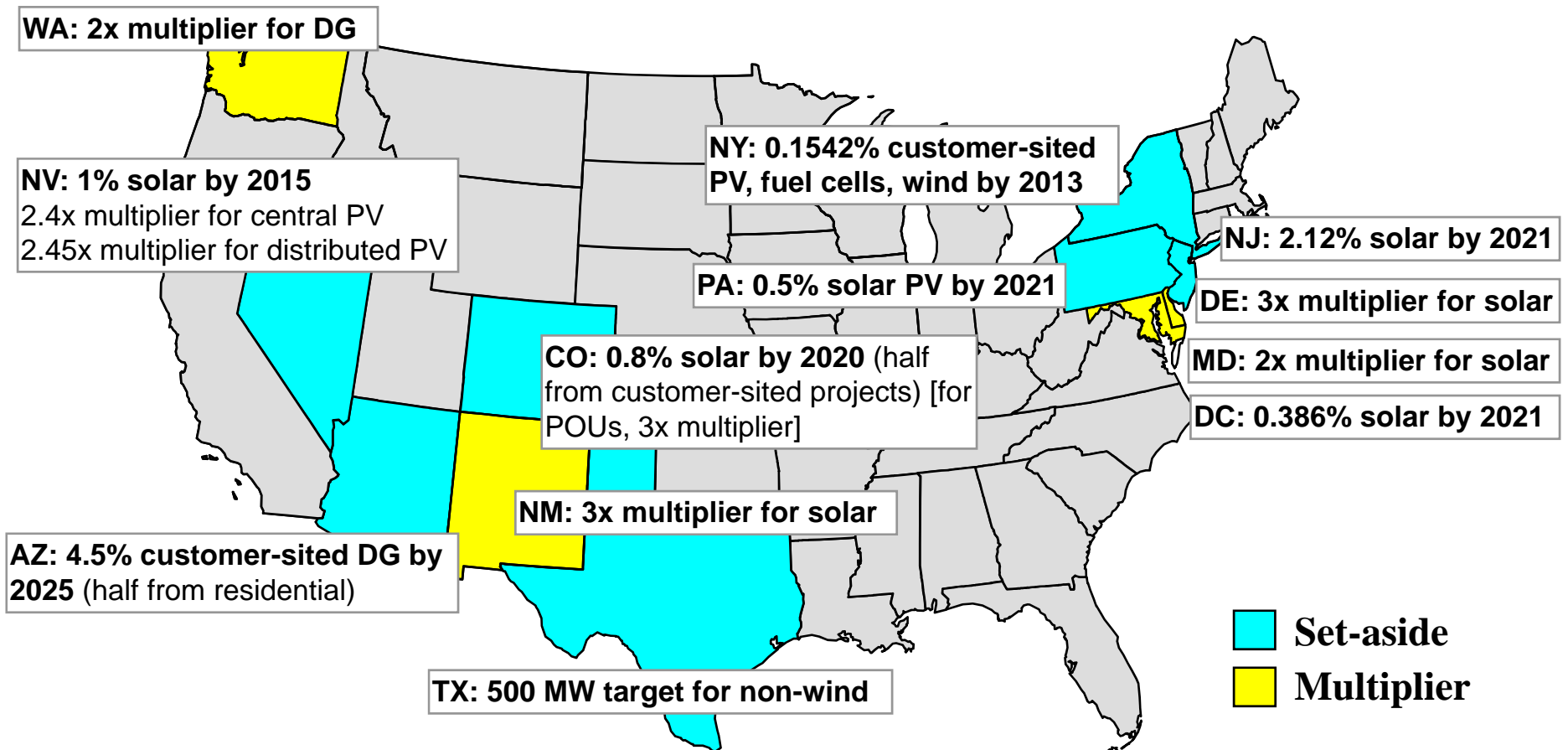
- A requirement that some portion of the RPS come from solar specifically, or distributed generation more broadly
- Can be designed in multiple ways, as state experience shows

- **Solar Multiplier**

- Provides solar electricity more credit towards an RPS than other forms of generation
- For example, a MWh of solar generation might count as 3 MWh towards the RPS

States may also use direct financial incentives to encourage solar power either separate from an RPS (CA) or under an RPS (NJ, NY)

Solar Incentives: Set Asides in 8 States, Credit Multipliers in 4 Additional States



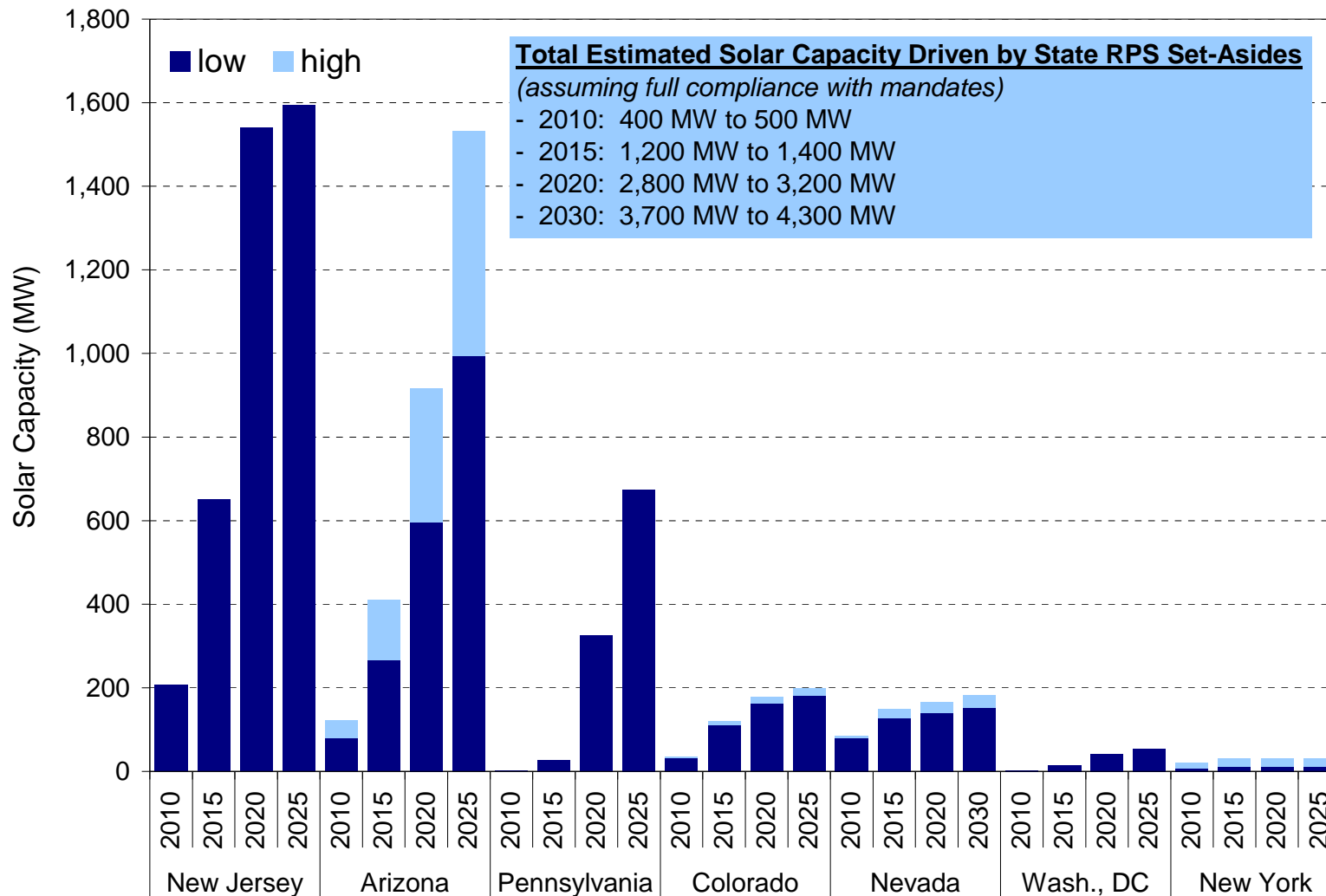
Early Results of Solar Incentives in State RPS Policies

- Credit Multipliers
 - WA: no real impact on solar to date, or expected
 - DE: no real impact on solar to date, or expected
 - MD: no real impact on solar to date, or expected
 - NM: some activity to support solar, but few results to show as of yet
- Solar Set Asides
 - NJ: 18 MW PV in 2006 (27 MW cumulative)
 - NY: 2.7 MW PV in 2006 (9 MW cumulative)
 - not significantly impacted by RPS set-aside, yet
 - AZ: 1.8 MW PV in 2006 (16 MW cumulative); 1 MW solar thermal plant
 - CO: 0.9 MW in 2006 (1.8 MW cumulative)
 - TX: 0.7 MW in 2006 (2.2 MW cumulative)
 - not significantly impacted by RPS set-aside, yet
 - NV: 2.6 MW in 2006 (3.5 MW cumulative); 64 MW solar thermal plant
 - DC: no real impact, yet
 - PA: no real impact, yet
- Note that many of the above states also offer direct financial support for solar, including (prominently) NJ and NY

Source: IREC, DRAFT

Projecting the Future Market Impacts of Existing State Solar Set Asides

(Assuming Full Compliance with Existing RPS Standards)



Lessons Learned

- Sizable solar markets typically exist in states that have:
 - Solar set-asides within their RPS policies
 - Solar incentive programs outside of RPS
- States that only have credit multipliers for solar, but no solar share requirement, have not yet seen significant solar additions, especially customer-sited solar
 - Partly reflects fact that credit multipliers have not been large enough to spur heightened interest
 - Also reflects fact that customer-sited solar projects face solicitation barriers due to their small individual size
- Bottom line: for an RPS to significantly benefit solar, especially PV, a solar share requirement appears necessary; or else multipliers must be set at higher levels, with overt action to remove contracting barriers for small, customer-sited projects

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Conclusions

- RPS policies are a major driver for renewable energy additions in the United States
- A Federal RPS may, if enacted, substantially increase this growth
- Standard RPS designs do little to support solar energy, especially customer-sited photovoltaics
- To encourage solar within an RPS, either solar share requirements or multipliers may be used; alternatively, direct financial incentives might be used
- Evidence suggests that solar share requirements (or direct financial incentives) are likely to be more effective than multipliers in growing the solar market within an RPS