New Hampshire Public Utilities Commission
2011 RPS Review

The Status of State RPS Efforts

- Observations & Trends -

Mark Sinclair
Clean Energy States Alliance
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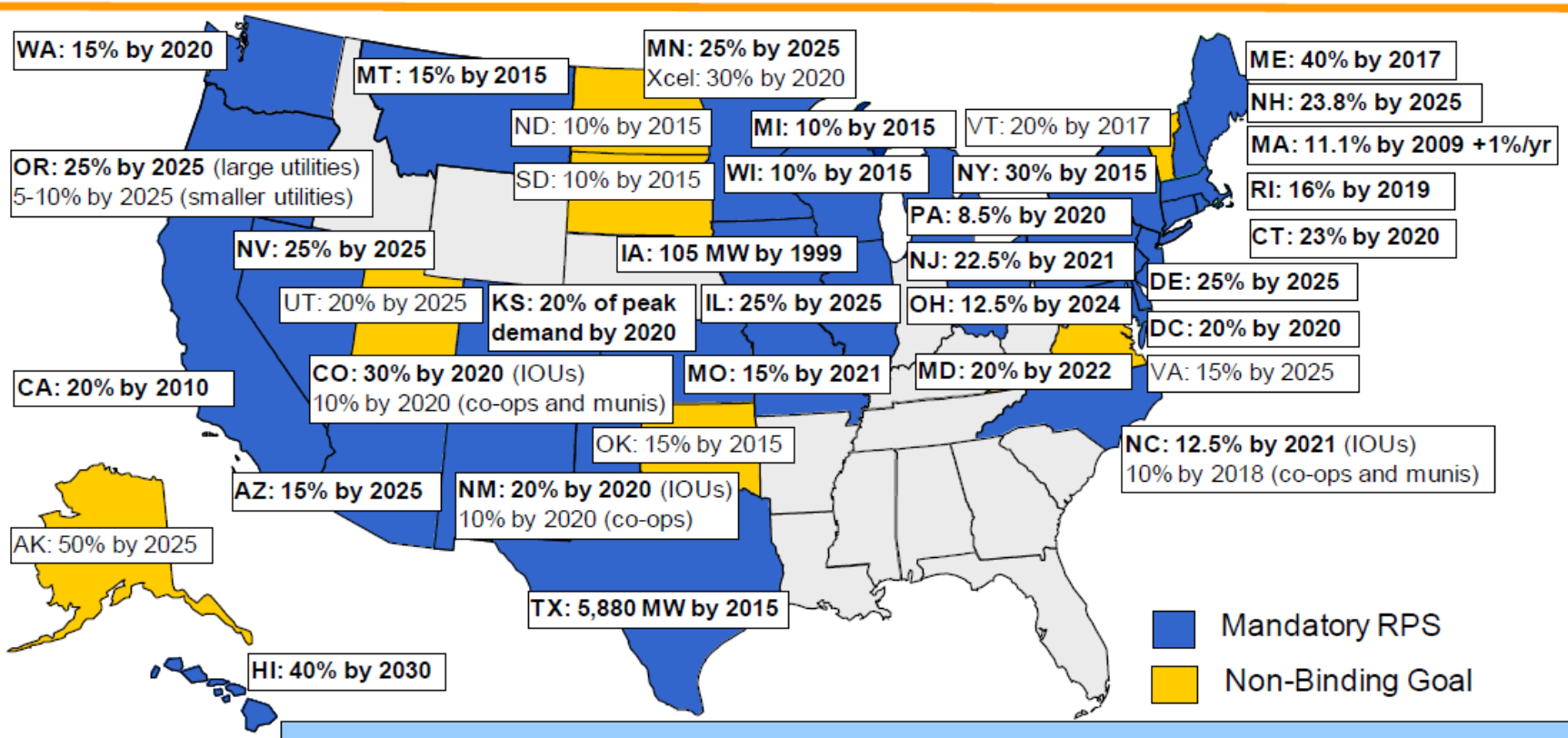
State RPS Policies: 29 States and D.C. (7 More States Have Non-Binding Goals)



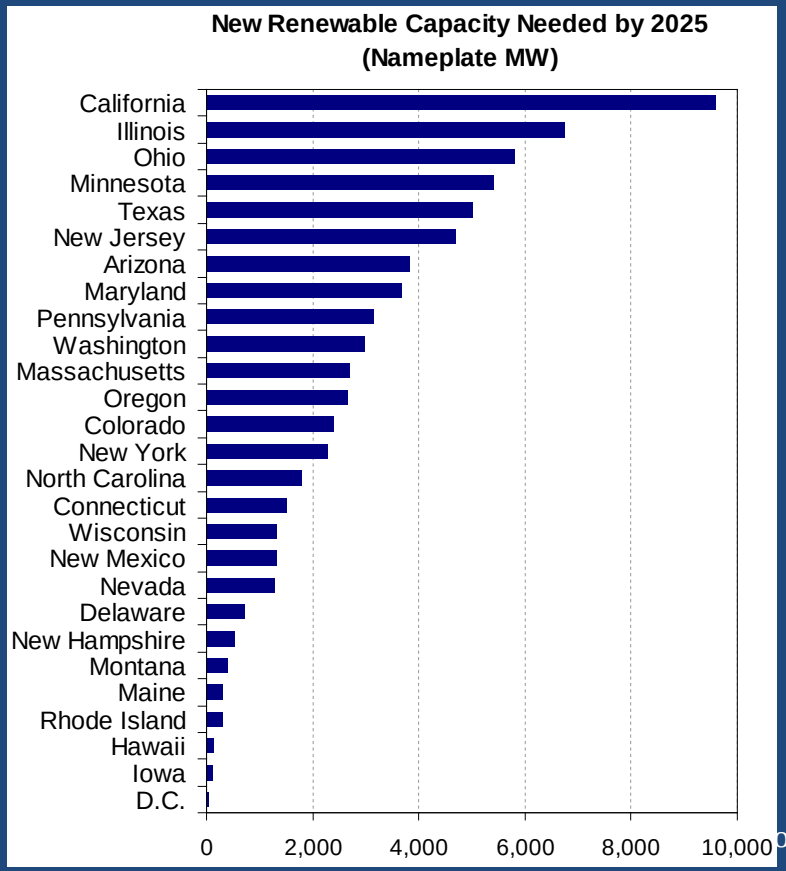
Source: Berkeley Lab

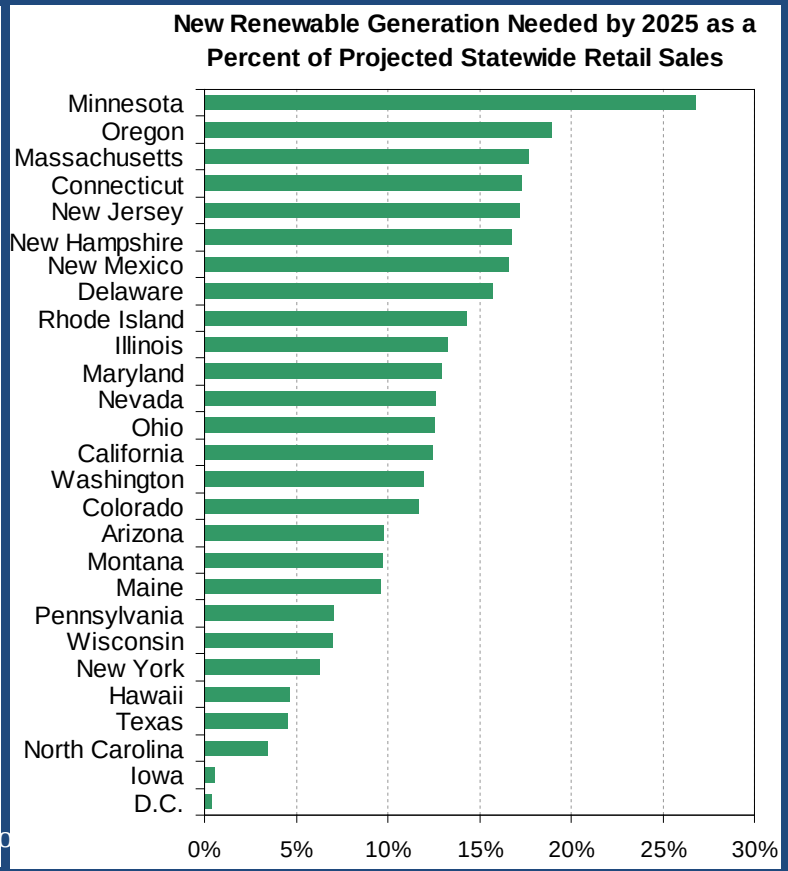
Existing RPS policies will apply to **56%** of U.S. electricity demand once fully implemented; require **73 GW** of new RE capacity by 2025

Of the 37 GW of RE capacity added from 98-09, **23 GW** occurred in states with active or impending RPS compliance obligations

Future Impacts of Existing State RPS Policies Are Projected To Be Relatively Sizable

- Roughly 71 GW of new renewables capacity by 2025, if full compliance is achieved (increases to 88 GW including all non-binding renewable targets)
- The 71 GW would represent ~5.5% of total U.S. generation in 2025
- 18% of projected load growth from 2000-2025 met by this new generation





State RPS Policies Feature Significant Design Differences

- Renewable purchase targets and timeframes
- Eligibility of different renewable technologies
- Whether existing renewable projects qualify
- Treatment of out-of-state generators
- Whether tech. set-asides or other tiers are used
- Use of credit multipliers for favored technologies
- Allowance for RECs, and REC definitions
- Methods to enforce compliance
- Existence and design of cost caps
- Compliance flexibility rules, and waivers from compliance
- Contracting requirements
- Compliance filing and approval requirements
- Compliance cost recovery
- Role of state funding mechanisms

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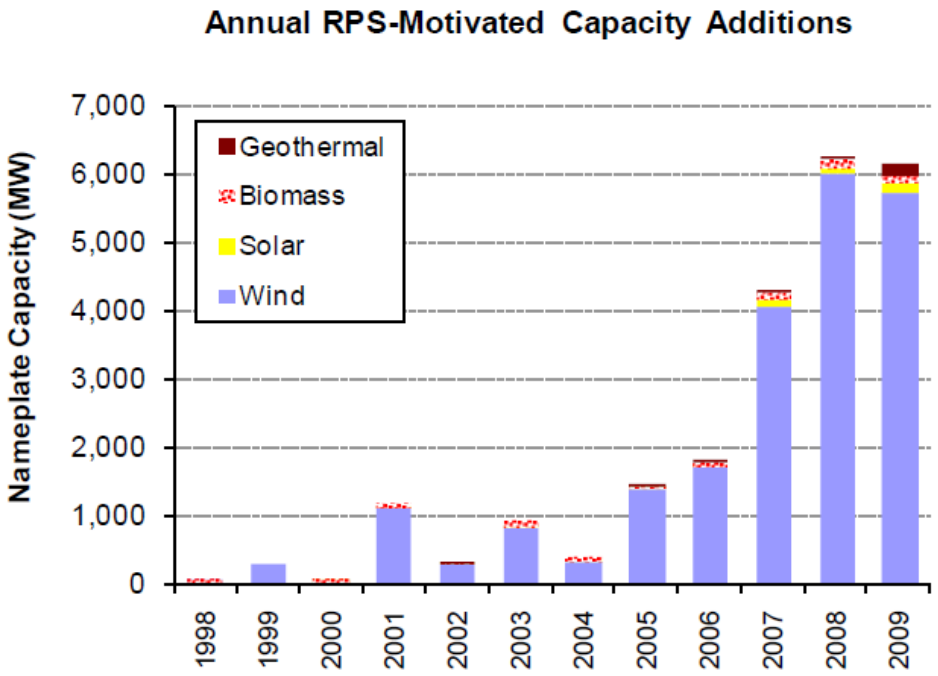
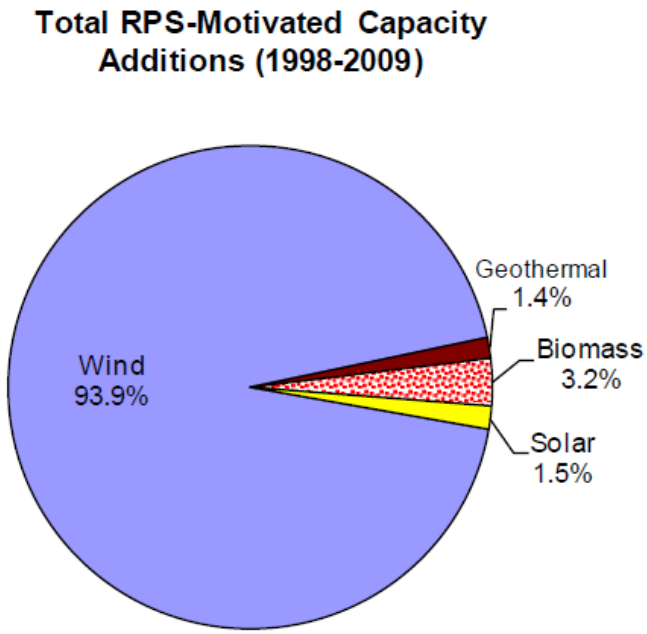
Trends Among Recently Established or Revised RPS Programs

- Increased stringency of RPS renewable energy purchase targets
- Expanded use of resource-specific set-asides, especially for solar power
- Increased requirement for long-term contracting

State RPS' Have Largely Supported Wind: Resource Diversity Limited So Far

RPS-Motivated* Renewable Energy Capacity Additions from 1998-2009, by Technology Type





*Renewable additions are counted as "RPS-motivated" if and only if they are located in a state with an RPS policy and commercial operation began no more than one year before the first calendar year of RPS compliance obligations in the host state.

RPS Policies Are Increasingly Being Designed to Support Resource Diversity

Set Asides: A requirement that some portion of the RPS come from certain technologies, technology types, or applications

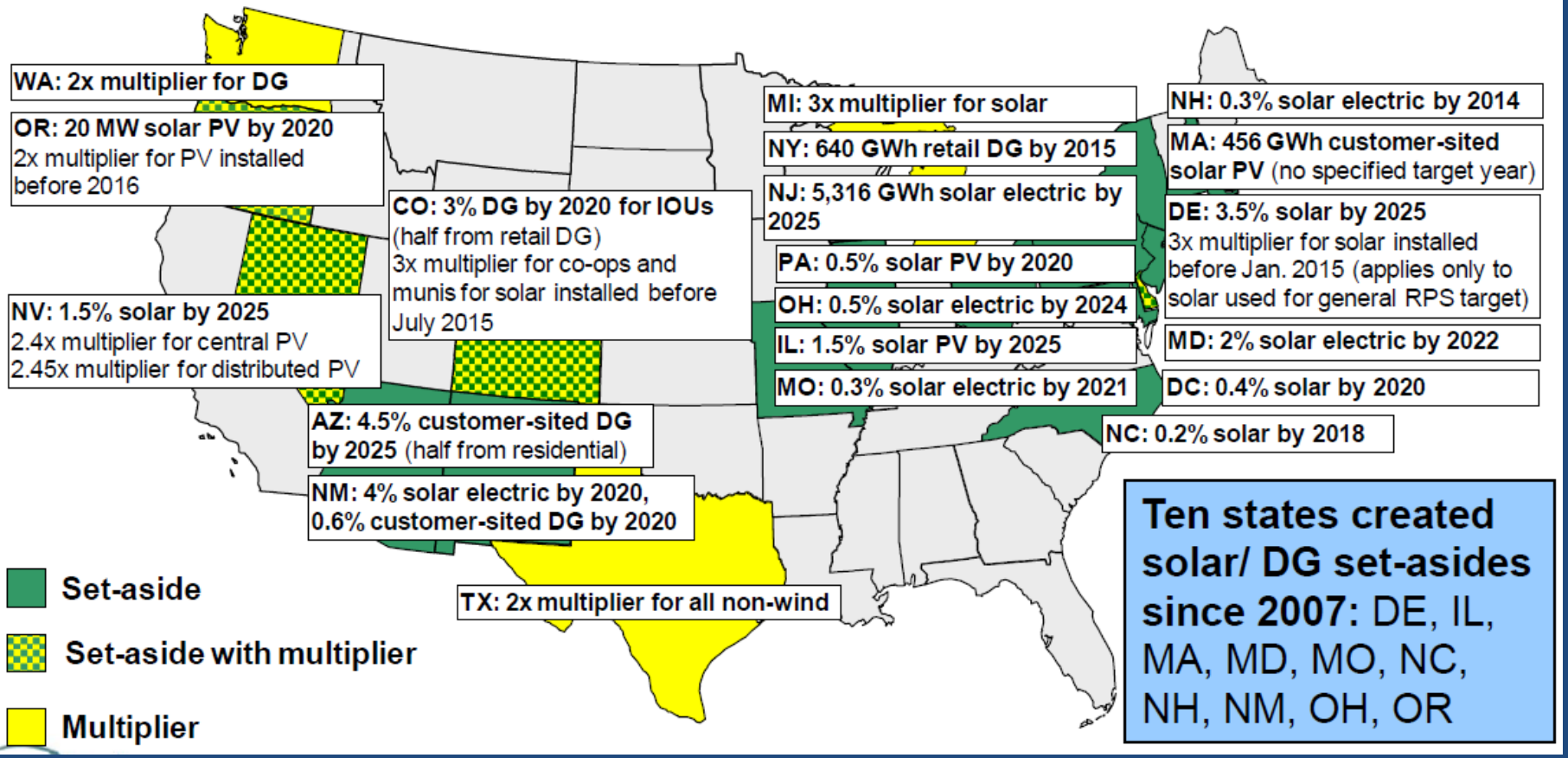
Credit Multipliers: Provides selected technologies or applications more credit than other forms of generation towards meeting the RPS

Set-Asides			Credit Multipliers
General Technology	**Specific Technology**	**Specific Application**	
Class I vs. II: CT, DC, MA, MD, ME, NJ	Solar Energy: DC, DE, IL, MA, MD, MO, NC, NH, NJ, NM, NV, OH, OR, PA Wind Energy: IL, ME (goal), MN, NJ (offshore), NM Existing Biomass/Methane: NH Existing Hydropower: NH Geothermal or Biomass: NM Swine Waste: NC Poultry Waste: NC Non-Wind: TX (goal)	Distributed Generation: AZ, CO, NM, NY Community Ownership: MN (goal), MT (wind), OR (goal, community and small scale)	Solar Energy: DE (general RPS), MI, CO (POUs), NV (PV), OR Wind Energy: DC, MD, DE (offshore) Methane: DC, MD Fuel Cells: DE Waste Tires: NV Non-Wind: TX Distributed Generation: NV (PV), WA Community Ownership: CO, ME

No differential support CA, IA, KS, WI

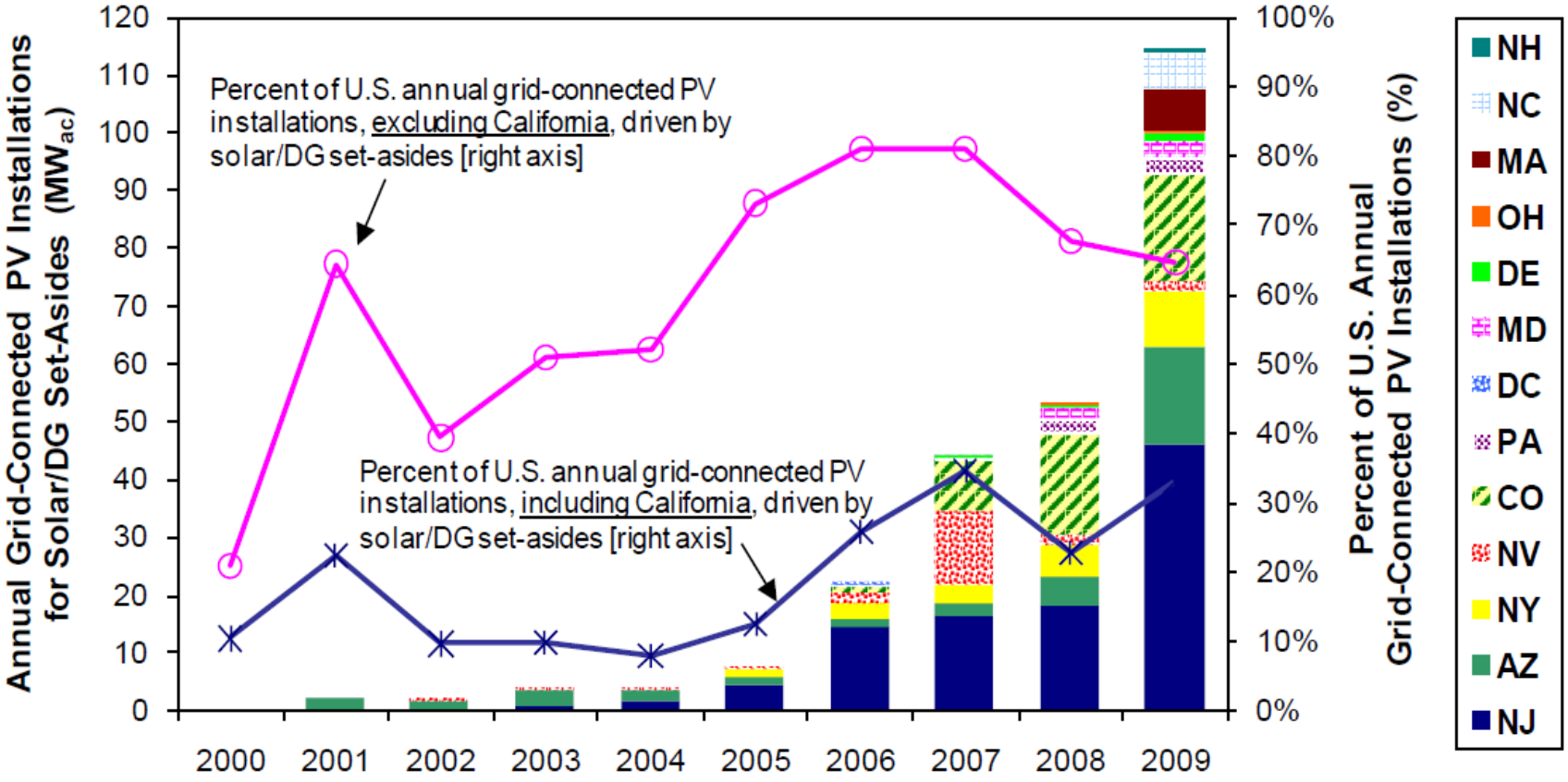
Solar/DG-Specific RPS Designs Becoming Common Nationwide

16 states & D.C. have solar or DG set-asides, sometimes combined with credit multipliers; 3 other states only have credit multipliers



Ten states created solar/ DG set-asides since 2007: DE, IL, MA, MD, MO, NC, NH, NM, OH, OR

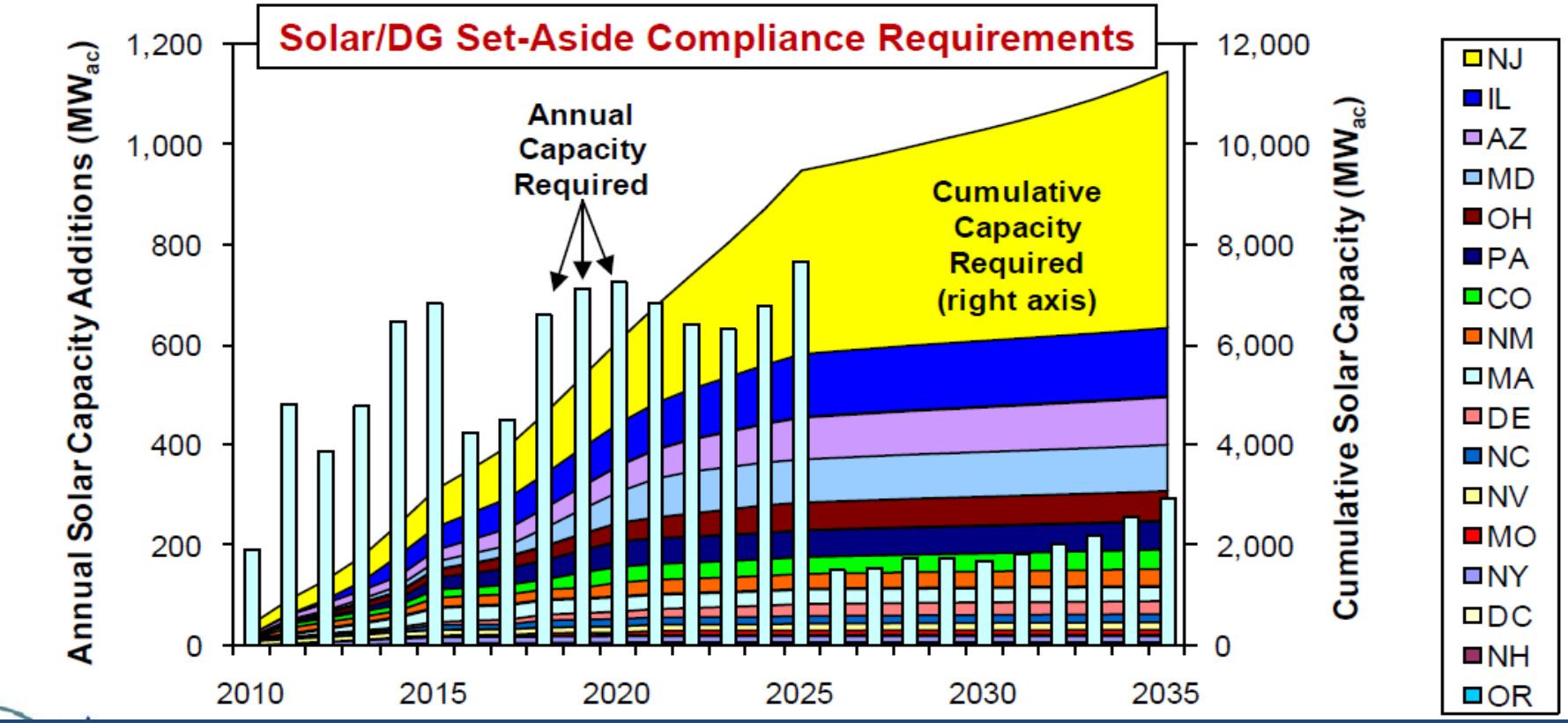
Impact of Solar/DG Set-Asides Is Growing: 253 Mw_{ac} of PV from 2000-2009



** PV additions are counted as being motivated by a solar/DG set-aside if and only if they are located in a state with an solar/DG set-aside policy and installation occurred no more than one year before the first calendar year of set-aside compliance obligations in the host state. The only exception is the 10 MWac El Dorado PV project installed in Nevada in 2008; the electricity generated by this project is being sold into California, and therefore is not attributed to Nevada's set-aside. Data on annual state PV capacity provided by Larry Sherwood (IREC).*

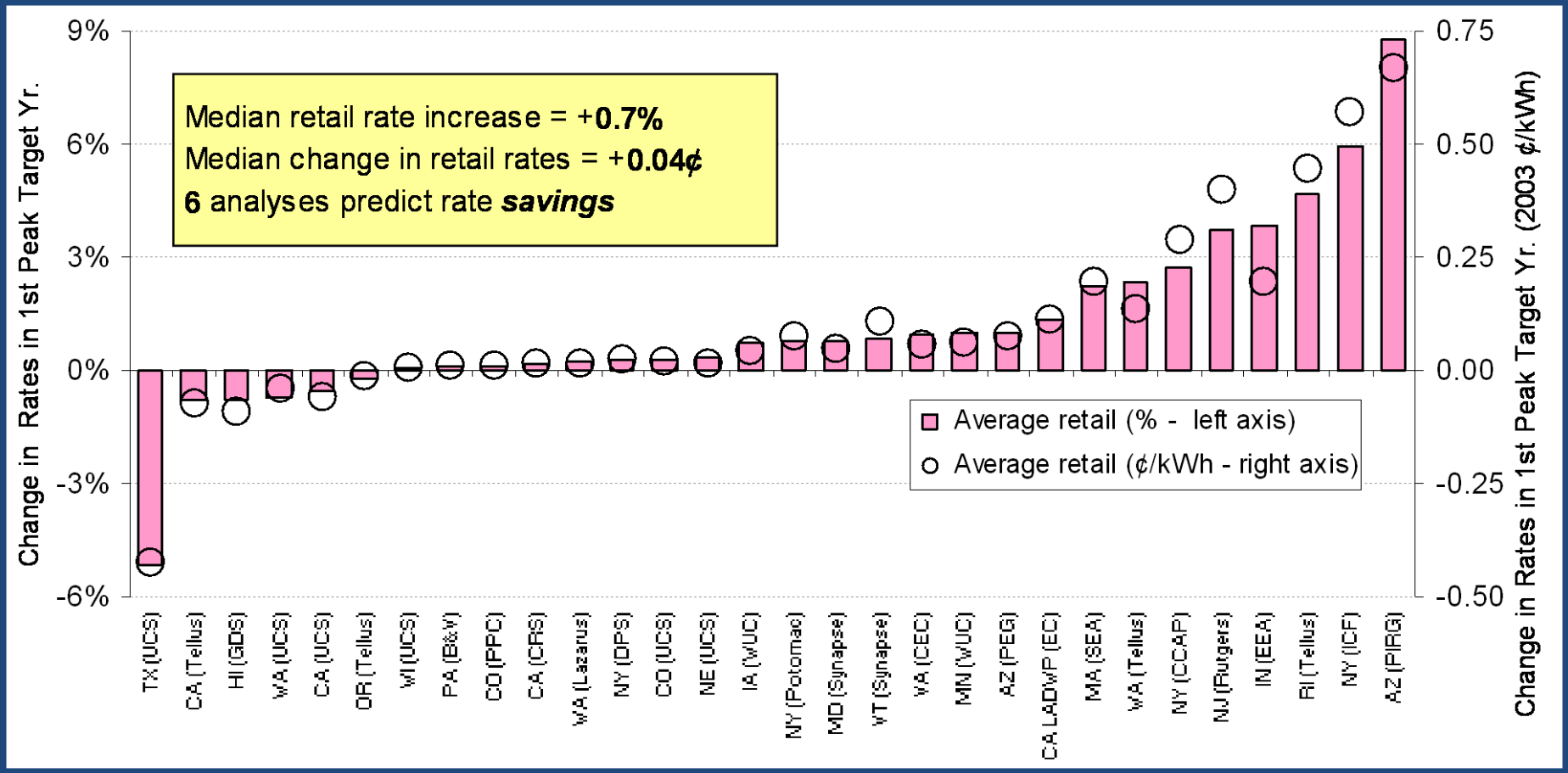
Solar/DG Set-Asides Will Require Substantial Growth in Solar Capacity

- Cumulative capacity requirement grows to 9,500 MW by 2025
- Required average annual solar capacity additions of ~400 MW/yr from 2010-14, ~600 MW/yr from 2015-25



Cost Concerns: Not Real So Far

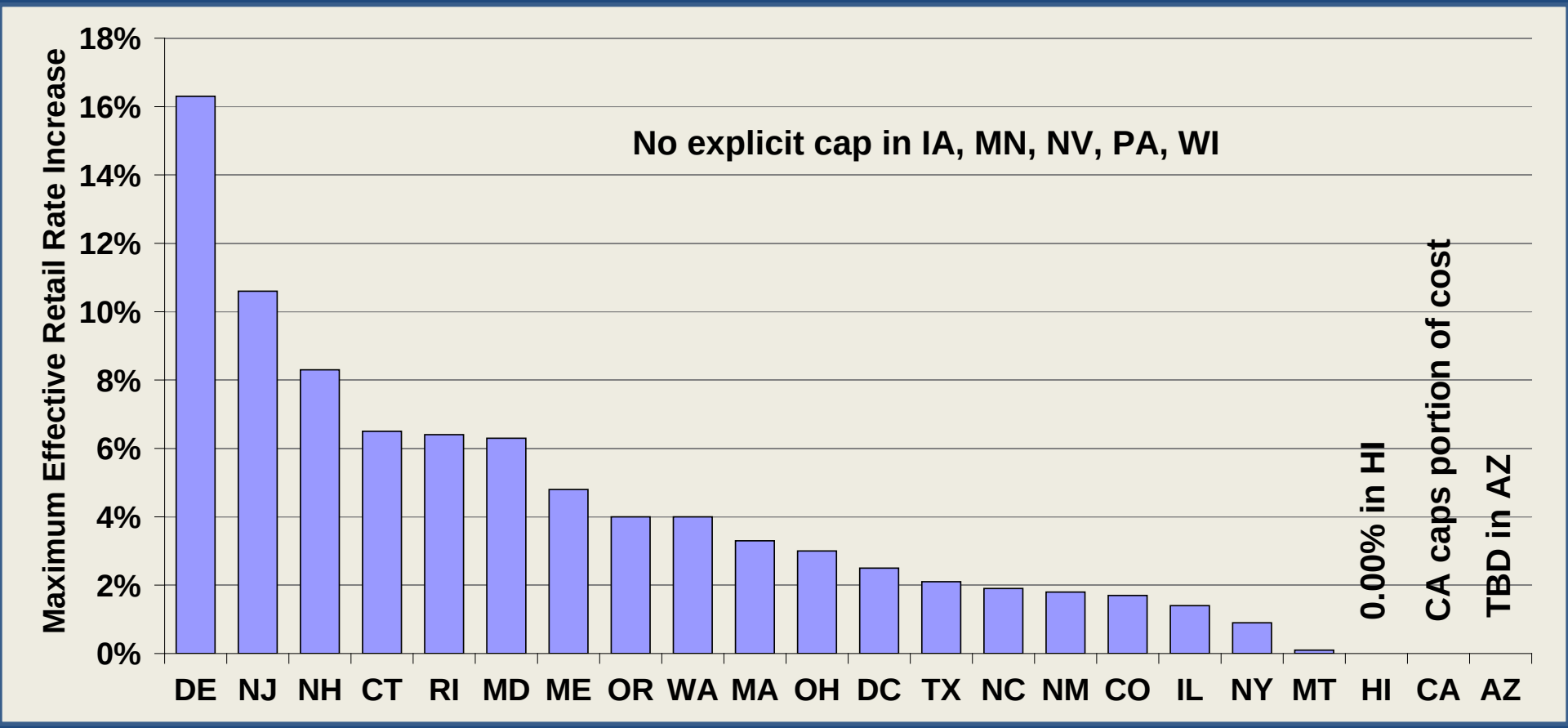
21 of 30 State RPS Analyses Predict Rate Increases of Less Than or Equal to 1%



Source: http://eetd.lbl.gov/ea/ems/reports/61580.pdf

Most States Have Capped Rate Impacts Well Below 10%

NH Alternative Compliance Payment: maximum effective retail rate increase: 8.3%



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NH Review Issue:
Should RPS Encourage More In-State Development?

- Rules for RPS geographic eligibility and electricity delivery vary greatly across states. Why?
  - Degree of state interest in supporting in-state or in-region development
  - Market structure and geography (NEPOOL, NE siting and transmission constraint)
  - Interpretation of federal commerce clause
  - Broader eligibility should reduce cost of RPS to ratepayer

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Geographic Eligibility: Major Approaches

- In-state generation requirement: HI, IA
- Delivery to state required
    - Direct transmission inter-tie to state: NV, TX
    - In-state delivery requirement: AZ, CA, MN, MT, NM, NY, WI
    - Delivery required to broader region/control areas: NEPOOL and PJM states
- In-state generation encouragement:
    - In-state multiplier for in-state projects: CO, DE (in-state wind)
    - Limit on RECs from out of state generators: NC – up to 25% compliance with RECs from outside state, 75% in-state or delivered
- Other approaches: rebates, tax credits, net metering, system benefit funds

Issues in Limiting Out of State Generation

- Dormant commerce clause restricts states from unjustifiably setting regulatory measures to benefit in-state economic interests by burdening out of state competitors
- Express in-state generation requirements are at legal risk
- Options for states:
  - Use eligibility requirements based on functional elements such as project's ability to interconnect with in-state distribution or deliver power in-state
  - Consider regional location requirements rather than in-state
  - Use distributed generation requirements and solar set-asides: imposes minimal burden on commerce and meets legitimate state goals (improved reliability, diverse supply, etc.)

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NH Review Issue: Should RPS Include Energy Efficiency?

- Three states allow energy efficiency to qualify for portion of RPS: HI, NV, NC
- But, since EE is always lower cost, this approach slows demand and growth of RE
- EE also requires different tracking system and measurement methodology
- Other states have established separate, mandatory energy efficiency portfolio stds: CO, CT, ILL, MN, NJ, NM, PA, TX

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States with Demand-Side Energy Efficiency Included in Mandatory RPS Requirements

State	Proportion of RPS that Can Be Met with Energy Efficiency	Notes
HI	Up to 50%	Heat pump water heating, ice storage, ratepayer-funded efficiency programs, and use of rejected heat from cogeneration and combined heat and power systems
NV	Up to 25%	Utility-subsidized efficiency measures installed after 1/1/05, and district heating powered by geothermal hot water; at least 50% of savings must come from the residential sector; utilities can purchase energy savings credits from third parties; energy efficiency receives standard multiplier of 1.05, and 2.0 for peak savings
NC	IOUs: Up to 25%; up to 40% after 2021 POUs: Unlimited for main RPS target	Efficiency measures after 1/1/07, including waste heat from combined heat and power systems powered by non-renewable fuels; POUs may also rely on demand-management/load-shifting

Source: Ryan Wiser, LBNL, 2008

NH Review Issue:
Should RPS Include Thermal Resources?

- Several states include electricity or heat from combined heat & power or waste heat recovery facilities: CO, CT, HI, IL, ME, NV, NC, MA
- Policy objective: Foster higher efficiency of energy resource, advance distributed generation
- MA Alternative Portfolio Standard (2009)
  - Flywheels, CHP, gasification
  - 0.5% in 2010, increases to 5% in 2020
  - ACP Rate $20, increases with CPI
- CT Class III
  - CHP (50% efficiency at minimum), waste heat
  - 4% minimum standard

NH Review Issue:

How Best to Foster RE Project Financing?

A Number of States Require Long Term Contracting

Renewable projects are capital intensive, and concerns about the challenges of project financing with REC price variability has spurred some states to adopt provisions to help projects secure financing

Contract Duration Requirement	**CA**	**10+ years**
	CO	**20+ years**
	CT	**100 MW, 10+ years**
	IA	**Ownership or long-term contract**
	MD	**Solar, 15+ years**
	MA	**10-15 years, if reasonable proposals**
	MT	**10+ years**
	NV	**10+ years**
	NC	**Solar, Sufficient length to stimulate development**
	PA	**Good faith effort includes seeking long-term contracts**
	RI	**PUC requires that default utility investigate long-term contracting**

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Another Approach to RPS Procurement: NY Central Procurement System

- NYSERDA (public authority) administers RPS procurement by purchasing attributes under long-term contract
- NYSERDA contracts long term on basis of collections from utilities and cash flow timing
- Projects compete for contracts via RFP in pay-as-bid auction
- NYSERDA purchases only renewable attributes (aka RECs)
- Energy delivered to NYISO/municipality/on-site
- Payments made on the basis of energy delivered
- Fixed-price REC contracts of up to 10 years employed
- RFP funding cap set for each RFP
- Baseline (existing)resources can petition for hardship relief
- Ratepayer collections and resource costs effectively govern scale/pace of compliance
- 2010 program evaluation shows significant benefit to cost result, including price suppression for non-renewable resources.

California's New Procurement Tool: Renewable Auction Mechanism (RAM)

- CA RPS: 33% by 2020 (12,000 MW of DG)
- Challenging to permit and construct large-scale projects
- Tap system-side renewable DG:
  - Quick project development timelines
  - Avoid new transmission
  - Declining technology prices
- How: reverse auction procurement mechanism

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RAM Program Overview

- Initial 1000 MW procurement cap over 2 years
- Projects up to 20 MW with any renewable technology
- Projects can interconnect at the distribution or transmission level
- Project must achieve commercial operation within 18 months of contract
- Each utility holds 2 auctions per year

RAM Design Elements

- Project viability screen: site control, development experience, commercialized technology
- Market based pricing: lowest prices bids are selected until auction capacity cap or revenue requirement cap is reached
- Bid price in not negotiable; paid as bid
- Use of standard contract
- Utilities must provide maps of good interconnection sites

Conclusions

- The popularity of RPS policies has grown, RPS' are already a major driver of renewable energy, and the importance of these programs is expected to build over the coming decade
- Designing an effective RPS is not easy, and varying state experiences highlight the importance of design details
- RPS programs do not operate in isolation: transmission and permitting policies, as well as federal tax incentives, play major roles in program effectiveness

Contact Info

Mark Sinclair
Executive Director
Clean Energy States Alliance
MSinclair@cleanegroup.org

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