

Renewables Portfolio Standards in the United States: A Status Update

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Austin, TX

September 24, 2013



Presentation Topics

- Political and legal challenges
- RPS impacts-to-date on renewable generation development
- Historical compliance levels
- Compliance costs and cost caps
- Projected RPS demand going forward
- Key issues impacting future the role and impact of state RPS programs



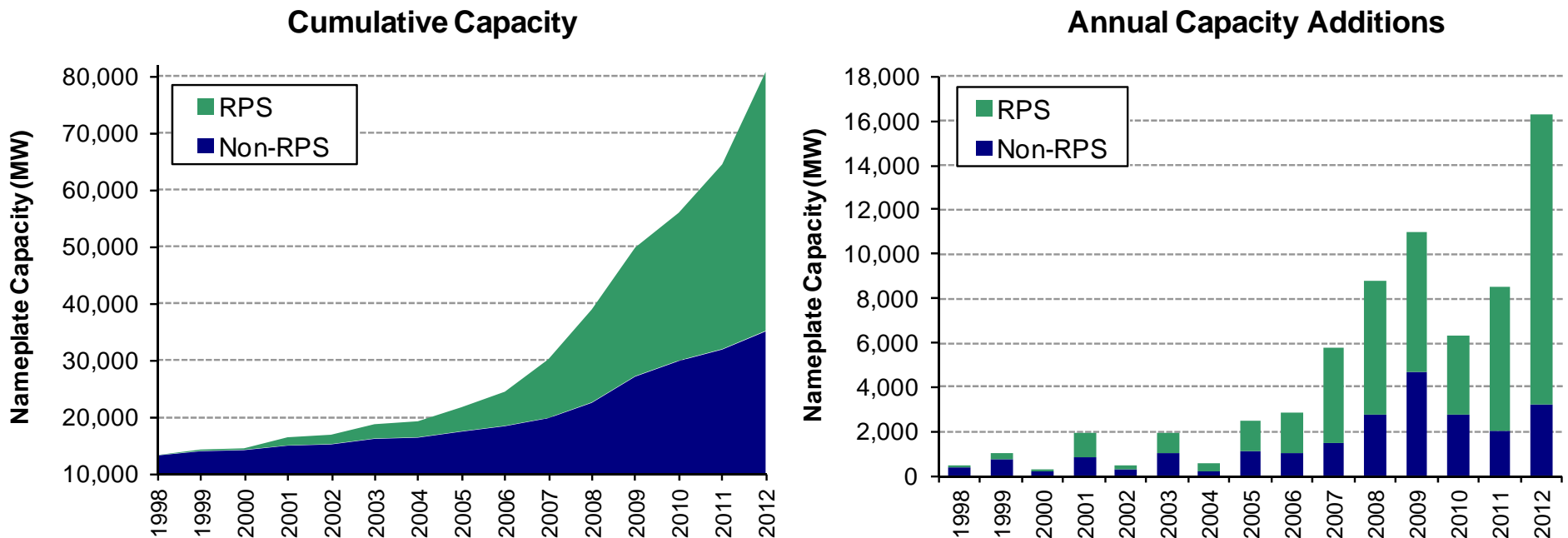
Political and Legal Challenges to RPS Policies Have Been Mounting

- Legislation to repeal, reduce, delay, or freeze RPS targets introduced in at least 6 states 2013 (Center for New Energy Economy)
 - American Legislative Exchange Council (ALEC) developed model legislation to repeal state RPS laws
 - None of those bills have thus far passed
- Other legislation has sought revisions that weaken RPS policies (e.g., expanding eligibility to large/existing hydro)
- Legal issues also raised in court cases & regulatory proceedings
 - Commerce Clause issues, often tied to geographic eligibility rules (MA, MI, CO, CA, MO)
 - Challenges to the jurisdictional authority of the PUC to enact an RPS (AZ)



State RPS Policies Have Motivated Substantial Renewable Capacity Development

Cumulative and Annual Non-Hydro Renewable Energy Capacity in RPS and Non-RPS States, Nationally



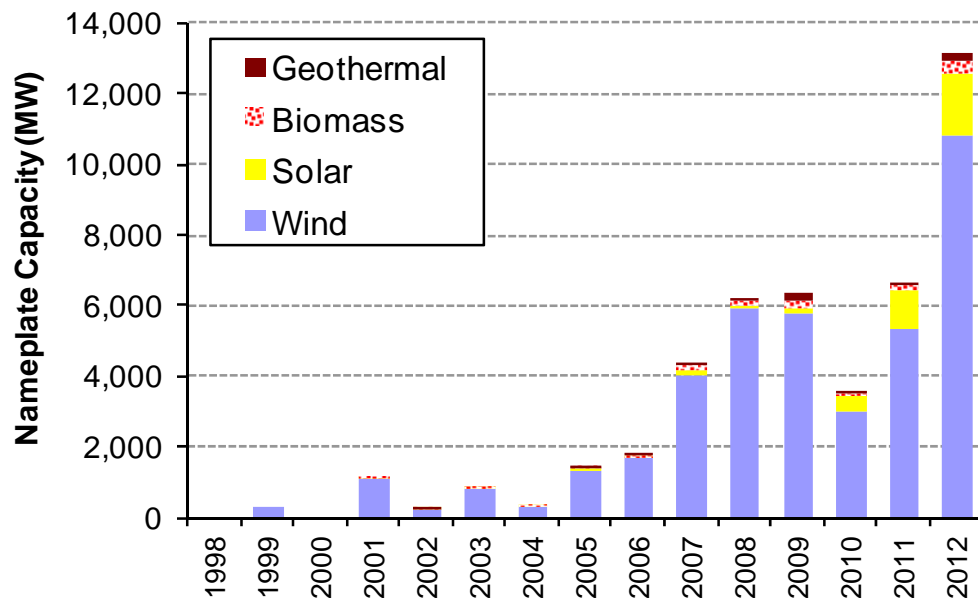
Though not an ideal metric for RPS-impact, **67% (46 GW)** of all non-hydro renewable capacity additions from 1998-2012 occurred in states with active/impending RPS compliance obligations



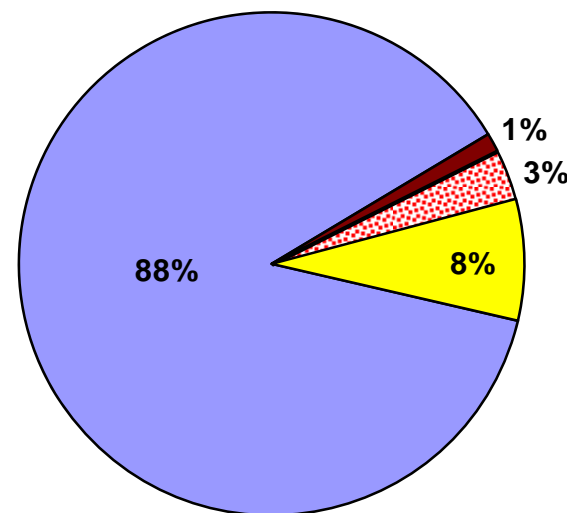
State RPS' Have Largely Supported Wind, Though Solar Has Become More Prominent

RPS-Motivated* Renewable Energy Capacity Additions from 1998-2012, by Technology Type

Annual RPS Capacity Additions

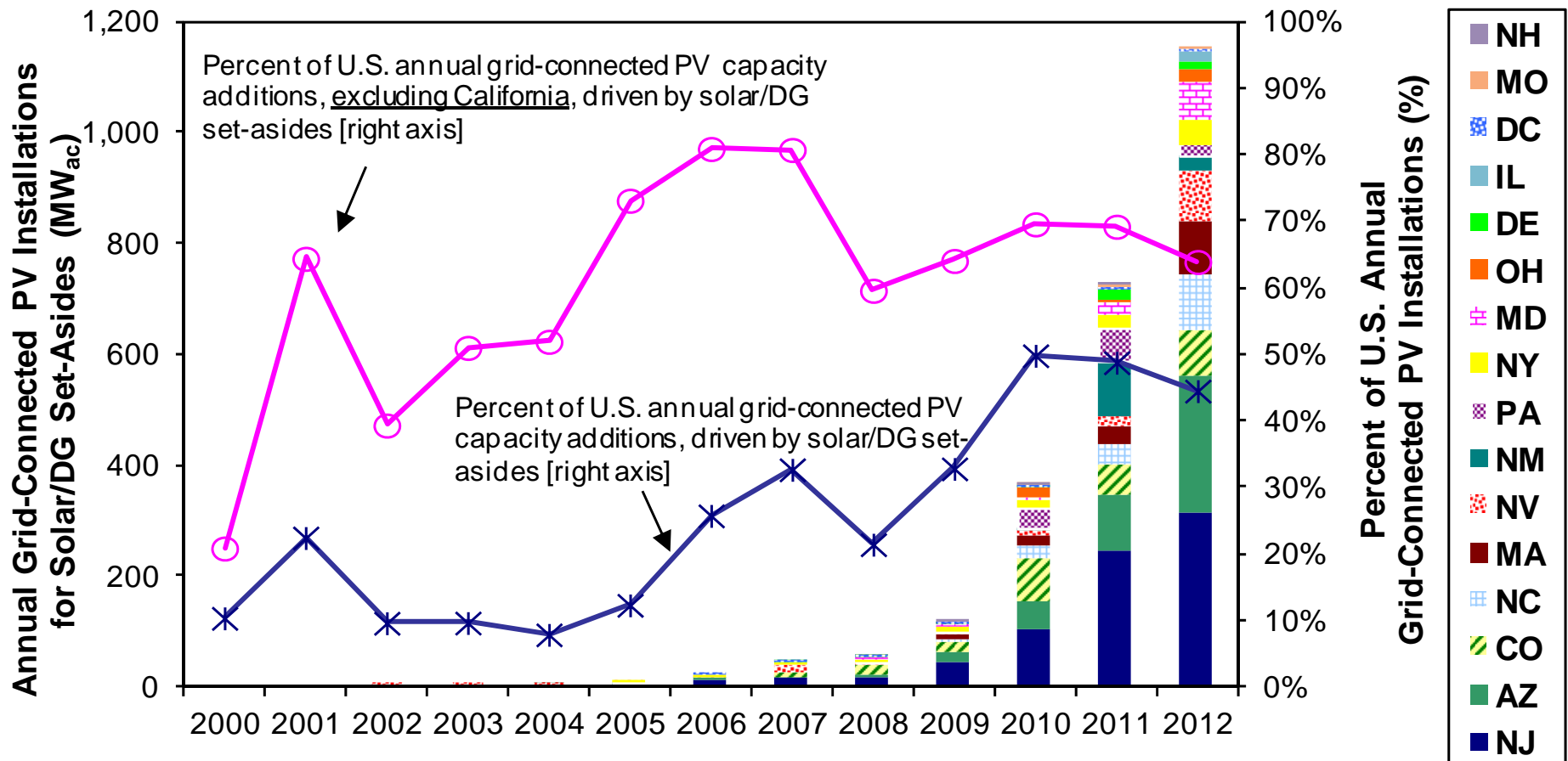


Cumulative RPS Capacity Additions (1998-2012)



* 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 year of RPS compliance obligations in that state. On an energy (as opposed to capacity) basis, wind energy represents approximately 85%, biomass 8%, solar 4%, and geothermal 3% of cumulative RPS-motivated renewable energy additions from 1998-2012, if estimated based on assumed capacity factors.

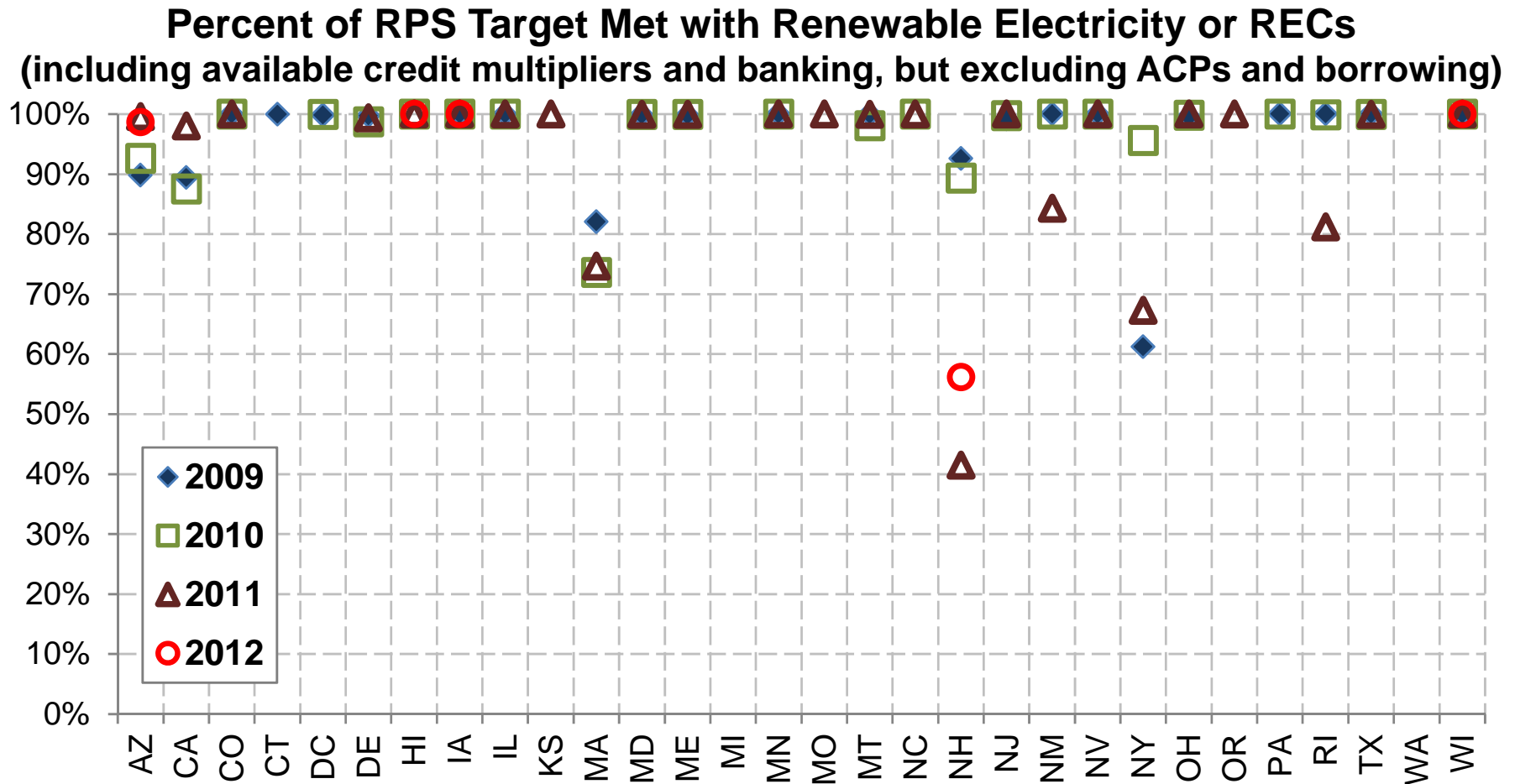
Impact of Solar/DG Set-Asides Is Growing: Drove ~50% of U.S. Solar Additions in 2010-12



Set-asides also benefiting solar-thermal electric (CSP): 1 MW (Arizona) constructed in 2006 and 64 MW (Nevada) in 2007



Targets Largely Met with Renewable Energy or RECs; Isolated Struggles Apparent

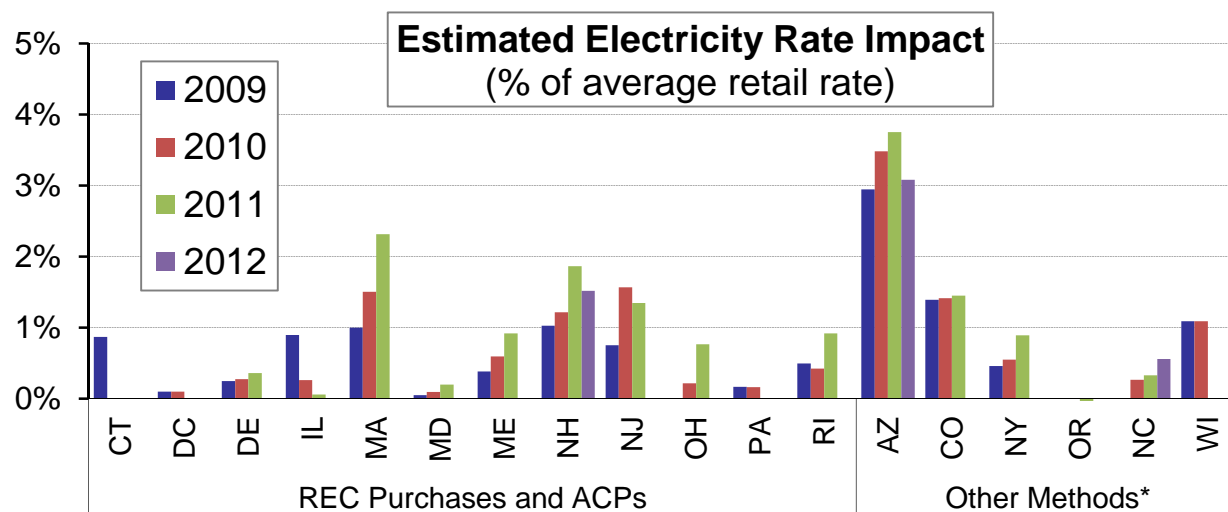


Note: Percentages less than 100% do not necessarily indicate that “full compliance” was not technically achieved, because of ACP compliance options, funding limits, or force majeure events.



RPS Policies Have Generally Resulted in <2% Increase in Electricity Rates So Far

Translating REC prices or other available data on net incremental costs into retail rate impacts yields the results shown below



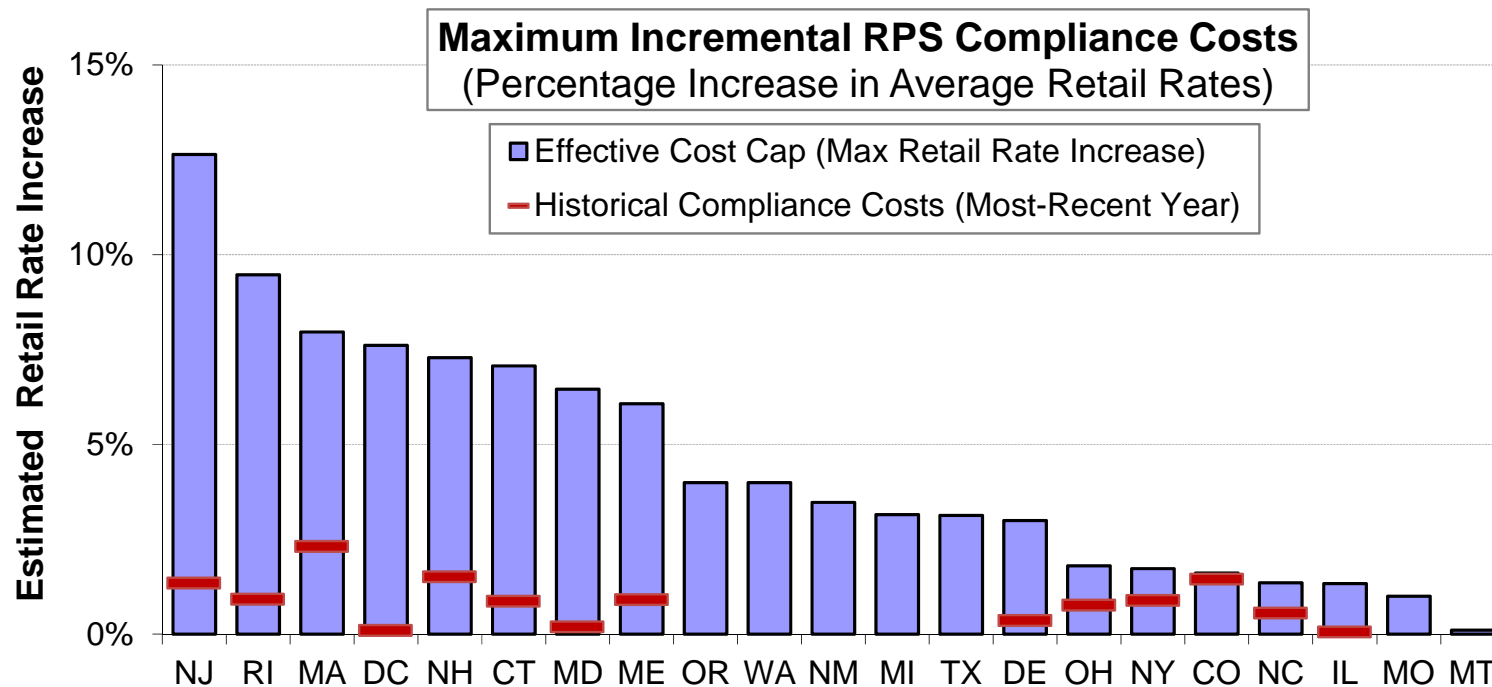
* Other Methods include utility-reported incremental costs (AZ, OR), RPS tariff rider collections (CO, NC), approved budget (NY), and PUC analysis (WI). States not included if data on incremental RPS compliance costs are unavailable (CA, IA, HI, KS, MI, MN, MO, MT, NM, NV, TX, WA).

- Simplified approach ignores some ratepayer costs (e.g., integration) *and* some benefits (e.g., wholesale electricity price suppression)
- Rate impacts differ with target levels, REC prices, presence of set-asides, whether up-front incentives are provided
- Little data on rate impacts for states dominated by bundled contracts

Future compliance costs impacted by increasing RPS targets, changes to fed. tax incentives, cost trajectories for RE, and natural gas prices (among other factors)

Most States Have Capped Rate Impacts Well Below 10% (13 States Below 5%)

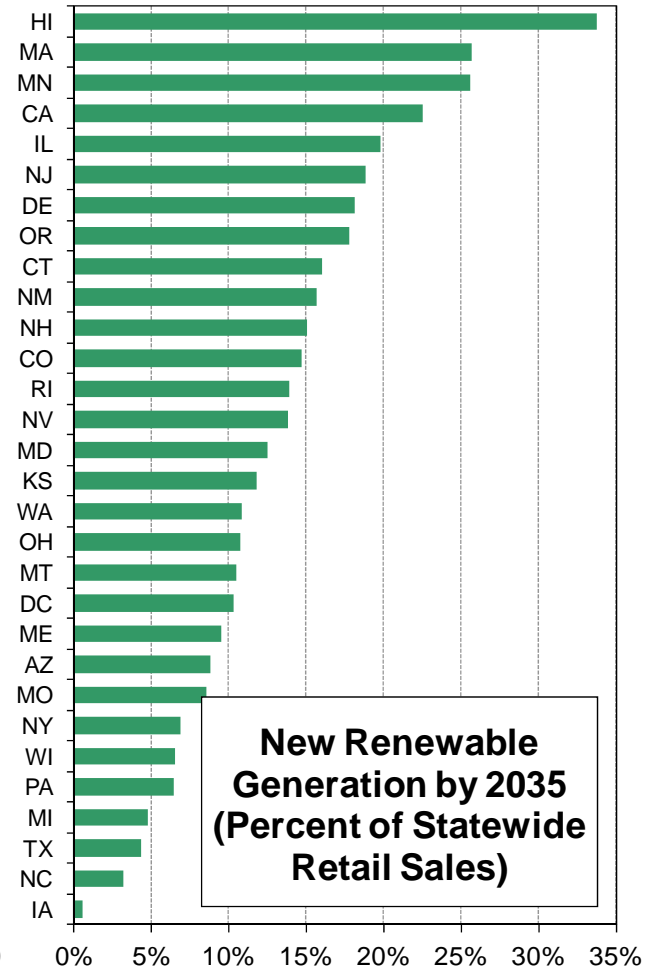
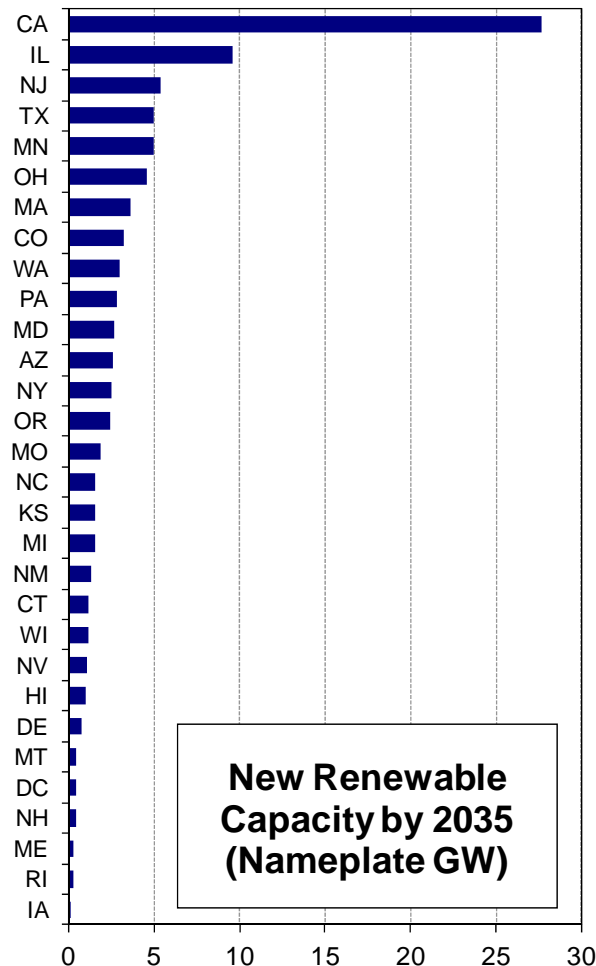
Many states cost containment mechanisms can be translated into an estimated maximum increase in retail rates



- No explicit cap on incremental compliance costs in 9 states (AZ, CA, IA, KS, HI, MN, NV, PA, WI), though KS caps gross revenue requirements and CA is currently developing its cost containment mechanism

Future RPS Requirements Are Sizable, But Well Within Recent RE Growth Rates

- **94 GW** of “New RE” required by 2035, if full compliance is achieved
- Equates to roughly **3-5 GW/yr** through 2020 and 2-3 GW through 2035
- By comparison, RPS-driven RE additions have ranged from **6-13 GW/yr** in all but one year since 2008



* New RE is defined based on state-specific distinctions between new vs. existing, or based on the year in which the RPS was enacted; it does not represent new renewables relative to current supply



The Future Role and Impact of State RPS Programs Will Depend On...

- The outcome of ongoing and future legislative and legal challenges
- Whether cost caps become binding (which in turn depends upon RE cost trajectories vis-à-vis natural gas)
- How policymakers re-tune RPS' in response to changed conditions (federal tax credits, RE costs, gas prices)
- Efforts to address challenges associated with volatile REC prices and lack of long term contracting options in restructured retail electricity markets
- How other related policy issues affecting RE deployment are addressed (transmission, integration, siting, net metering, etc.)



Thank You!

For further information:

LBL renewable energy publications:

<http://emp.lbl.gov/reports/re>

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