

# State Renewable Portfolio Standards

## Current Status and Trends

**April 16, 2018**

**Warren Leon**  
Executive Director



# Clean Energy States Alliance

CESA is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy

- Facilitates information sharing
- Provides technical assistance
- Coordinates multi-state collaborative projects

[www.cesa.org](http://www.cesa.org)



# State-Federal RPS Collaborative

- Funded by the US Department of Energy and the Energy Foundation
- Managed by CESA
- Encourages information sharing among RPS program managers
- Monitors and reports on RPS news, trends, and best practices
- Free monthly newsletter
- Regular webinars

[www.cesa.org/projects/renewable-portfolio-standards/](http://www.cesa.org/projects/renewable-portfolio-standards/)

# Table of Contents

1. RPS basics
2. The current state of RPSs across the country
3. The projected future RPS market
4. RPS prices and costs
5. RPS benefits
6. General observations about RPSs: strengths, weaknesses, and considerations for RPS design

Many of the charts and related information comes from Lawrence Berkeley National Laboratory's *U.S. Renewables Portfolio Standards: 2017 Annual Status Report*

# What Is an RPS?

- A requirement that retail electricity suppliers get a specified minimum share of their electricity from eligible clean energy electricity generators
  - The % usually increases over time
- Most often use tradable renewable energy certificates (RECs) to facilitate compliance

# What Is a REC?

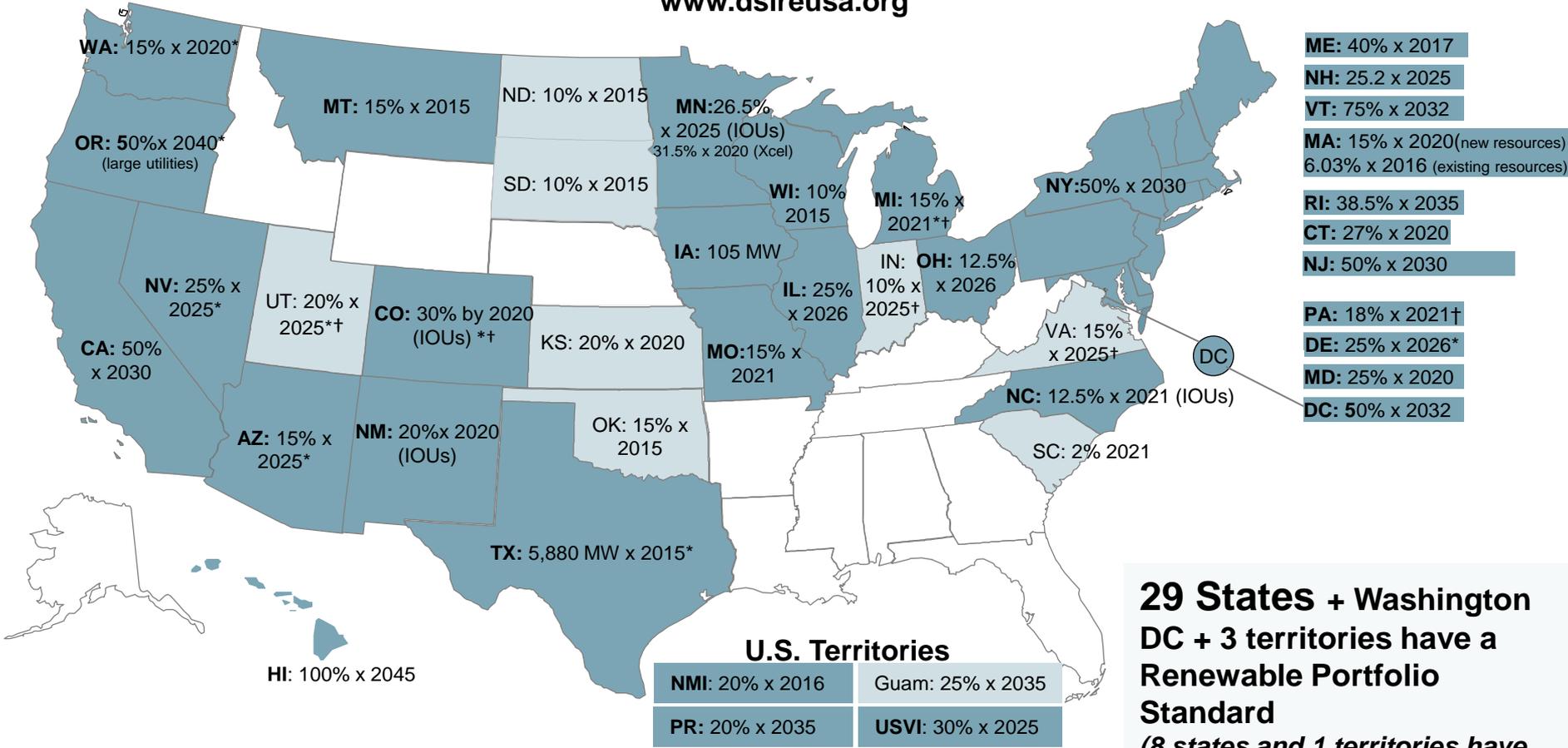
- When a renewable energy generator generates a MWh of electricity, it produces two things for sale:
  - 1 MWh of generic electricity
  - 1 REC: a certificate that symbolizes the generation's renewable energy attributes
- The REC can be traded separately from the electricity
- Whoever owns the REC can claim that they have purchased and/or are using renewable electricity
  - A REC that meets the requirements of a state's RPS can be used for RPS compliance
  - Otherwise, the REC can be sold in the voluntary market

# Overview of the State of State RPSs

- RPSs in a large number of states
  - 29 states plus DC
  - 8 more states have voluntary goals
  - Outside the broader southeast (WV to LA), only 4 states without either an RPS or voluntary goals
- Leading to considerable renewable energy generation
- Catalyzed far-reaching changes, altering the decisionmaking and operations of electricity regulators, utilities, the energy industry, and other stakeholders
- Much variation among states in goals, technologies, timing, other provisions

# Renewable Portfolio Standard Policies

[www.dsireusa.org](http://www.dsireusa.org)

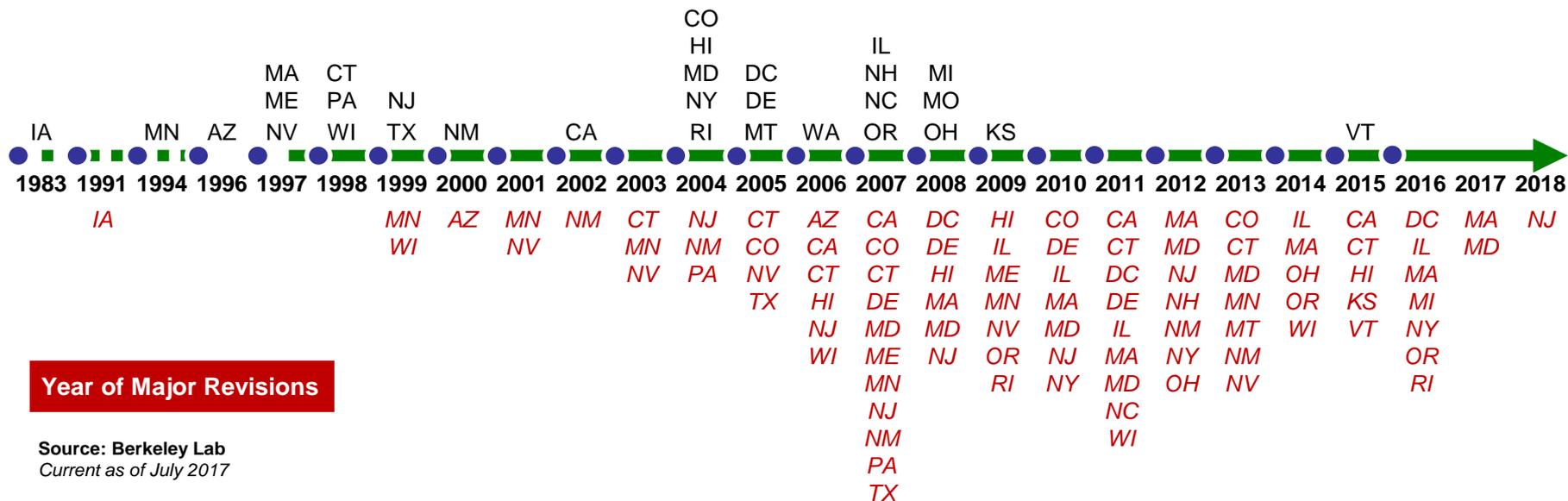


**29 States + Washington DC + 3 territories have a Renewable Portfolio Standard**  
*(8 states and 1 territories have renewable portfolio goals)*

Renewable portfolio standard  
 Renewable portfolio goal  
\* Extra credit for solar or customer-sited renewables  
† Includes non-renewable alternative resources

# States make regularly and significant revisions to their RPSs

## Year of RPS Enactment



## Year of Major Revisions

Source: Berkeley Lab  
Current as of July 2017

Most RPSs have been in place for at least 10 years

# General Trends in RPS Revisions

**Creation of resource-specific carve-outs:** Solar and DG carve-outs are most common (18 states + D.C.), often added onto an existing RPS

**Increase and extension of RPS targets:** More than half of all RPS states have raised their overall RPS targets or carve-outs since initial RPS adoption

**Long-term contracting programs:** Often aimed at regulated distribution utilities in competitive retail markets; sometimes target solar/DG specifically

**Refining resource eligibility rules:** Particularly for hydro and biomass, e.g., related to project size, eligible feedstock, repowered facilities

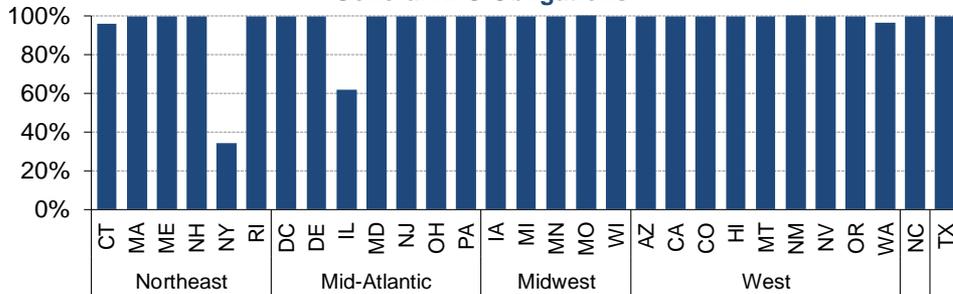
**Loosening geographic preferences or restrictions:** Sometimes motivated by concerns about Commerce Clause challenges or to facilitate lower-cost compliance

**Note:** Although many states have introduced bills to reduce, repeal, or freeze their RPS, only two (Kansas, Ohio) have been enacted

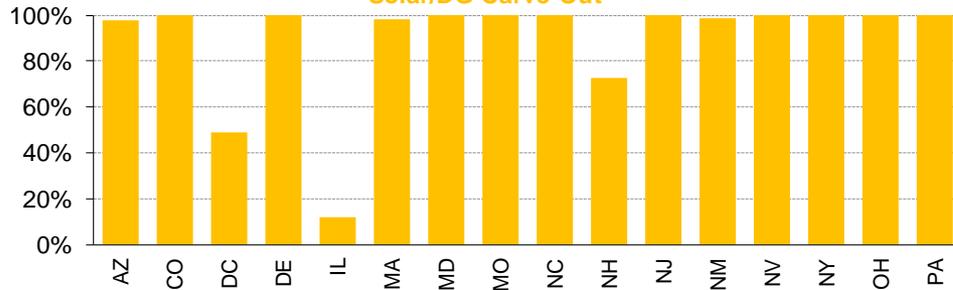
# States Have Generally Met Their Interim RPS Targets

## Percentage of RPS Obligations Met with RECs or RE For most-recent compliance year available in each state

General RPS Obligations



Solar/DG Carve-Out



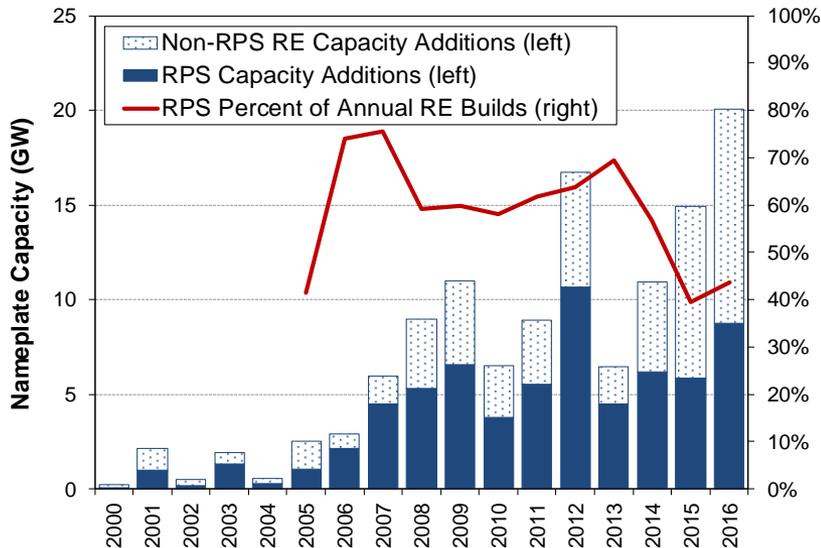
Source: Berkeley Lab

Notes: "General RPS Obligations" refers to the non-carve-out portion of RPS requirements in each state. For New England states, it refers to Class I obligations.

- Many states/utilities well ahead of schedule, easily meeting interim targets
- Others met interim targets by relying on stockpile of banked RECs from prior years
- Some state-specific conditions create a few exceptions:
  - **DC (Solar):** In-district eligibility requirements limit pool of supply
  - **IL (General RPS & Solar):** Alternative retail suppliers required to meet 50% of RPS with ACPs
  - **NH (Solar):** Solar/DG data is from 2015, when there was a Class II Rec shortage. Low solar ACP prices led to Class II RECs flowing into neighboring Class I markets
  - **NY (General RPS):** Procurement has lagged targets, partly due to budget constraints

# RPSs Are a Major Driver of Renewable Energy Growth

## Annual Renewable Capacity Additions



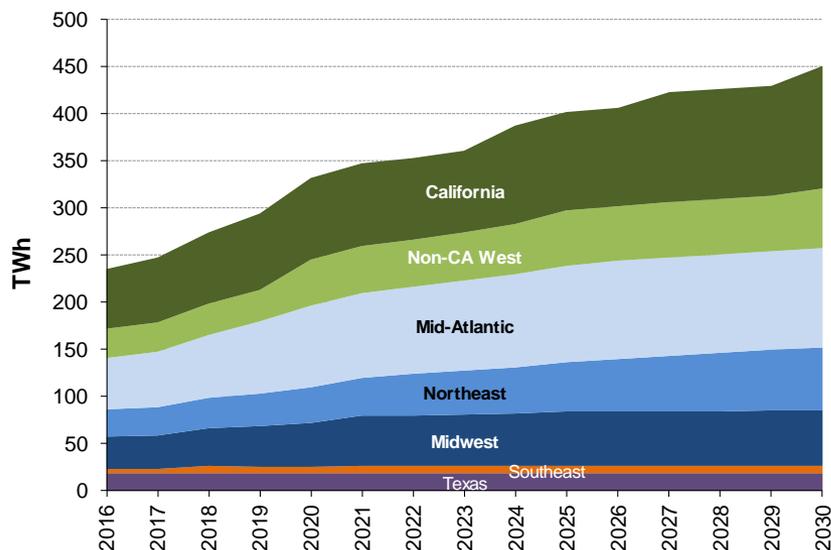
Source: Berkeley Lab

Notes: RPS Capacity Additions consists of RE capacity contracted to entities with active RPS obligations or sold on a merchant basis into regional RPS markets.

- RPS requirements constitute ~50% of total U.S. RE growth since 2000
- Other RE growth associated with:
  - Corporate procurement and other voluntary green power markets
  - Economic utility purchases
  - Accelerated RPS procurement
- Significant variations among regions
  - In New England, almost all capacity additions serve the RPS market

# Projected RPS Demand through 2030

## Projected RPS Demand (TWh)



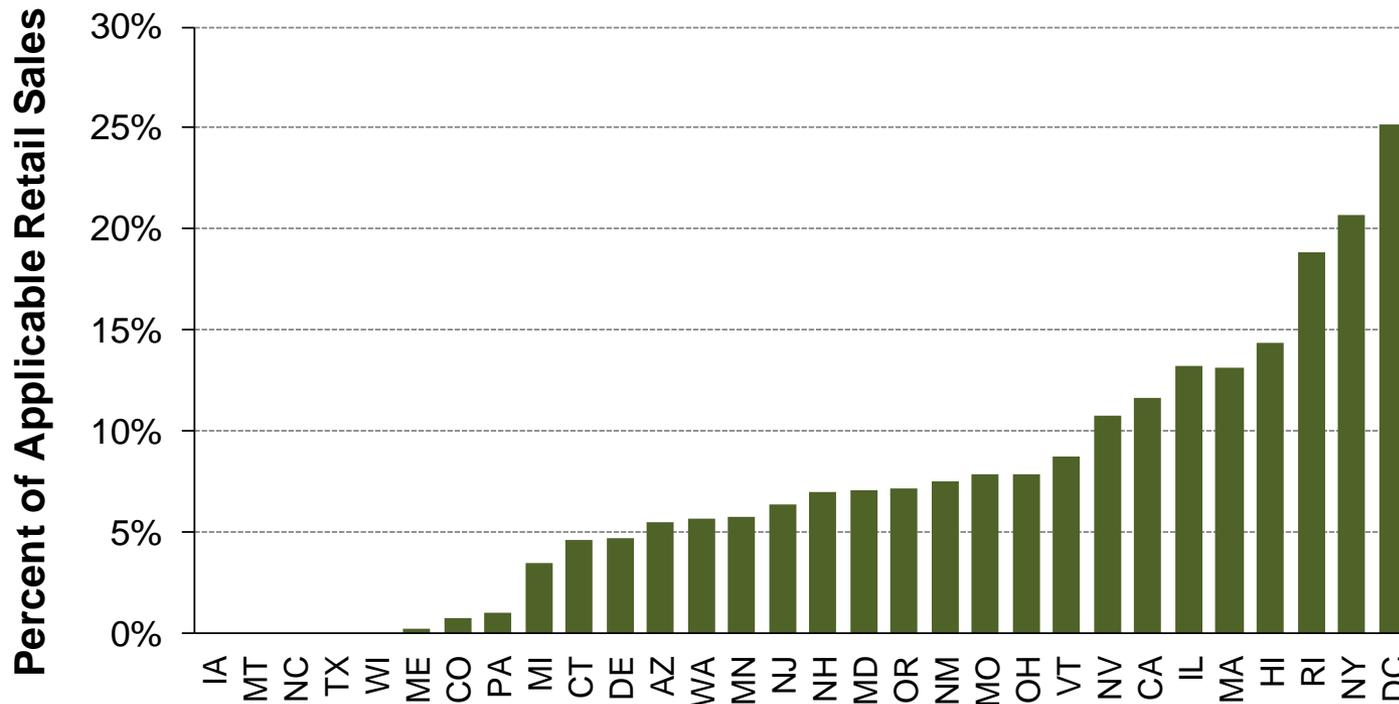
Source: Berkeley Lab

Notes: Projected RPS demand is estimated based on current targets, accounting for exempt load, likely use of credit multipliers, offsets, and other state-specific provisions. Underlying retail electricity sales forecasts are based on regional growth rates from the most-recent EIA Annual Energy Outlook reference case.

- Under current policies, total RPS demand roughly doubles, growing from roughly 235 TWh in 2016 to 450 TWh in 2030
- Increased demand does not necessarily equate to required increase in supply
  - Some utilities/regions ahead of schedule, others are behind
  - Some growth in demand will likely be met with banked RECs
- Much Northeast growth linked to NY's 30% by 2030 target

# RPS Procurement Needs by 2030

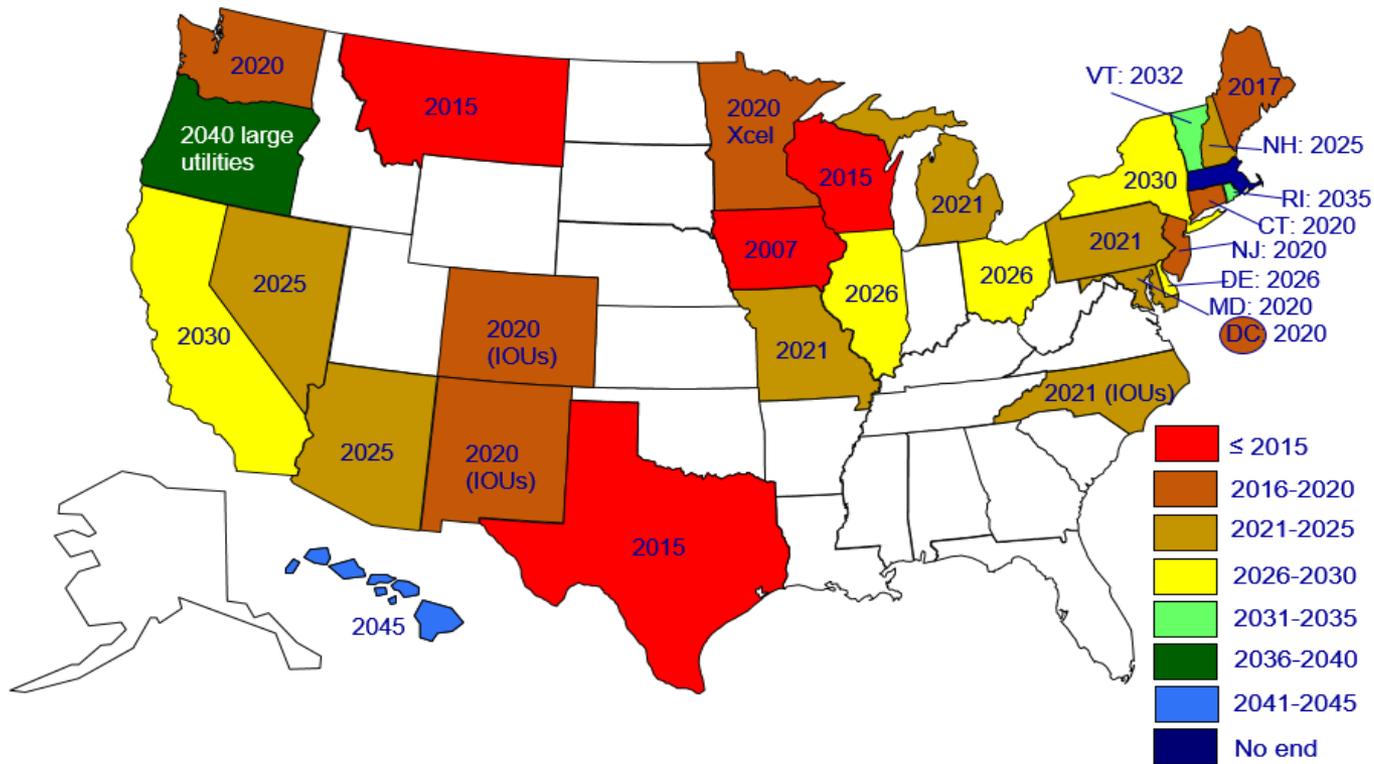
Residual RPS Procurement Needs by 2030  
(Percent of Applicable Retail Sales)



Source:  
Berkeley Lab

- 8 states effectively have no remaining need; 8 others have needs >10% retail sales
- Numbers based on 2016, so some of these needs have already been filled

# States Reaching Their Maximum Targets



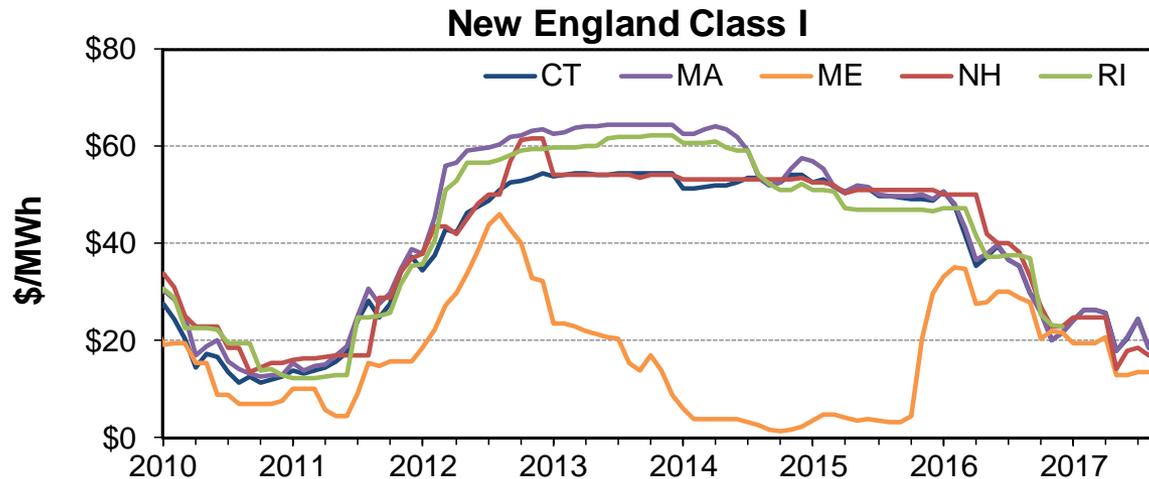
Source:  
Holt, *When Renewable  
Portfolio Standards Max Out*,  
CESA, 2017

- 4 states have already reached their maximum target
- 15 more states will reach their max by 2025
- Options
  - Sunset the RPS
  - Leave targets unchanged but extend compliance period
  - Increase RPS targets (8 states have done that since 2015)

# The Context for Understanding RPS Costs and Benefits

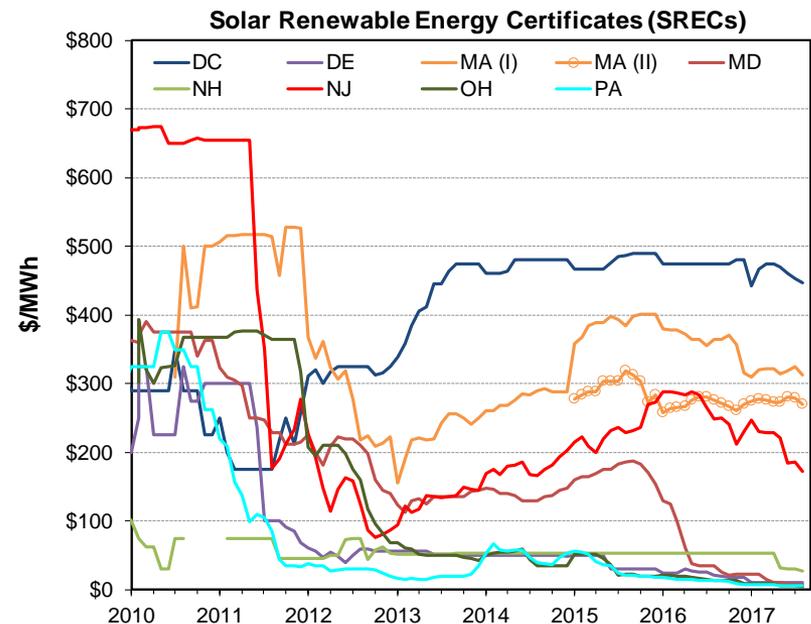
- It is easier to count the costs than the benefits
- The easiest thing to focus on is electricity prices, but even that isn't easy. Factors to consider:
  - **Renewable integration costs.** Some portion of incremental integration and transmission costs may be socialized by the network operator and not reflected in REC prices
  - **Merit-order (price suppression) effect.** At least within the short-run, low marginal-cost resources (like wind and solar) put downward pressure on wholesale prices, and in turn retail prices. This benefits consumers and reduces income for generators. MA found this to be greater than the cost of all RECs in 2010.
- Other considerations on the benefits side
  - Creation of local businesses and jobs
  - Environmental benefits (with associated economic benefits)

# REC Price Trends



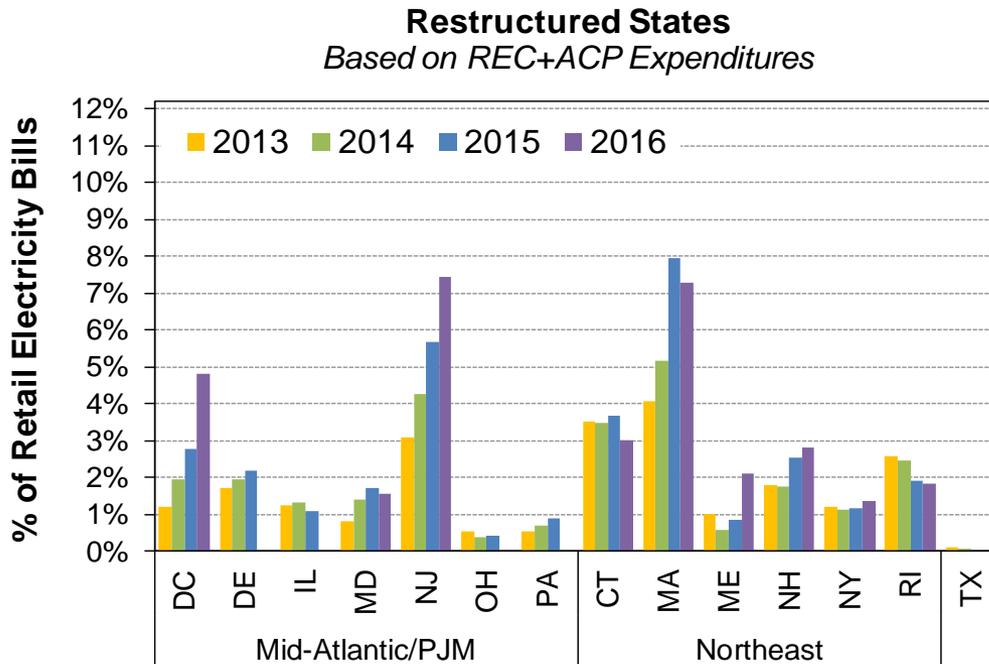
Source:  
Berkeley Lab

- REC prices can be volatile and are sensitive to sudden changes in eligibility rules.
- REC prices are a function of ACP rates and current/expected supply and demand.
- Prices have declined in New England in recent years.
- SREC prices are very state-specific, because markets are primarily in-state and are shaped by ACP price.



# Recent RPS Compliance Costs

Costs as % of Average Retail Electricity Bill

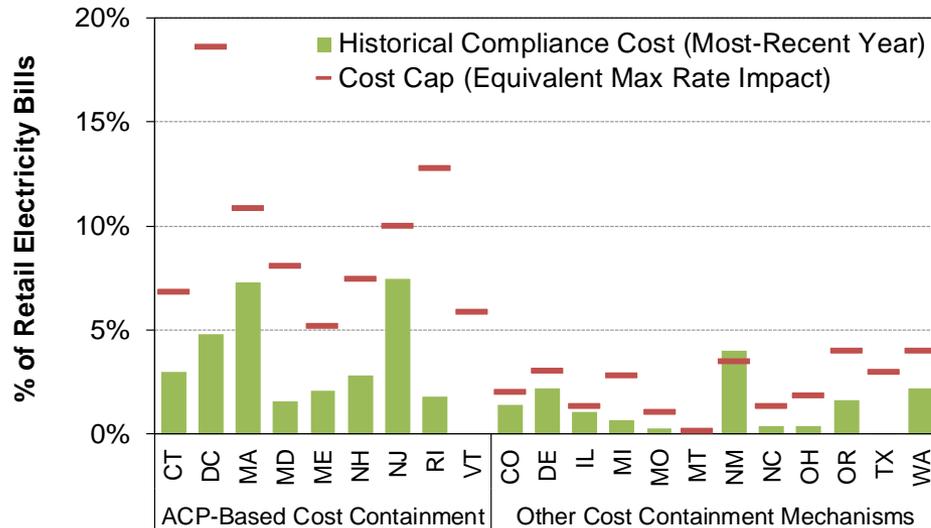


Source: Berkeley Lab, based on spot market data and sample long-term contract data. For New Hampshire, the % should be lower for 2017, when REC prices were much lower. NH PUC reports actual RPS costs to be about 1% in the years from 2013-2016.

- The numbers are estimated based on REC and ACP expenditures.
- They ignore other factors that work in opposing directions: renewable integration costs and merit-order effect.
- ACPs may be credited to ratepayers or recycled through incentive programs
- Variation among states reflects differences in:
  - RPS target levels
  - Resource tiers/mix
  - Wholesale electricity prices
  - Available renewable energy resources
  - Other factors

# Future RPS Compliance Costs

## Current Costs Compared to Maximum Future Cost (% of Average Retail Electricity Bill)

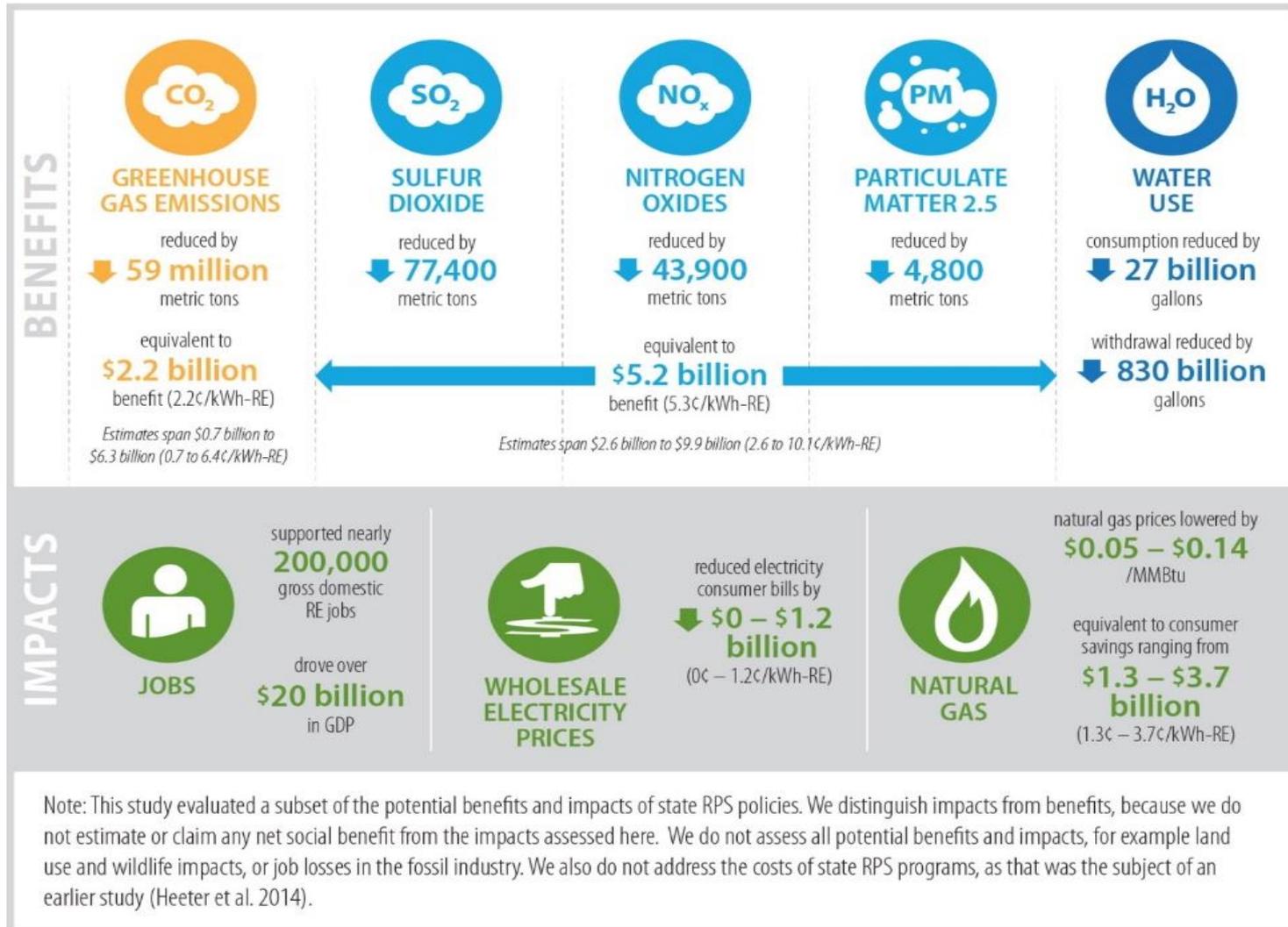


- For New England, offshore wind development will be a big factor in determining whether there is a surplus or shortage of RECs

Source: NREL and Berkeley Lab

Notes: Each state's cost containment mechanism was translated into the equivalent maximum allowed rate impact for the final year in the RPS. For states with an ACP, this corresponds to a scenario in which the entire RPS obligation in the final RPS year is achieved with ACPs or RECs priced at the ACP rate.

# Historical Benefits of RPSs



From:

Wiser et al, [A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards](#), National Renewable Energy Laboratory and Berkeley Lab, 2016

# Observations about RPSs: Strengths of RPS as a policy

- It is straight-forward concept with appeal to the public
- It uses a market-based approach
- It is a long-term policy
- It is a flexible policy mechanism
  - Most states have undergone at least one major revision
- RPSs have had modest costs up to now
- They have created jobs and contributed to local economic development

# Observations about RPSs: Weaknesses of an RPS as a policy

- There can be significant volatility in the price of renewable energy certificates
- An RPS can have free riders
- For an RPS to work well, it needs to be fine-tuned over time, but that can be difficult

# Considerations for RPS Design

- Review progress regularly
- It is easy to have unintended consequences
- Assess possible RPS modifications carefully
- Consider potential interactions with other states' RPSs
  - Assess implications of ACP rates (encourage others to reduce rates)
- Maintain flexibility
- The New Hampshire renewable thermal carve-out has been path-breaking and influential
- Keep in mind the implications of the Commerce Clause of the US Constitution
  - For guidance: [www.cleanenergystates.org/assets/Uploads/CEG-Commerce-Clause-paper-031111-Final.pdf](http://www.cleanenergystates.org/assets/Uploads/CEG-Commerce-Clause-paper-031111-Final.pdf)
- More on RPS design: Leon, [\*Designing the Right RPS\*](#), CESA, 2012

# Contact Information

Clean Energy States Alliance  
50 State Street, Suite 1  
Montpelier, VT 05602  
802-223-2554  
[www.cesa.org](http://www.cesa.org)

Warren Leon  
978-317-4559  
[wleon@cleangroup.org](mailto:wleon@cleangroup.org)

