

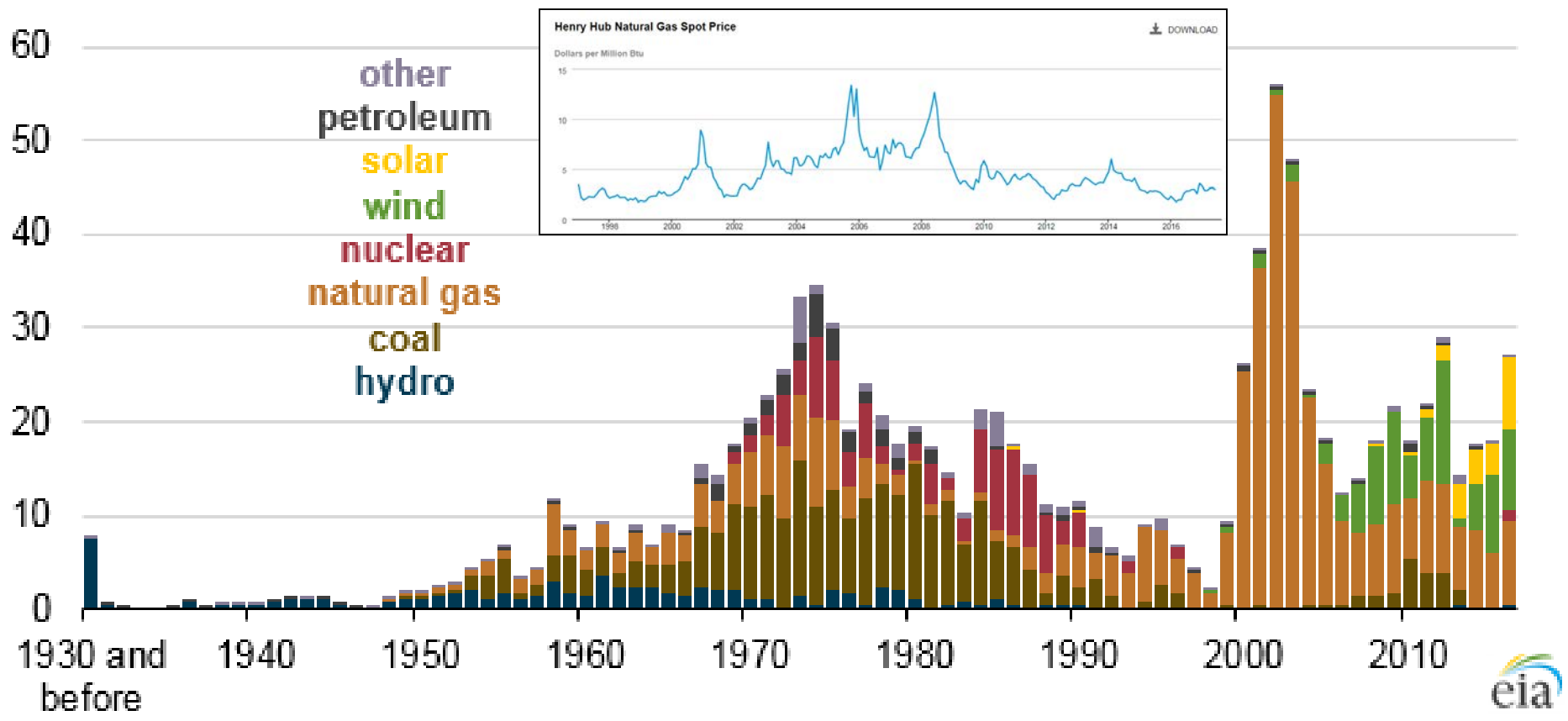
# Trends in Energy Generation & Consumption

Tom Plant



# Electricity has followed a pattern of resource 'ages'

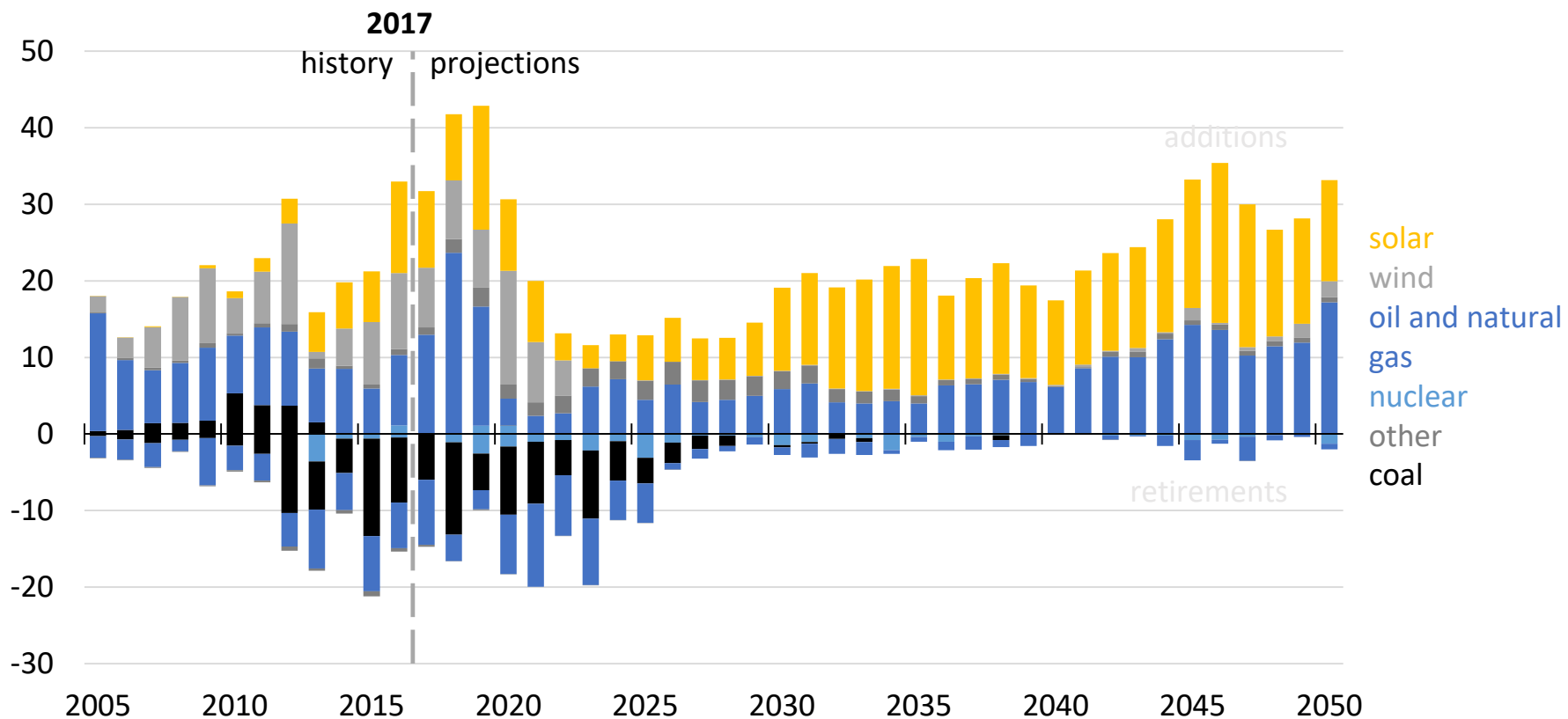
U.S. utility-scale electric generating capacity by initial operating year (as of Dec 2016) gigawatts



Renewables and natural gas comprise most of the capacity additions through the projection period in the Reference case.

### Annual electricity generating capacity additions and retirements (Reference case)

gigawatts



U.S. Annual Energy Outlook (2018)

[https://www.eia.gov/outlooks/aeo/pdf/0383\(2018\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2018).pdf)

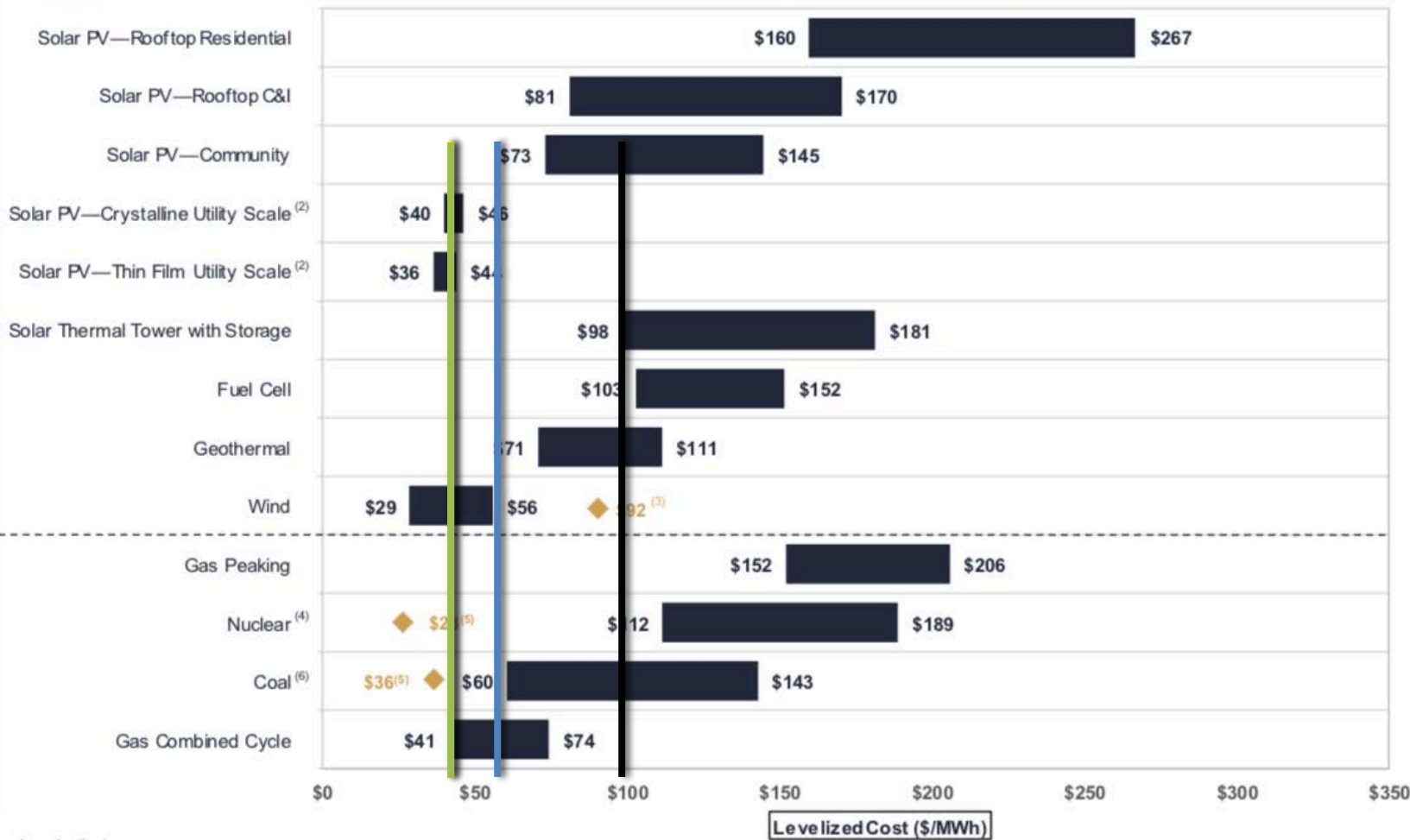
# Levelized Cost of Energy Comparison—Unsubsidized Analysis

Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances<sup>(1)</sup>

Alternative Energy

---

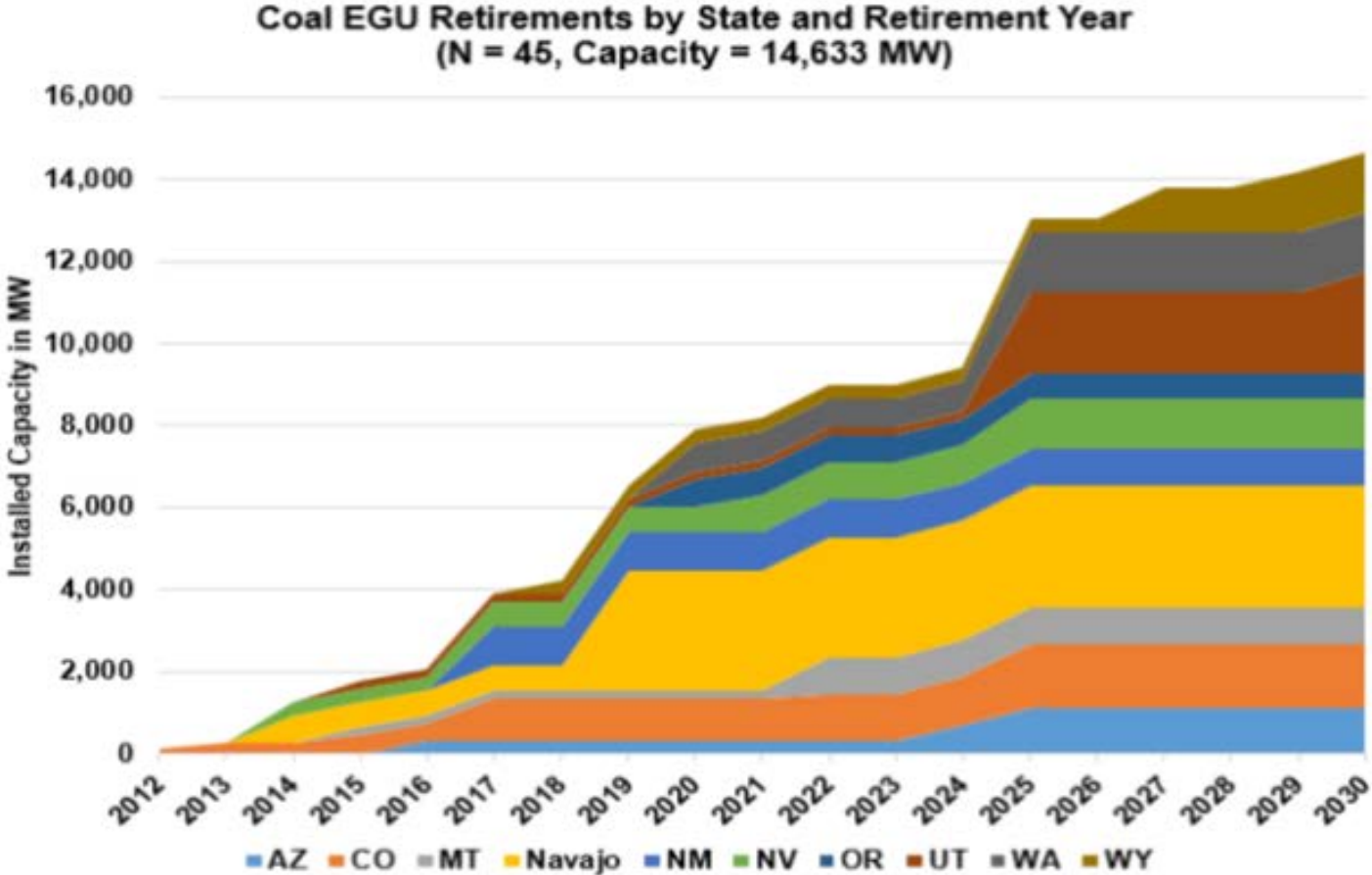
Conventional



Source: Levelized estimates

# Securitization - Cost Recovery for Coal Plants

As the electricity market adds new natural gas, nuclear and renewable resources, coal plants will be retired, leaving utilities with stranded assets.





*“Utilities get about 90% of their cost recovery from the states and only 10% from Washington. If you want to implement innovative policy, focus on what happens in the states.”*

*~ CEO of a Western Utility*

# Trends in State Energy Policy

# Renewable Portfolio Standards

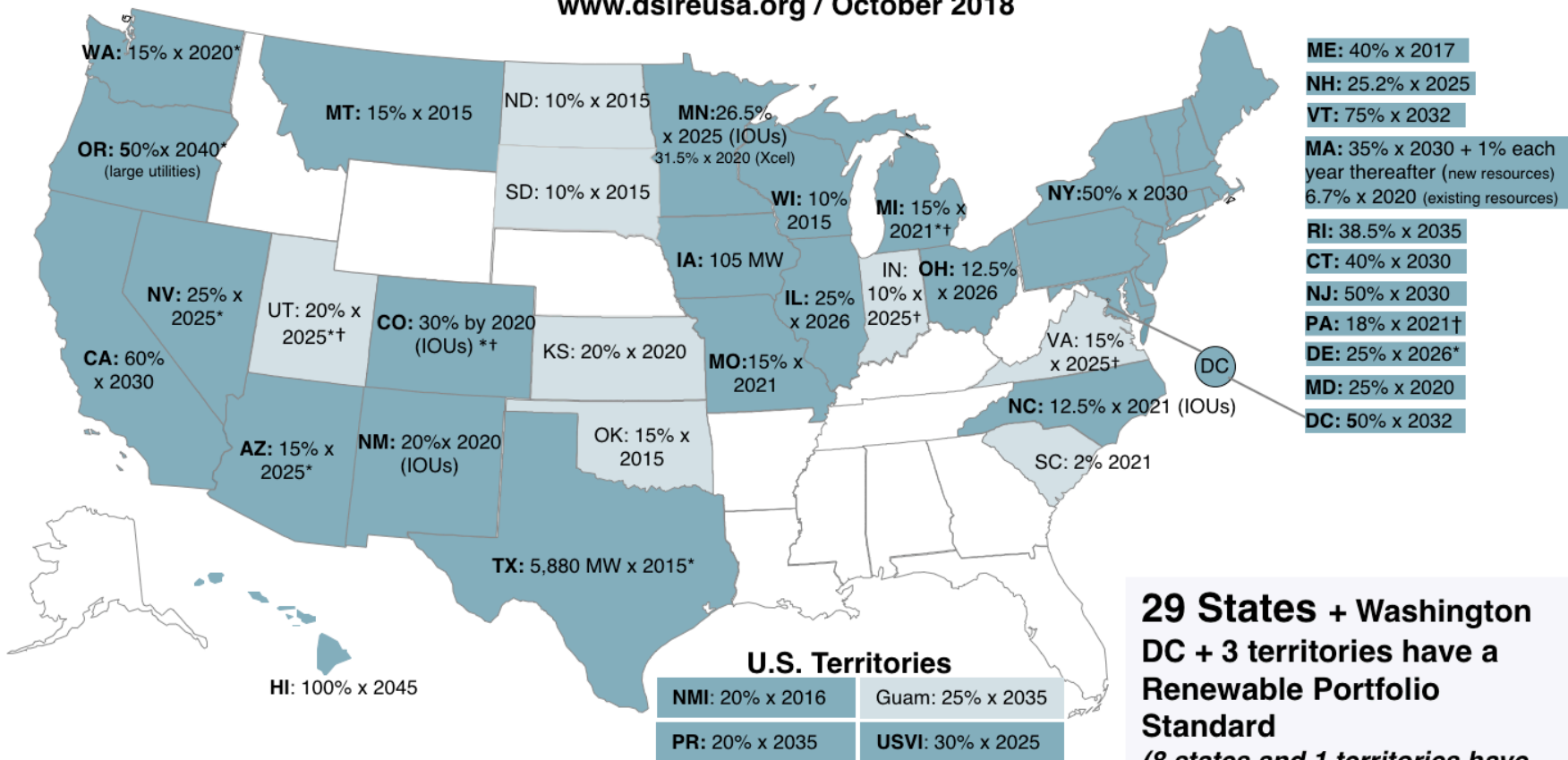


U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

## Renewable Portfolio Standard Policies

[www.dsireusa.org](http://www.dsireusa.org) / October 2018

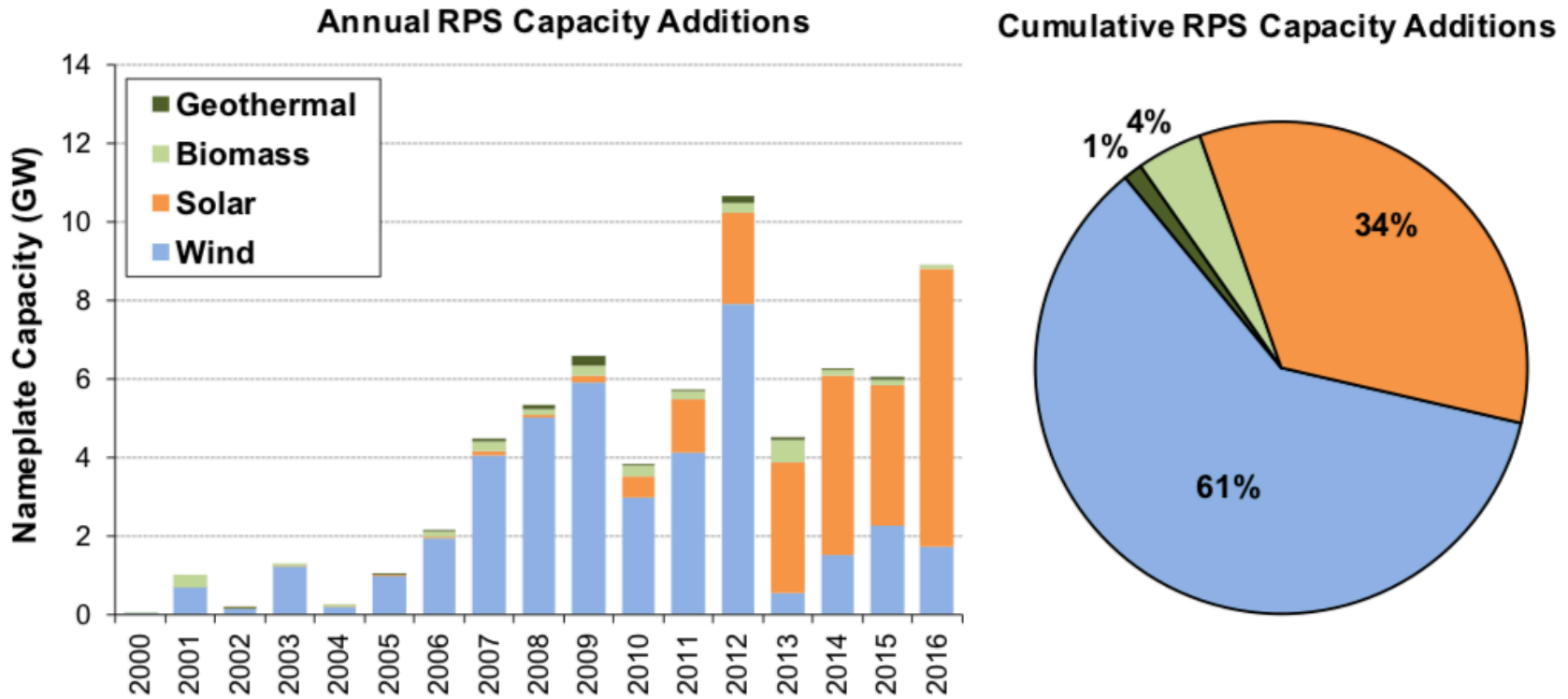


- Renewable portfolio standard
- Renewable portfolio goal

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



# Resources for RPS Compliance are shifting from Wind to Solar



Notes: "RPS Capacity Additions" represent RE capacity contracted to entities subject to an RPS or sold on a merchant basis into regional RPS markets. On an energy (as opposed to capacity) basis, wind represents approximately 75%, solar 16%, biomass 5%, and geothermal 4% of RPS-related renewable energy growth.

From 2017 Renewable Portfolio Standards Status Report

Lawrence Berkeley National Lab



# RPS Target Dates

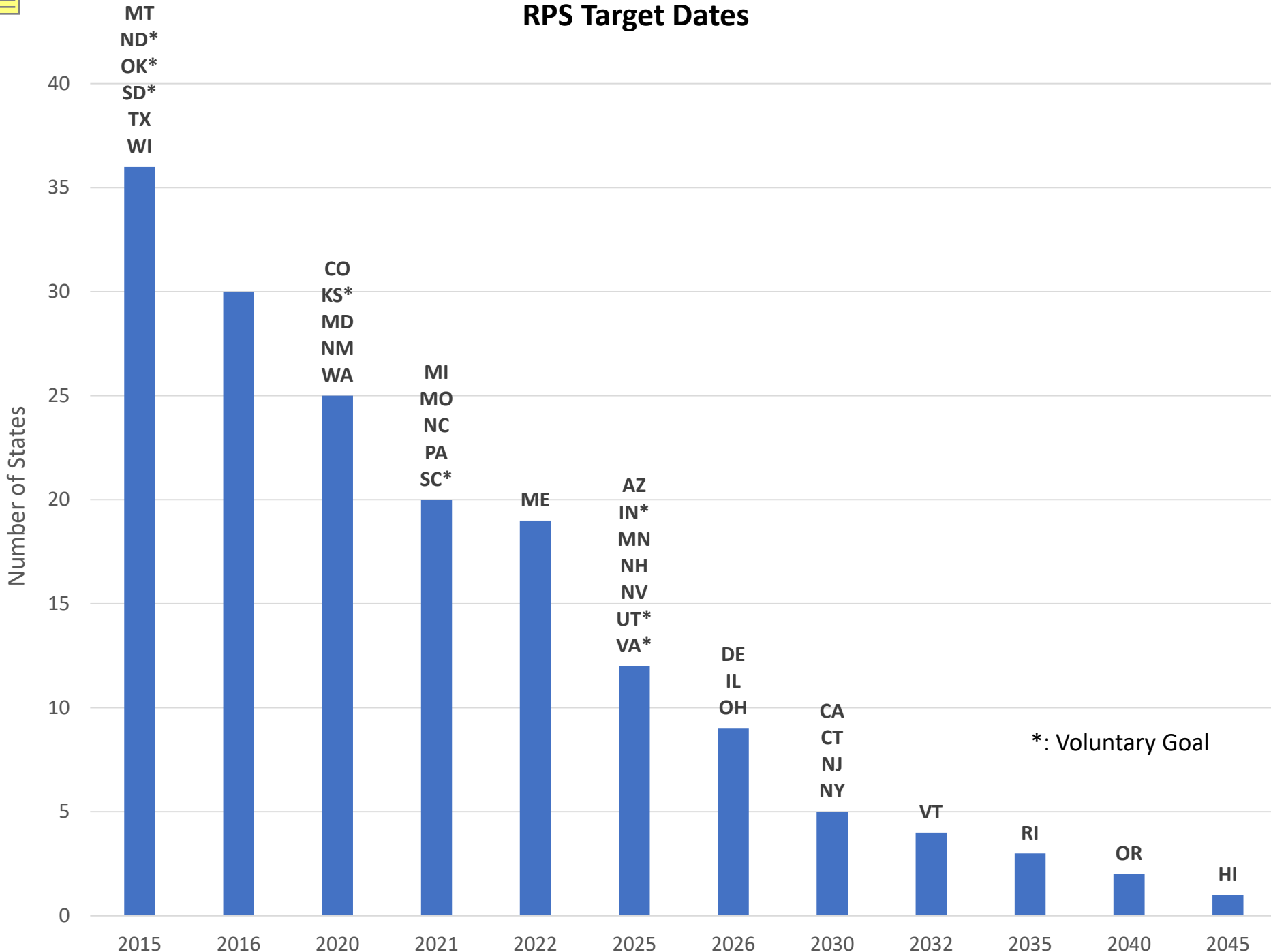
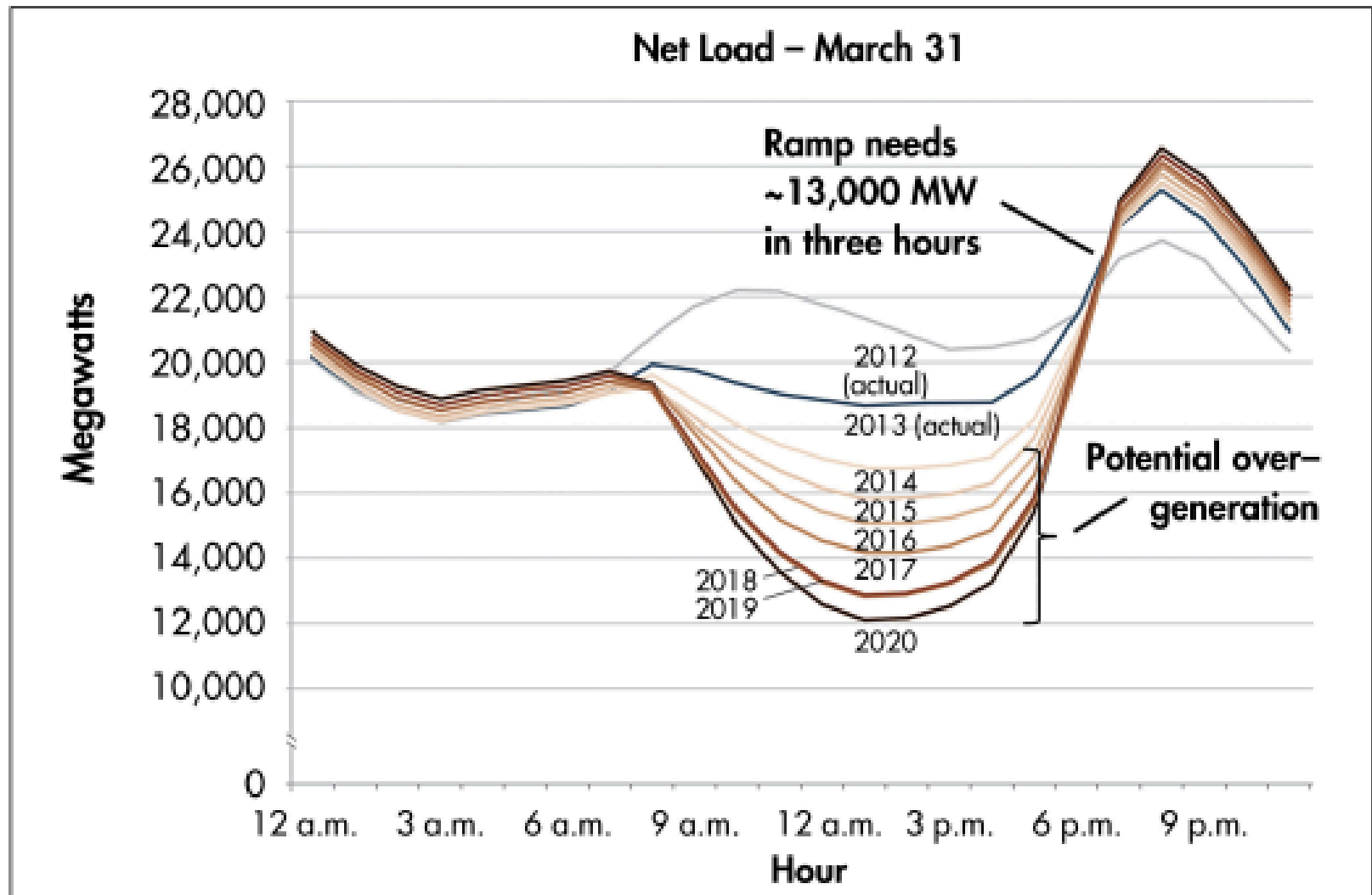
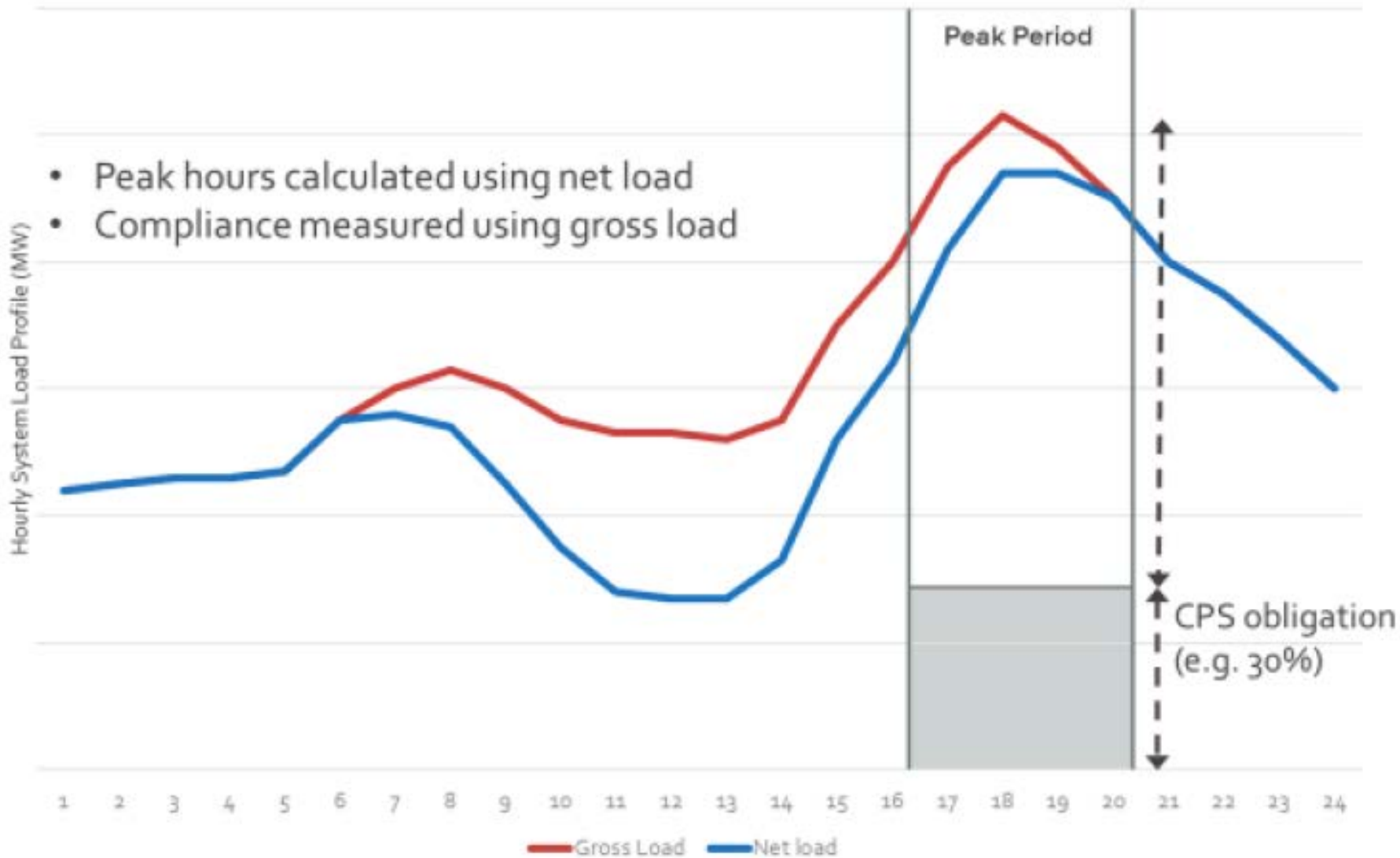


Figure 1: Net load on the CAISO system

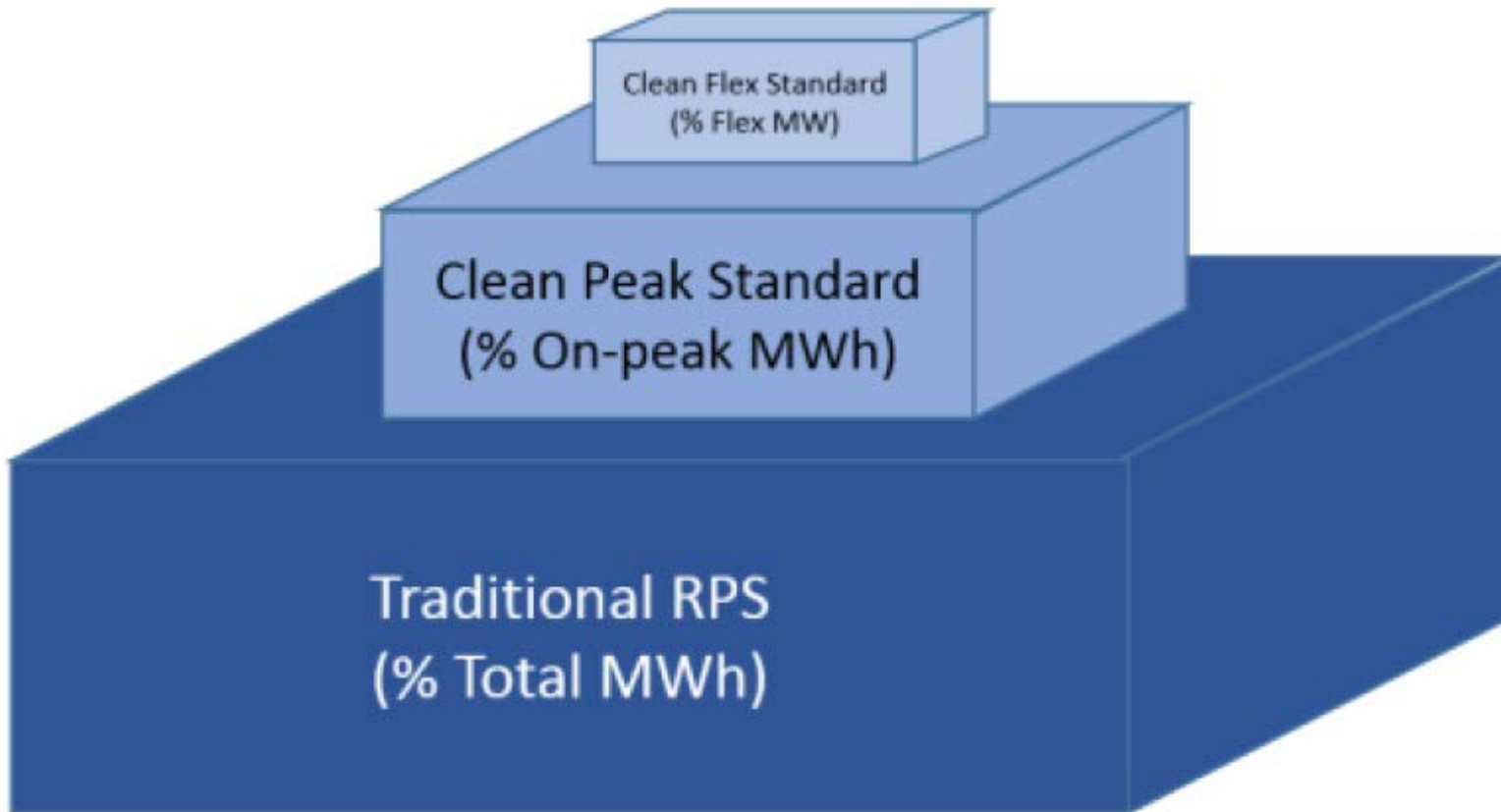


Source: CAISO

# Illustration of Clean Peak Standard (CPS)



**Policy design increases in sophistication as new building blocks are added**

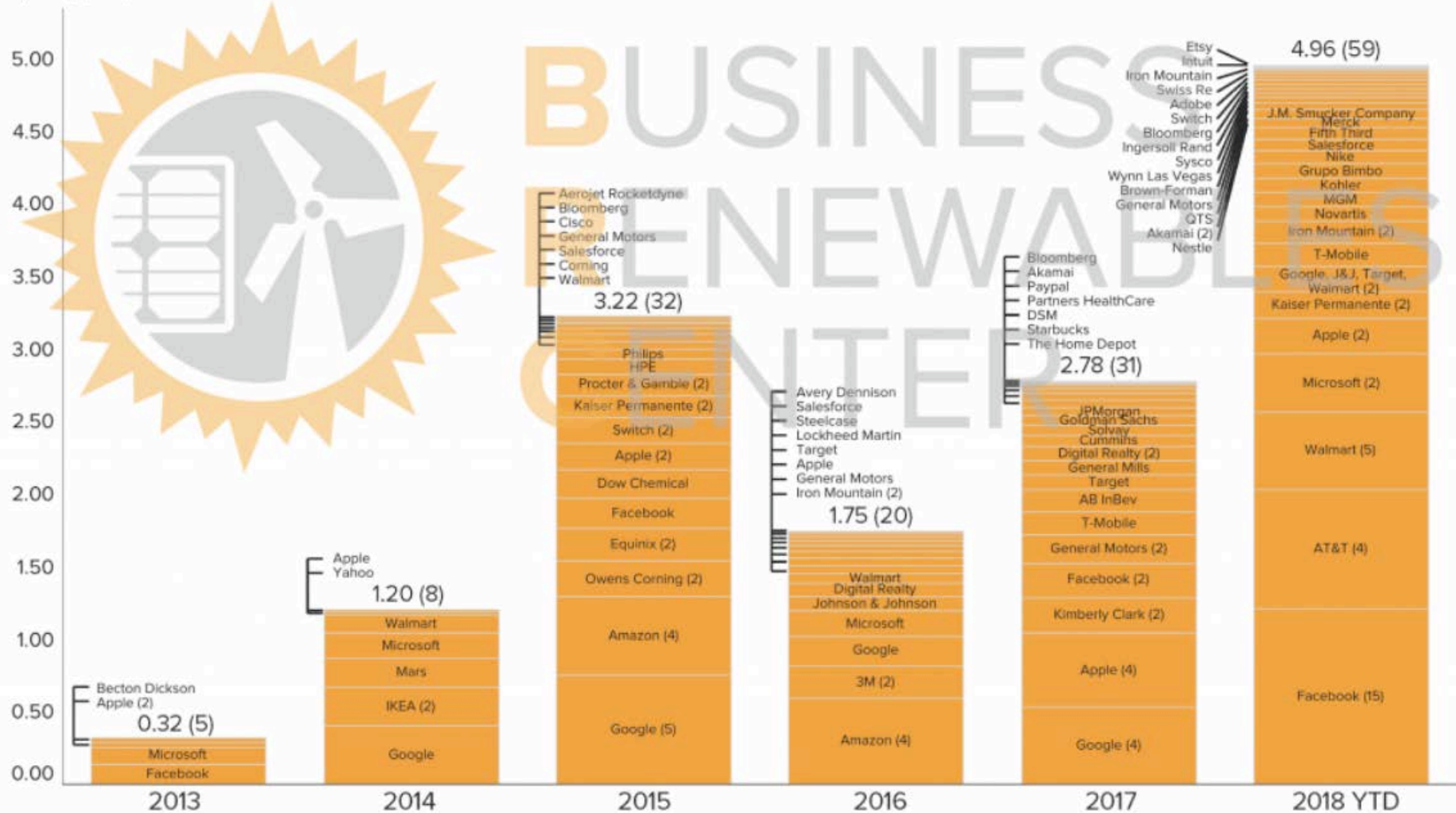


*Figure 5. Conceptual Building Blocks of the RPS 2.0 Framework*  
*Strategen consulting, llc: Evolving the RPS: A Clean Peak Standard for a Smarter Renewable Future*



# Corporate Renewable Deals 2013 – 2018 YTD

Capacity (GW)

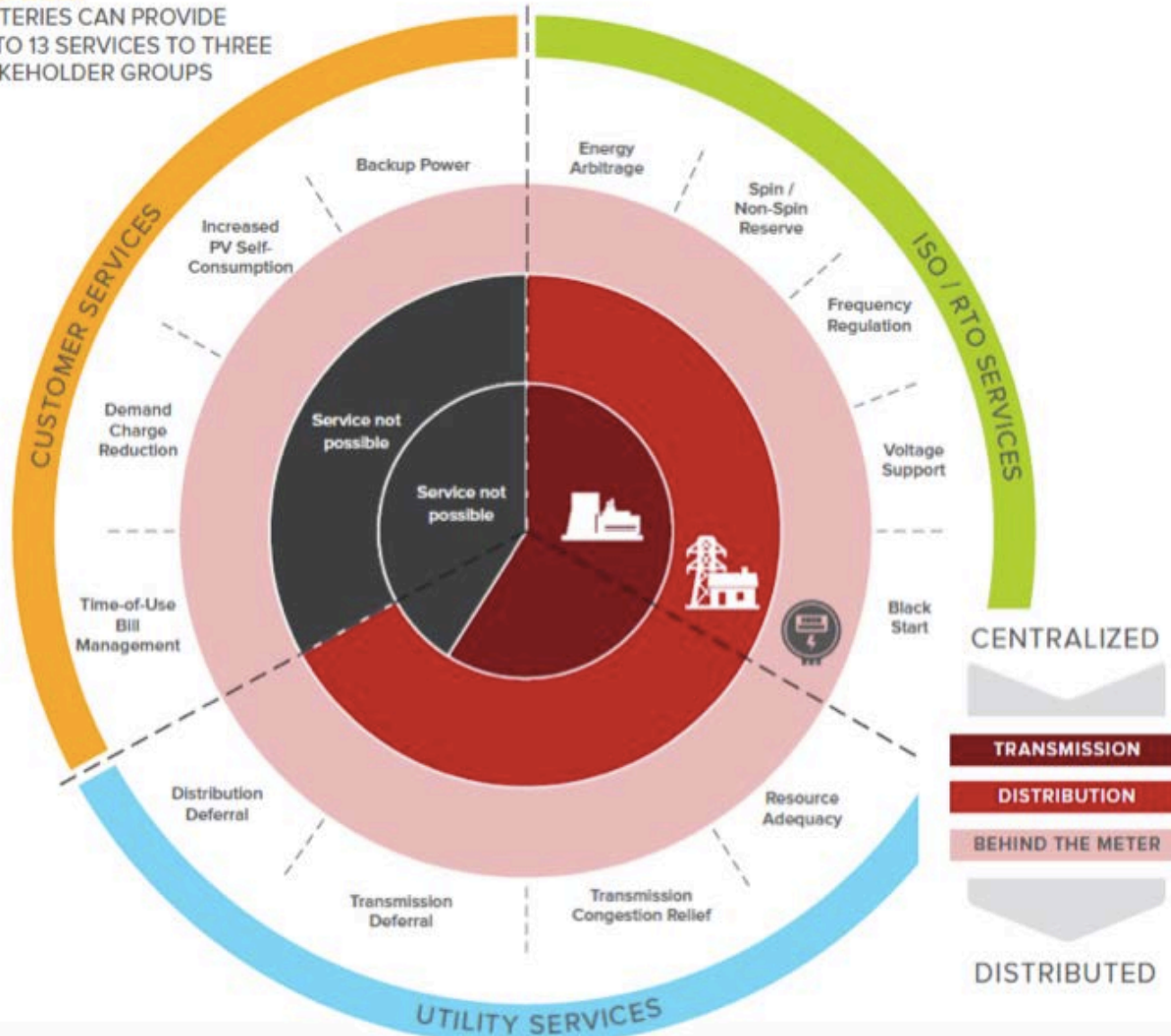


As of October 17, 2018. Publicly announced contracted capacity of corporate Power Purchase Agreements, Green Power Purchases, Green Tariffs, and Outright Project Ownership in the US, 2013 – 2018 YTD. Excludes on-site generation (e.g., rooftop solar PV) and deals with operating plants. (#) indicates number of deals each year by individual companies. Copyright 2018 by Rocky Mountain Institute

# Energy Storage

FIGURE ES2

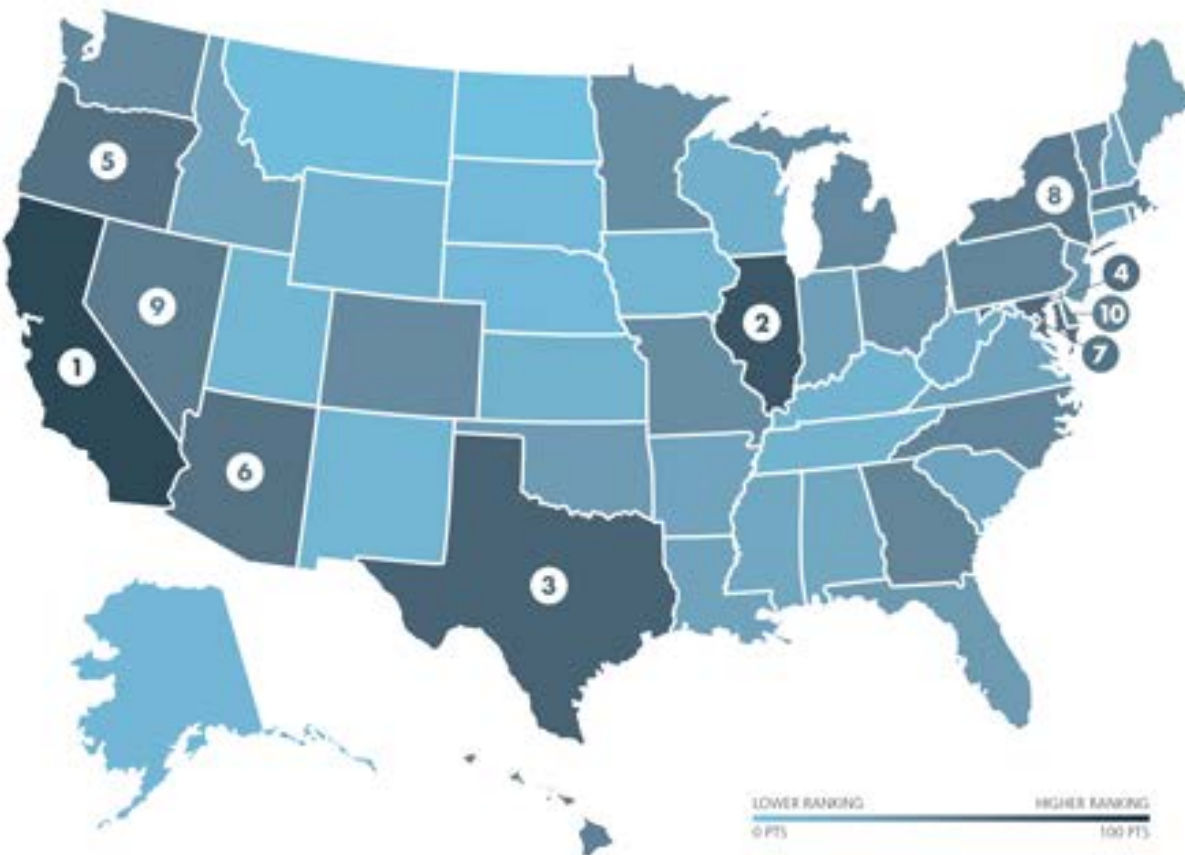
BATTERIES CAN PROVIDE UP TO 13 SERVICES TO THREE STAKEHOLDER GROUPS





# Grid Modernization

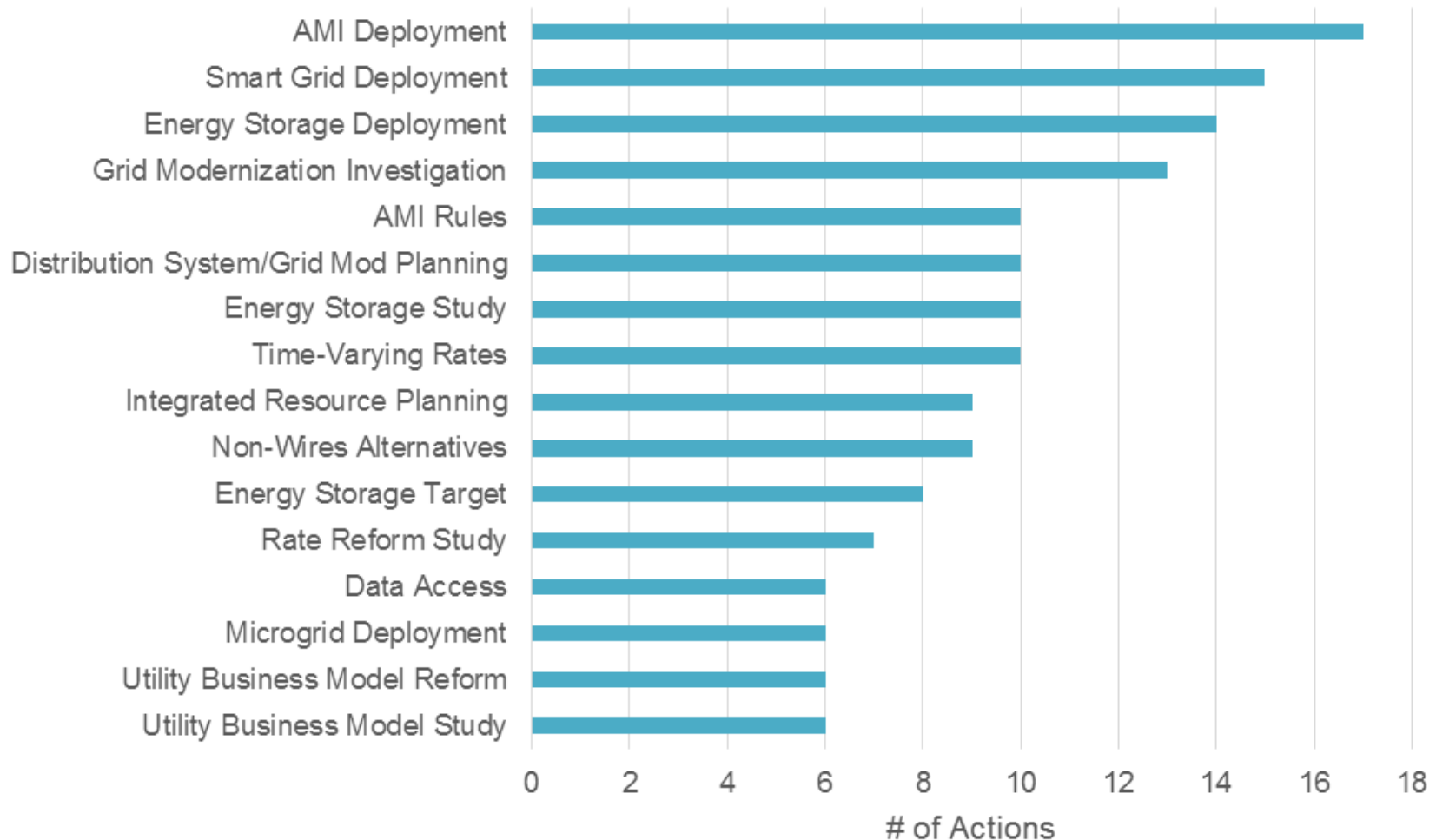
## OVERALL RESULTS



RANK	+/-	STATE	LEADERSHIP SCORE
1	0	California	81.5
2	0	Illinois	73.0
3	0	Texas	64.6
4	0	Maryland	57.5
5	2	Oregon	56.8
6	3	Arizona	55.5
7	-2	District of Columbia	53.5
8	8	New York	51.0
9	5	Nevada	50.1
10	-4	Delaware	48.5
11	1	Hawaii	46.0
12	8	Massachusetts	44.8
13	-5	Pennsylvania	44.0
14	-4	Georgia	43.5
15	-4	North Carolina	43.3
16	-1	Michigan	41.7
17	12	Washington	40.5
18	17	Colorado	40.0
19	-6	Vermont	39.6
20	2	Missouri	39.0
21	-2	Minnesota	38.8
22	3	Ohio	36.8
23	25	Rhode Island	34.0
24	2	New Jersey	32.3
25	-8	Florida	30.1
26	-5	Maine	29.5
27	-9	Oklahoma	29.0
28	-4	Indiana	27.0
29	4	Louisiana	24.4
30	2	Idaho	23.9
31	-8	Virginia	23.4
32	-2	Arkansas	23.2
33	1	South Carolina	23.1
34	-6	New Hampshire	21.6
35	-4	Connecticut	21.4
36	7	Mississippi	21.3
37	-10	Alabama	21.0
38	-1	West Virginia	19.0
39	1	Wisconsin	15.1
40	-4	Kansas	14.4
41	3	Tennessee	13.2
42	-3	Wyoming	11.9
43	2	Kentucky	11.6
44	-3	New Mexico	11.0
45	1	Iowa	10.7
46	-8	Utah	10.5
47	0	Alaska	10.3
48	-6	South Dakota	9.0
49	1	Nebraska	8.5
50	-1	Montana	6.3
51	0	North Dakota	-3.3*

# Grid Modernization

## Most Common Types of Policies in 2017



# Policies 2018

## RENEWABLE PORTFOLIO STANDARDS

**Massachusetts HB 18-4857:** Increased the state's RPS to approximately 50% by 2030, sets an energy storage target of 1000 MWh by 2026, and directs the Department of Energy Resources to establish a clean peak standard for retail electric suppliers.

**New Jersey A 18-3723:** Increased the state's RPS to 50% by 2030, set a 2000 MW target for energy storage.

## ELECTRIC VEHICLES

**Colorado E.O. B 2018 006:** Directed CDPHE to consider a rule adopting California's LEV standard.

## UTILITY BUSINESS MODELS

**Hawaii SB 18-2939:** Requires the PUC to establish performance incentive and penalty mechanisms by 2020 that directly tie electric utility revenues to the utility's achievement on performance metrics including reliability, customer engagement, and rapid integration of renewable energy resources.

## GRID MODERNIZATION

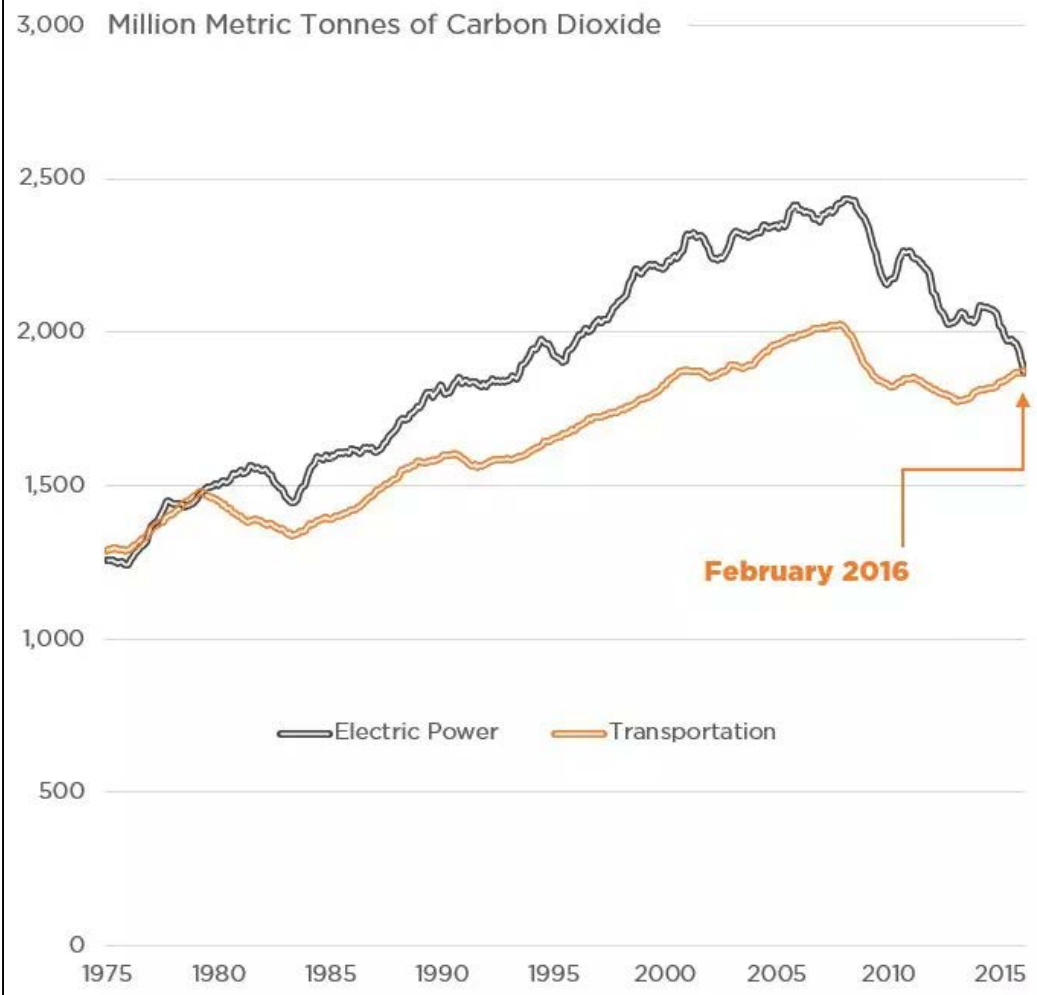
**Maine LD 17-755:** Utilities proposing transmission projects must allow a third-party investigation of potential non-transmission alternatives, to be submitted to the PUC.

## CARBON STANDARDS

**California SB-100:** A goal of 100% carbon-free electricity by 2045. Within this standard is the state's carbon trading program and renewable portfolio standard of 60% by 2030 (from 50% by 2030). There already exists an economy wide 40% reduction in GHG by 2030.



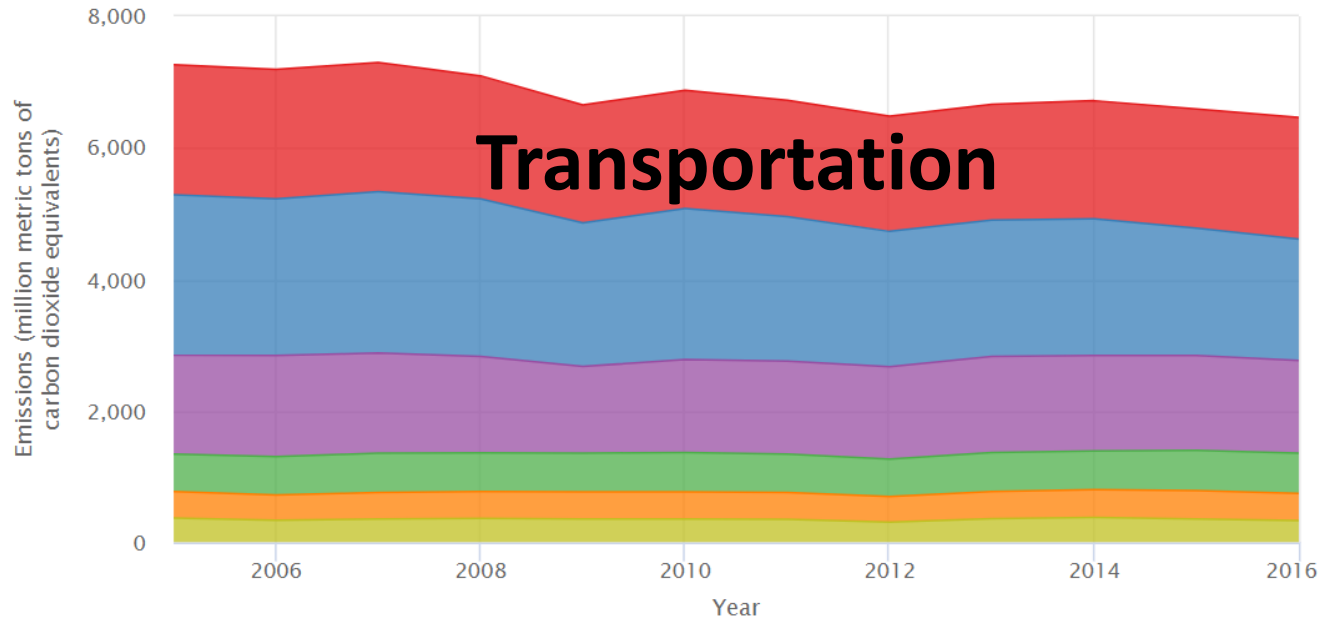
## Carbon Dioxide Emissions by Sector Moving 12-Month Total



Source: DOE, EIA, May 2016 Monthly Energy Review

# U.S. Greenhouse Gas Emissions by Economic Sector, 2005-2016

Export



● Transportation ● Electricity generation ● Industry ● Agriculture ● Commercial ● Residential

## Percent change:

### 2005-2016

- 🚗 ▼ 6.1%
- ⚡ ▼ 24.3%
- 🏭 ▼ 6.7%
- 🐄 ▲ 7.6%
- 🏢 ▲ 3.1%
- 🏠 ▼ 10.3%

Total: ▼ 11.1%

## Percent change:

### 2012-2016

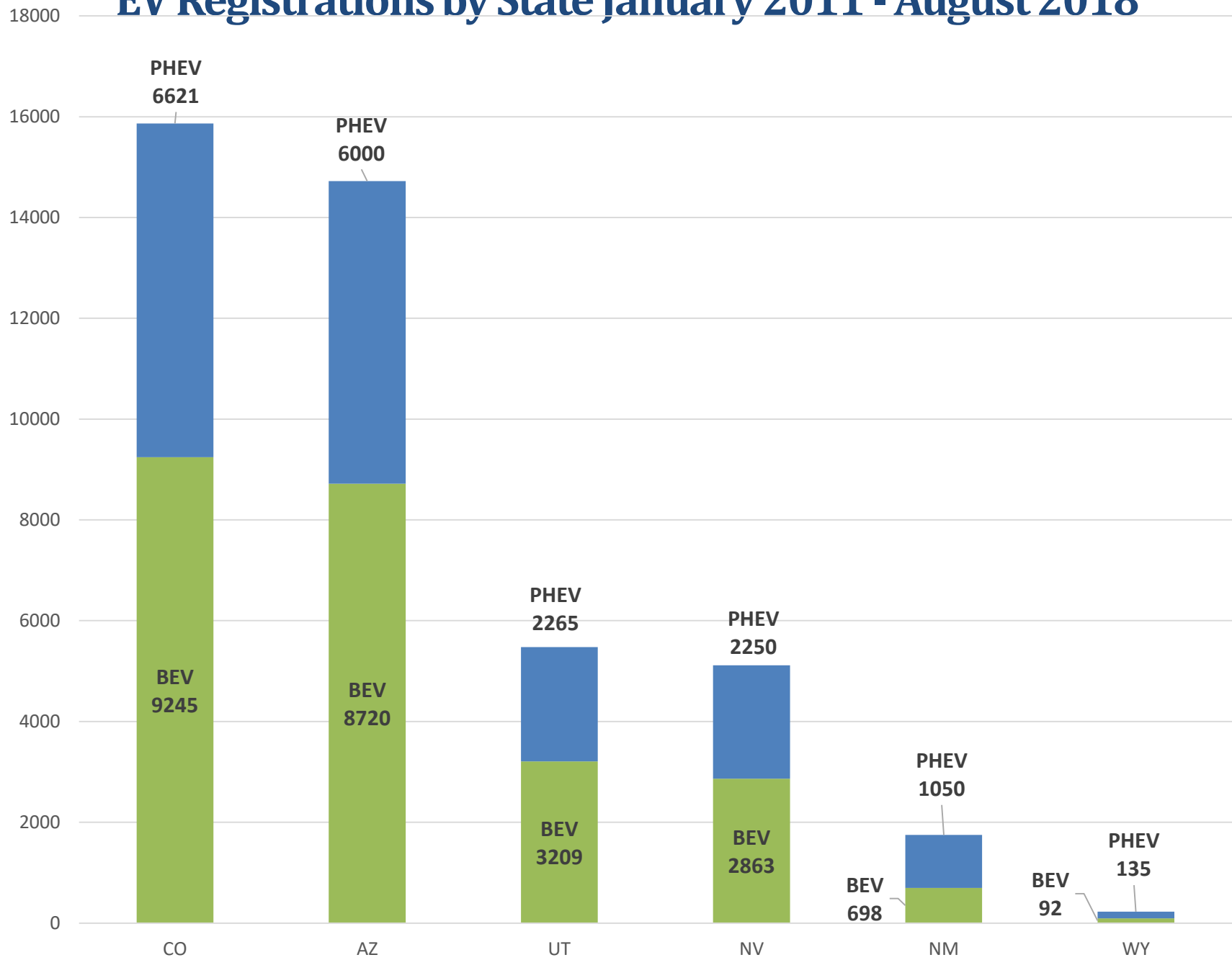
- 🚗 ▲ 5.8%
- ⚡ ▼ 10.2%
- 🏭 ▲ 0.2%
- 🐄 ▲ 7.0%
- 🏢 ▲ 7.0%
- 🏠 ▲ 7.5%

Total: ▼ 0.3%

Source: US EPA



# EV Registrations by State January 2011 - August 2018



Source: <https://autoalliance.org/energy-environment/advanced-technology-vehicle-sales-dashboard/>



# The REV West MOU

- The MOU creates a framework to:
  - Reduce transportation sector carbon emissions and allow EV drivers to travel between the states using major transportation corridors.
- The Signatory states agree to:
  - Create best practices and procedures that will enhance EV adoption;
  - Create voluntary minimum standards for EV charging stations;
  - Identify and develop opportunities to incorporate EV charging station infrastructure into planning and development processes;
  - Encourage EV manufacturers to stock and market a wide variety of EVs in the states; and
  - Identify, respond to, and where possible collaborate on funding opportunities to support the development of the REV West Plan.

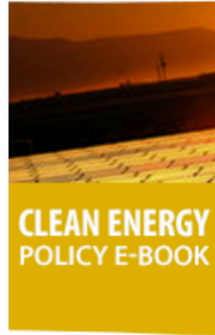
# CNEE Projects



**AEL  
TRACKER**



**SPOT  
FOR CLEAN  
ENERGY**



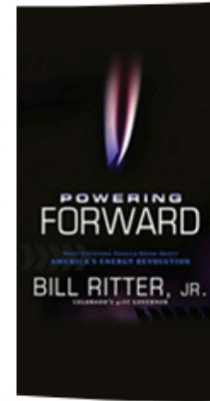
**CLEAN ENERGY  
POLICY E-BOOK**



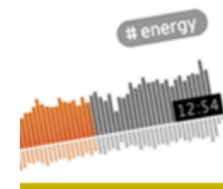
**REPOWERING  
THE WESTERN  
ECONOMY**



**CLEAN ENERGY  
LEGISLATIVE  
ACADEMY**



**POWERING  
FORWARD**  
THE POLITICAL MOVEMENT BEHIND  
AMERICA'S ENERGY REVOLUTION  
BILL RITTER, JR.  
CHAIRMAN & CEO, CNEE



**POLICY  
PODCAST**



# The Clean Energy Legislative Academy

hosted by CNEE



- Energy Storage
- Grid Modernization
- Clean Energy Finance
- Utility Business Models
- Electrifying Transportation
- Mainstreaming Renewables

State	Legislators and Staff Who Have Attended
Arizona	Representative Ken Clark
Arizona	Senator Frank Pratt
Arizona	Andrew Loucks
Arizona	Jeff Kros
Colorado	Representative Jeni Arndt
Colorado	Senator Kevin Priola
Colorado	Representative Mike Foote
Colorado	Representative Chris Hansen
Colorado	Matt Becker
Colorado	Katie Ruedebusch
Colorado	Jasmin Barco
Nevada	Assemblyman Chris Brooks
Nevada	Senator Pat Spearman
Nevada	Senator Mo Denis
Nevada	Marjorie Paslov-Thomas
New Mexico	Representative Nathan Small
New Mexico	Julia Barnes
Utah	Representative Stephen Handy
Utah	Sarah Balland

# Search Advanced Energy Legislation

2018 Legislative Schedules

Also visit CNEE's:



**1 STATES**

SELECT ONE OR MORE STATES BELOW.

Alabama	Kentucky	North Dakota
Alaska	Louisiana	Ohio
Arizona	Maine	Oklahoma
Arkansas	Maryland	Oregon
California	Massachusetts	Pennsylvania
Colorado	Michigan	Rhode Island
Connecticut	Minnesota	South Carolina
Delaware	Mississippi	South Dakota
District of Columbia	Missouri	Tennessee
Florida	Montana	Texas
Georgia	Nebraska	Utah
Hawaii	Nevada	Vermont
Idaho	New Hampshire	Virginia
Illinois	New Jersey	Washington
Indiana	New Mexico	West Virginia
Iowa	New York	Wisconsin
Kansas	North Carolina	Wyoming

SELECT ALL STATES

**2 POLICIES**

SELECT ONE OR MORE POLICIES BELOW.

Economic Development	Infrastructure
Electricity Generation	Natural Gas Development
Emissions	Other Energy
Energy Efficiency	Regulatory
Financing and Financial Incentives	Transportation

SELECT ALL POLICIES

**3 YEAR INTRODUCED**

SELECT ONE OR MORE YEARS.

1 selected ▼

**4 BILL STATUS**

SELECT ONE OR MORE BILL STATUSES BELOW.

Introduced	Passed One Chamber	Passed Both Chambers
Enacted	Failed	Vetoes

SELECT ALL STATUSES

**5 KEYWORDS**

SEARCH FOR BILL NUMBER, SPONSOR NAME, ETC.

ENTER KEYWORDS

DISPLAY MY RESULTS ➔

Click here to request that we add a bill to the database.  
 Click here to search bills awaiting approval and entry.

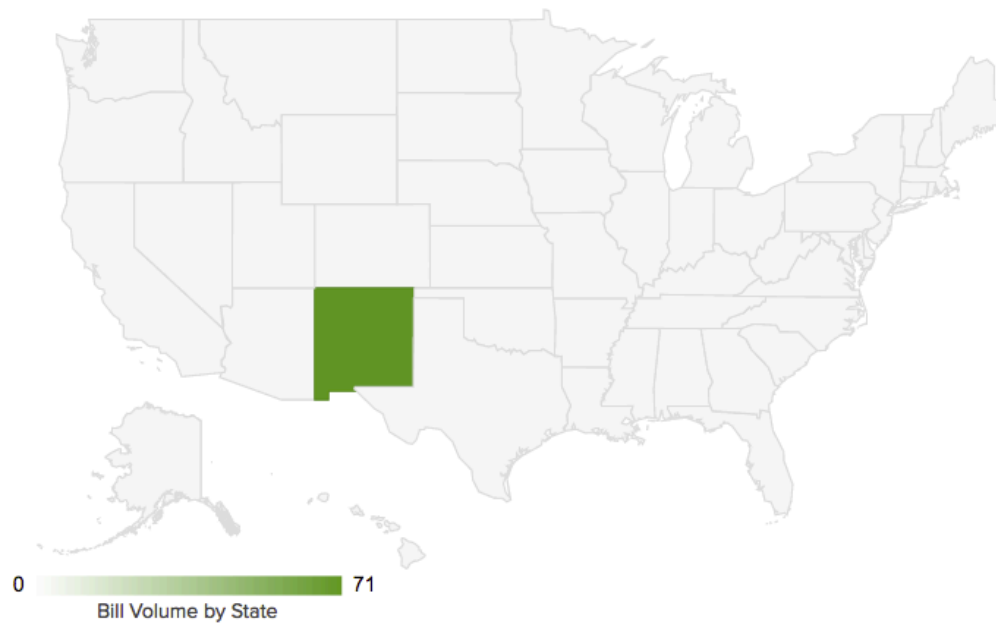
How to use this database <https://www.aeltracker.org>

# THIS SEARCH FOUND 71 BILLS

SEARCH

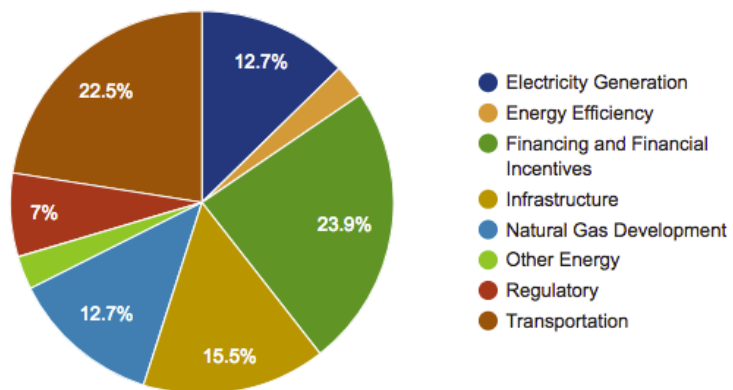


## DISTRIBUTION OF BILLS ACROSS STATES

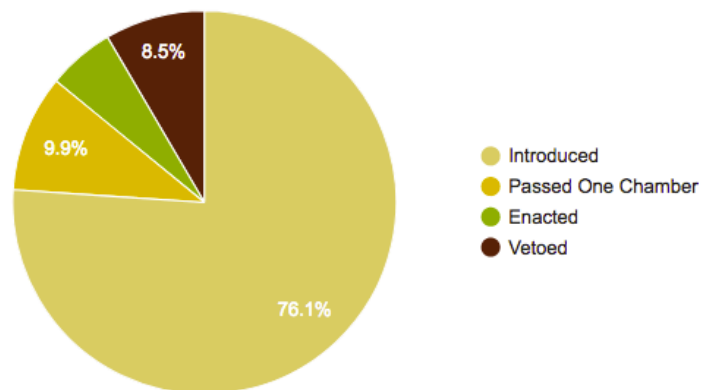


Click a state to view policy category distribution.







## DISTRIBUTION OF BILLS ACROSS POLICY CATEGORIES



## DISTRIBUTION OF BILLS ACROSS STATUSES





STATE BILL NO.	YEAR	STATUS	BILL TITLE	POLICY CATEGORY	PRIMARY SPONSOR(S)	UPDATED
New Mexico HB121	2018	I	Oil & Gas Fund To Carlsbad Brine Well Fund	 Natural Gas Development	Cathrynn Brown (Republican)	2018-01-16
New Mexico HB126	2018	I	Oil & Gas Fund To Carlsbad Brine Well Fund	 Natural Gas Development	Cathrynn Brown (Republican)	2018-04-17
New Mexico HB165	2018	E	Alternate Fuel Acquisition Act Definitions	 Financing and Financial Incentives	Roberto Gonzales (Democratic)	2018-02-14
New Mexico HB193	2017	I	Solar Market Tax Credit Permanent	 Financing and Financial Incentives	Daymon Ely (Democratic)	2017-01-17
New Mexico HB196	2018	I	Energy Efficiency & Renewable Bonding Changes	 Energy Efficiency	Bill McCamley (Democratic)	2018-01-24
New Mexico HB199	2017	E	Distributed Generation Consumer Protection	 Financing and Financial Incentives	Cathrynn Brown (Republican) Eliseo Alcon (Democratic)	2017-02-12



# New Mexico - SB47 - 2018

Energy Redevelopment Bonds



Infrastructure

[VIEW LATEST BILL](#)

**INTRODUCED**

Added On: 03-08-2018

Updated On: 04-16-2018

Status: Introduced

Primary Sponsors: [Jacob Candelaria](#) (Democratic), [Rodney Montoya](#) (Republican)

▼ [Actions \(6\)](#)

▼ [Sponsors \(3\)](#)

▼ [News \(2\)](#)



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Create a list of bills by selecting them from your search results. Choose the frequency you would like to be notified about updates to these bills (hourly, daily, weekly, or never) and what types of changes you would like to be notified about (new vote, action, version, news article, or status change).

In addition to receiving email notifications about changes to your bills, you can log into [AELTracker.org/account](https://www.aeltracker.org/account) at any time for updates.

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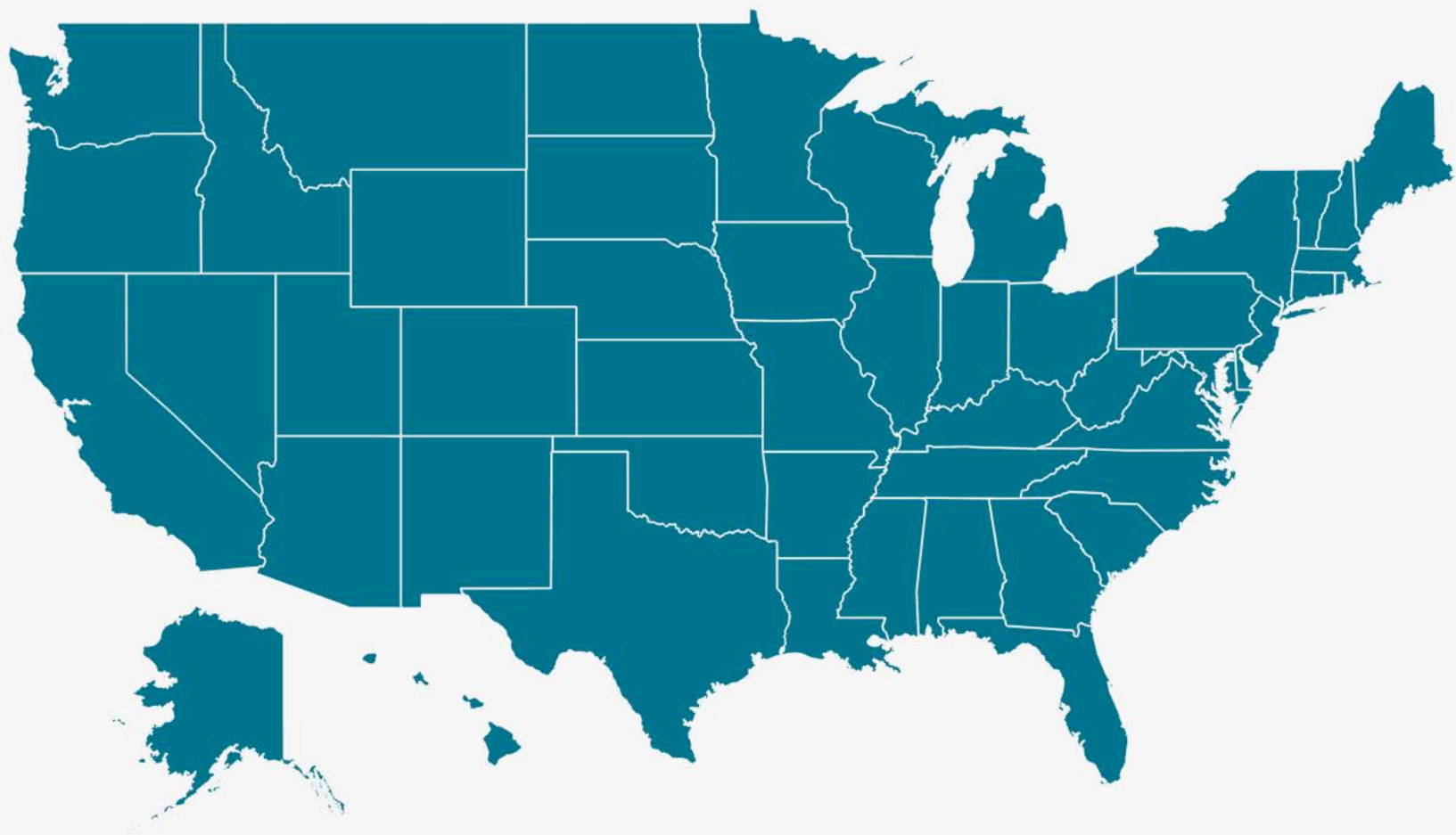
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[DOWNLOAD FULL 50 STATE GAP ANALYSIS](#)

STATE PROFILE

CHOOSE ANOTHER STATE **NEW MEXICO** ▾



# NEW MEXICO

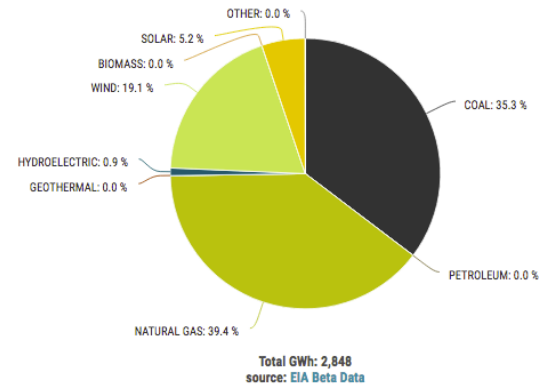
## State Snapshot:

**Governor:** Susana Martinez (R)  
**2018 Legislative Session Dates:** January 16th - February 15th  
**House Majority Party:** (D) **Senate Majority Party:** (D)  
 New Mexico State Legislature

**Public Regulation Commission**  
**Commissioners Appointed or Elected:** Elected  
 Public Regulation Commission

**Other State Offices**  
 Energy, Minerals, and Natural Resources Department  
 Environment Department

## Electric Generation Mix



## GAP ANALYSIS

### 1 MARKET PREPARATION

- Interconnection ████████
- Net Metering ██████
- Utility Green Power Option ██████
- Modified Energy Efficiency Cost/Benefit Tests ██████

### 2 MARKET CREATION

- Renewable Portfolio Standard ████████
- Distributed Generation / Solar Carve-out ██████
- Energy Efficiency Resource Standard ██████
- Residential Building Energy Codes ██████

### 3 MARKET EXPANSION

- Renewable Standard Offer ████████
- Shared Renewables ██████
- Aggregate Net Metering ██████
- Combined Heat and Power Incentives ██████





## NEW MEXICO - SOLAR INCENTIVES



### POLICY COMPONENTS QUESTIONS

1. Does the state offer loans?
2. Does the state offer a rebate program?
3. Does the state offer a tax credit?
4. Do the top three utilities in the state offer any type of incentive?
5. Do any of these incentives also apply to solar thermal technologies?

YES >

NO >

YES >

YES >

YES >

### DESCRIPTION

Distributed generation (DG) provides localized generation that serves a specific part of the grid. It may include generation serving a specific residence or business, a neighborhood, or a region served by a substation. DG has the benefit of reducing stress on large transmission infrastructure by providing distribution level power (as opposed to central generation). Because small-scale renewable energy systems require large upfront investments, many states provide financing and financial incentives to spur adoption of these technologies. For more information, see the full policy brief.

For more information on the components of the policy see the full policy brief.

[DOWNLOAD FULL POLICY BRIEF](#)

*Policy Component information last updated July 30 2018*

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### MORE INFORMATION

#### Recent Legislation

ADVANCED ENERGY LEGISLATION **tracker**

\*New Mexico - HB36

\*New Mexico - HB87

\*New Mexico - SB79

\*For historic legislation, visit <http://www.aeltracker.org/>

#### Other Links

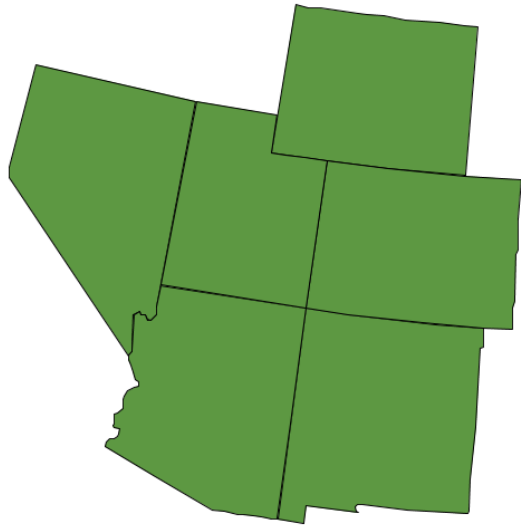
\*Loan - DSIRE

\*Tax Credit - DSIRE

\*Performance-Based Incentive - DSIRE

\*Drinking Water State Revolving Loan Fund - DSIRE

\*Tax Credit - DSIRE



# CNEE State Briefs

- Provide a brief background on the energy economy in your state
- Introduce the concept of policy stacking
- Present background and policy opportunities\* for your state in four major areas:
  - Grid Modernization
  - Energy Storage
  - Renewable Energy
  - Electrification of the Transportation Sector
- Link to recent news and other resources

\*Most of these policies can be created through legislative or regulatory procedures.

# Clean Energy Opportunities for New Mexico

- Transition from coal to cleaner electricity
  - Securitization
  - Equitable transition for communities
- NM Renewable Portfolio Standard
- EV charging corridors and infrastructure
- Regional grid modernization and transmission planning
- Data privacy and ownership legislation
- Jobs and economic development opportunities
- Storage and “non-wire alternatives” considered in utility planning



# Thank you. Questions?

**Contact Information:**

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Patrick Cummins, Senior Policy Advisor: [Patrick.Cummins@colostate.edu](mailto:Patrick.Cummins@colostate.edu)

Tom Plant, Senior Policy Advisor: [Tom.Plant@colostate.edu](mailto:Tom.Plant@colostate.edu)

**Colorado State University**