# STATE TRENDS IN GRID MODERNIZATION

COLORADO HOUSE ENERGY & ENVIRONMENT COMMITTEE
JANUARY 14, 2018

Glen Andersen
NCSL Energy Program Director

NCSL

# ABOUT NCSL

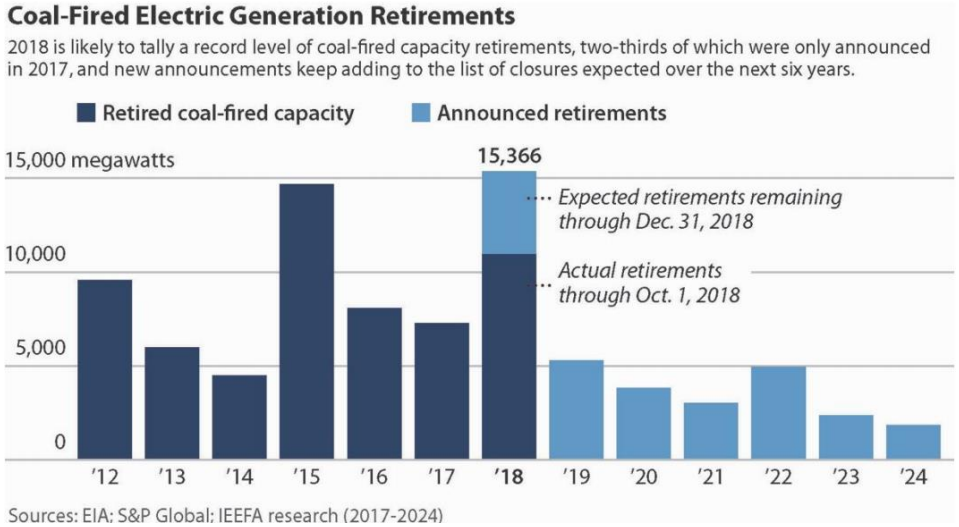
- **Bipartisan organization**
  - Serves 7,383 legislators and 30,000+ legislative staff across 50 states, as well as commonwealths and territories

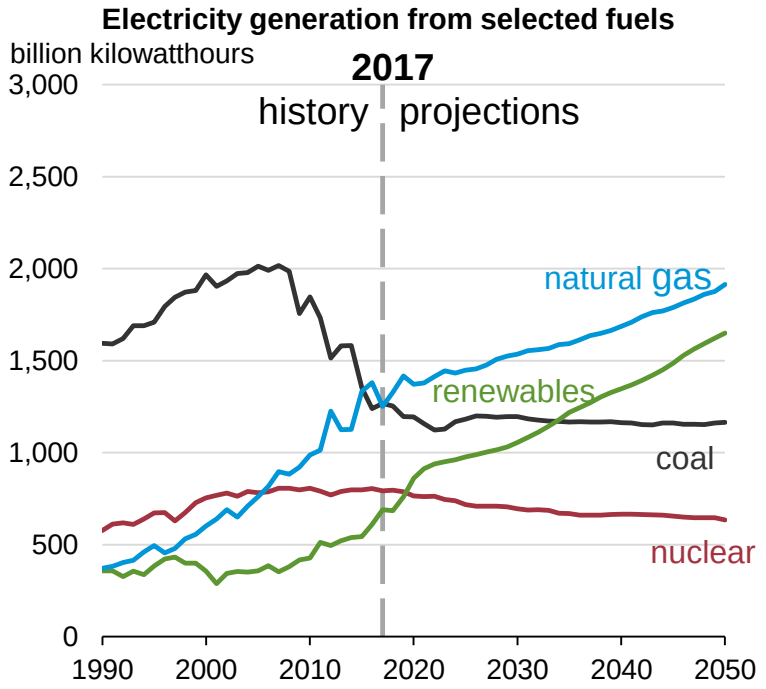
- **Services**
  - State policy research
  - Technical assistance and training
  - Provide a forum where policymakers can exchange ideas
  - Lobbying for states' interests at the federal level

NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# THE CHANGING ENERGY MIX

- Coal: 50 at percent in 2005 down to 28 percent in 2018
- Gas: now around 35 percent
- Wind and solar: 4 percent in 2010 to near 10 percent in 2018



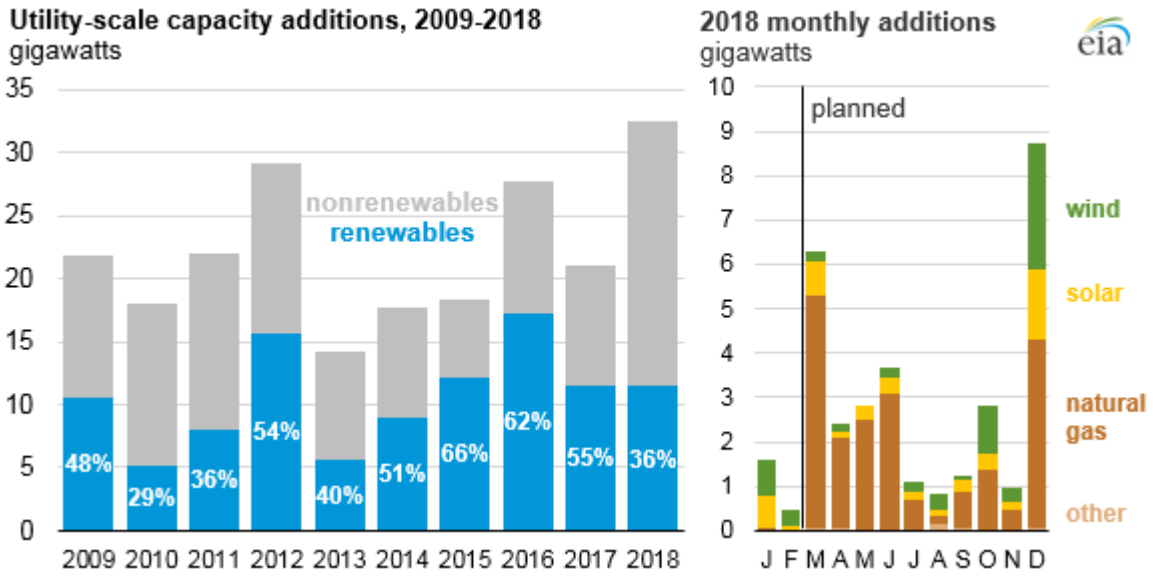




EIA 2018 Energy Outlook

NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# THE CHANGING EMISSIONS PROFILE

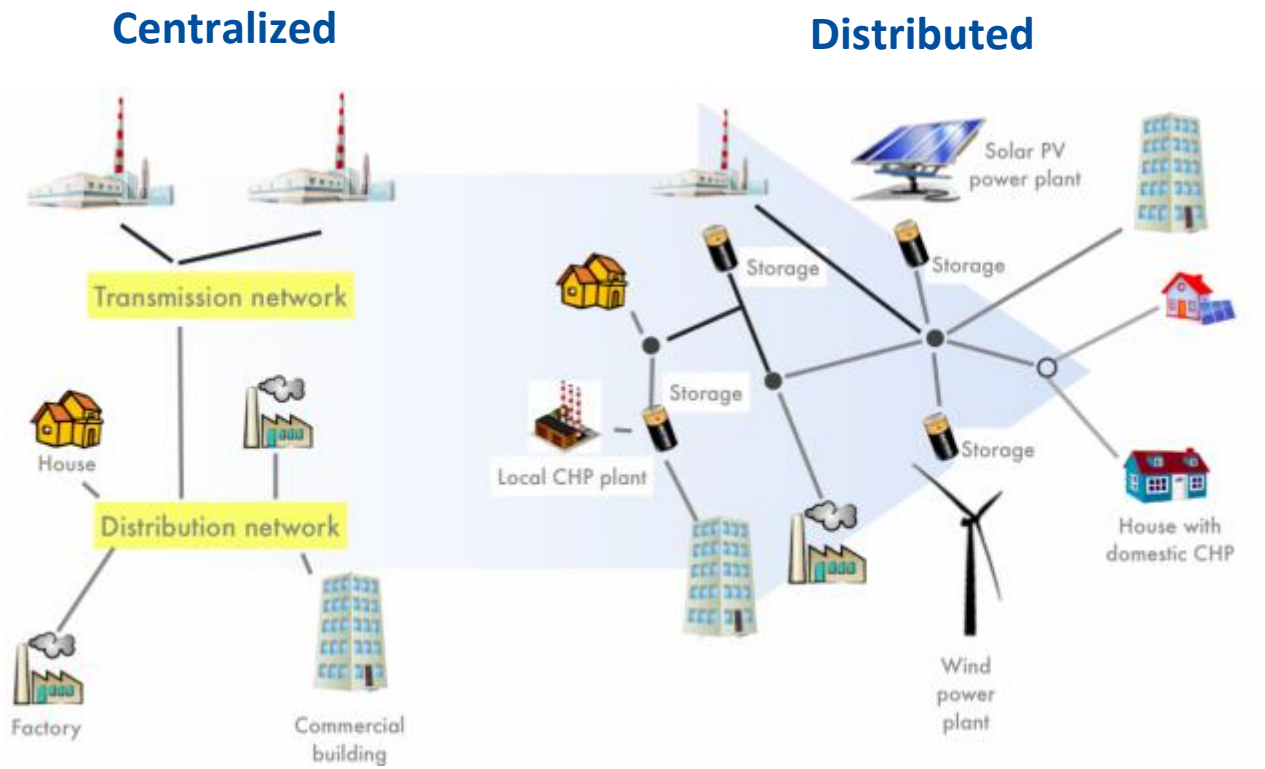
- Trend toward less carbon intensive generation
- Overall power sector CO2 emission decreased 12% from 2007 to 2015
- CO2 Emissions increased by 3.4% in 2018: Natural gas produced 3 times the decline in coal generation and four times the growth in wind and solar growth




Source: EIA


NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# AN ELECTRIC GRID REVOLUTION DRIVES STATE POLICY

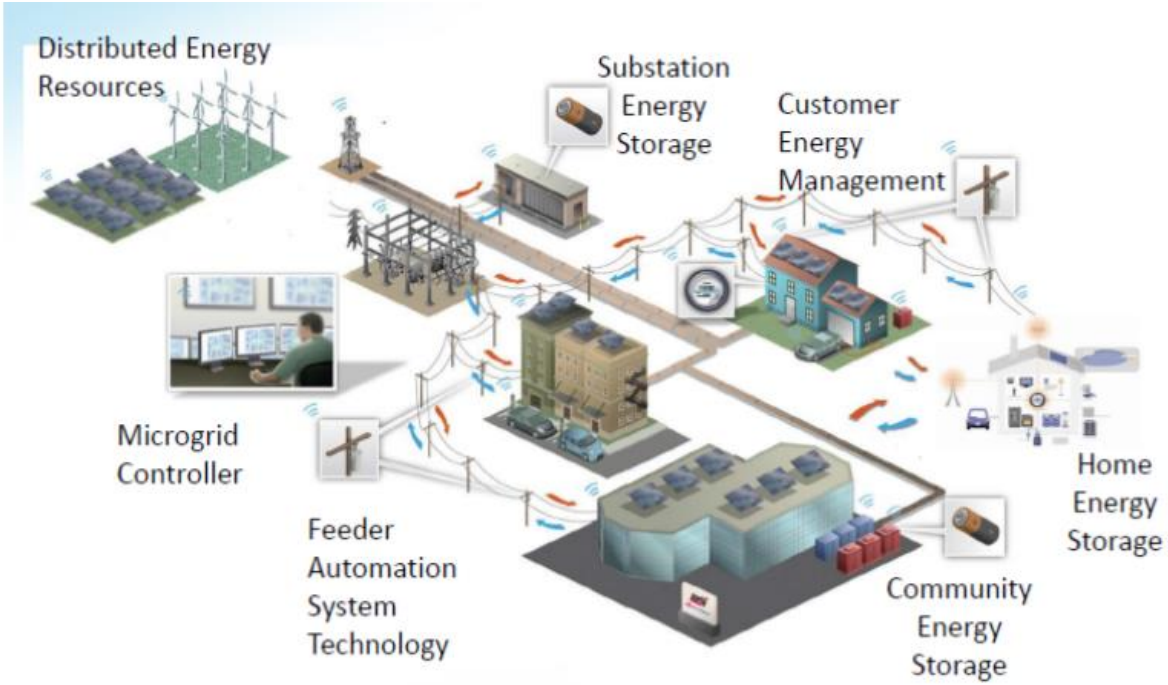



- One way to two-way grid
- Centralized to distributed
- Consumer producers
- More efficient, more reliable, more secure, cleaner
- Communications and control technologies

NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

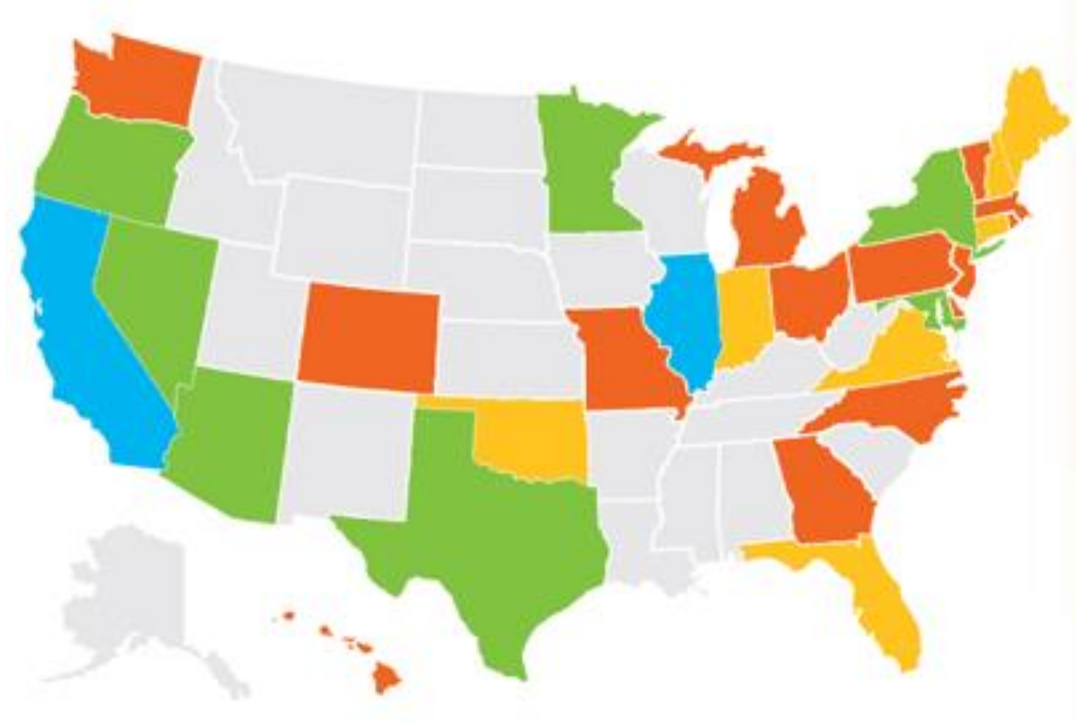
# TECHNOLOGY IS CHANGING FASTER THAN POLICY

- ‘Smart Grid’ technologies
- Energy Storage
- Electric Vehicles
- Microgrids
- Energy Efficiency
- Demand Response
- Distributed generation growth
- Dramatic Renewable Energy Growth




NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# GRID MODERNIZATION INDEX 2018



| RANK | STATE | | |
|---|---|---|---|
| 1 | California | 82 | LEADERS |
| 2 | Illinois | 77 | |
| 3 | Maryland | 62 | MOVERS |
| 4 | Arizona | 60 | |
| 5 | Oregon | 58 | |
| 6 | Texas | 57 | |
| 7 | New York | 54 | |
| 8 | Nevada | 51 | |
| 8 | District of Columbia | 51 | |
| 10 | Minnesota | 50 | |
| 11 | Michigan | 48 | BELIEVERS |
| 11 | Massachusetts | 48 | |
| 11 | Georgia | 48 | |
| 11 | Colorado | 48 | |
| 15 | Hawaii | 47 | |
| 16 | Delaware | 46 | |
| 17 | Pennsylvania | 45 | |
| 18 | Ohio | 44 | |
| 19 | Rhode Island | 43 | |
| 20 | Vermont | 42 | |
| 20 | Missouri | 42 | |
| 22 | Washington | 41 | |
| 23 | North Carolina | 40 | |
| 24 | New Jersey | 37 | |
| 25 | Virginia | 32 | BEGINNERS |
| 26 | Maine | 29 | |
| 26 | Oklahoma | 29 | |
| 26 | Connecticut | 29 | |
| 29 | Florida | 27 | |
| 29 | Indiana | 27 | |
| 29 | New Hampshire | 27 | |
| 32 | Louisiana | 24 | |
| 32 | Idaho | 24 | |
| 34 | Arkansas | 23 | |
| 34 | South Carolina | 23 | |
| 36 | Mississippi | 21 | |
| 36 | Alabama | 21 | |

Source: Gridwise Alliance



NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# MODERN RATES FOR A MODERN GRID

- Rates recover a utility's authorized revenue requirement, traditionally through a flat rate with a fixed charge
- Customer-sited generation, storage, smart meters, flattening load growth and ability to shape demand has challenged this approach
- Utilities are pushing to recover more of their costs via fixed charges and demand charges, lowering the variable component
  - Costs may be fixed in the short term, but vary in the long term
  - Less reliance on variable price signals reduces incentive for efficiency, increases consumption, and ultimately increases the need to build more infrastructure
- Better rate structures can reflect how system and utility costs vary over time, and reward utilities for reaching performance goals that benefit customers



NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# MODERN RATES FOR A MODERN GRID

- **Time Base Rates and Dynamic Pricing**
  - More accurately represent the time-variable cost of providing electricity, signaling customers to shift or reduce their energy use during periods when the cost of providing electricity is highest.
  - Ultimately, improved market signaling can reduce system operating costs in the short term and infrastructure costs in the longer term.
- **California** (AB 327 - 2013) gave the Public Utilities Commission the authority to direct investor-owned utilities to adopt TOU rates. The state's three largest investor-owned utilities will transition from voluntary to default TOU rates by 2019.
- **Massachusetts** (S 2564 – 2018)
  - Requires the state's distribution utilities to offer residential and small commercial and industrial customers at least one TOU rate option.
  - The rates are not to include demand charges.
  - Utilities must provide customers with estimated bills under each of the available rate options.
  - Options to mitigate adverse impact on low-income customers are to be considered.



NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# PERFORMANCE BASED REGULATION

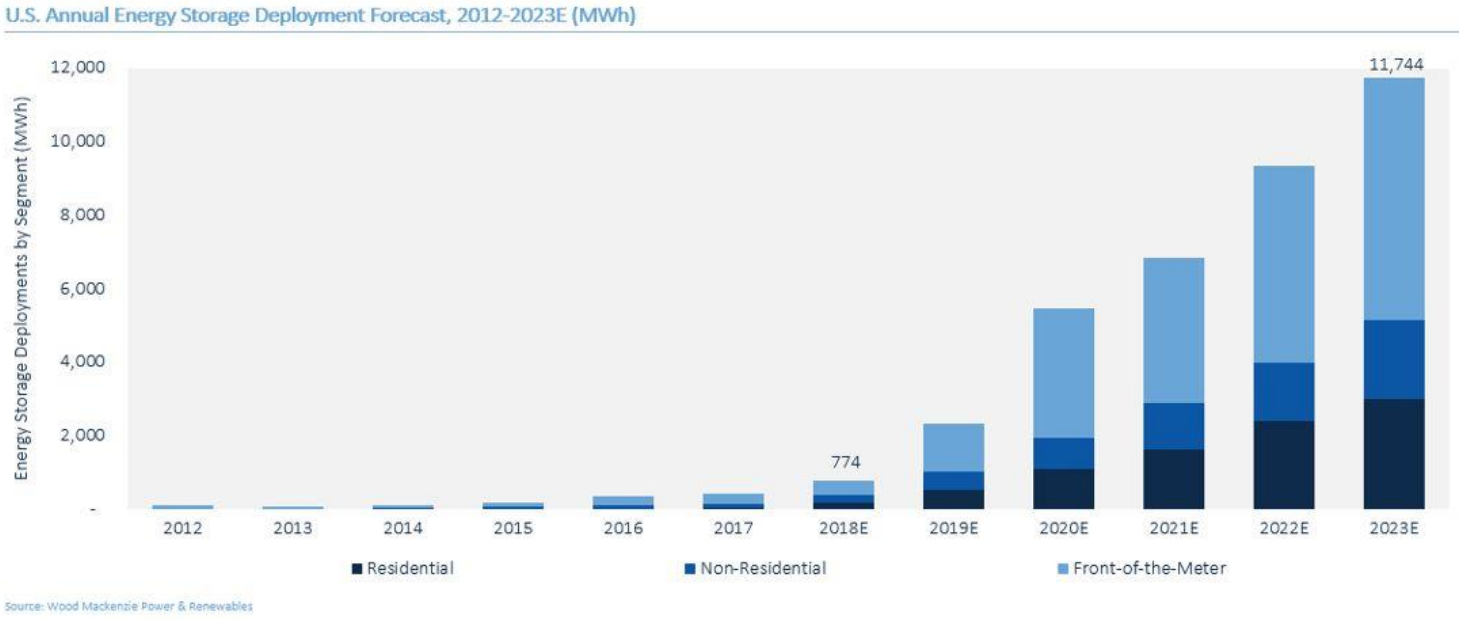
- **The traditional regulatory framework does not align utility and customer goals**
  - The "perverse incentive" rewards regulated utilities with a return on capital expenditures, even if they are not the lowest cost approaches to meeting system needs. (Profits are lower when utilities sell less or building less)
  - Utilities can propose capital expenditures that recover the shareholder investment with a profit, or propose a solution that is good for customers but sacrifices earnings
- New approaches reward utilities for reaching new targets and meeting customer needs in areas like energy efficiency, reliability, grid modernization, public safety, customer service, economic development and others.
  - Performance Based Regulation – rewards utilities for achieving a desired outcome or performance. i.e. increasing energy efficiency and demand response, improving resiliency or heightening customer satisfaction
  - Revenue Decoupling – eliminates the relationship between revenues and sales
  - Shared Savings – Utility shares percentage of customer savings it achieves

# PERFORMANCE BASED REGULATION

- **New York** Reforming the Energy Vision (REV) initiative, roadmap for building a clean, resilient and affordable energy system. A comprehensive reworking of the traditional utility compensation model through performance-based incentives and more accurate pricing schemes for distributed generation.
- **Hawaii** (SB 2939) directs the Hawaii Public Utilities Commission (PUC) to implement performance-based regulation by 2020. First state to legislatively break the link between utility revenues and capital expenditures. The legislation also requires the PUC to evaluate existing ratemaking structures and to design incentives and penalties around several outcomes, such as customer affordability, electric reliability, and rapid interconnection of renewable energy systems and distributed resources.
- **Pennsylvania** (HB 1782) allows utilities to propose and the PUC to approve alternative ratemaking approaches based on decoupling mechanisms, performance-based rates, formula rates, and/or multiyear rate plans.

# ENERGY STORAGE

- Energy Storage growth has exploded for many reasons
  - Resiliency
  - Reliability
  - Outage mitigation
  - Modularity
  - Congestion reduction
  - Peak load reduction




NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# ENERGY STORAGE

**17 state legislatures considered more than 80 measures on energy storage in 2018**

- **5 states legislatures have directed creation of energy storage targets**
  - NY – 3 GW by 2030
  - CA – 1.9 GW by 2021
  - MA – 1 GWh by 2025
  - NJ – 2  GW by 2030
  - OR – .01 GWh by 2020
  - NV – PUC is studying setting a target
  - AZ – ACC directing utilities to incentivize residential storage
- **Hawaii** and **Maryland** enacted tax credits for energy storage, while Maine, Minnesota and New Mexico have considered similar measures.
- **Maryland** (HB 773, 2017) requires study of regulatory reforms and market incentives that could be beneficial to energy storage in the state.
- **California** (SB 700, 2017) creates efficiency requirements for incentivized energy storage systems to ensure they reduce greenhouse gas emissions. Batteries using nonrenewable fuel power generation are not eligible for incentives after a specified date.

NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# ENERGY STORAGE

- **Colorado** (HB 1270 - 2018) establishes rules to encourage storage development by integrating storage into the IRP process
- **Nevada** (SB 145 - 2017) establishes a program for the payment of incentives for the installation of certain energy storage systems under the Solar Energy Systems Incentive Program, in addition to creating the Electric Vehicle Infrastructure Demonstration program
- **Massachusetts**
  - HB 4857 (2018)– Clean Peak Standard targets renewables, energy storage, demand response to meet peak load. Sets 1 GW Energy storage target by 2025
  - SMART Program – solar + storage incentive of 2.5 to 7.5 cents/kwh for paired systems
  - Programs expected to drive jump from 5.4 MW deployed in 2018 to 54 MW during 2019

# SECURING A MODERN GRID

- DHS finds that the energy industry is heavily targeted: >50% of reported incidents are persistent threats from sophisticated actors.
- DHS, NSA, FERC, NERC and US DOE take the lead in cyber risk reduction efforts.
- FERC has approved and updated cybersecurity standards developed by NERC to enhance grid defenses, directing NERC to improve reporting requirements for cyber incidents and address supply chain vulnerabilities.
- Collaborative effort with power industry, federal and state agencies.



NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# SECURING A MODERN GRID: 2018 STATE ACTION

- **8 bills enacted in 6 states**
- **Cybersecurity Research Councils**
  - Delaware created a Cybersecurity Advisory Council to provide recommendations to the governor with H 429.
  - Maryland added the state Administrator of elections to its existing council.
  - At least six other states—California, Nevada, New Jersey, New York, Texas and Washington—considered this type of measure.
- **Missouri** (HB 1355, 2018): Established the joint legislative Committee on Disaster Preparedness and Awareness, which studies and investigates issues relating to potential disasters, including cyber-attacks.
- **California**
  - SB 532 added cyberterrorism to the list of conditions that could constitute a state or local emergency declaration. Other states, have considered similar measures.
  - AB 2813 established a state Cybersecurity Integration Center within the Office of Emergency Services, along with its own cyber incident response team. Similar to a state-level version of the DHS cyber office.

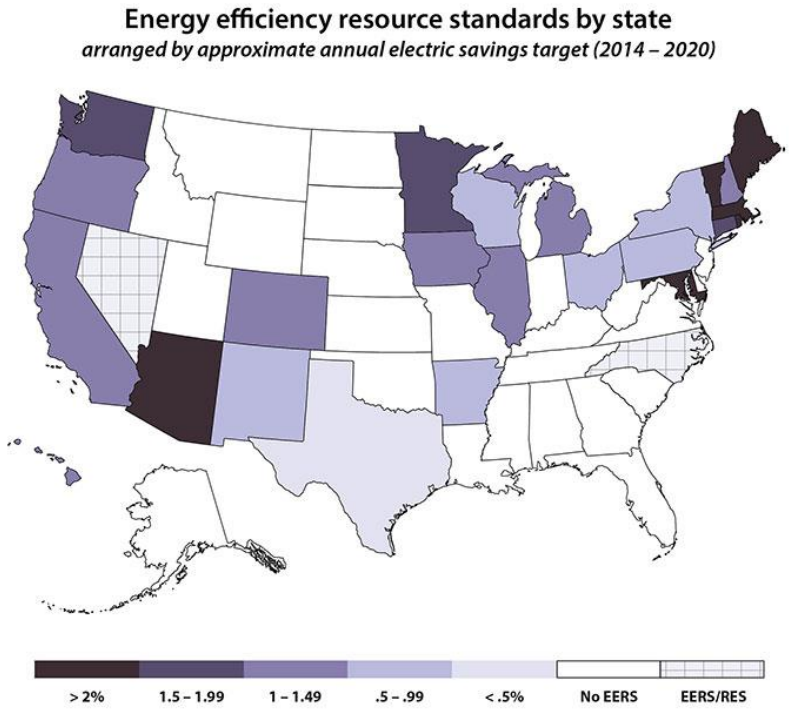


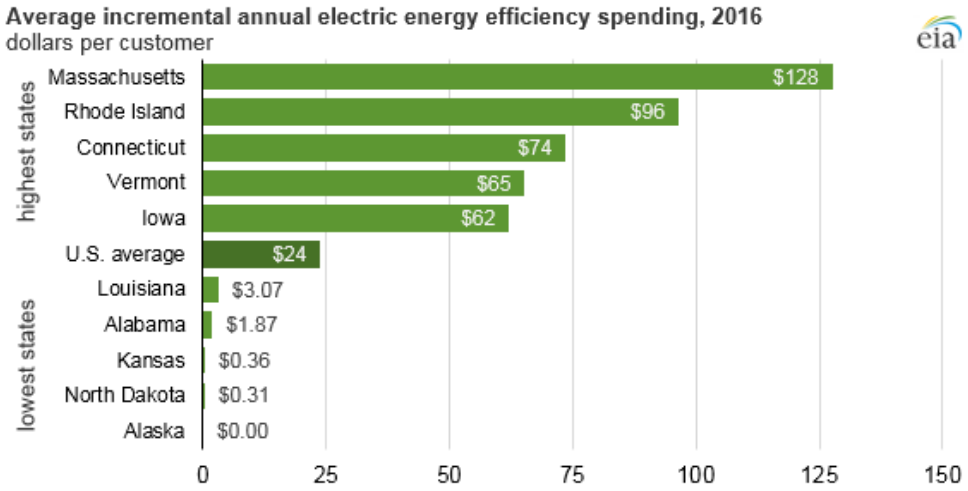
NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# SECURING A MODERN GRID: STATE ACTION

- **Public Disclosure Restrictions**
  - Many states have explored these policies.
  - Iowa and Virginia each passed multiple FOIA exemption bills.
    - Virginia focused on protecting vulnerabilities to critical infrastructure, information related to response plans and information that would hinder antiterrorism efforts.
    - Iowa HB 445 and HB 601 (2017) restrict public Freedom of Information Act disclosures of certain information that could reveal cyber vulnerabilities to critical infrastructure
  - See NCSL's Open Government Laws and Critical Energy Infrastructure for more on this topic

# ENERGY EFFICIENCY MANDATES




NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# EFFICIENCY TRENDS IN 2018

- 609 bills considered
- 94 bills enacted in 30 states
  - Building codes, efficiency in schools and public buildings, reporting requirements
  - Financing Policy (PACE financing)
  - Statewide efficiency targets or incentives
  - Sales tax holidays for efficient appliances

NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

# ENACTED LEGISLATION

- **Maryland** (House Bill 1481 & Senate Bill 648)
  - Requires home builders to disclose energy-efficient options to buyers, including which tax credits may be available.
- **Connecticut (Senate Bill 9)**
  - Requires utilities to detail how they will implement demand management initiatives, energy conservation programs and market transformation initiatives, in their three-year electric and gas conservation and load management plans.
- **New Jersey** (Assembly Bill 3723) Creates 2% annual energy efficiency requirement for utilities. Requires Board of Public Utilities to adopt efficiency programs that ensure investment in cost-effective energy efficiency measures.
- **Vermont** (House Bill 410) Efficiency standards for 16 products, including air conditioners, computers and faucets to the state's appliance efficiency law.

NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

**Glen Andersen,**

**Energy Program Director**

Phone: 303-856-1341

glen.andersen@ncsl.org

**Additional Resources**

**http://www.ncsl.org/research/energy/energy-legislation-tracking-database.aspx**

NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES