NATIONAL GOVERNORS ASSOCIATION

Governors' New Energy Policy Advisors Bootcamp

May 9 - 10, 2019

National Governors Association
Center for Best Practices

WIFI

Network: LeMeridien_Meetings

Password: spg2019

#WeTheStates

NATIONAL GOVERNORS ASSOCIATION

Welcome & Opening Remarks

Sue Gander, Division Director, Energy, Environment & Infrastructure, National Governors Association

Dan Lauf, Energy Program Director, Energy, Environment & Infrastructure, National Governors Association

Anne Clement, Senior Legislative Associate, Natural Resources Committee, NGA Advocacy

#WeTheStates

About NGA

Founded in 1908, the National Governors Association (NGA) is the collective voice of the nation's governors. Our members are the governors of the 55 states, territories and commonwealths. NGA provides governors and their staff with services that range from representing states on Capitol Hill and before the Administration to developing and implementing innovative solutions to public policy challenges through NGA Solutions -- Center for Best Practices.

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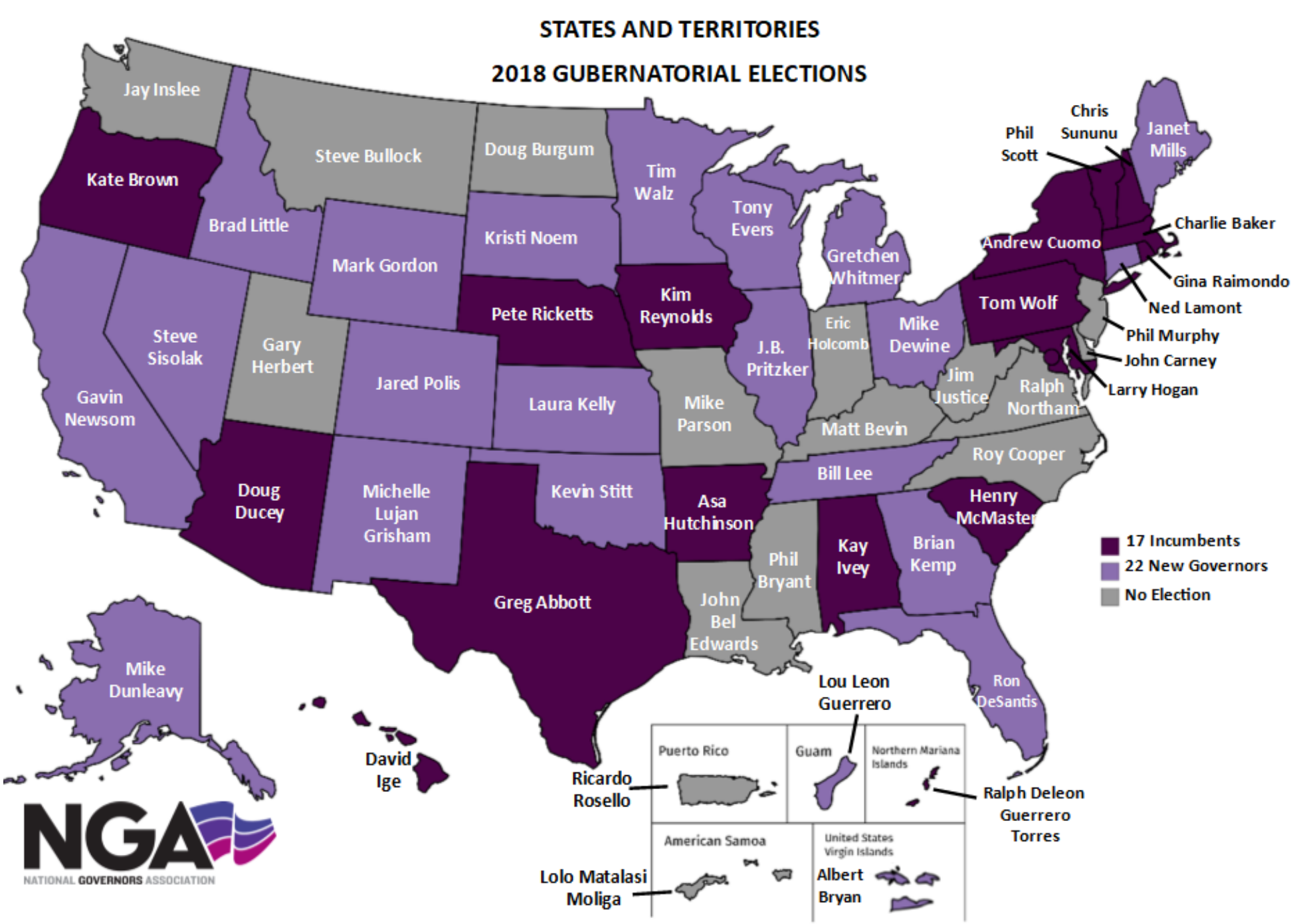
Serving 22 NEW governors in 2019



NGA Services

NGA SOLUTIONS
The NGA CENTER FOR BEST PRACTICES is the only research and development firm that directly serves the nation's governors. Areas of expertise inside the division grow aptitude in five key public policy areas being shaped in the states.

NGA GLOBAL

NGA ADVOCACY
The mission of NGA GOVERNMENT RELATIONS is to ensure governors' views are represented in the shaping of federal policy. The collective policy positions, reflecting governors' principles on priority issues, guide the association's efforts.

NGA FUTURE

NGA CONSULTING
NGA provides leadership assistance targeting the complete life-cycle of an administration—from election day through the final year in office. NGA Consulting offers services, resources and training, as well as a one-of-a-kind spouses' program.

NGA PARTNERS

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NGA's Technical Assistance Toolkit

Multi-State Meetings and Expert Panels:
Convenings to help governors' offices and state officials increase their understanding of issues and best practices through peer-to-peer exchanges and discussions with experts. The NGA Center organizes ~100 meetings annually.

Policy Academies:
Intensive technical assistance between policy experts and state teams over the course of one year (or more) to develop strategic action plans and begin to work towards tangible outcomes

Governors Response Team:
Tailored responses to governors' requests, which may consist of written analyses, on-site consultations or connections between states

Learning Labs:
Opportunities for state teams to learn about and replicate innovative initiatives across states

Webinars and Calls:
Ongoing opportunities to convey policy updates on a variety of issues of interest to governors and their staffs

Publications:
Issue briefs, papers, reports, and actionable road maps with policy guidance for governors and their staffs

Retreats:
Short gathering of state officials and external stakeholders for states to discuss policy issues, existing state solutions and develop consensus on next steps

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NGA Center for Best Practices.
Energy, Environment & Infrastructure

Provide governors state-based energy, environment and infrastructure solutions that enhance economic development, mobility, sustainability, reliability, resiliency, health and safety.

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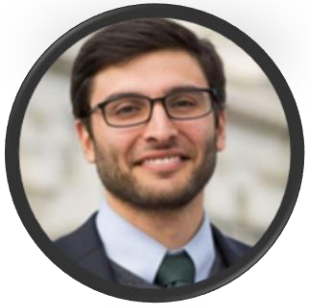
NGA's Energy, Environment & Infrastructure Team

Sue Gander
Director

Dan Lauf
Energy Program Director

Jessica Rackley
Senior Policy Analyst



Patricio Portillo
Policy Analyst

Alyse Taylor-Anyikire
Senior Policy Analyst

Matt Rogotzke
Policy Analyst

Garrett Eucalitto
Transportation Program Director

Bevin Buchheister
Senior Policy Analyst

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Energy, Environment & Infrastructure: A Year In Review

3 Learning Labs

4 Publications (Reports, Roadmaps, Whitepapers, Etc.)

4 Experts Roundtables

5 Policy Institutes, Workshops & Summits

7 In-State Retreats

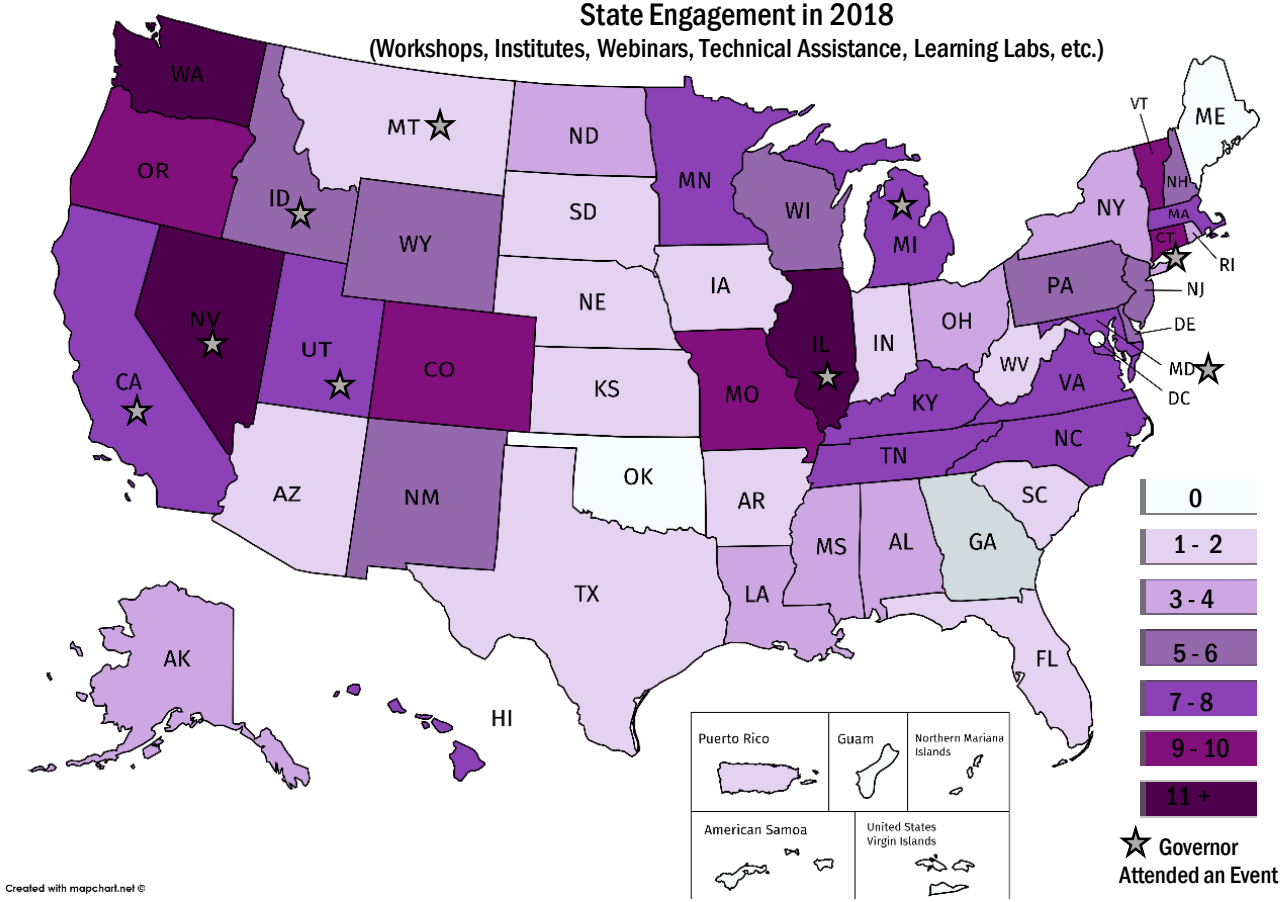
10 Webinars

15 Technical Assistance Memos for States at Their Request

20+ outside events featuring an EET speaker

State Engagement in 2018

(Workshops, Institutes, Webinars, Technical Assistance, Learning Labs, etc.)



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Energy, Environment & Infrastructure Division Focus

Power Sector Modernization

Energy Policy Institute

Grid Modernization Retreats

Global Energy Solutions Summit

Resiliency

State Energy Risk Assessment & Planning Tool and State Resilience Retreats

Grid Emergency Exercises

State/Utility Coordination Workshop

Housing Resiliency Experts Roundtable

Smarter States, Smarter Communities

Learning Lab

Roadmap

Policy Academy Kick Off

Support for New Governors

Boot Camps and Webinars

Energy Advisors

Transportation Advisors

Water Advisors

Governors Guide to Energy Policy

Technical Assistance on Demand

Research

Policy Memos

Consultations

Transportation Modernization

Traffic Safety Learning Labs

Electric Vehicle (EV) Regional Workshops

Innovation Workshops

Transportation Policy Institute

Energy Efficiency

Lead By Example Workshop

Energy Efficiency Experts Roundtable

Energy Efficiency Roadmap for Governors

Nuclear Weapons Waste

Federal Facilities Task Force Meeting

Intergovernmental Meeting

Governors Guide to Nuclear Weapons Waste Cleanup

Water Policy Learning Network

Water Policy Institute

Webinar Series

Delaware River Basin Retreats

Power Sector Modernization

Recent Projects

- 2016 Experts Roundtable on Grid Modernization Technologies and State Policy Options
- 2017-18 Power Sector Modernization Policy Academy (KY, OR, RI, WA)
- Global Energy Solutions Summit (March 28-29, 2019)
- Transportation Electrification Regional Workshops (Winter – Spring, 2019

Publications

- *Powering Up: State Trends for Advancing the Use of Energy Storage (11/2017)*
- *Grid Smarts: State Considerations for Adopting Grid Modernization Technologies (11/2017)*
- *Opportunities for Governors to Align Electricity Markets with State Energy Policy Goals (11/2017)*

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Energy Security and Resilience

Recent Projects

- 2016 Grid Outage In-State Retreats (WA, WI)
- 2018 GridEx IV State After-Action Workshop (CT, IL, MA, SD, WI)
- 2018 State Resilience Retreats (ID, MD, OR)
- State Resilience Assessment & Planning Tool (beta version)
- Grid Outage Exercises (e.g., DOE Clear Path, NERC GridEx)

Resilience is the ability to:
Withstand disasters better; Respond and recover more quickly; and Excel under new conditions

Publications

- *Improving State Coordination for Energy Assurance Planning and Response* (10/2016)
- *Preparing States for Extreme Electrical Power Grid Outages* (11/2016)
- *Executive Authority During Energy Emergencies: A Road Map for Governors* (7/2018)

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Energy Efficiency

Recent Projects

- 2016 Energy Efficiency Retreats (AK, MI, NH, VA)
- 2017 Lead by Example Retreats (MS, MD, NC, PA, WA)
- 2018 Lead by Example Workshop
- 2018 Energy Efficiency Experts Roundtable

Publications

- *Advancing the Energy-Water Nexus: How Governors Can Bridge Their Conservation Goals* (June 2017)
- *Aligning Energy Efficiency and Demand Response to Lower Peak Electricity Demand, Reduce Costs and Address Reliability Concerns* (August 2016)

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And More…

Nuclear Energy

Policy scan released in April 2019

Smarter States, Smarter Communities

Roadmap coming summer, 2019

Workshop and in-state retreats coming late 2019, early 2020

Energy/Water Nexus

And other critical interdependencies

Transportation Electrification

Regional workshops held in late ‘18 thru spring 2019

Ahead of the Curve: Innovation Governors

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On-Demand Technical Assistance

On-Demand State Technical Assistance

As-needed; quick turnaround

Direct Consultations

Remote or in-person

Quarterly Webinars

On a variety of topics; suggestions welcome!

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State Introductions

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State Introductions

- For state attendees, in 2-3 minutes please spend 2 to 3 minutes introducing yourself, and provide the following:

1. Information on your background, and
2. Describe your governor's energy policy priorities.

Setting an Energy Policy Vision and Implementing Your Governor's Priorities

- Moderator
  - **Jessica Rackley,** Senior Policy Analyst, NGA
- Speakers:
  - **Sam Robinson**, Deputy Chief of Staff, Pennsylvania Governor Tom Wolf
  - **Alex Whitaker**, former Policy Advisor to Colorado Governor John Hickenlooper

Levers and Language: An Overview of State Energy Policy and Regulation

- Moderator
  - **Sue Gander**, Division Director, NGA
- Speakers:
  - **Rich Sedano**, President and CEO, Regulatory Assistance Project
  - **Branko Terzic**, Managing Director, Berkeley Research Group

9 May 2019

Power Sector Trends, Utility Regulation, State Developments and Advice

National Governors Association Energy Advisors Bootcamp

Richard Sedano
President and CEO
Regulatory Assistance Project (RAP)©

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raponline.org

Plan for our time today

- Identify **Trends** Driving Actions
- Discuss **utility regulatory process**, the foundation for managing change
- Advice for state **executive branches**
- **Action** in selected states (if time allows)

Trends -- Innovation

- Customers
  - Needs, Wants, Nudges
- Clean Energy
  - Hard Costs, Soft Costs
- Technology
- Environment
- Markets and Regulatory Reforms

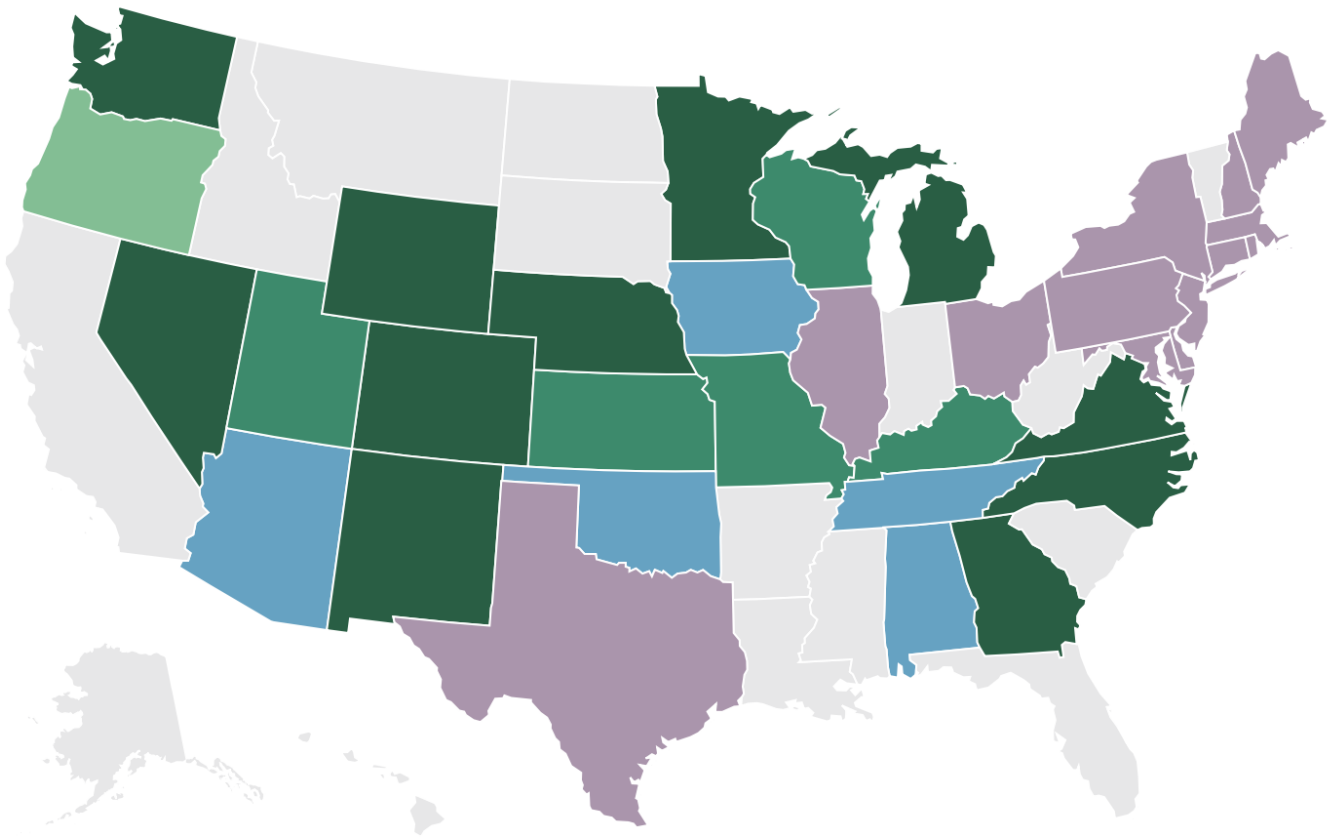
Trends: Customers

Costs and Fairness always important, new layers of interest on top of energy efficiency

- Larger Customers
  - Sustainability plans, private PPAs, Buyers Principles, Emerging end uses (data, indoor Ag)
- Smaller Customers
  - Solar + Storage + EV + etc.
- Locally sourced
  - Communities (resilience, solar, microgrid)
- The Internet, Apps, Controls, Behavioral Science

U.S. RENEWABLE ENERGY MAP: A GUIDE FOR CORPORATE BUYERS

Where customers can buy large-scale renewable energy through the grid



Utility Renewable Energy (RE) Deals

- Green tariff(s) and executed RE deal(s) through tariff
- Green tariff(s) but no deal(s) through tariff to date
- Considering a green tariff (proposal with the PUC)
- One-on-one RE deal(s) between companies and utilities, but no green tariff to date
- Electric retail choice easily available (EIA)
- No known direct large-scale RE access available

Buyersprinciples.org

Strengthening a community through local energy options.

The Brooklyn Microgrid reimagines the traditional energy grid model, with the concept of a communal energy network. While the utility provider still maintains the electrical grid that delivers power, the actual energy is generated, stored, and traded locally by members of the community, for a more resilient and sustainable clean energy model.

Brooklyn.energy

Trends: Clean Energy

- Policy (climate, jobs)
- Planning
  - Integrated Resource P >>> Distribution Planning
- Procurement
  - Resource Standards >>> emissions stds
  - All source
- Access
  - PURPA >> net metering >> interconnect >> distributed ledger and peer to peer

Trends: Technology

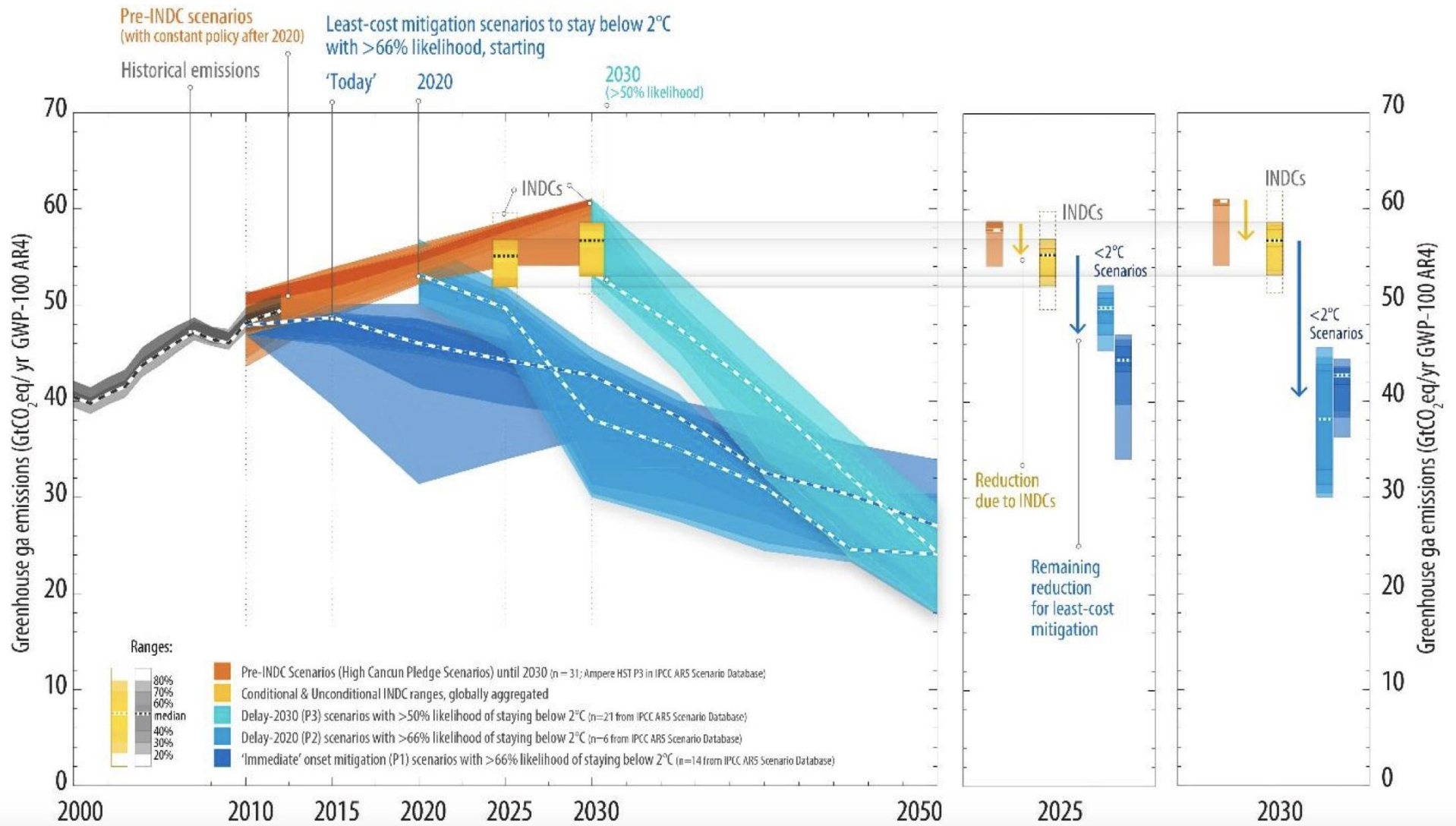
- Clean - electrification
- Fast – sensors, telecom, protected
- Smart – programmed, reactive
- Controls – larger, complex systems
- Increasingly Ubiquitous – both sides of the meter
  - Not evenly distributed
- **Grid Integrated Efficient Buildings**

Beneficial Electrification

- Standard for Electrification that receives policy support
  - Beneficial to decision-making **consumers**
  - Beneficial to the **grid**
  - Beneficial to the **environment and society**

Figure 2

Comparison of global emission levels resulting from the intended nationally determined contributions in 2025 and 2030 with other trajectories



UN Framework Convention on Climate Change – October 2015

Utility Regulation

- Objectives
- Characteristics
- Regulation balanced with Markets
- Effect on Utility
- State authority and Federal authority

Regulatory Process - Objectives

- Total Cost - control
- Prices - accurate
- Reliability - sufficient
- Fairness
  - Allocation, earnings, access, …
- Capital Access
  - Healthy regulated companies are in service to assure capital access

Process – Characteristics and Options

- Tradition: Reactive, evidence-based
  - Regulation originated as a delegation from legislatures
- Alternatives
  - Collaboratives, workshops, engagement

Process – Characteristics and Options

- Tradition: Reactive, evidence-based
  - Too Narrow? Room for initiative? Regulation originated as a delegation from legislatures
- Alternatives may recognize value in proactivity
  - Collaboratives, workshops, engagement
- Innovation is stifled with too much structure
- Innovation is stimulated with engagement

Regulation and Markets

- There is always a balance between regulation and markets
  - In a one-way system, markets are evident in wholesale, and customers make their choices
  - In a two-way or N-way system, customers are presented with more options
    - EE, Production (Solar), Storage, EVs, fuel switch, Grid integration, new suppliers of services, new rules (roles?) for utility

The One Way Grid

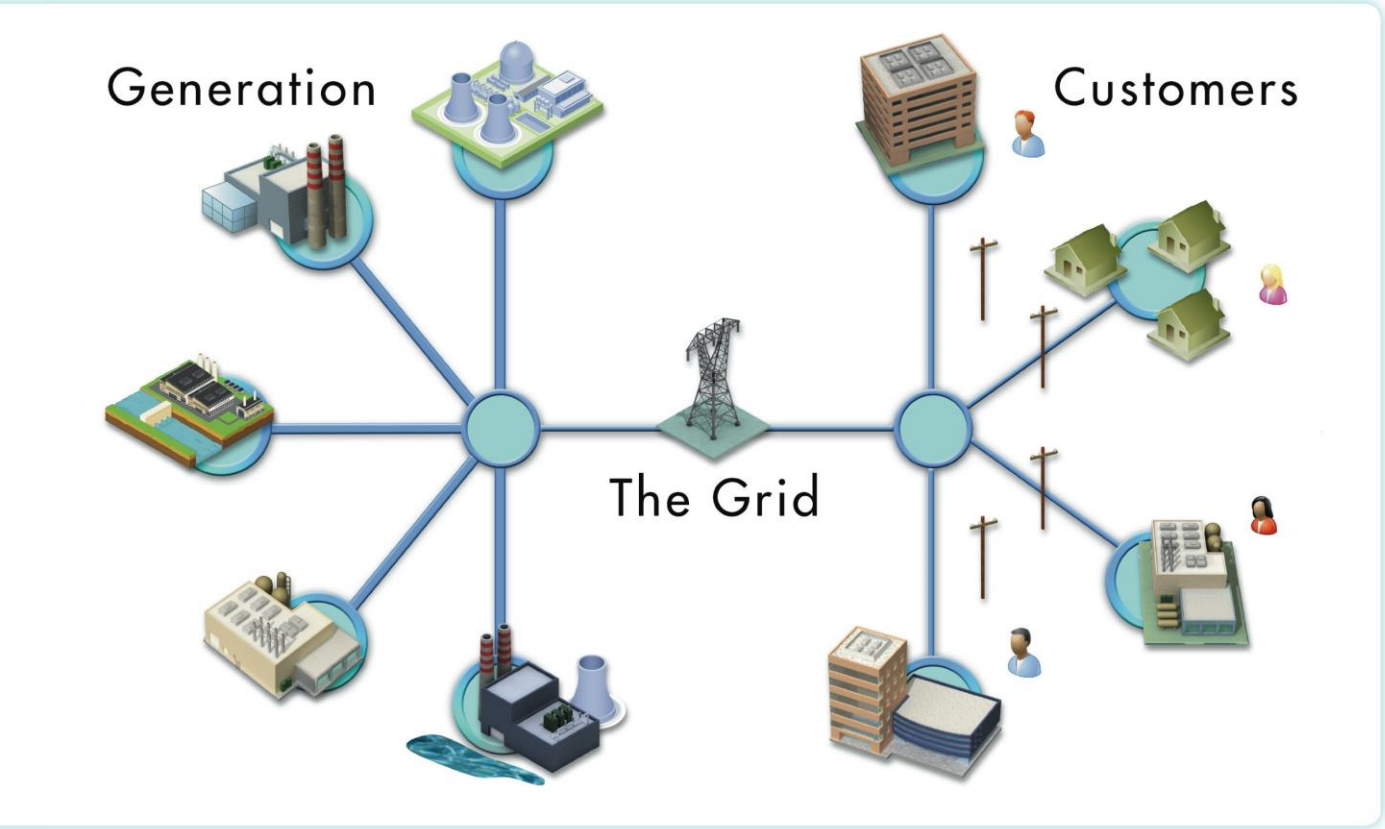
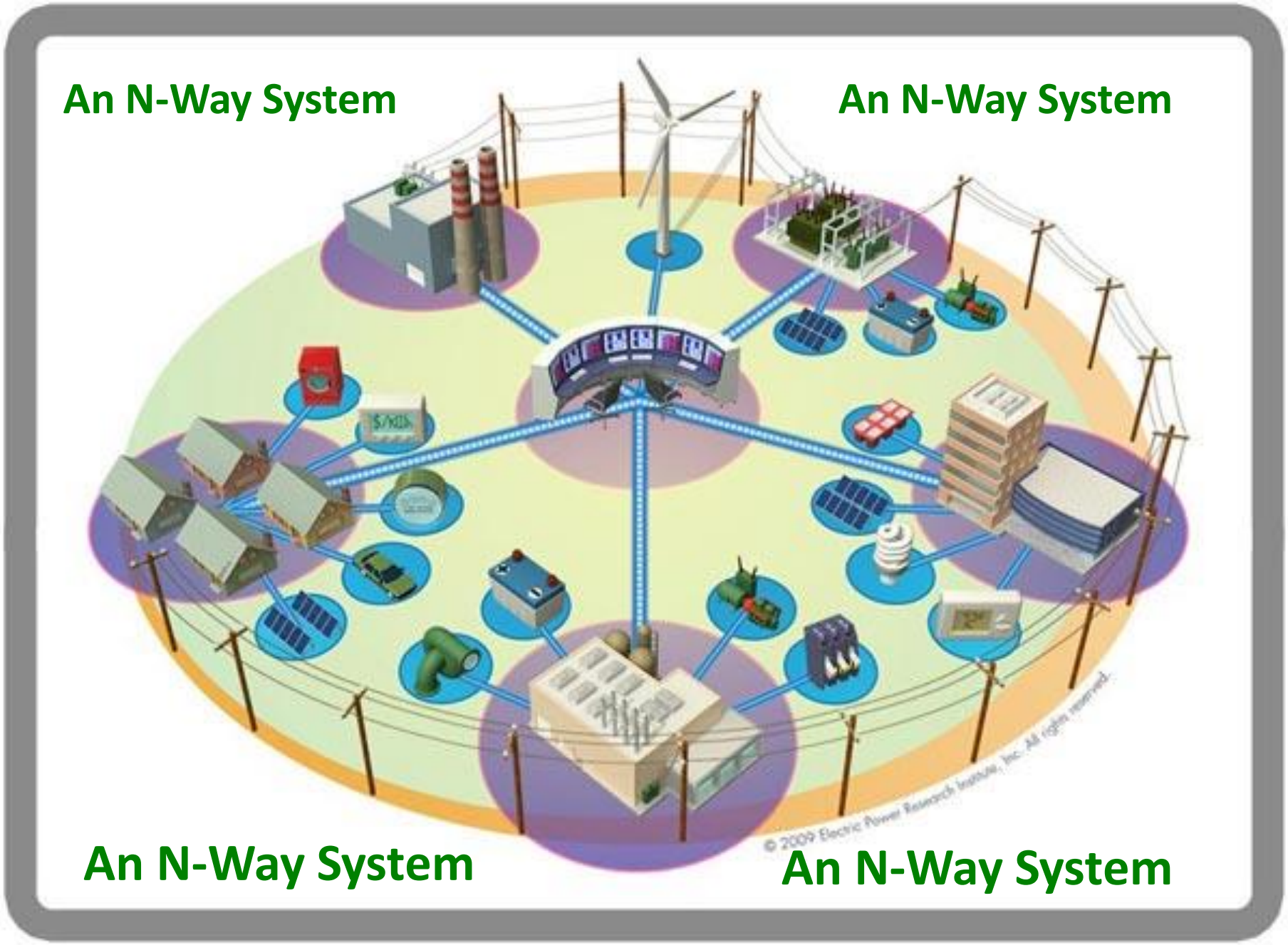


Figure 1: Today's Power System Characterized by Central Generation of Electricity, Transmission, and Distribution to End-Use Consumers

EPRI


An N-Way System
An N-Way System
An N-Way System
An N-Way System

Utility Culture and Customers

- Most utility execs see this clearly
- Many do not trust government to manage the transition with due care
  - Munis and coops tend to have more latitude
- Many are arrogant about what should happen
- Many are taking steps to protect cash flow
  - Proposals to increase monthly charges, demand
- Government can guide progress

State / Federal: How cooperative is Cooperative Federalism?

- Basic idea: states manage in-state stuff
  - FERC manages inter-state commerce
- Where is the line?
- What are the inter-dependencies?
- When coordination makes sense, does it happen?
  - Regional State Committees
- States are advocates in federal forums

Regulation and The Executive

- Independence is a hallmark of regulation
- Isolation is bad for regulation
  - Awareness of social realities
  - Accounting for (accelerating) trends
  - Political/Social significance
  - Climate Change, other regional national shared interests

What can the Executive Do?

- Appoint
- Convene
- Cajole
- Lead (with a vision for using technology and more active customers to address needs, position for the future
- Collaborate regionally, cross-sectorally
- Manage actively state – utility relationship

Perpetual and Emergent Issues

- The utility role
- Cost control
- Throughput incentive
- Capital bias
- How utilities earn
- Procurement
- Price signals

- The Public Interest
- Fairness
- Access
- Outcomes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POMONA
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ecoliner
F2001
Foothill Transit

States to talk about

- California and New York
- Rhode Island and Oregon
- Minnesota and Michigan
- Arkansas and North Carolina

What's Happening out there – Big States

New York

- Reforming the Energy Vision (REV)
- Reconsider utility role
- Customer resources

California

- Clean energy and climate priorities
- Incremental changes to key jobs utilities do

What's Happening out there – Small States

Rhode Island

- Power Sector Transformation
- Report of Phase 1

Oregon

- Performance Reg.
- Climate
- Report to Legislature

What's Happening out there – Interior States

Michigan

- Reformed IRP
- Performance

Minnesota

- Decoupling
- Community solar
- Distribution planning
- Performance

Southeast States

Arkansas

- New workshop process starting to reduce barriers to distributed resources

North Carolina

- Clean Energy Plan Development Process underway
- Implementing an Executive Order

Final Word

- Because changes are prompted by technology and consumers, trends are **unstoppable**
- Because regulation will always tend to the vulnerable, change will be **slower** than some want
- Because change has deep social effects, **politics** must guide if change is to favor the public interest
- Because implementation takes effort, **planning** is valuable

Selected Resources

- Selected Issues in Power Sector Transformation (used as a framing document for the Oregon process)
- Getting From Here to There: Regulatory Considerations for Transportation Electrification
- Teaching the Duck to Fly – Second Edition

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

Richard Sedano
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National Governors Association
Bootcamp for Energy Policy Advisors

Levers and Language:
An Overview of State Energy Policy

Dr. h.c. Branko Terzic

BRG
Berkeley Research Group

May 9, 2019
Arlington, VA

Biography

Speaker: Branko Terzic
Managing Director
Berkeley Research Group LLC

Distinguished Fellow
Council on Competitiveness
and
Senior Fellow
Atlantic Council

Profile: Formerly;
Chairman, CEO Yankee Energy System,
Commissioner, US Federal Energy Regulatory Commission (FERC),
Commissioner, State of Wisconsin Public Service Commission (PSCW)

BS in Energy Engineering and
Honorary Doctor of Sciences in Engineering
University of Wisconsin – Milwaukee.

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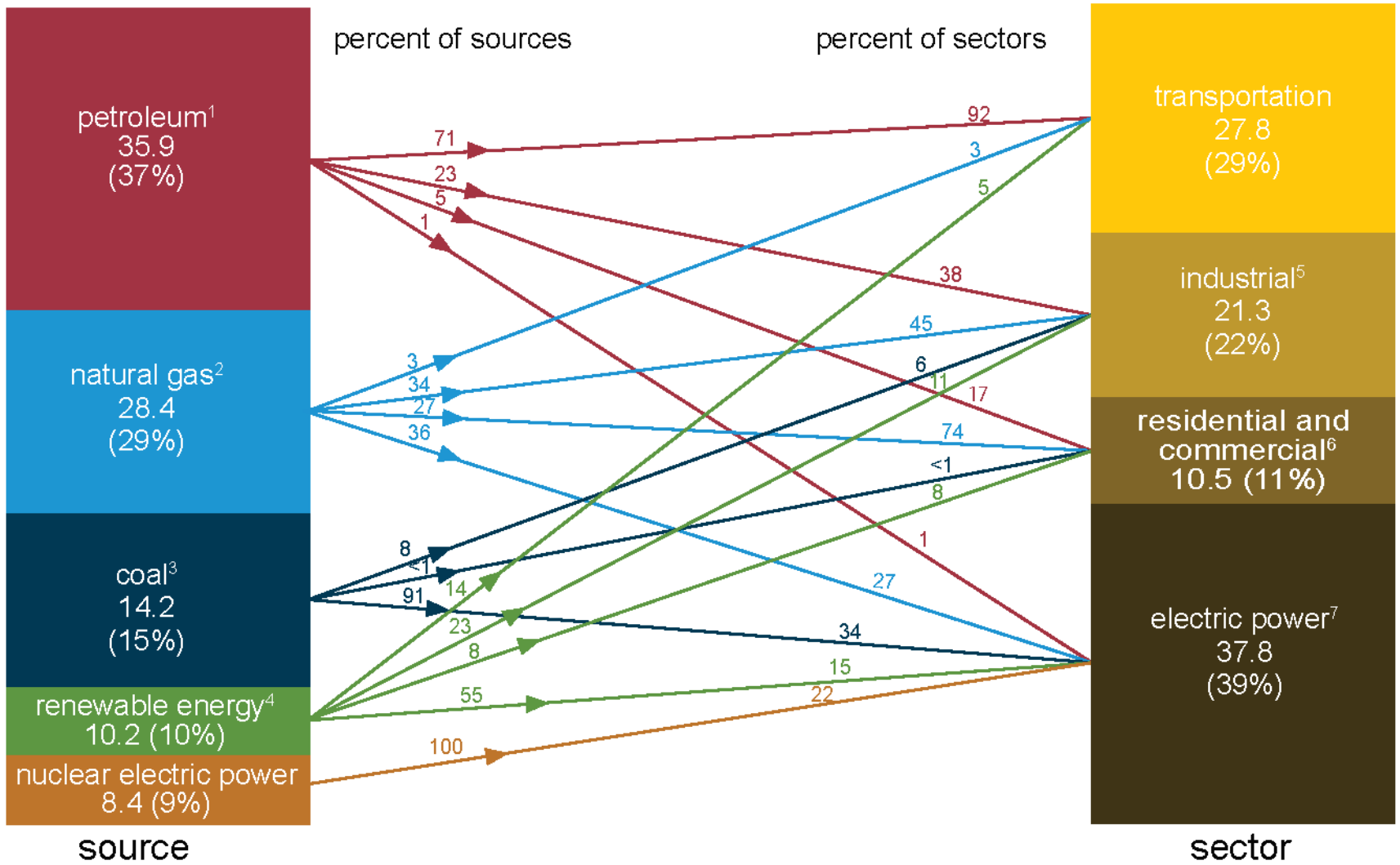
U.S. primary energy consumption by source and sector, 2016

Total = 97.4 quadrillion British thermal units (Btu)



Electric Service = Power & Energy

- Power & Energy

POWER: rate of energy delivery

- 13 Strong men
- = 2 Draft horses
- = 1.34 horsepower
- = 1 kiloWatt

ENERGY: ability to do work

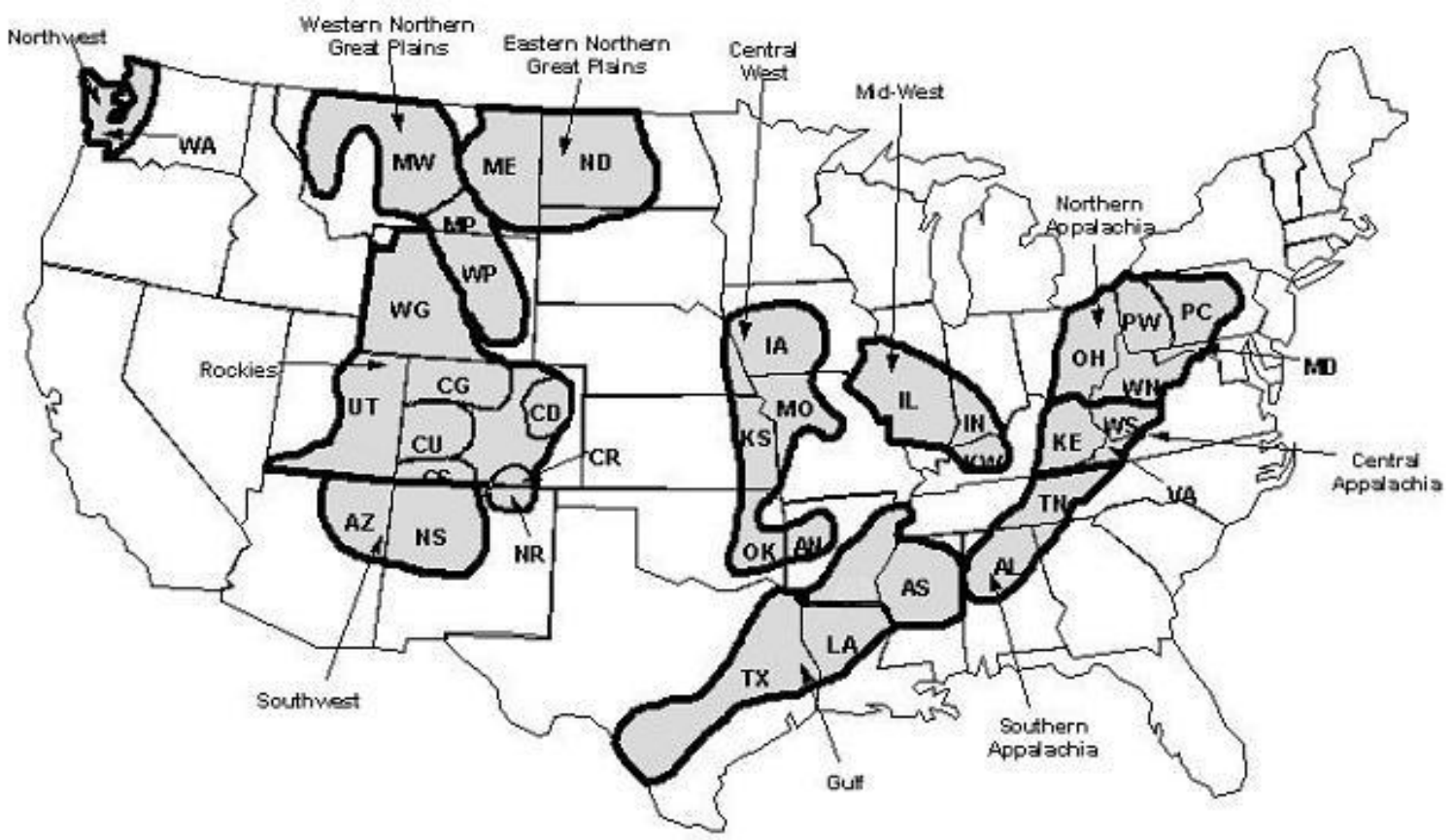
- kiloWatt-Hour
- 3.6 MJoules
- Therms
- BTU

How much HP does your house need?

US Average home has 27 electric devices

- Water heater 3 kW
- Lighting 1 kW
- Microwave 1.7 kW
- Dishwasher 1 kW
- Spin dryer 3 kW
- Washer 1 kW
- Iron 2 kW
- Toaster 1 kW
- Kettle 2 kW
- Refrig/Freezer 1 kW
- Vacuum 1.2 kW
- Hair dryer 1.5 kW
- TV (3 sets) 1 kW
- Air Con (4 rms) 6 kW
- Garage dr 1 kW
- 27 kW = 36 HP
- California average solar array is 4-6 kW

Coal Supply Region Map

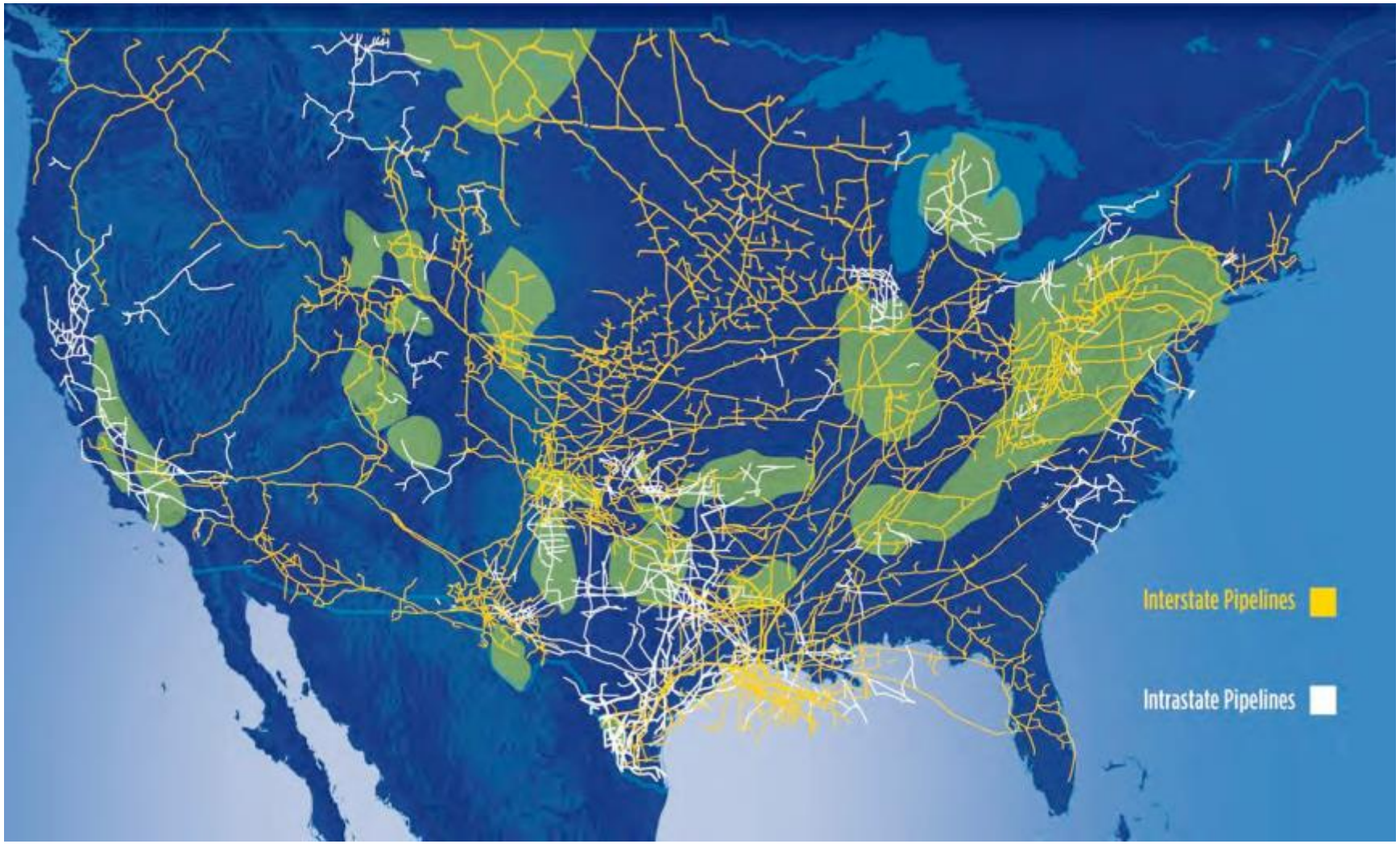


- In addition to the 37 regions depicted here, there are separate coal supply regions for Alaska and Imports, for a total of 39.

Oil Shale and Natural Gas Shale – Where they are

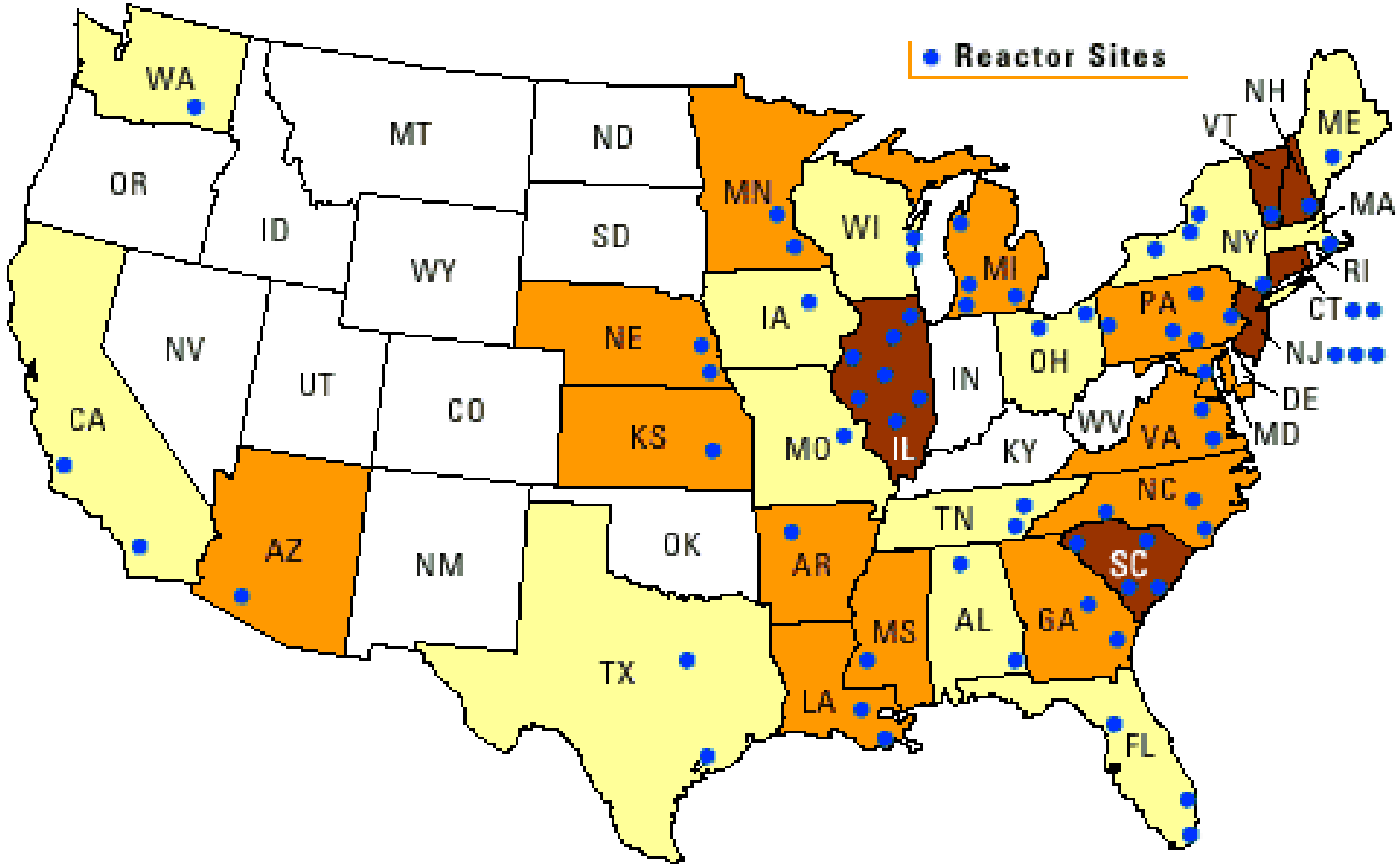
Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI.
Updated: May 9, 2011

Shale basins and the U.S. pipeline grid

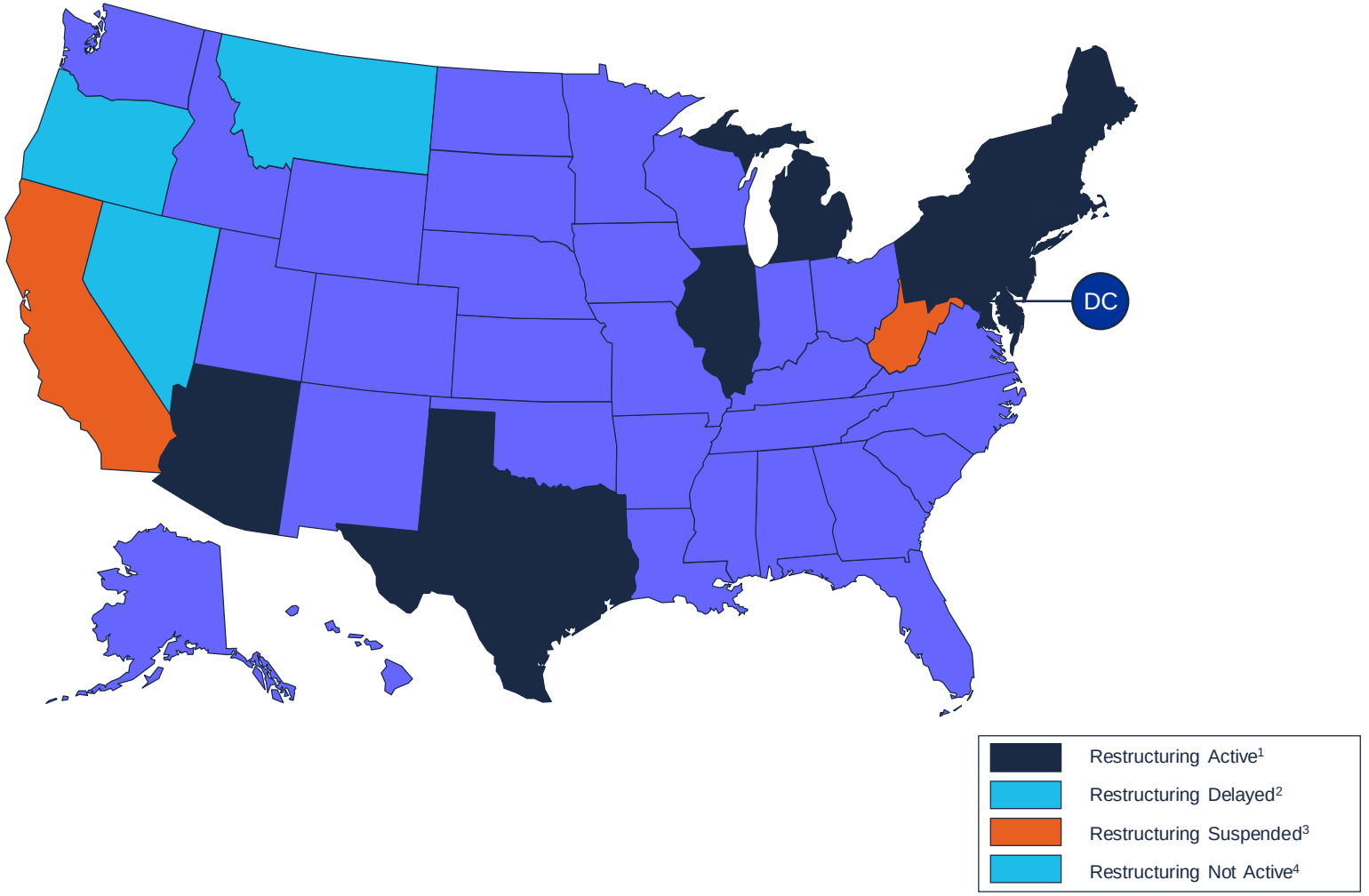


Source: American Clean Skies Foundation.

Locations of nuclear facilities in U.S.

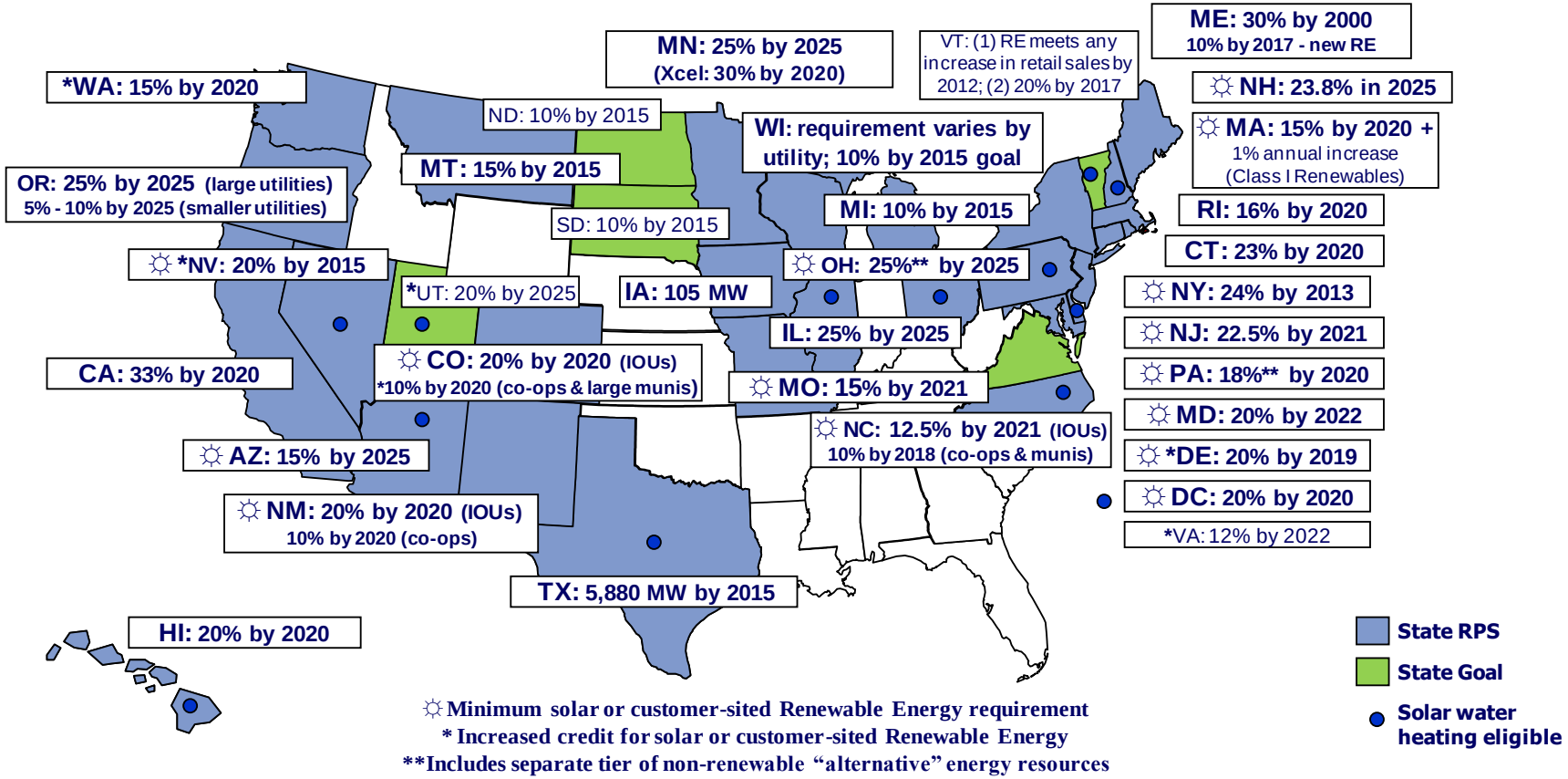


Status of restructuring



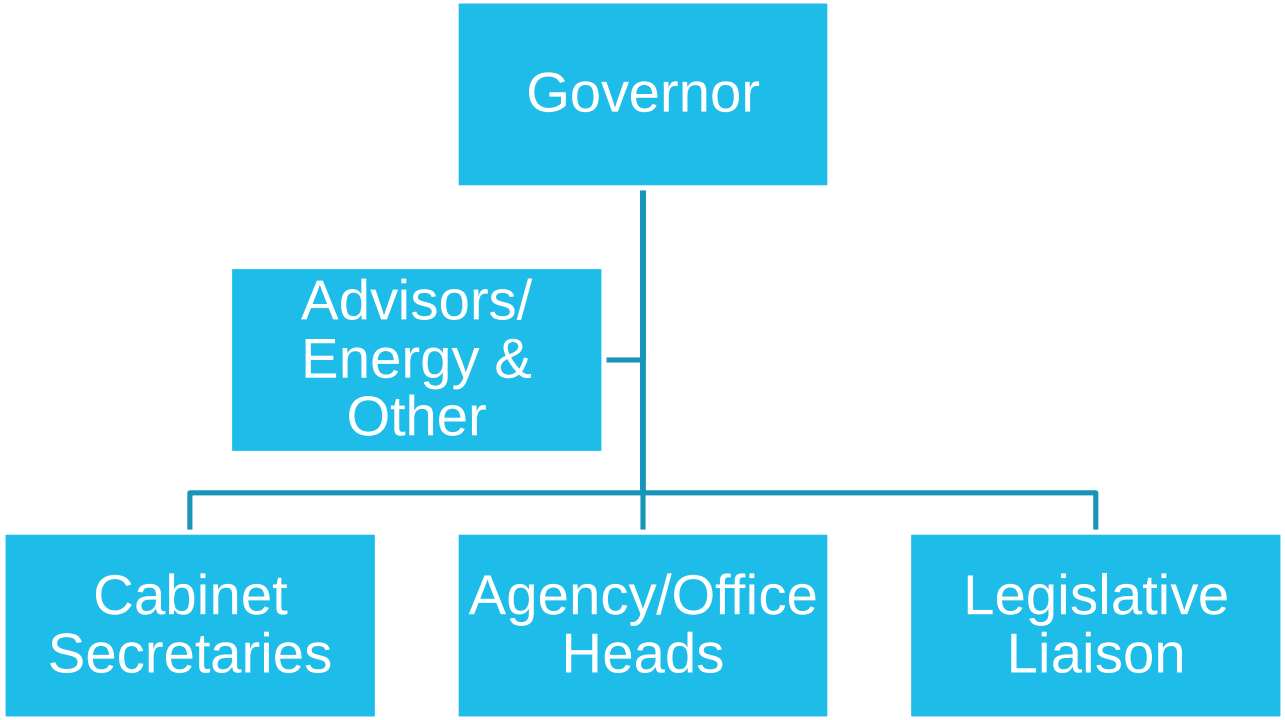
U.S. Domestic Renewable Energy Goals

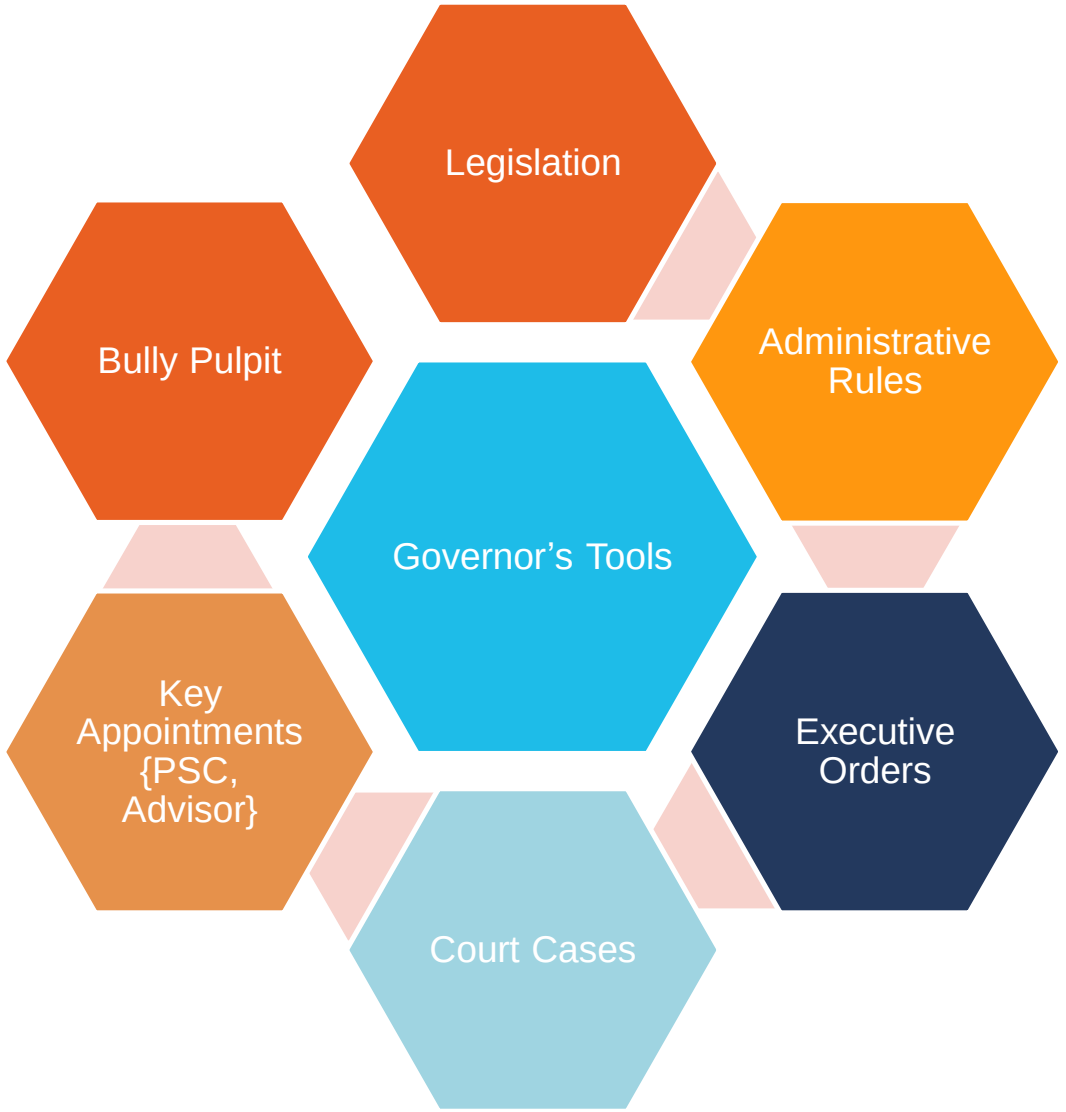
Several states have established aggressive goals for renewable energy production (RPS), many of which have specific carve-outs for solar energy.



Source: www.dsireusa.org

Advisor Roles




Legislation
Bully Pulpit
Administrative Rules
Governor's Tools
Key Appointments {PSC, Advisor}
Executive Orders
Court Cases


Governor's Goals
Energy Plan
Orders, Rules, Legislation

One state example

Governor Murphy Signs Measures to Advance New Jersey's Clean Energy Economy

05/23/2018

MONMOUTH JUNCTION – Bolstering his commitment to New Jersey's energy future, Governor Phil Murphy today signed several legislative initiatives to establish New Jersey's leadership in the clean energy economy. Governor Murphy also signed an executive order directing the development of an updated Energy Master Plan (EMP) for the state to achieve 100 percent clean energy by 2050.

The State Energy Plan

- “A well-constructed state energy plan provides an assessment of current and future energy supply and demand, examines existing energy policies, and identifies emerging energy challenges and opportunities.”

- **NASEO’s State Energy Planning Guidelines**
  2018 Guidance for States in Developing Comprehensive Energy Plans and Policy Recommendations

State Energy Plan Objectives I

- Identify and vet strategies to accelerate energy-related economic development, and ensure policies and programs reflect market needs and opportunities;
- Ensure that new and existing policies and programs related to grid modernization, energy emergency preparedness, energy efficiency, and others are coordinated and complementary;
- Build consensus around state energy policy and investment decisions;
- Build a long-term energy roadmap that is based on widely accepted data and analysis;
  [continued next page]

- Ref: NASEO Guidelines

State Energy Plan Objectives II

- Manage risk (e.g., physical and cyber security) associated with energy markets to ensure that system reliability and integrity are maintained;
- Assign responsibility for specific energy actions and provide resources for successful implementation of plan recommendations;
- Enhance transparency and accountability within state government; and
- Serve as a guide for economic development, workforce training, and prudent stewardship of a state's natural resources.

Ref: NASEO Guidelines

NASEO State Energy Planning Steps

Step 1: Establish a Requirement and Scope for a State Energy Plan

Step 2: Convene the Planning Team

Step 3: Develop a Vision for the State Energy Plan

Step 4: Conduct Data Collection and Projection Analyses

Step 5: Garner Public Input and Feedback

Step 6: Establish Goals and Recommended Actions to Meet the Vision

Step 7: Draft the State Energy Plan

Step 8: Finalize, Adopt, and Implement the Plan

Step 9: Conduct Outreach and Education

Step 10: Monitor Progress and Update the Plan

State Energy Plan Components

- Assessment of the current energy profile, industries, and institutional capacity, with a focus on the unique energy assets within a state;
- Energy outlook, forecast, or projection of future needs including supply, demand, and costs;
- Vision of the desired energy future;
- Challenges to be addressed;
- Goals and strategies;
- Prioritized and specific actions with timeline and evaluation and measurement criteria;
- and
- Identification of potential financing and funding mechanisms to support implementation of the recommended actions.

Ref: NASEO Guidelines

Typical Policy Program Areas

Demand-side policies and program

- Energy efficiency
- Renewable energy

Supply-side policies and programs

- Alternative fuels
- Natural Gas and Oil
- Electricity
- Coal
- Nuclear

Example:
New Hampshire 10 Year Strategy

- Electric Grid of the Future
  - Open PUC Docket on Grid Modernization
- Increase Investments in Cost Effective Energy Efficiency
  - Set energy efficiency goal
  - Address utility disincentives
  - Improve coordination and design of existing programs
  - improve customer access to financing
  - Do more to reduce costs for low income neighbors

- Fuel Diversity and Choice
  - Strengthen and stabilize Renewable Portfolio Standards
  - Encourage Distributed Energy Resources
    - Attract private financing
    - Expand use and scope of renewable property tax exemption

- Increase transportation options
  - Enable and encourage adoption of plug-in electric vehicles
- Identify sustainable transportation funding mechanisms
- Expand and coordinate mass transit
- Support efforts to maintain and expand rail
- Expand ride-share
- Reduce unnecessary idling

Some Recommended Reading

- Electricity
  - **The Grid: A Journey Through the Heart of our Electrified World** by Phillip Schewe
- Natural gas
  - **Shale Gas: The Promise and the Peril** by Vikram Rao
  - **The Political Economy of Pipelines** by Jeff Makholm
- Oil
  - **Oil 101** by Morgan Downey
  - **Oil: Beginners Guide** by Vaclal Smil
- Global Energy
  - **The Quest: Energy, Security and the Remaking of the Modern World** by Daniel Yergin
- Energy Sources
  - **Energy: A Human History** by Richard Rhodes
- Nuclear
  - **Energy for Future Presidents** by Richard A. Muller
- Solar
  - **Sun Above The Horizon** by Peter Varadi

Knowles Law of Legislative Deliberation

"The length of debate varies inversely with the complexity of the issue."

Corollary: When the issue is simple and everyone understands it, debate is almost interminable.

State Senator (WI) Robert Knowles (1916-1985)

Ref: The Official Rules, Paul Dickson Dover, 2013

And then…

Proposed State Energy Strategy Draws Critics

SEP 06, 2017 HARTFORD COURANT

…NEW PLAN FALLS SHORT OF WHAT IS NEEDED….

Draft energy plan draws criticism from environmental activists

Mach 7, 2014 WRVO-FM

…needs to be more emphasis on renewable energy…

Scientists Sharply Rebut Influential Renewable-Energy Plan

June 19, 2017 MIT technology review

Nearly two dozen researchers critique a proposal for wind, solar, and water power gaining traction in policy circles.

…it contained modeling errors and implausible assumptions that could distort public policy and spending decisions…

Shorr's Laws of Economics

If there are imperfections in the structure of the marketplace, entrepreneurs will make lots of money.

If there are no imperfections in the structure of the market[lace, entrepreneurs will make imperfections in the structure of the marketplace.

Ref: The Official Rules, Paul Dickson, Dover, 2013

Branko Terzic
Managing Director
bterzic@thinkbrg.com
+1 703 480 2647

Berkeley Research Group LLC
1800 M St., NW 2nd Floor
Washington, DC 20036

Appendix

Details of State Energy Plans

Demand side programs

Energy Efficiency

- Output based regulation
- Energy codes
- Green building standards
- Appliance standards
- Investment incentives for energy efficiency technologies
- Demand response
- Energy Efficiency Resources Standards "EERS"

Renewable Energy

- Green pricing
- Alternative vehicle fuels
- Green power purchasing requirements
- Net metering rules
- Interconnection standards
- Production incentives
- Investment incentives

Supply side programs I

Alternative Fuels

- Biofuels production incentives
- Zero emission vehicle (ZEV) incentives
- Low emission vehicle (LEV) incentives

Natural gas and oil

- Streamlined permitting and reporting
- Enhanced oil and gas recovery incentives- ”fraking”
- Production incentives for oil
- Production incentives for natural gas

Supply side programs II

Electricity

- Industry structure
- Generation disclosure requirements
- Energy efficiency resource standards
- Resource portfolio or energy standards “RPS”
- Distributed energy resources “DER”
- System benefit fund

Coal and Nuclear

- Tax credits new clean coal
- Indigenous coal use incentive
- Coal production incentives
- Nuclear market support

Overarching Policy Driver Metrics

- Economic development
  - Value of industry
  - Gross state product impact
  - Jobs impact
- Environmental
  - Local air quality
  - Greenhouse gas emissions
- Energy Security
  - Fuel import offset
  - Fuel diversity

Ref: NREL Analytic Framework for Evaluation of State Energy July 2008

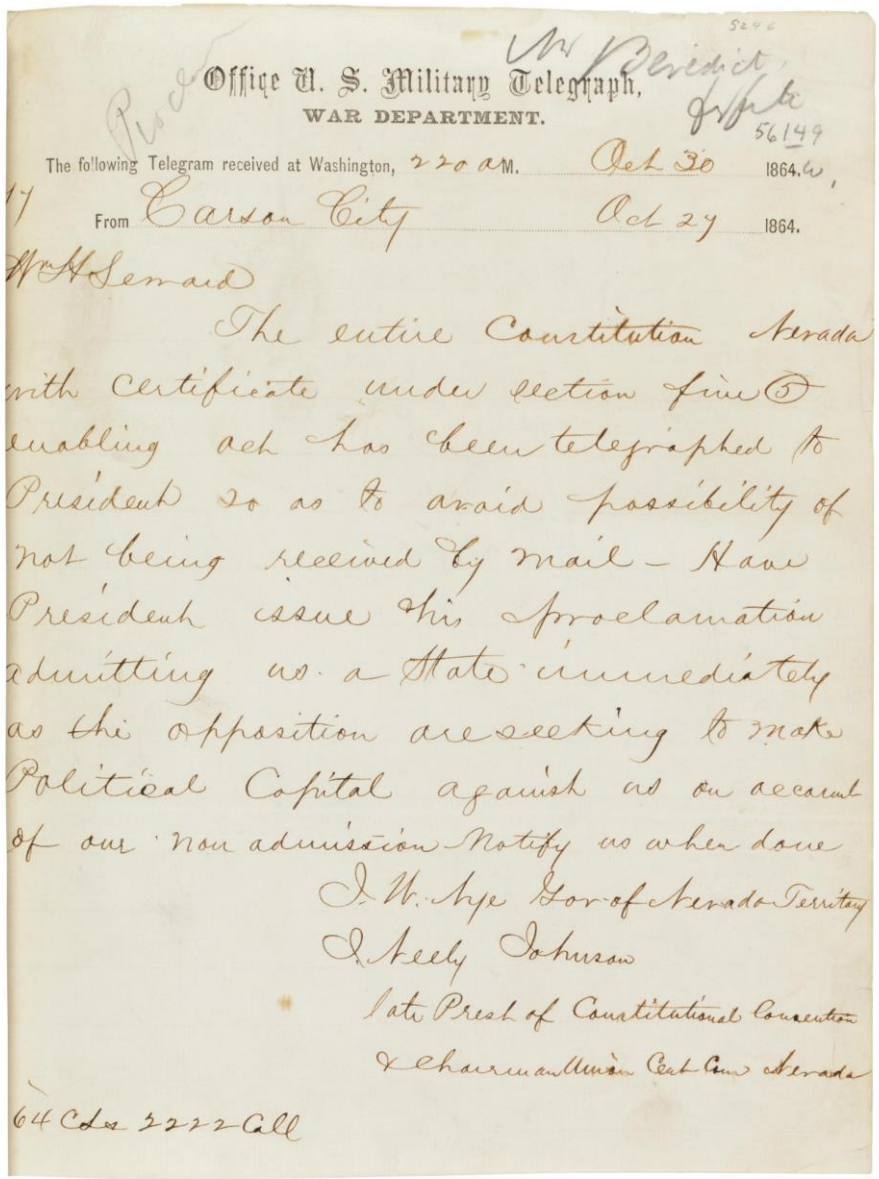
Trivia Time!

Question 1:

- The Governor of which state/territory sent the world's longest telegram ever sent by Morse Code?

Nevada!

- In October 1864, Nevada's Governor James Nye sent the state's constitution via Morse Code (through Salt Lake City and then Chicago) to ensure the state was admitted to the union prior to the presidential election.



Office U. S. Military Telegraph,
WAR DEPARTMENT.

The following Telegram received at Washington, 2 20 A.M. Oct 30 1864.

From Carson City Oct 29 1864.

Wm H Seward

The entire Constitution Nevada with certificate under election fine enabling act has been telegraphed to President so as to avoid possibility of not being received by mail – Have President issue his proclamation admitting us a State immediately as the opposition are seeking to make Political Capital against us on account of our non admission Notify us when done

J. W. Nye Gov of Nevada Territory
J. Neely Johnson
late Pres of Constitutional Convention
& Chairman Union Cent Com Nevada

64 Cds 2222 Call

Question 2:

- Which state in the continental U.S. charges the highest residential electricity prices?

Connecticut

- The state charges on average 21.56 cents per kWH on residential electricity bills. The national average is 12.47 cents per kWH

Policy Deep Dive: Grid Operations in a Distributed World

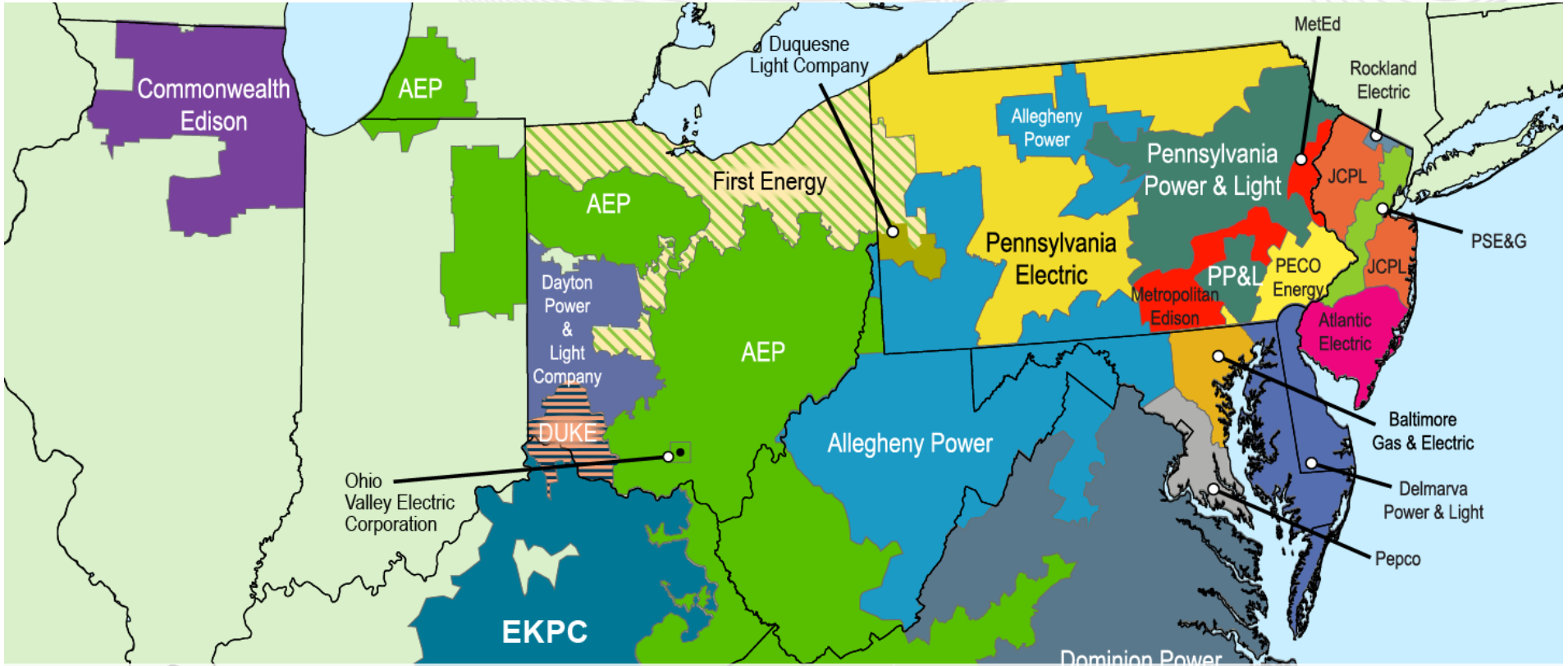
- Speaker:
  - **Darlene Phillips,** Senior Director, Operations Engineering Support, PJM

Grid Operations in a Distributed World

Darlene Phillips
Sr. Director, Operations Engineering Support
PJM Interconnection

Bootcamp for Governors' New Energy Policy Advisors
May 9, 2019

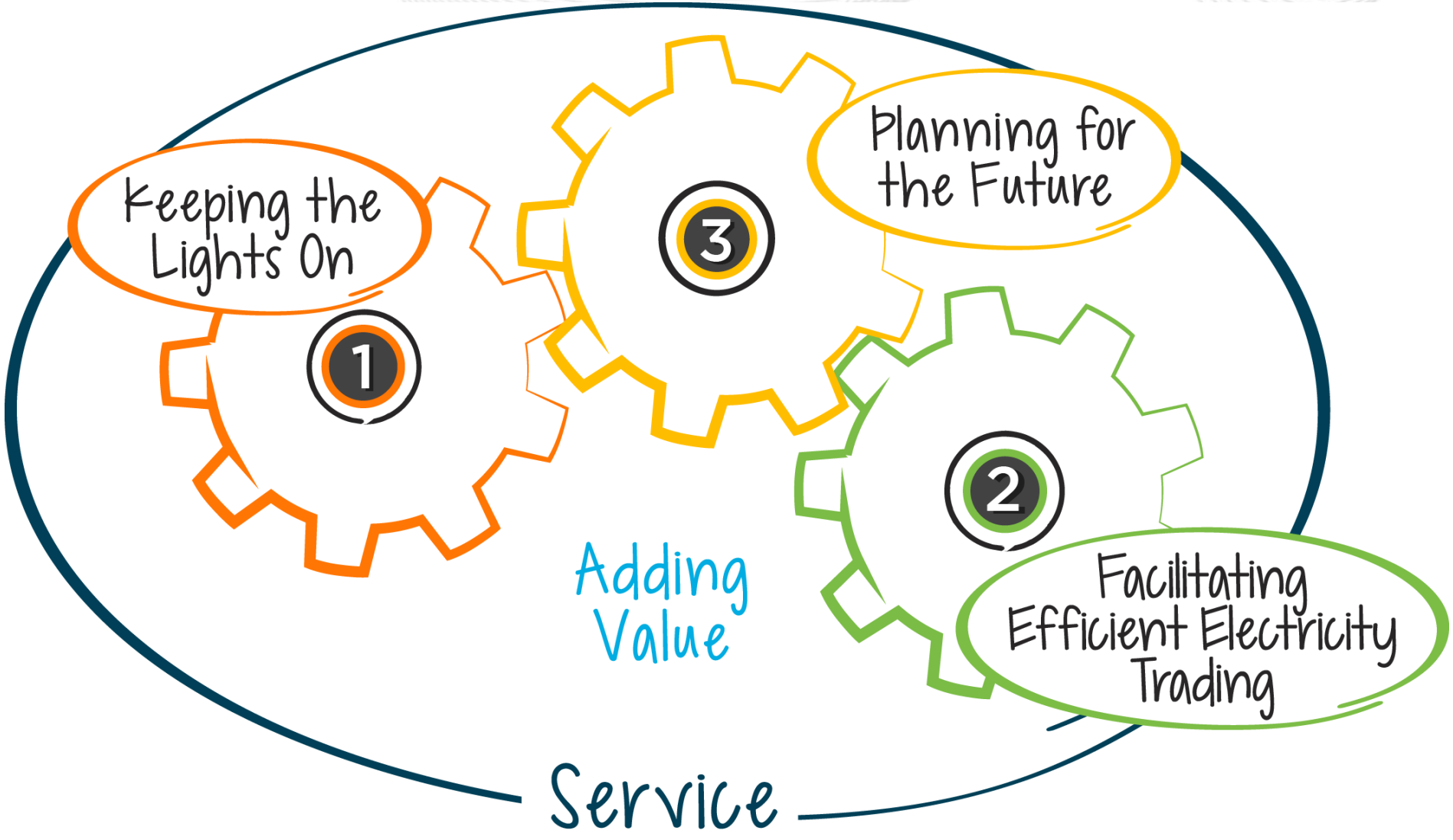
PJM Evolution



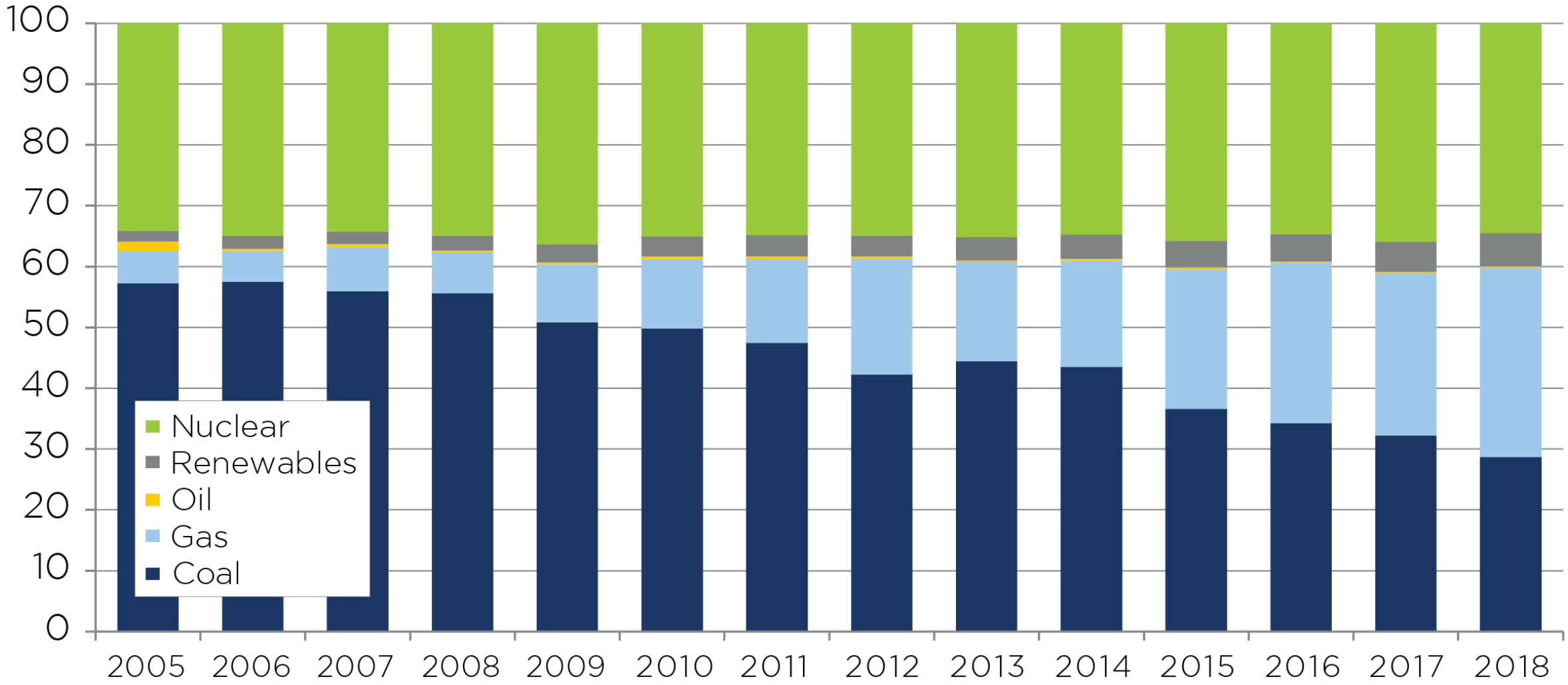
PJM Expansion History

- 1927– Started three utility power pool
- 1997 – Started RTO with eight TOs
- June 2002 – AP Joined
- May 2004 - ComEd joined
- October 2004 – AEP/Dayton
- May 2005 – Dominion joined
- January 2006 – Duquesne joined
- June 2011 – FirstEnergy joined
- January 2012 – Duke joined
- June 2013 – EKPC joined
- December 2018 – OVEC joined

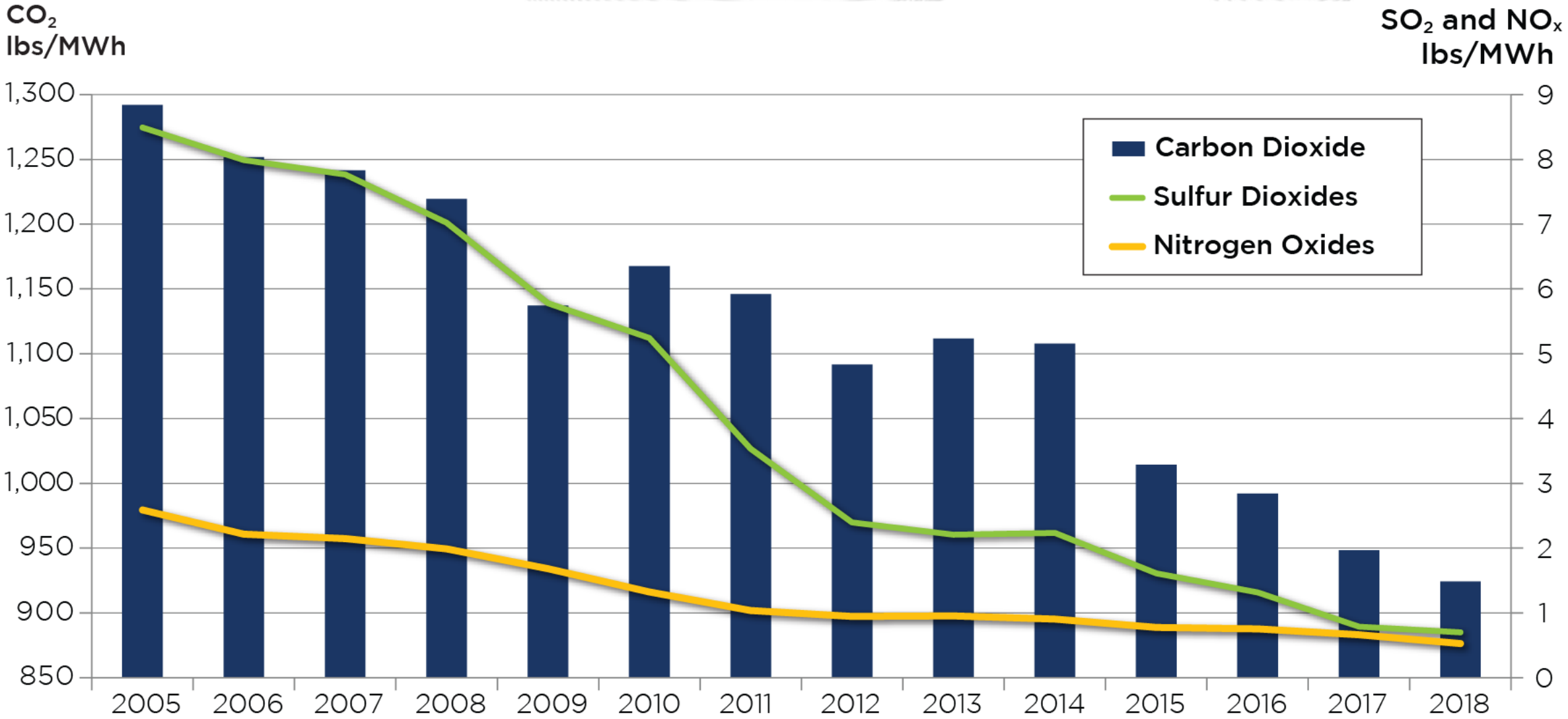
Focus on Just 3 Things



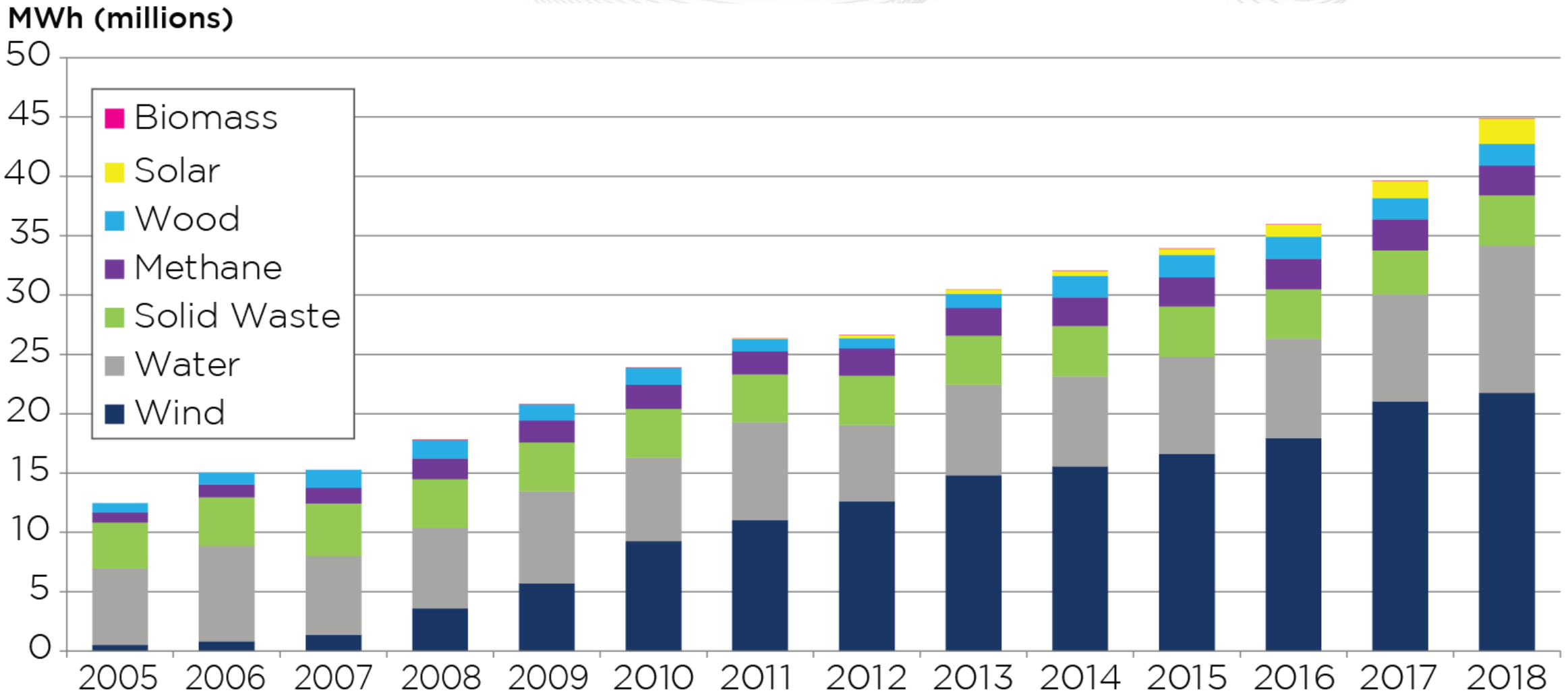
Annual Fuel Mix



2005-2018 PJM Average Emissions

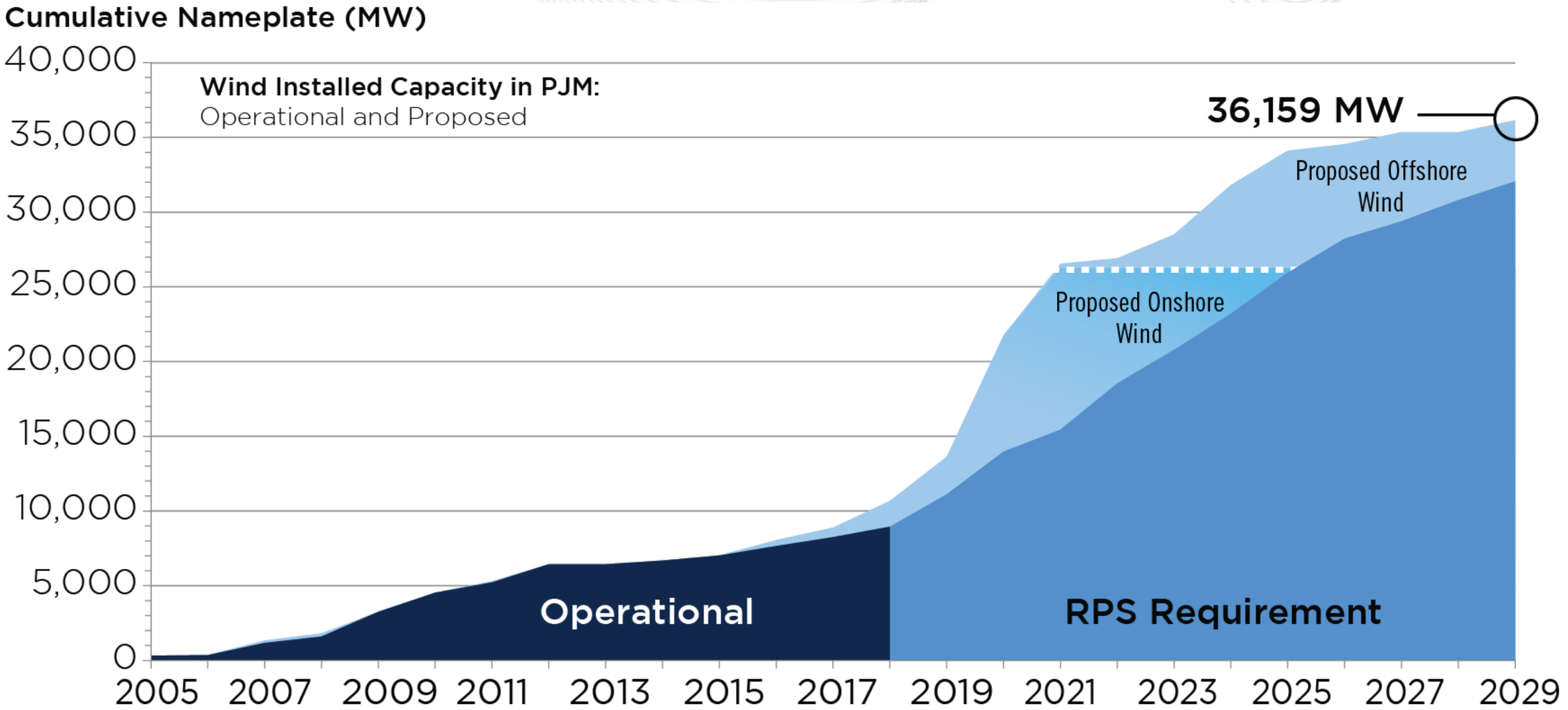


2018 Renewable Energy in PJM

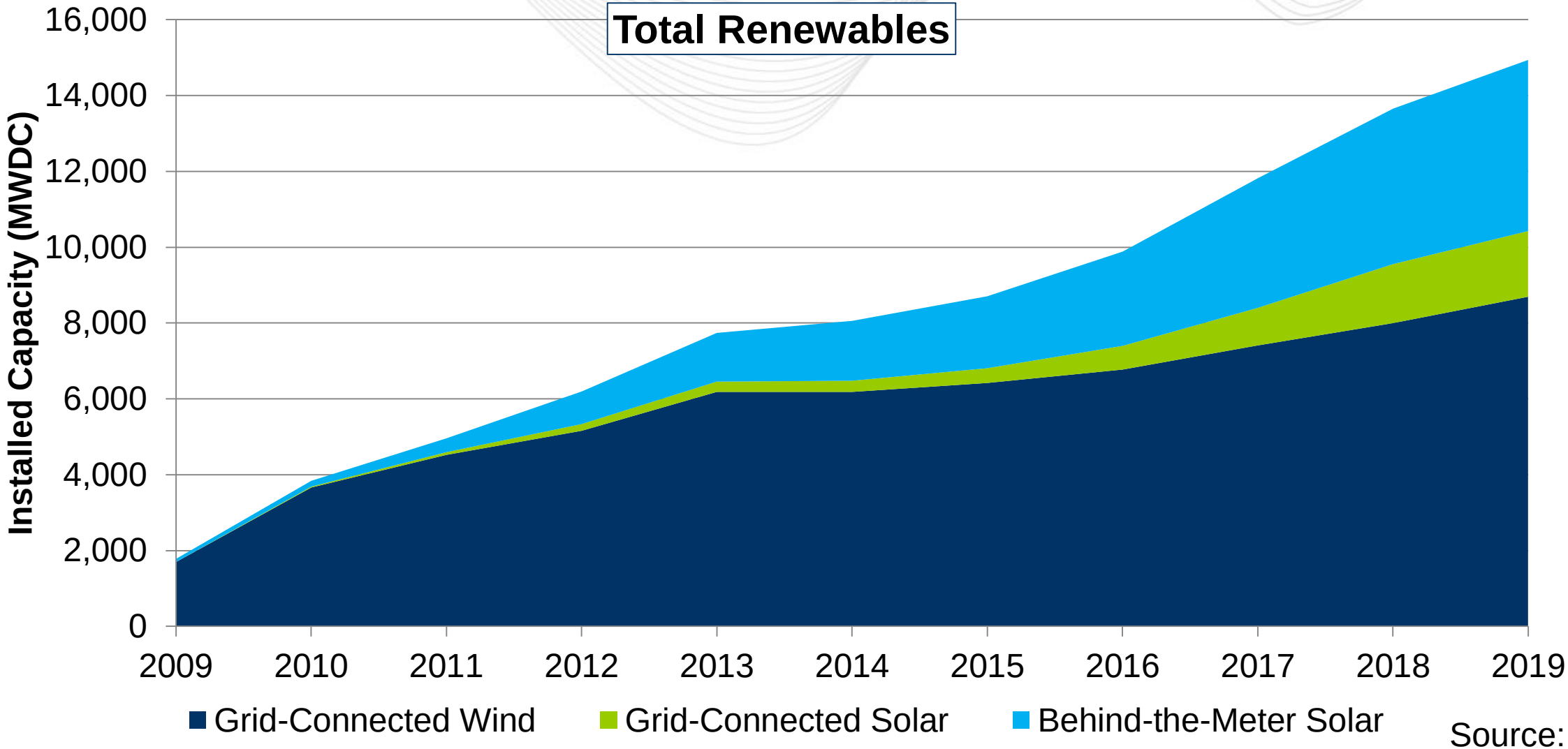


2018 Wind Capacity in PJM

Generation is Stated in MWh



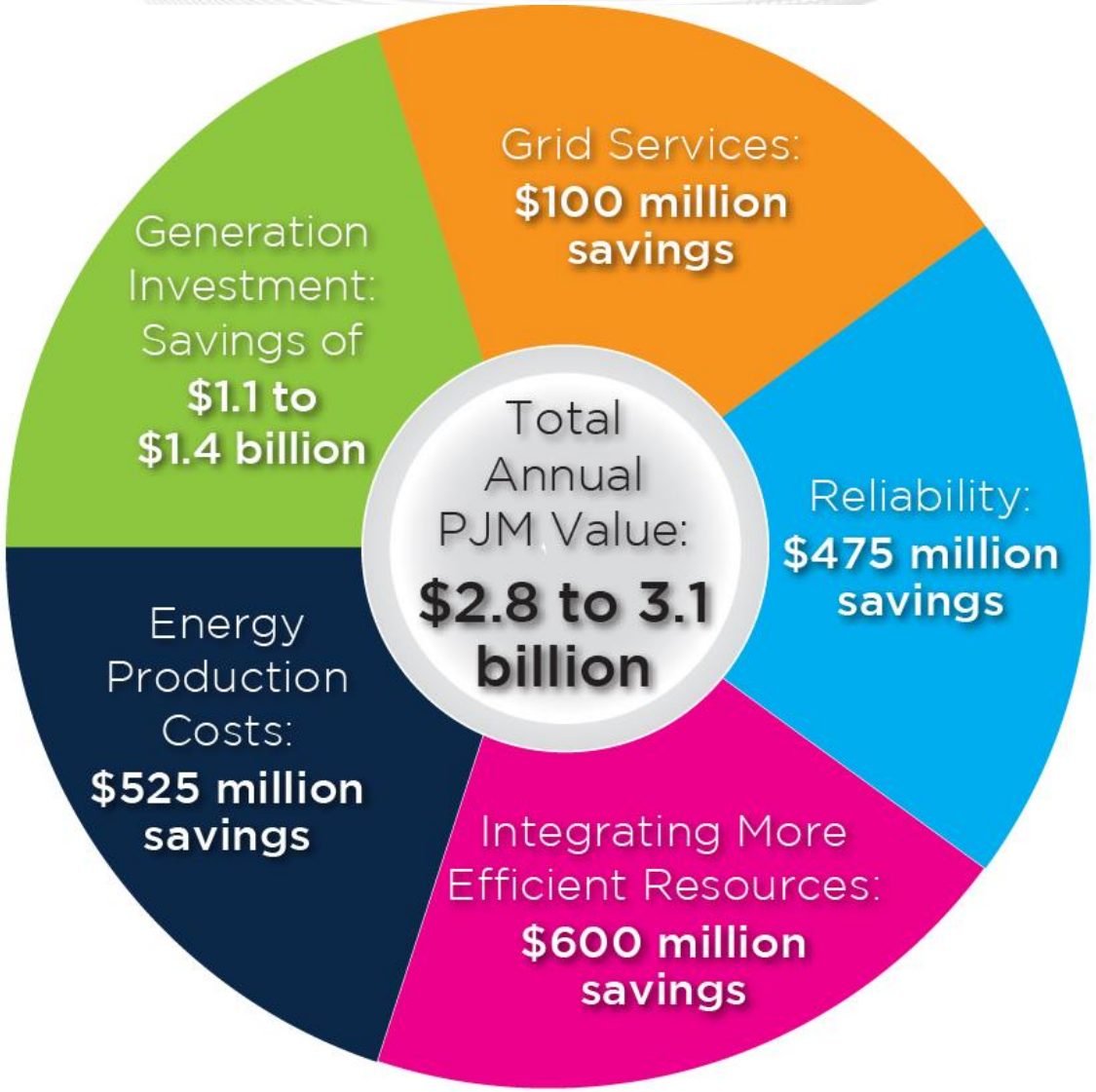
Ten Years of Renewable Growth in PJM



Source: GATS

Appendix

Value Proposition



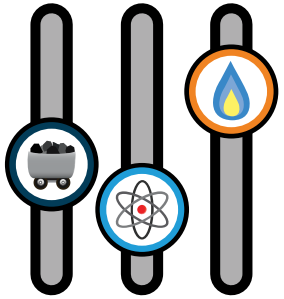
Unprecedented number of changes in the power industry

Storage technologies

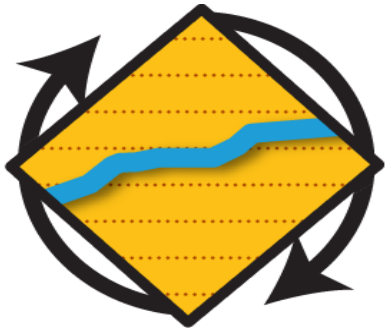
Distributed energy resources

Intermittent renewables

Alternative technologies

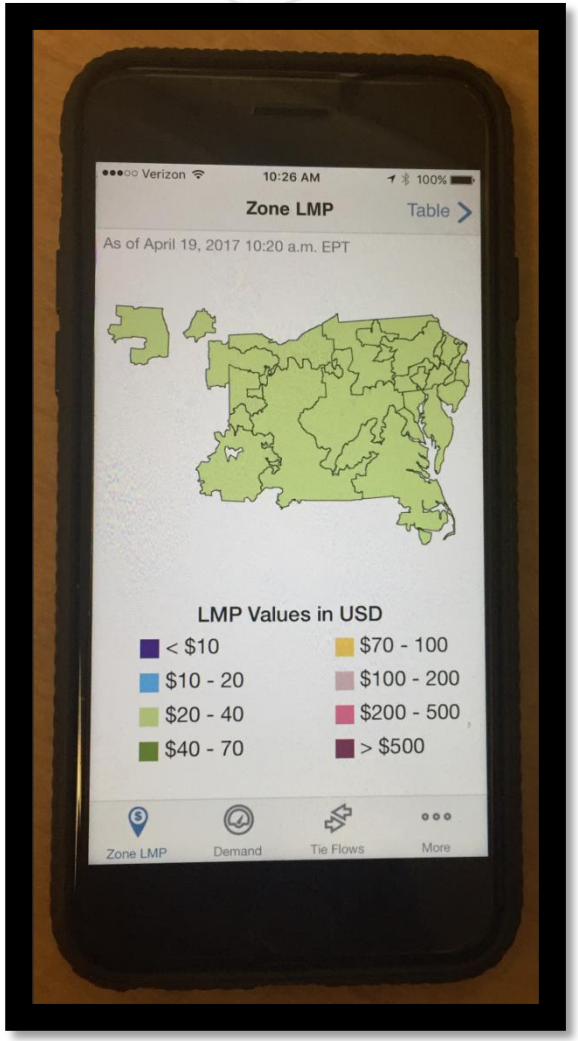


Fuel Swap

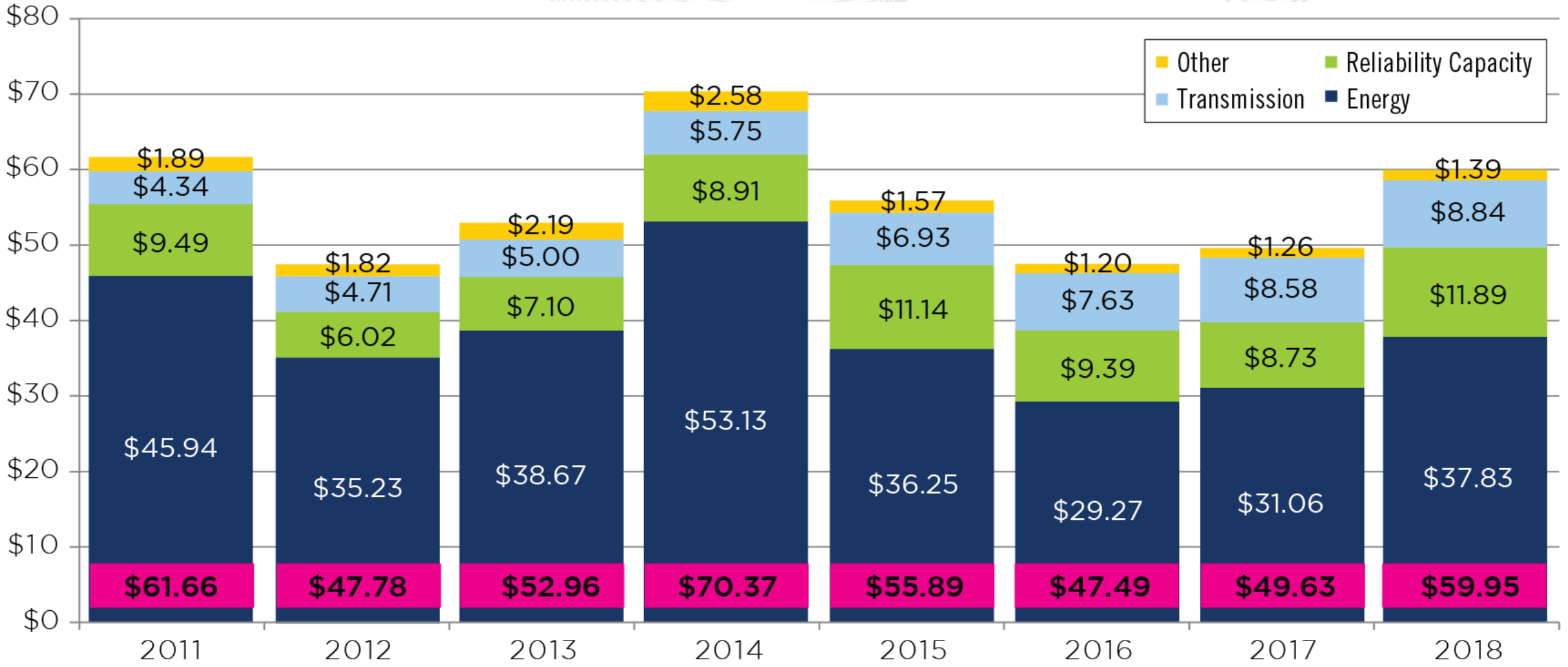


Changes in customer expectations

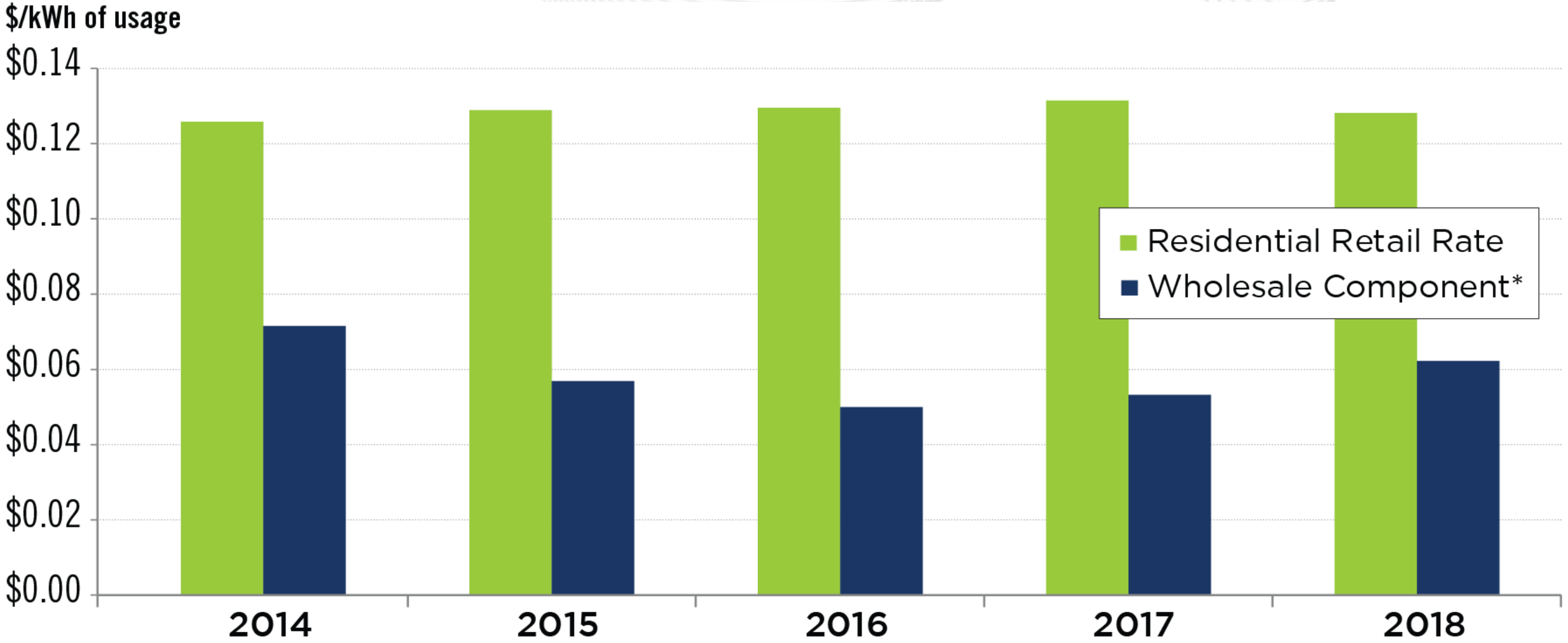
PJM Now App Available



PJM Wholesale Cost – 6 Years



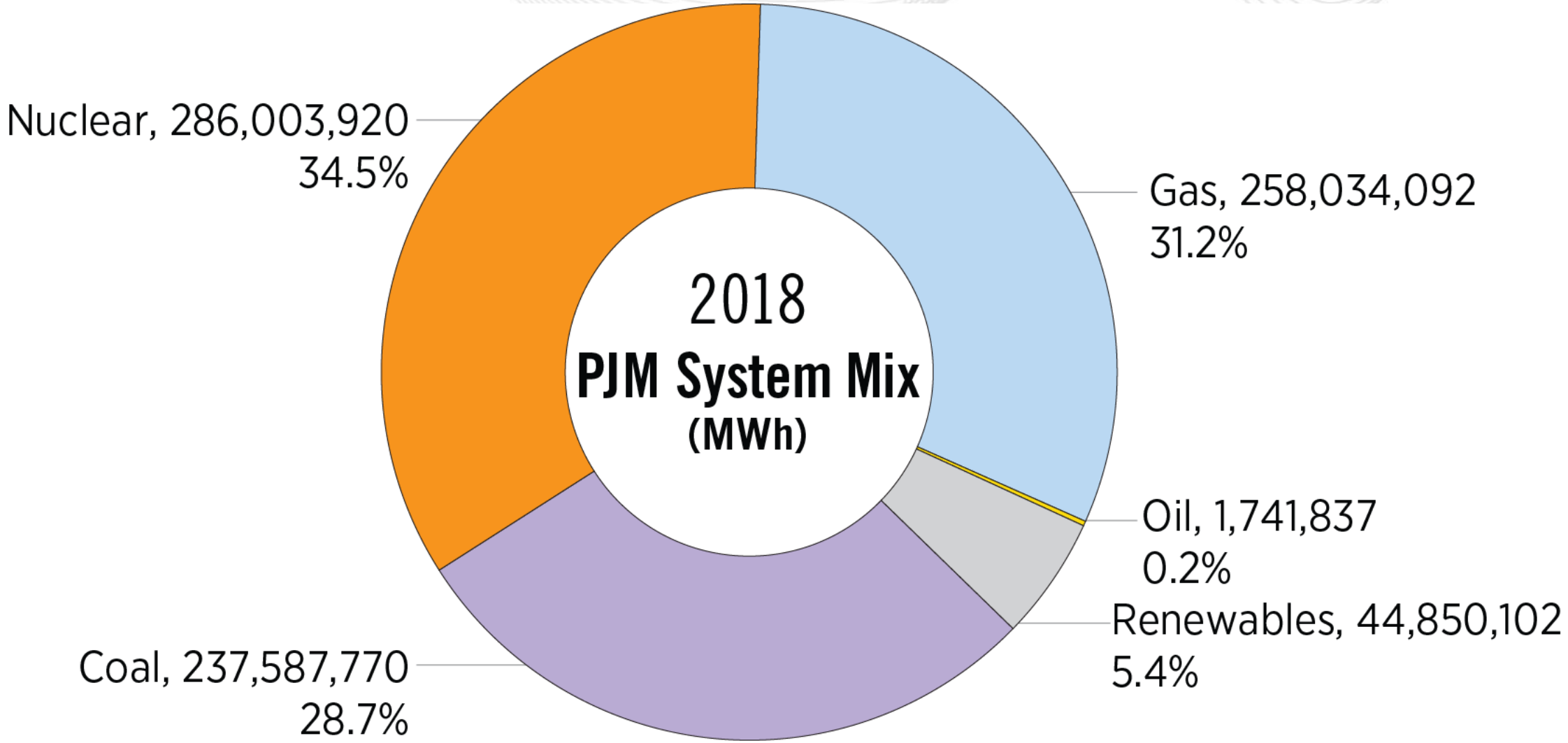
PJM Wholesale Rates (2014-2018)



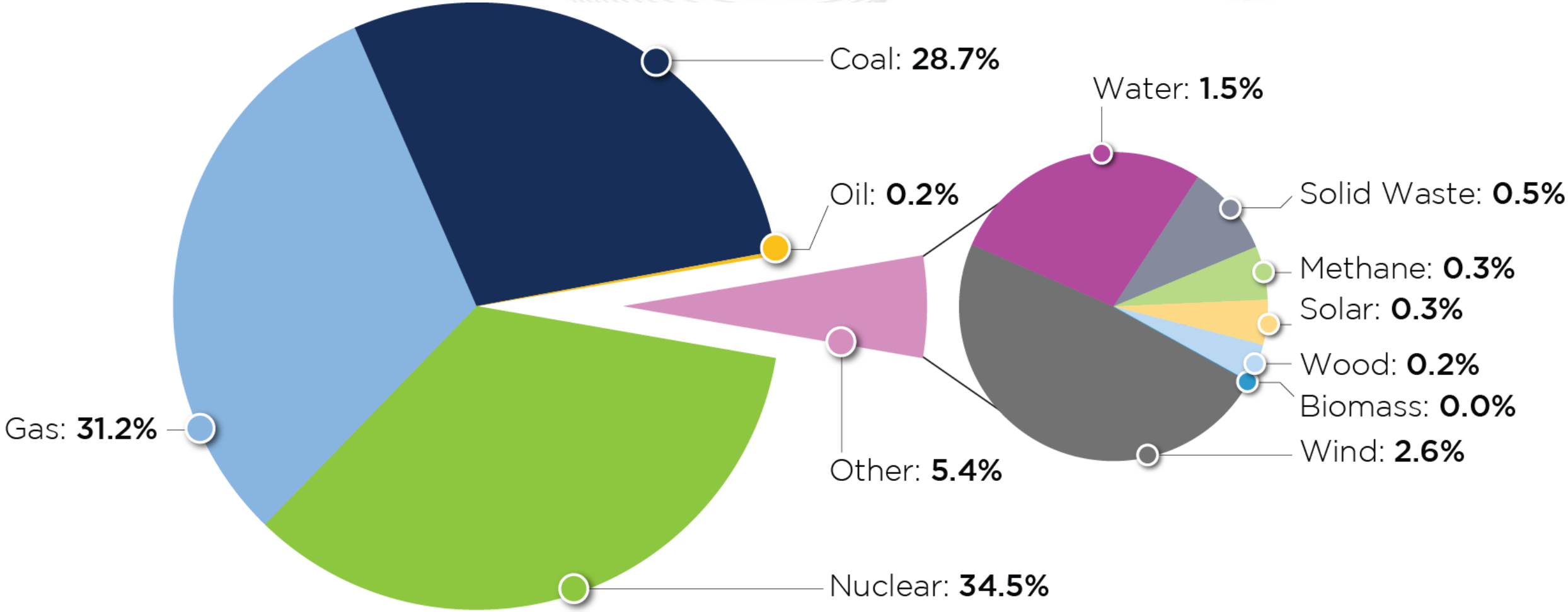
*Includes LMP, capacity, transmission, ancillary services and other costs

Sources: EIA, EEI, Monitoring Analytics, PJM

PJM System Mix



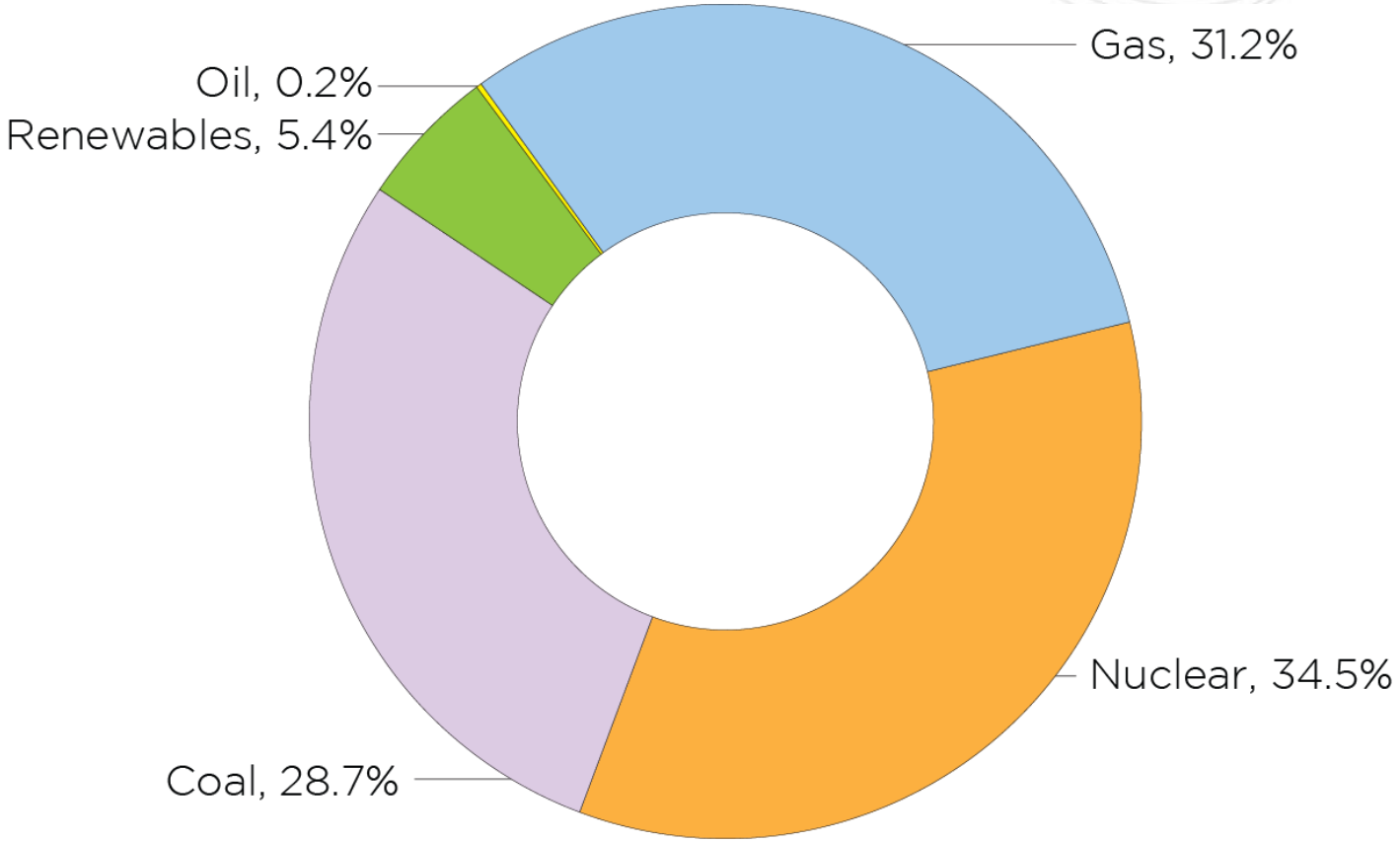
2018 PJM Fuel Mix

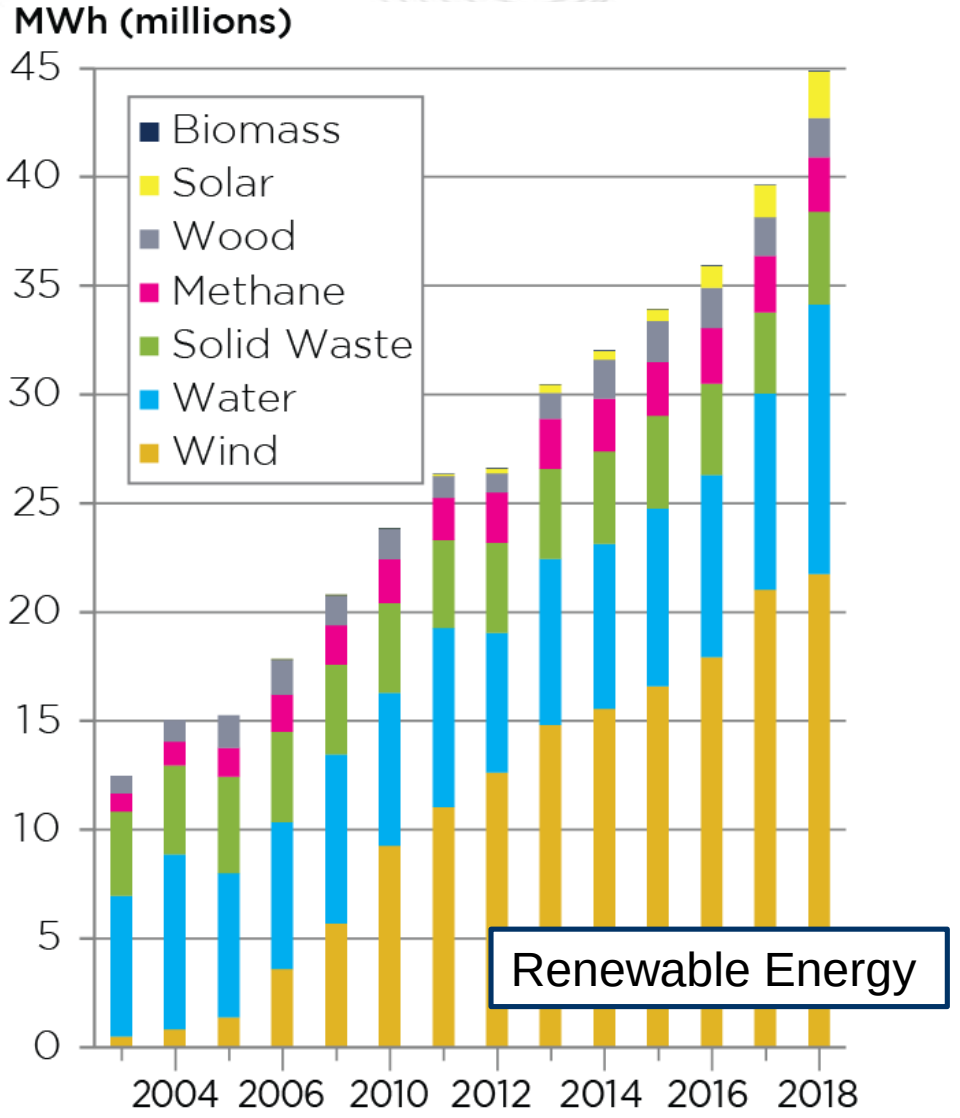


(% Annual Energy)

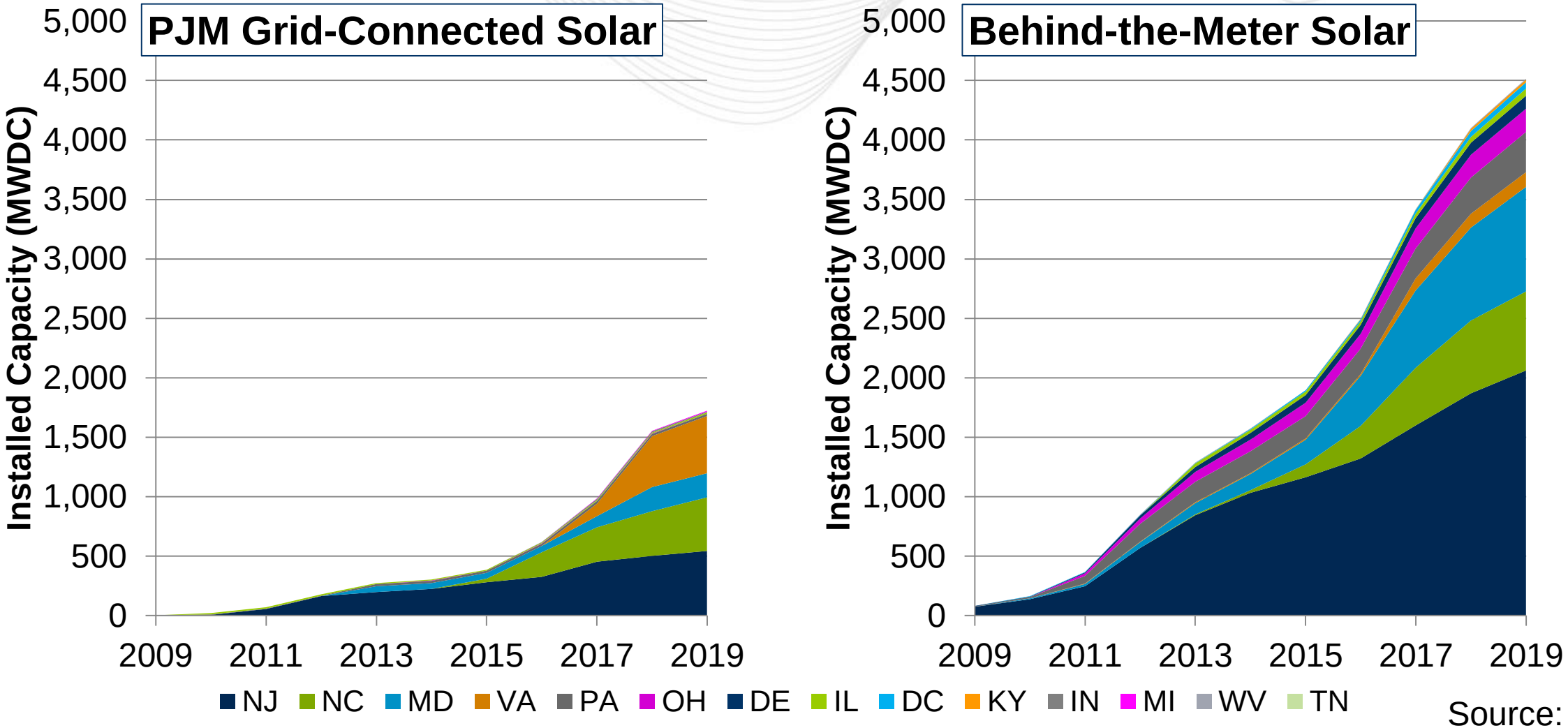
Percentage of Renewable Energy is Small but Growing

PJM Generation Mix – 2018 Annual Energy





Ten Years of Renewable Growth in PJM



Source: GATS

Snapshot of DER in PJM Today

Wholesale DER

1 GW Demand Response

Customer-sited generation:
Offers into capacity, energy and/or ancillary services markets

74%	24%	2%
Diesel	**Natural Gas**	**Other**

Remaining ~8 GW of DR is load modification without any generation (e.g., industrial process management)

1 GW Generator

Front-of-the-meter generation:
Offers into capacity, energy and/or ancillary services markets. Can be sited at customers.

Mostly solar but also other fuels

Non-Wholesale DER

~7 GW DER

Solar PV DER: Retail/rooftop solar

Municipal DER: Municipal electric company distribution-level generators

Process DER: Industrial generators, combined heat and power

Resilience DER: Emergency backup

Qualified Facilities: Direct sales to distribution utilities

Lunch Keynote: Incorporating Equity in State Energy Policymaking

- Speaker:
  - **John Howat**, Senior Energy Analyst, National Consumer Law Center

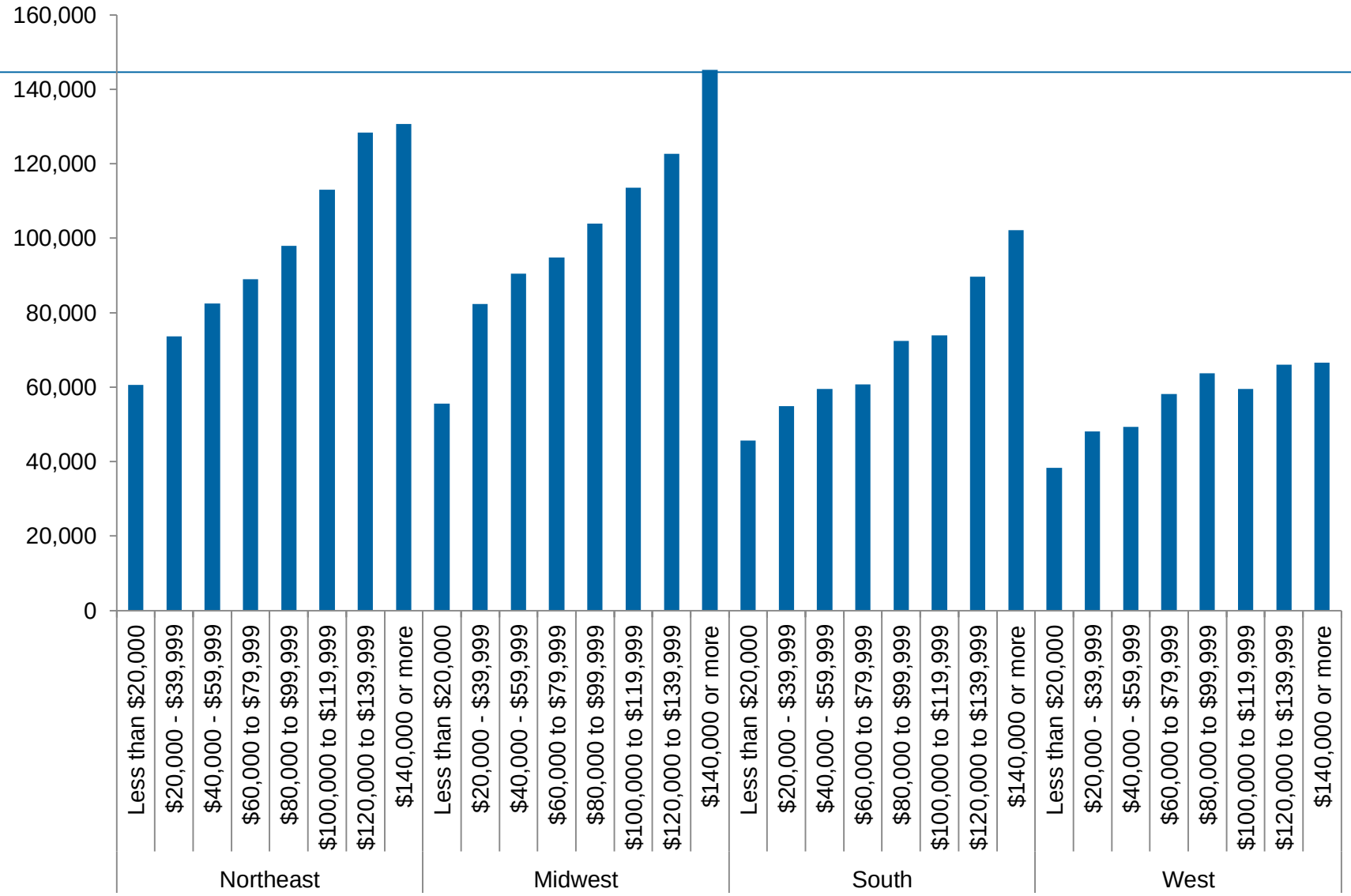
State Energy Policy as a Tool to Reverse Energy System Inequity During the Clean Energy Transition

John Howat – National Consumer Law Center

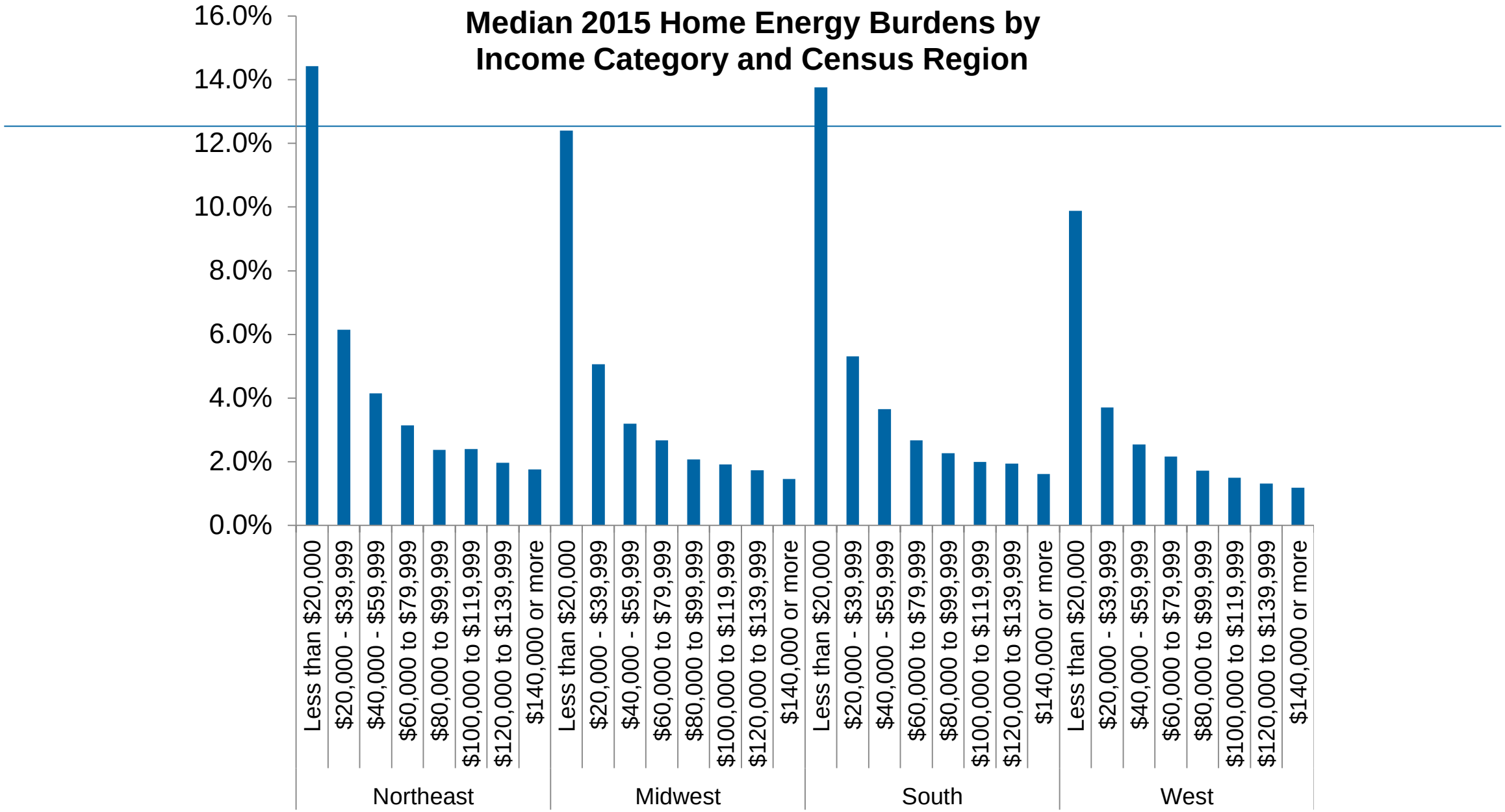
National Governors Association

May 2019

Median 2015 Household Energy Usage (thousand Btu) by Household Income Category and Census Region

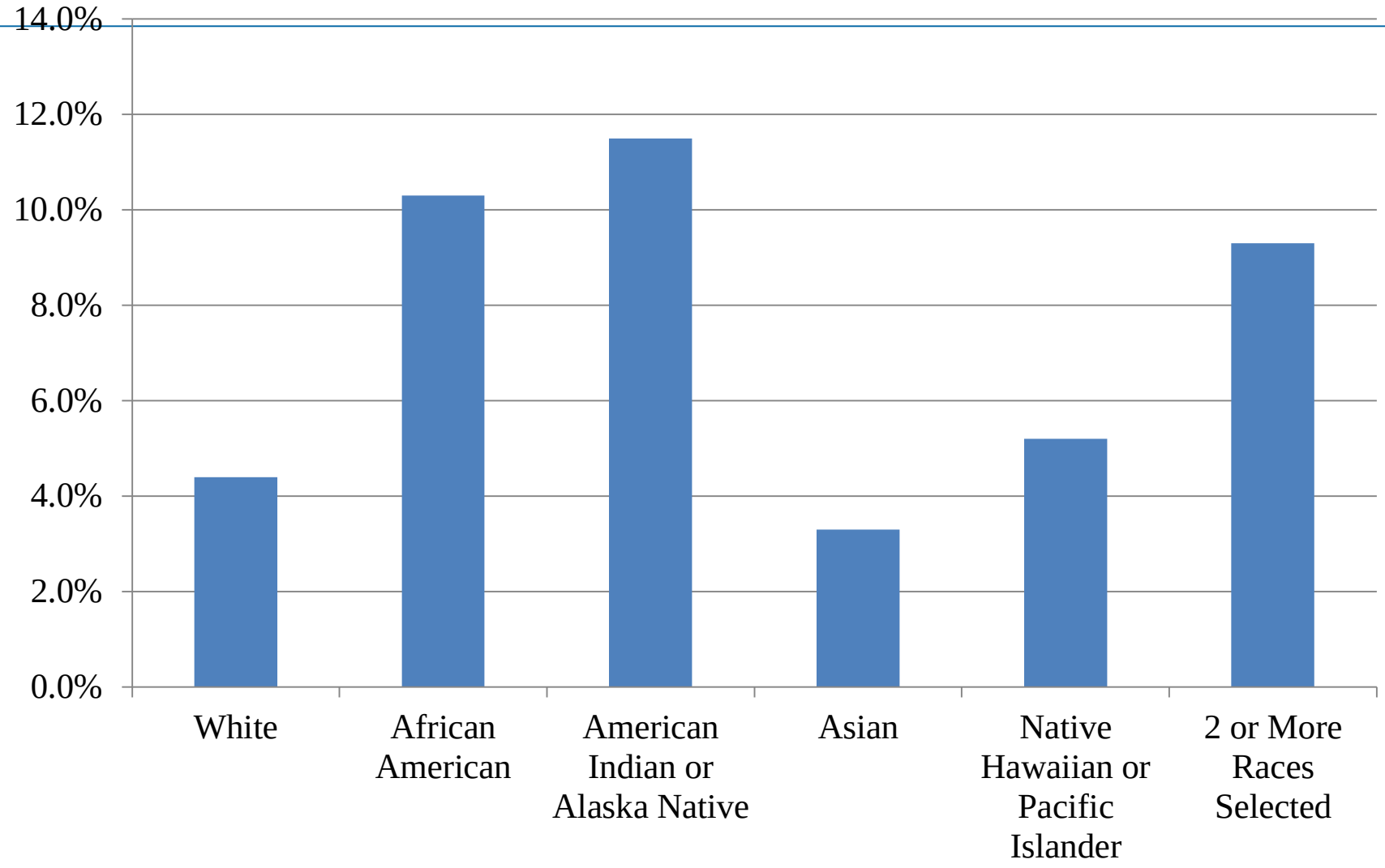


John Howat – National Consumer Law Center - jhowat@nclc.org



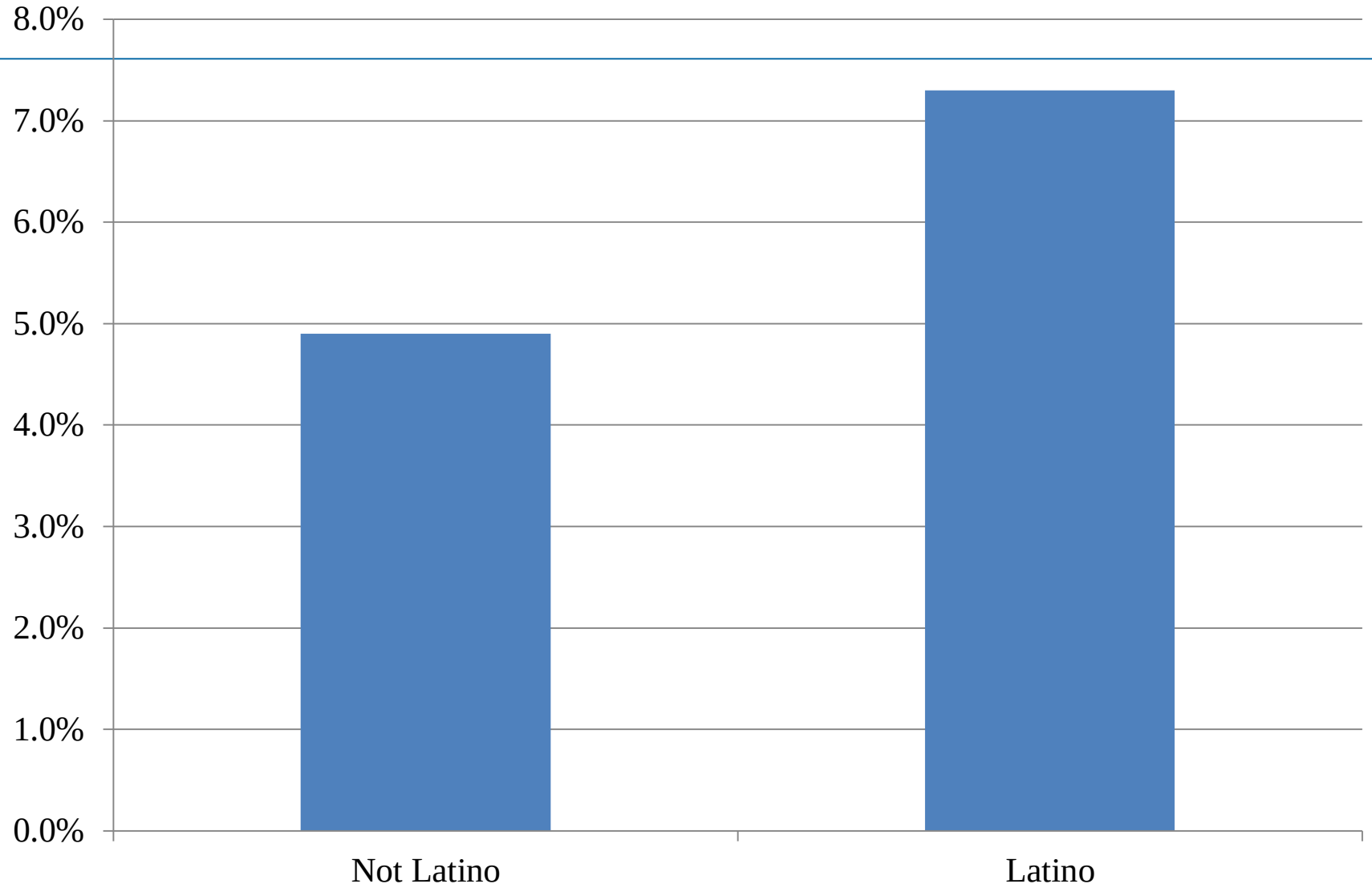
John Howat – National Consumer Law Center - jhowat@nclc.org

Loss of Heat in the Past Year Due to Unaffordable Utility Service, Fuel or Heating System Repair by Race: U.S.



John Howat – National Consumer Law Center - jhowat@nclc.org

Loss of Heat in the Past Year Due to Unaffordable Utility Service, Fuel or Heating System Repair by Ethnicity: U.S.



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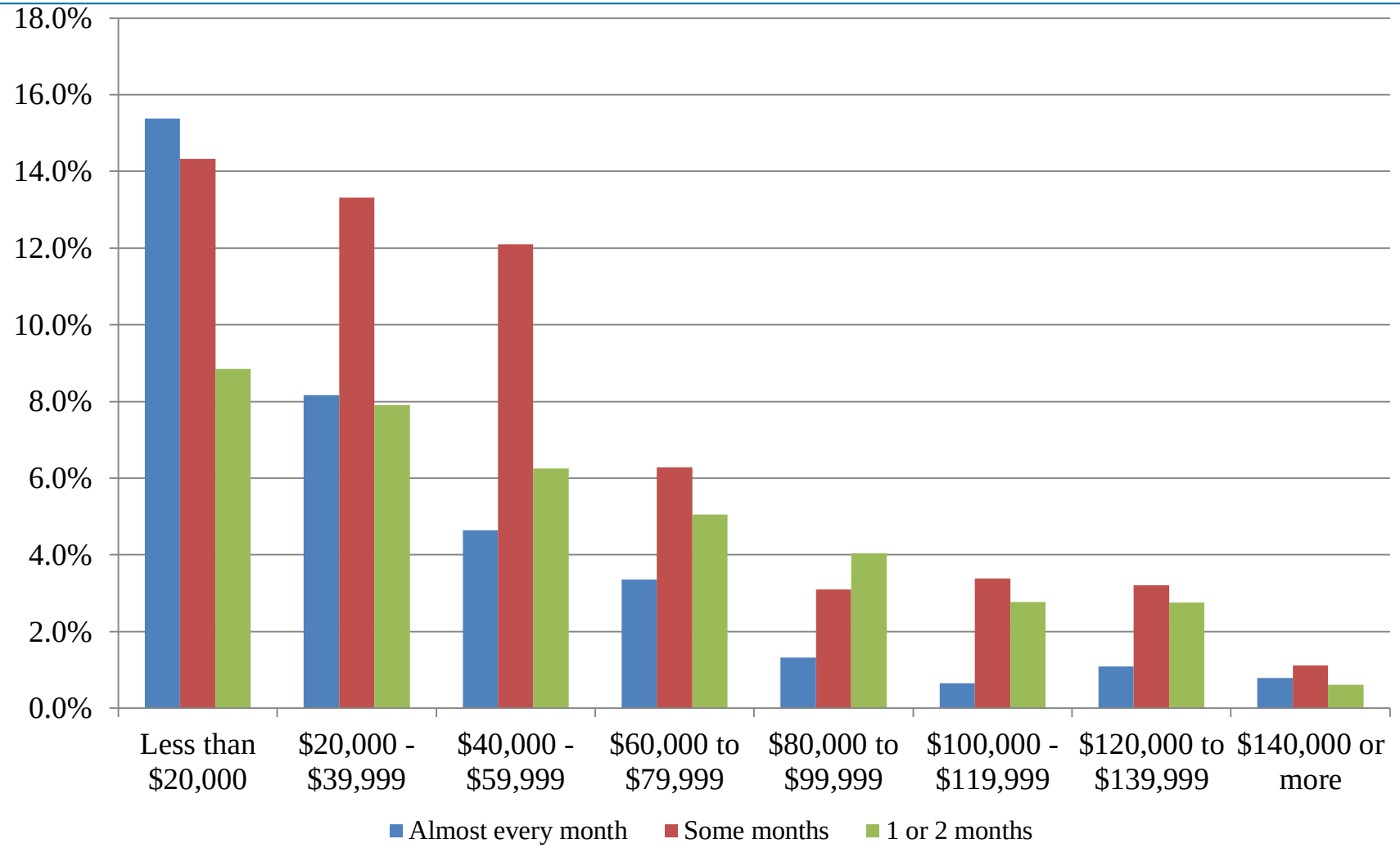
Frequency of Reducing or Forgoing Basic Necessities Due to Home Energy Bill by Household Income Category - U.S.



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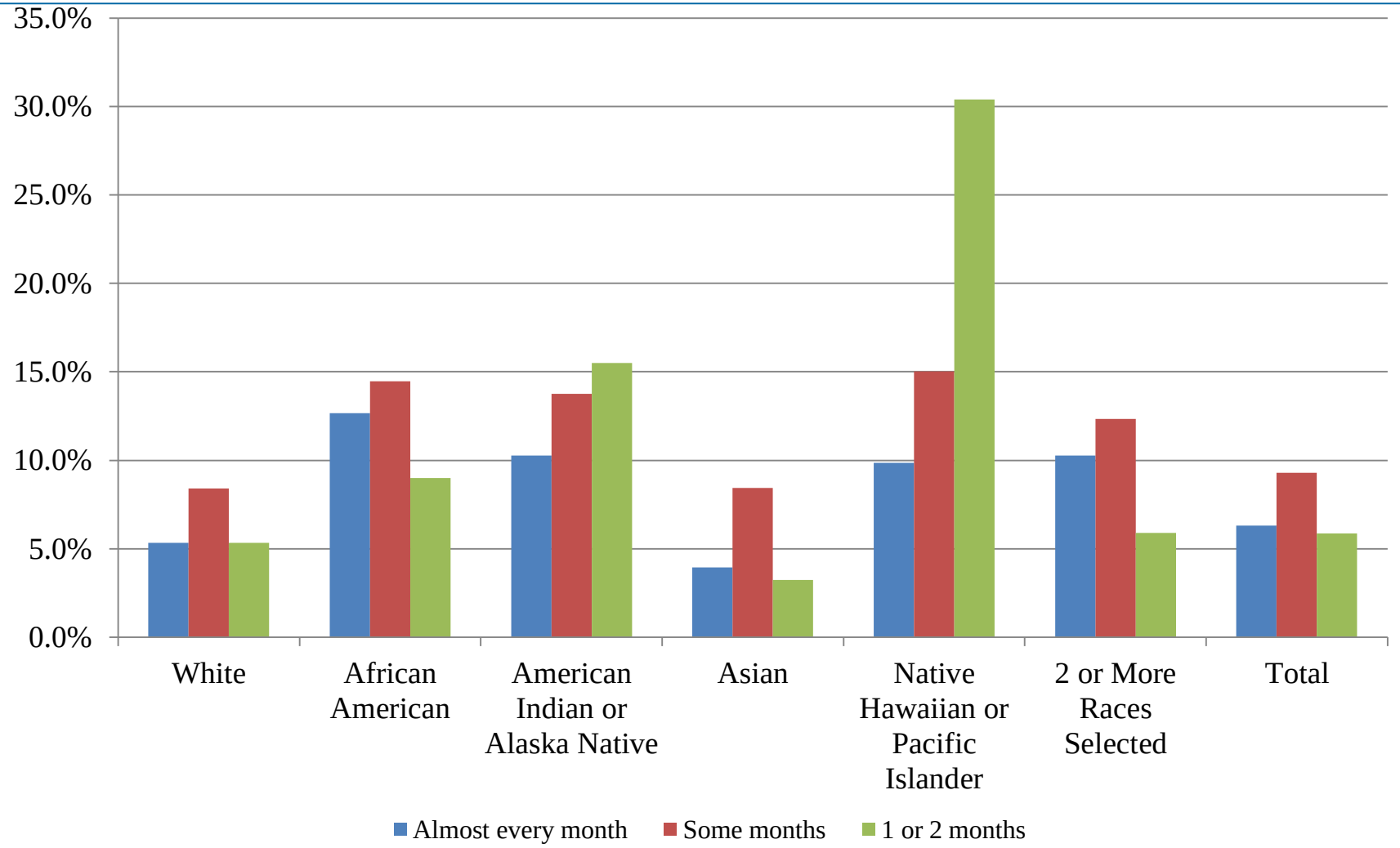
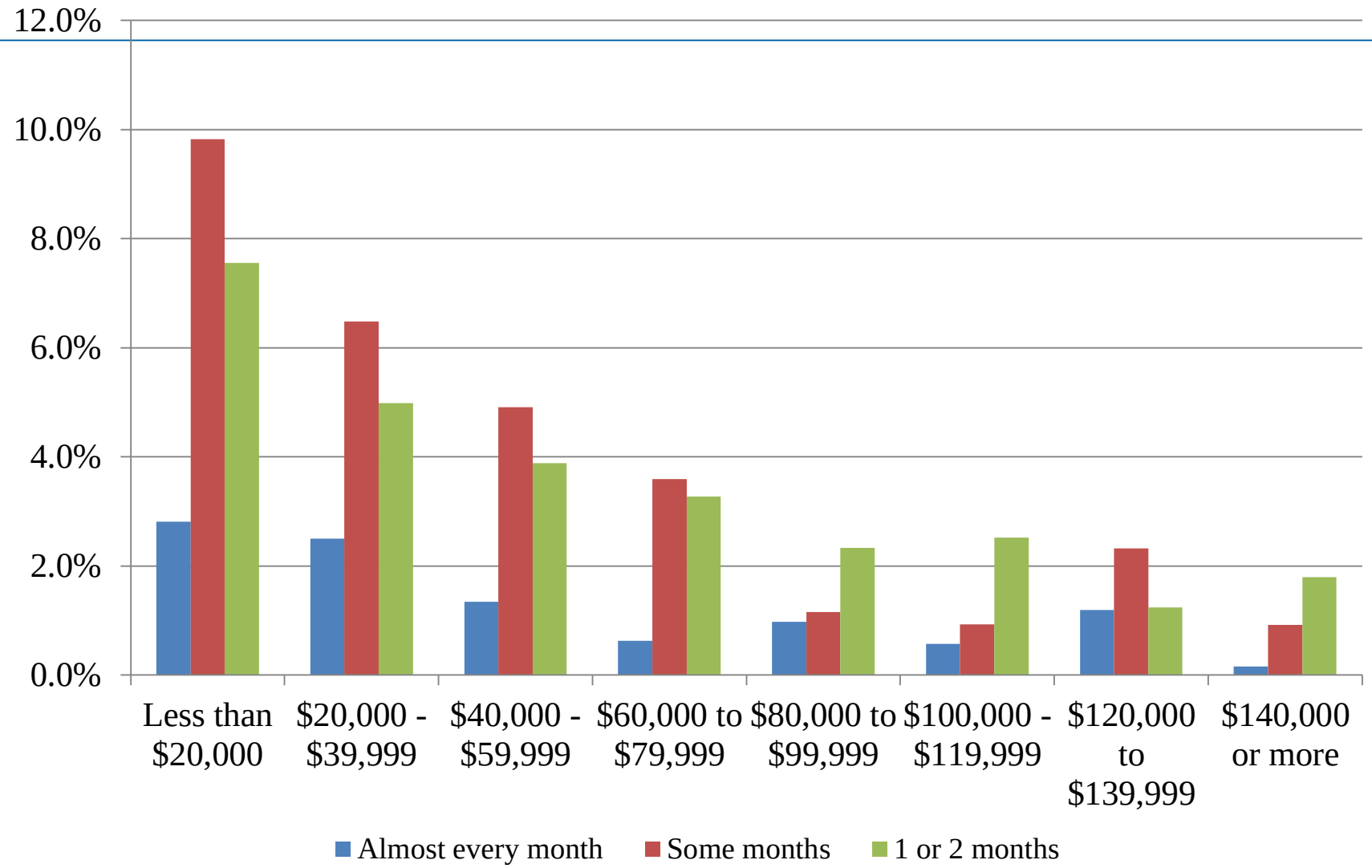
Frequency of Reducing or Forgoing Basic Necessities Due to Home Energy Bill by Race - U.S.



John Howat – National Consumer Law Center - jhowat@nclc.org

Frequency of Keeping Home at Unhealthy Temperature by Household Income Category: U.S.



John Howat – National Consumer Law Center - jhowat@nclc.org

Credit and Collection Data Points

- Number of residential accounts
- Total billed and receipts amounts
- Total number of “protected” accounts (e.g., for serious illness, elderly, disability)
- Number and dollar value of unpaid accounts 30-60 days after issuance of a bill
- Number and dollar value of unpaid accounts 60-90 days after issuance of a bill
- Number and dollar value of unpaid accounts 90+ days after issuance of a bill
- Number of accounts referred to collection agencies
- Number of new payment agreements
- Number of accounts sent notice of disconnection for non-payment, and number of service
- disconnections for non-payment
- Number of service restorations after disconnection for non-payment
- Number of customers completing an extended payment plan
- Average duration of service disconnection for restored accounts
- Number and dollar value of accounts written off as uncollectible

John Howat – National Consumer Law Center - jhowat@nclc.org


Low-income Home Energy Security
Safety Net
Affordable
Payments
Consumer
Protections
Efficient
Usage

“Reversing Energy System Inequity: Urgency and Opportunity During the Clean Energy Transition”

John Howat – National Consumer Law Center - jhowat@nclc.org

Keys to Success: Engaging Your Legislature, Regulators, and Other State Partners

- Moderator
  - **Dan Lauf**, Energy Program Director, NGA
- Speakers:
  - **Rick Bender**, Executive Director, Kentucky Office of Energy Policy
  - **Emma Cimino**, former policy advisor to Connecticut Governor Dannel Malloy

Trivia Time!

Question 3:

- Which state/territory observes only 2 national holidays?

Guam

- Guam Discovery Day is held on the first Monday in March. Liberation Day is on July 21st.

Question 4:

- Which state/territory has no poison ivy or poison oak?

Alaska

- Alaska is the only state that does not have any poison ivy or poison oak. It also does not have any poisonous snakes!

Policy Deep Dive: The Benefits and Opportunities of Energy Efficiency

- Speaker:
  - **Annie Gilleo**, Senior Manager, State Policy, American Council for an Energy Efficient Economy

Energy Efficiency Opportunities

Impactful Policies and Programs

Annie Gilleo
Senior Manager, State Policy
May 9, 2019

ACEEE
American Council for an Energy-Efficient Economy

The American Council for an Energy-Efficient Economy is a nonprofit 501(c)(3) founded in 1980. We act as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors.

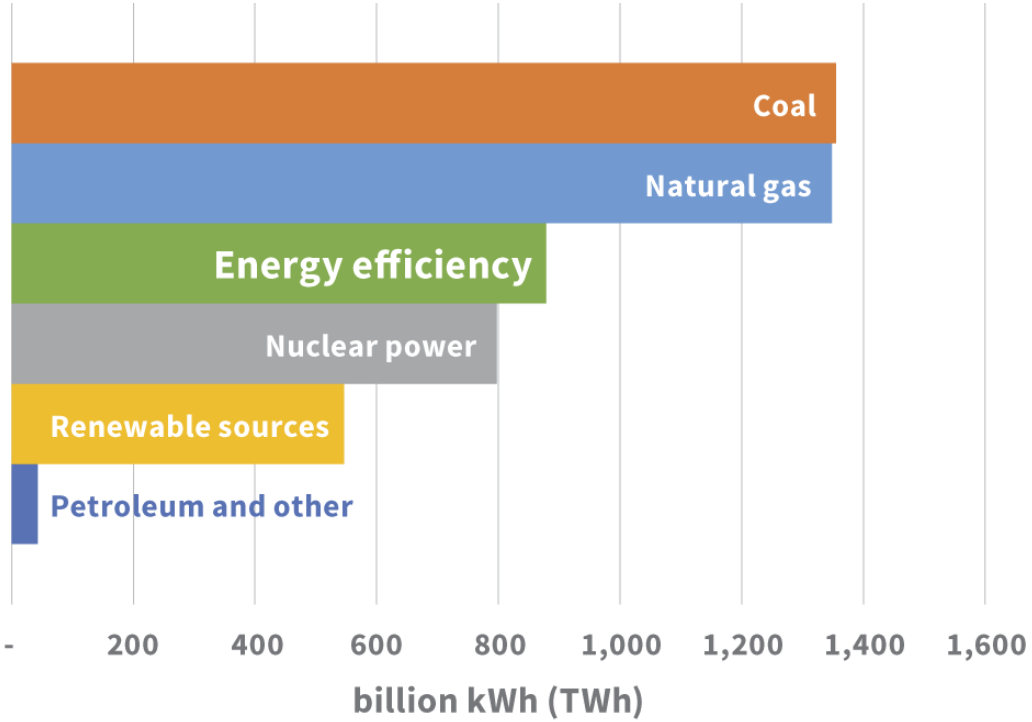
Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

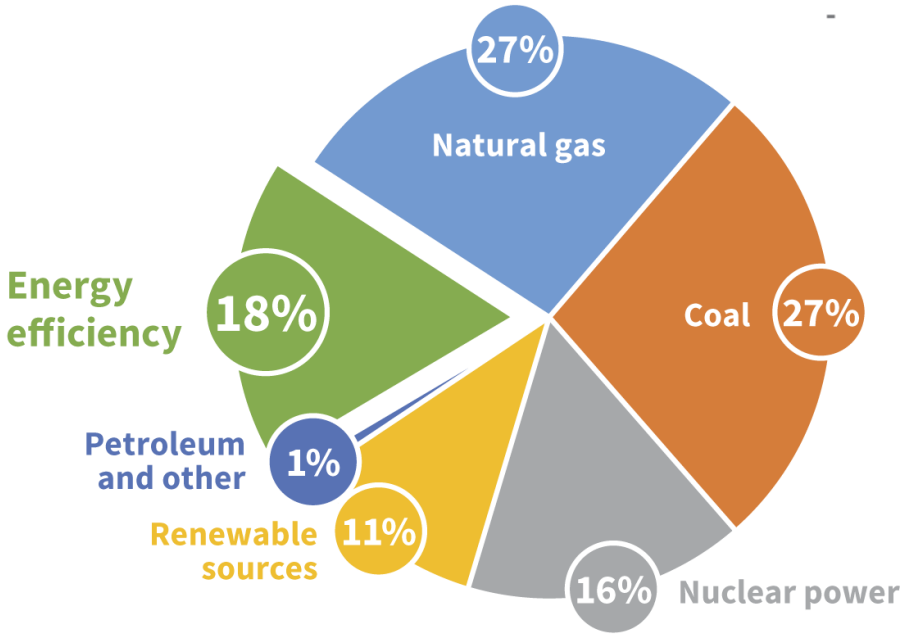
Our work is made possible by foundation funding, contracts, government grants, and conference revenue.

aceee.org @ACEEEdc

ACEEE
American Council for an Energy-Efficient Economy

In the electricity sector, efficiency is now our 3rd largest resource





Source: ACEEE 2016. *Greatest Energy Story You Haven't Heard.* http://aceee.org/research-report/u1604

MORE ENERGY EFFICIENCY = MORE CONSTRUCTION JOBS

More than 1 out of every 6 US construction workers spend 50% or more of their time on Energy Efficiency (18%)

Nearly 60% of energy efficiency's 2.25 million employees work in construction (1.27 million)

80%

of energy efficiency construction businesses say employees spend a majority of time on energy efficiency—an increase from last year (74%)

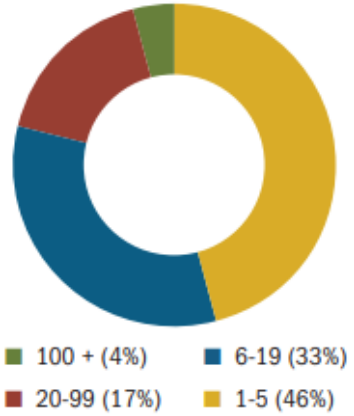
EE JOBS ACROSS THE COUNTRY

- These jobs are local. **99.7%** of U.S. counties have energy efficiency jobs
- Energy efficiency now employs workers in more than **3,000** of America's **3,007** counties
- More than **300,000** Americans living in rural areas work in energy efficiency
- America's Top 25 metro areas employ **900,000** workers in energy efficiency
- **35%** of U.S. energy workers are involved in energy efficiency

GROWTH ACROSS AMERICA

There are
353,269
energy efficiency businesses in America

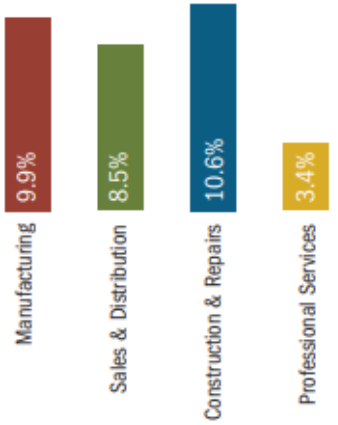
SMALL EE BUSINESS BY EMPLOYEE COUNT



GROWTH FOR THE FUTURE

Energy efficiency businesses are projecting
9% growth in jobs
for 2018

...and the job growth is expected across all major industries



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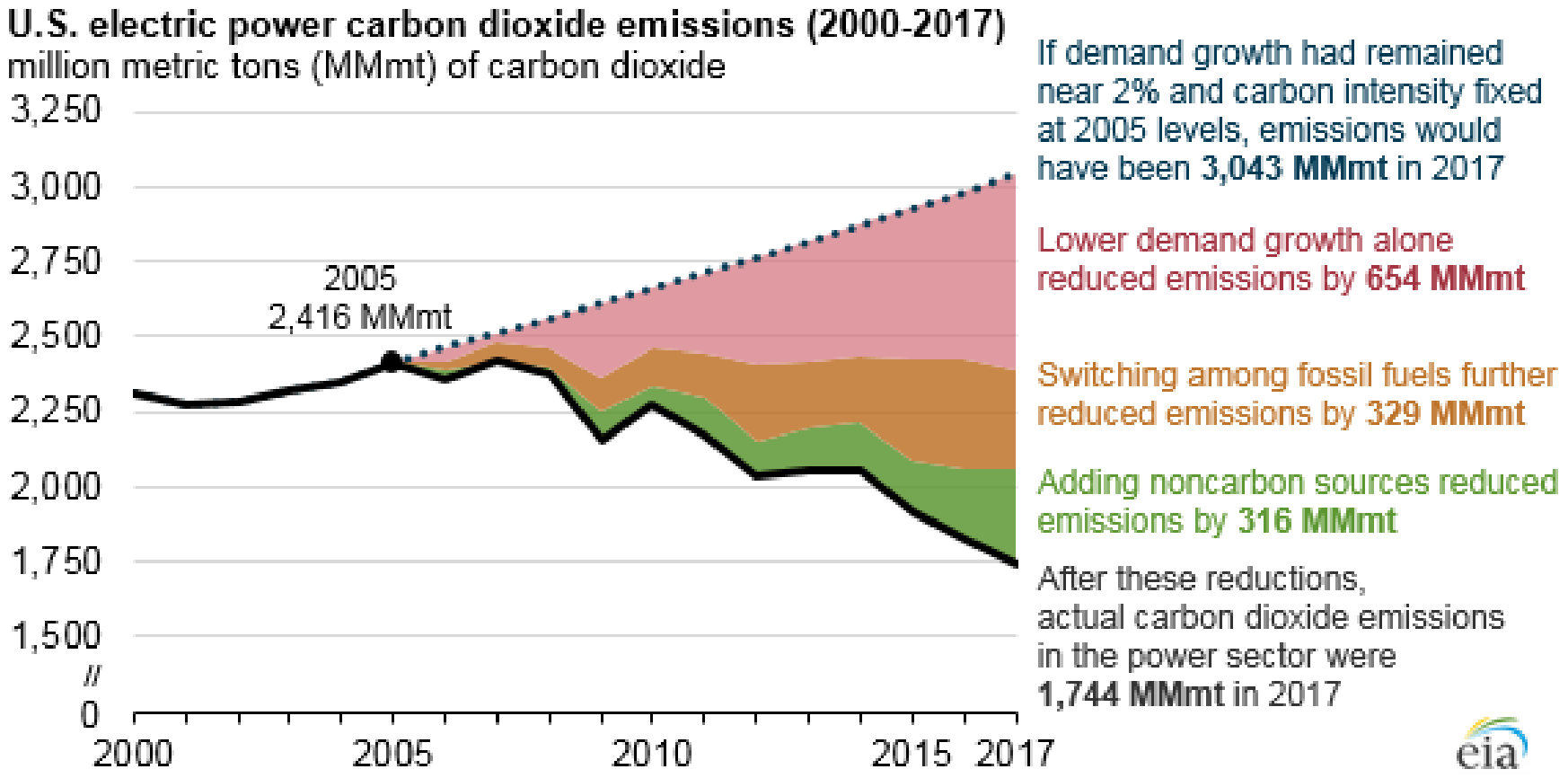
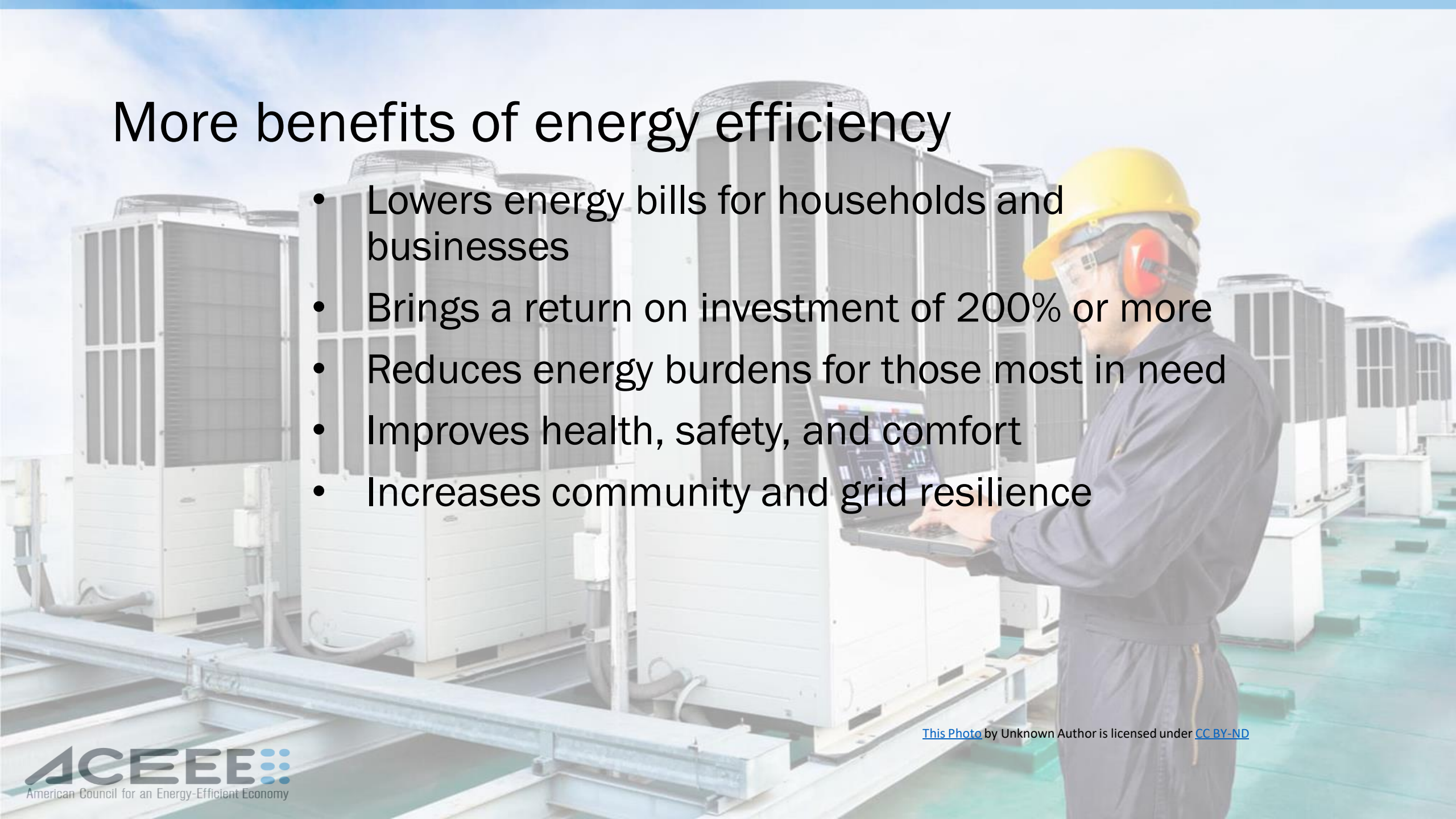
American Council for an Energy-Efficient Economy

E2 and E4TheFuture. Energy Efficiency Jobs in America

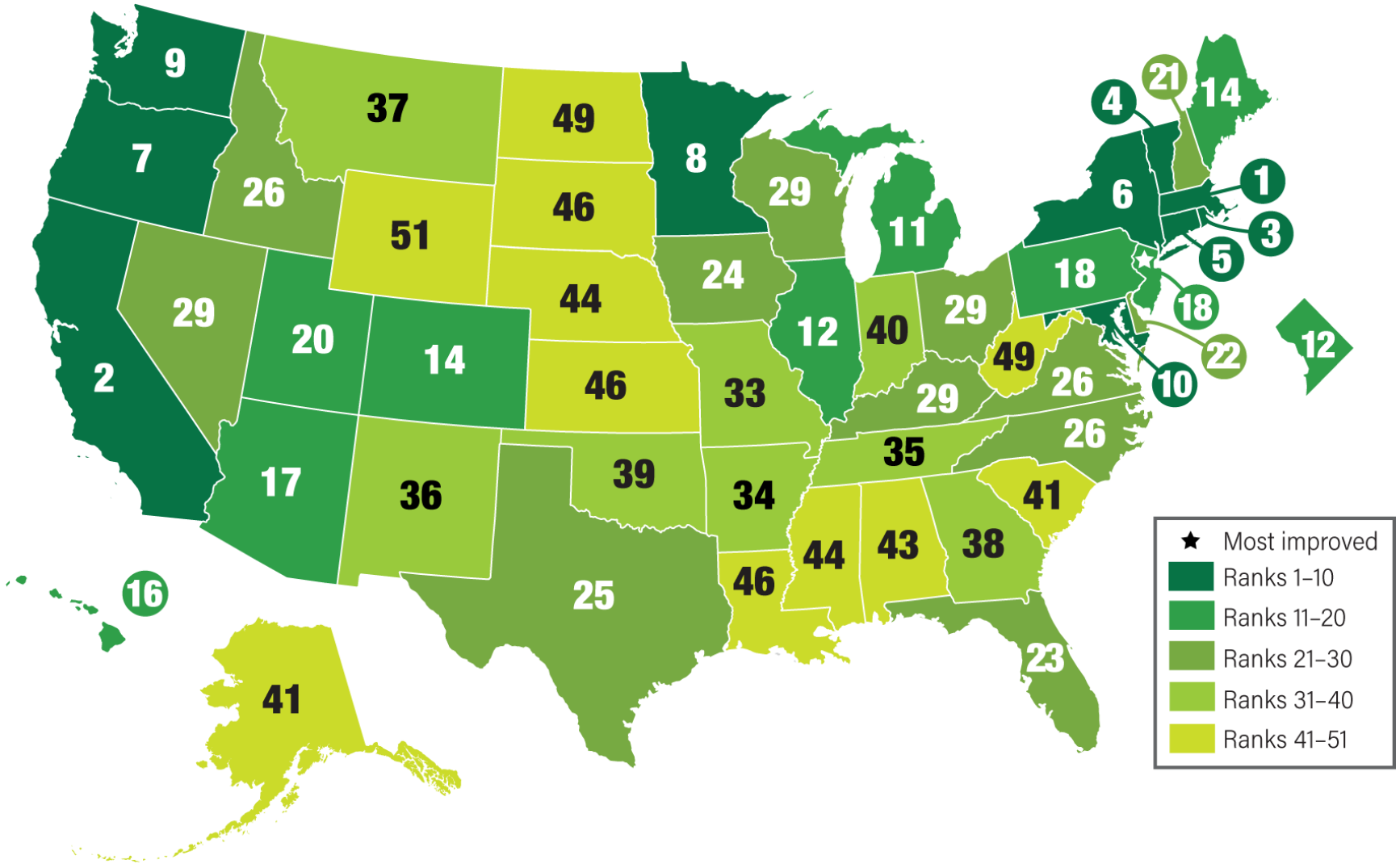

U.S. electric power carbon dioxide emissions (2000-2017)
million metric tons (MMmt) of carbon dioxide
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
0
2005
2,416 MMmt
2000
2005
2010
2015
2017
If demand growth had remained near 2% and carbon intensity fixed at 2005 levels, emissions would have been 3,043 MMmt in 2017
Lower demand growth alone reduced emissions by 654 MMmt
Switching among fossil fuels further reduced emissions by 329 MMmt
Adding noncarbon sources reduced emissions by 316 MMmt
After these reductions, actual carbon dioxide emissions in the power sector were 1,744 MMmt in 2017
eia

More benefits of energy efficiency

- Lowers energy bills for households and businesses
- Brings a return on investment of 200% or more
- Reduces energy burdens for those most in need
- Improves health, safety, and comfort
- Increases community and grid resilience



State Leadership



ACEEE
American Council for an Energy-Efficient Economy

2018 State Energy Efficiency Scorecard

Communicating a Vision

- ✓ State Energy Plan
- ✓ Cross-agency coordination

Energy Efficiency in the Utility Sector

- ✓ Set energy savings goals
- ✓ Promote regulatory reforms
  - ✓ Utility business model
  - ✓ Rate design
  - ✓ Data access
  - ✓ Long-range planning
  - ✓ Cost-effectiveness testing

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American Council for an Energy-Efficient Economy

Energy-efficient Transportation

- ✓ Strategies to accelerate adoption of zero emissions vehicles
- ✓ Complete Streets and land use planning
- ✓ Sustainable transit funding
- ✓ Targets for VMT and freight movement

ACEEE
American Council for an Energy-Efficient Economy

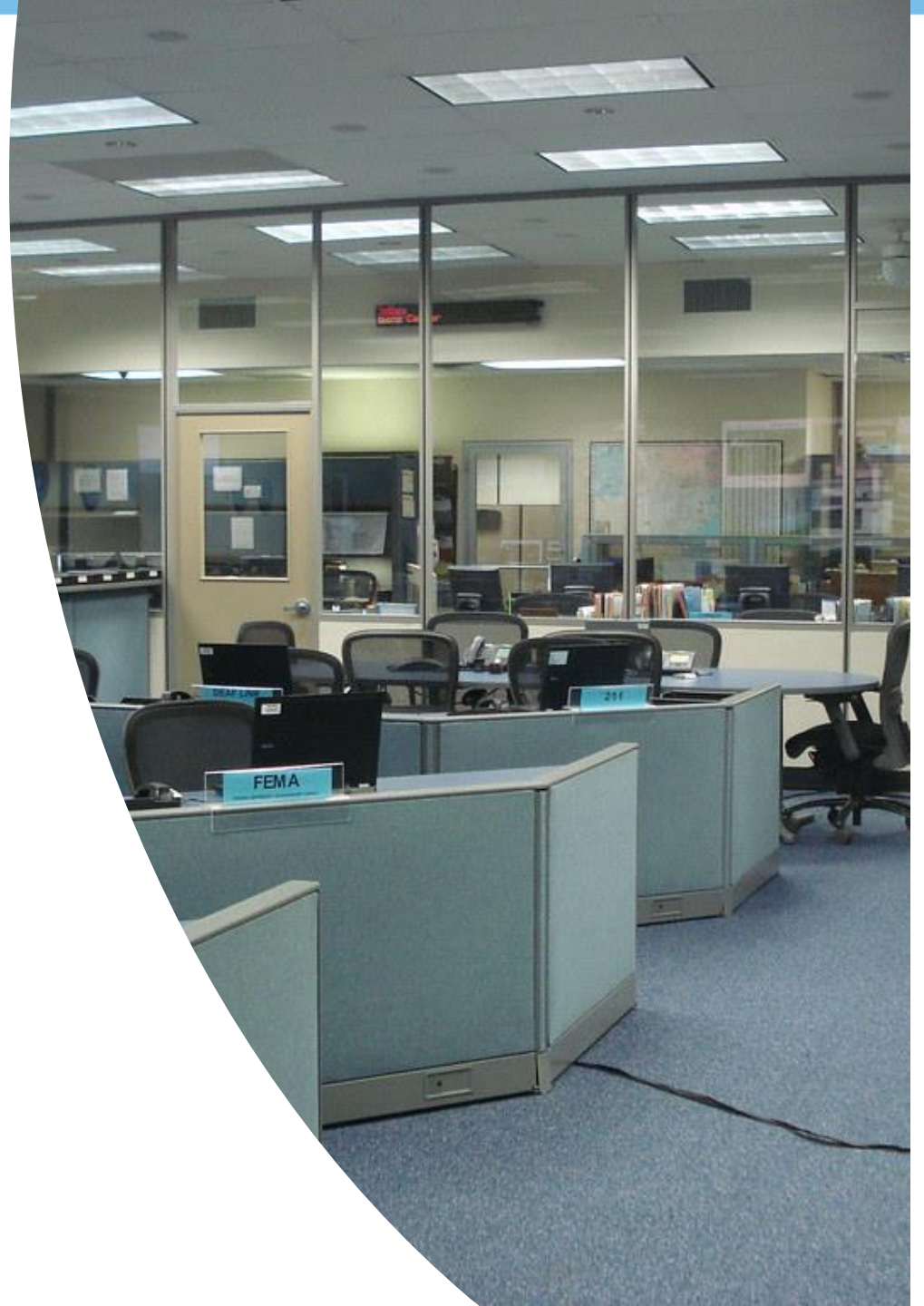
Energy Efficiency in Buildings

- ✓ Building energy codes
- ✓ Labeling and disclosure

ACEEE
American Council for an Energy-Efficient Economy

Leading By Example

- ✓ Efficient state buildings
- ✓ Efficient fleets
- ✓ Focus on procurement, plug loads, and behavior



Efficient Appliances

- ✓Set new standards
- ✓Protect national standards

Reaching Underserved Communities and Sectors

- ✓ Energy office programs
  - ✓ Rural communities
  - ✓ Industrial and manufacturing technical resources
- ✓ Coordinate assistance for low-income households
- ✓ Scale financing options

ACEEE Resources

- State Policy Database
  - https://database.aceee.org/
- State Energy Efficiency Policy Toolkits
  - https://aceee.org/sector/state-policy/toolkit
- Governors Toolkit for Energy Efficiency
  - https://aceee.org/topic-brief/governors-ee-toolkit
- Technical Assistance for Policymakers

Annie Gilleo
Senior Manager, State Policy
agilleo@aceee.org
(202) 507-4002

Flash Mentoring Session

- Mentors:
  - **Sam Robinson**, Deputy Chief of Staff, Pennsylvania Governor Tom Wolf
  - **Rick Bender**, Executive Director, Kentucky Office of Energy Policy
  - **Emma Cimino**, former policy advisor to Connecticut Governor Dannel Malloy

Working with Washington, Part 1: Tracking the Federal Energy Regulatory Commission

- Speaker:
  - **Richard Glick**, Commissioner, Federal Energy Regulatory Commission

Trivia Time!

Question 5:

- Which state/territory has the largest annual fireworks display?

Kentucky

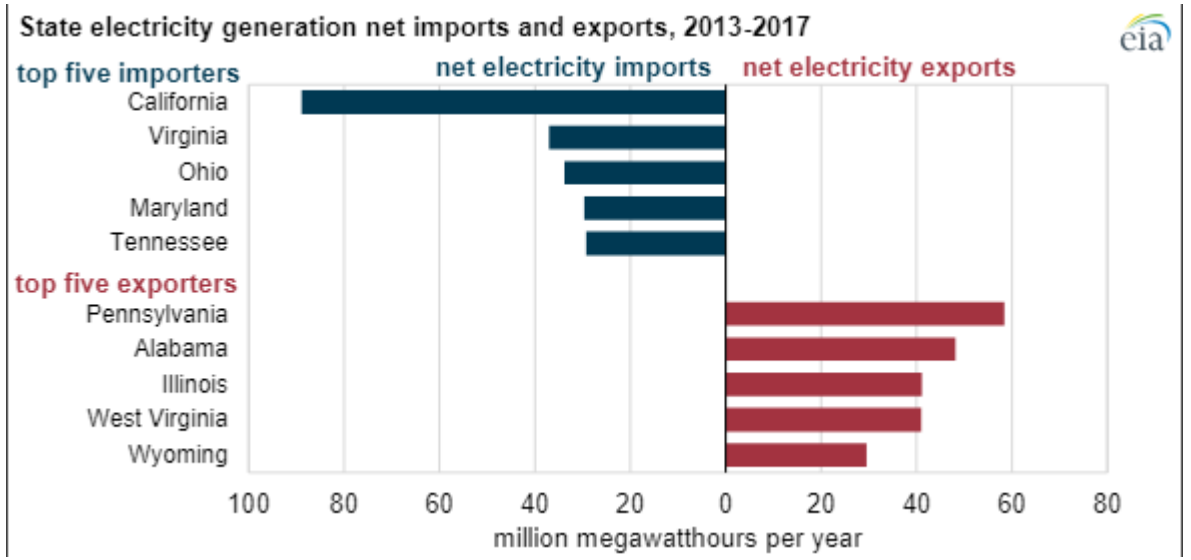
- Thunder Over Louisville is the annual kick-off to the Kentucky Derby

Question 6:

- Which state/territory exports the most electricity?

Pennsylvania

- According to EIA data, Pennsylvania exports the most electricity.



Working with State Partners: Energy Resources, Roles, and Responsibilities Across State Government

- Moderator
  - **Dan Lauf**, Energy Program Director, NGA
- Speakers:
  - **David Terry**, Executive Director, National Association of State Energy Officials
  - **Danielle Sass Byrnett**, Director, Center for Partnerships & Innovation, National Association of Regulatory Utility Commissioners
  - **David Springe**, Executive Director, National Association of State Utility Consumer Advocates
  - **Glen Anderson**, Energy Program Director, National Conference of State Legislatures

NATIONAL GOVERNORS ASSOCIATION

New Energy Policy Advisors Bootcamp

May 9 - 10, 2019

National Governors Association
Center for Best Practices

WIFI Network:

Password:

#WeTheStates

NATIONAL GOVERNORS ASSOCIATION

Welcome and Additional Resources

Jessica Rackley, Senior Policy Analyst, NGA

#WeTheStates

Energy, Environment & Transportation Division
2019 FOCUS AREAS

NGA
NATIONAL GOVERNORS ASSOCIATION

Power Sector Modernization

Energy Policy Institute

Grid Modernization Retreats

Global Energy Solutions Summit

Resiliency

State Energy Risk Assessment & Planning Tool and State Resilience Retreats

Grid Emergency Exercises

State/Utility Coordination Workshop

Housing Resiliency Experts Roundtable

Smarter States, Smarter Communities

Learning Lab

Roadmap

Policy Academy Kick Off

Support for New Governors

Boot Camps and Webinars

Energy Advisors

Transportation Advisors

Water Advisors

Governors Guide to Energy Policy

Technical Assistance on Demand

Research

Policy Memos

Consultations

Transportation Modernization

Traffic Safety Learning Labs

Electric Vehicle (EV) Regional Workshops

Innovation Workshops

Transportation Policy Institute

Energy Efficiency

Lead By Example Workshop

Energy Efficiency Experts Roundtable

Energy Efficiency Roadmap for Governors

Nuclear Weapons Waste

Federal Facilities Task Force Meeting

Intergovernmental Meeting

Governors Guide to Nuclear Weapons Waste Cleanup

Water Policy Learning Network

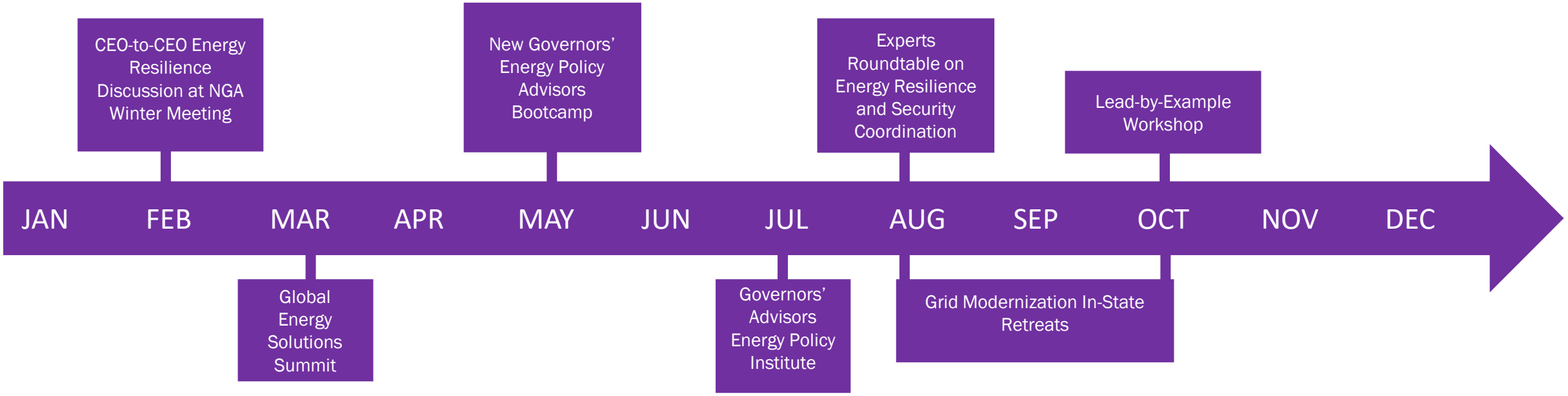
Water Policy Institute

Webinar Series

Delaware River Basin Retreats

2019 TIMELINE FOR NGA'S ENERGY POLICY LEARNING NETWORK

NGA's Energy Policy Learning Network is the premier energy policy resource for governors and their staff, focusing on a range of timely and relevant topics. Through the Network, governors' energy policy advisors have access to NGA resources, expertise, and consultations. They also have opportunities to convene, network, and share best practices with peers and experts.



GLOBAL ENERGY SOLUTIONS SUMMIT (MARCH)

NGA co-hosted the Global Energy Solutions Summit with the Embassies of Australia, Canada, and Denmark; it focused on three technology areas – offshore wind, energy storage, and carbon capture, utilization and storage. The Summit was held on March 28-29, 2019, in Washington, D.C., and paired examples of advancing these technologies in the U.S. and internationally.

ENERGY POLICY INSTITUTE (JULY)

The Annual Energy Policy Institute gathers state officials for peer-to-peer exchanges, strategy sessions, and discussions with national thought-leaders on a diverse set of energy policy issues. Topics discuss span the range of energy policy topics, addressing financing, regulation, planning, and innovation.

LEAD BY EXAMPLE WORKSHOP (OCTOBER)

NGA's Lead-by-Example (LBE) workshop (Oct. 2019) will help states better tap into opportunities to reduce energy consumption and expenses in public buildings. Topics covered will include innovative financing and models to incentivize greater state agency participation.

IN-STATE RETREATS | **MULTI-STATE CONVENINGS** | **WRITTEN POLICY BRIEFS** | **QUARTERLY WEBINAR SERIES** | **ON-DEMAND TECHNICAL ASSISTANCE**

NGA

Upcoming Events

Power Sector Modernization

- Grid Modernization In-State Retreats (Fall 2019)

Energy Efficiency

- Lead by Example Financing Workshop (October 2019)

Energy Security and Resilience

- Energy Security and Resilience Coordination Experts Roundtable (August 2019)
- Critical Infrastructure Cybersecurity Initiative (Ongoing)

NGA
NATIONAL GOVERNORS ASSOCIATION

Upcoming Resources

Power Sector Modernization

- Global Energy Solutions Summit Summary (May 2019)
- Transportation Electrification Summary Takeaways (Summer 2019)
- Clean Energy Toolkit (Summer 2019)
- Smarter States Smarter Communities Roadmap (Summer 2019)

Energy Efficiency

- Energy Efficiency Primer for Governors (Summer 2019)

Energy Security and Resilience

- State Electricity Cybersecurity White Paper (Spring 2019)
- Energy Security and Resilience Coordination White Paper (Summer 2019)
- State Resilience Assessment and Planning Tool (late 2019)
- Grid Outage Exercise Support (e.g., DOE Clear Path, NERC GridEx)

NGA
NATIONAL GOVERNORS ASSOCIATION

On-Demand Technical Assistance

On-Demand State Technical Assistance

As-needed; quick turnaround

Direct Consultations

Remote or in-person

Quarterly Webinars

On a variety of topics; suggestions welcome!

NGA
NATIONAL GOVERNORS ASSOCIATION

Join us in St. Paul, MN for our Annual Energy Policy Institute, July 18th and 19th

NGA
NATIONAL GOVERNORS ASSOCIATION

Working with Washington, Part 2: Resources and Partnerships at the U.S. Department of Energy

- Moderator:
  - **Sue Gander**, Division Director, NGA
- Speakers:
  - **Adrienne Lotto,** Acting Principal Deputy Assistant Secretary, Office of Cybersecurity, Energy Security, and Emergency Response, U.S. Department of Energy
  - **Katie Jereza,** Deputy Assistant Secretary, Transmission Permitting & Technical Assistance, Office of Electricity, U.S. Department of Energy
  - **Alex Fitzsimmons,** Chief of Staff, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy
  - **Mark Planning,** Director, Intergovernmental & External Affairs, U.S. Department of Energy

Policy Deep Dive: Preparing for and Responding to Energy Emergencies

- Moderator:
  - **Dan Lauf**, Energy Program Director, NGA
- Speakers:
  - **Art House**, Chief Cybersecurity Risk Officer, State of Connecticut
  - **Paul Holloway,** Emergency Planning & Energy Analyst, Massachusetts Department of Energy Resources

Creating a Clean, Affordable and Resilient Energy Future for the Commonwealth

DOER
Massachusetts Department of Energy Resources

National Governors Association

Preparing for and Responding to Emergencies

Paul Holloway
Emergency Planning & Energy Analyst
Massachusetts Department of Energy Resources

Defining Resilience

- Presidential Policy Directive 21-- Critical Infrastructure Security defines "resilience" as

  'the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents'

- **Resilience is not 100% provision of service 100% of the time**
  - Resilience is instead a time varying description of the level of service provided following a disruptive event

Figure 2.2
Different Systems Will Have Different Resilience to the Same Disruption

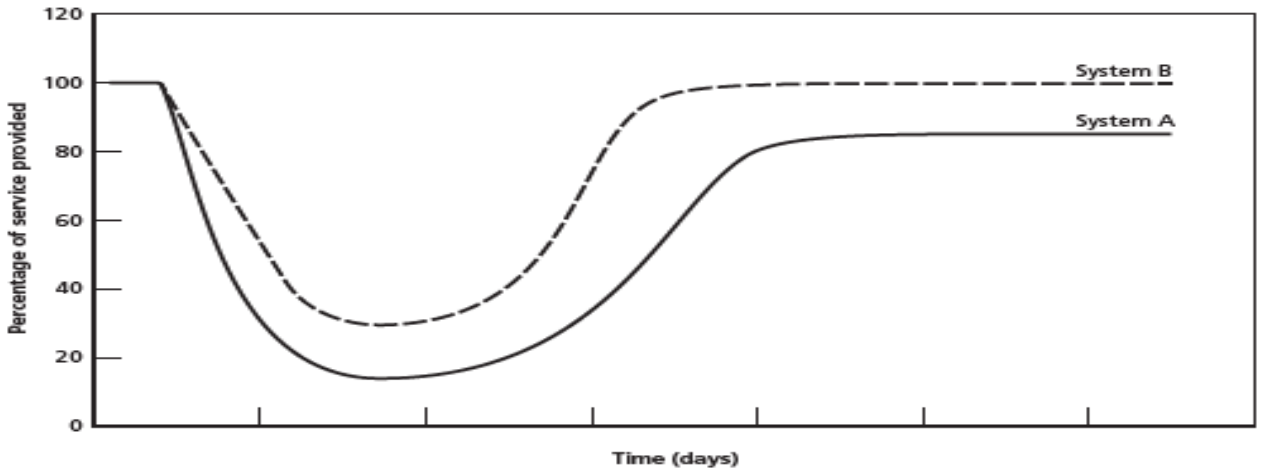


Figure 2.2 from RAND Study RR883

Measuring the Resilience of Energy Distribution Systems

Value in Planning for Emergencies

- Minimize impacts
- Provide specific strategies/menu of options for coordinating actions to manage the disruption
- Details roles & responsibilities for key government & industry stakeholders
- Structure for information sharing
- Flexible to supports a wide-range of incidents
- Process as Important as Product:
  - Understand supply chain
  - Energy Use
  - Key assets /infrastructure
  - Industry and govt. contacts
  - actionable checklists
- Informs investments
- Inspires Public Confidence

The MA Energy Assurance Plan Structure

I. Energy Profile

- Energy Use and Expenditures by sector
- Energy Supplies
- Key energy resources, infrastructure, distribution system

II. Vulnerability and Risk Assessment

- Vulnerabilities/Risk to energy infrastructure
- Interdependencies
- Critical Assets/Supply
- Consequences

III. Emergency Response Management Plan

- Energy emergency strategies/implementation procedures
- Industry/State Actions
- Legal Authorities
- Roles/Responsibilities of industry stakeholders in response/recovery

IV. New & Emerging Tech

- Smart-grid, renewables, biofuels, micro-grids, CHP

Vulnerability and Risk Assessment

Natural Hazards	Deliberate Acts	Technological Hazards
Severe Winter Storm/Nor'easter	Cyber Incident	Infrastructure Failure
Inland Flooding		
Coastal Flooding	Terrorism	
Other Severe Weather		
Hurricane/Tropical Storm	Civil Unrest	Nuclear Power Plant Event
Coastal Erosion		Hazard Material Accident/Spills
Tornado		Major Air Crash
Extreme Temperatures		Dam Failure
Invasive Species		
Earthquake	Chemical, Biological, Radiological, and Nuclear (CBRN) Incident	
Wildfire		
Drought		
Landslide		
Tsunami		
Public Health Emergency		

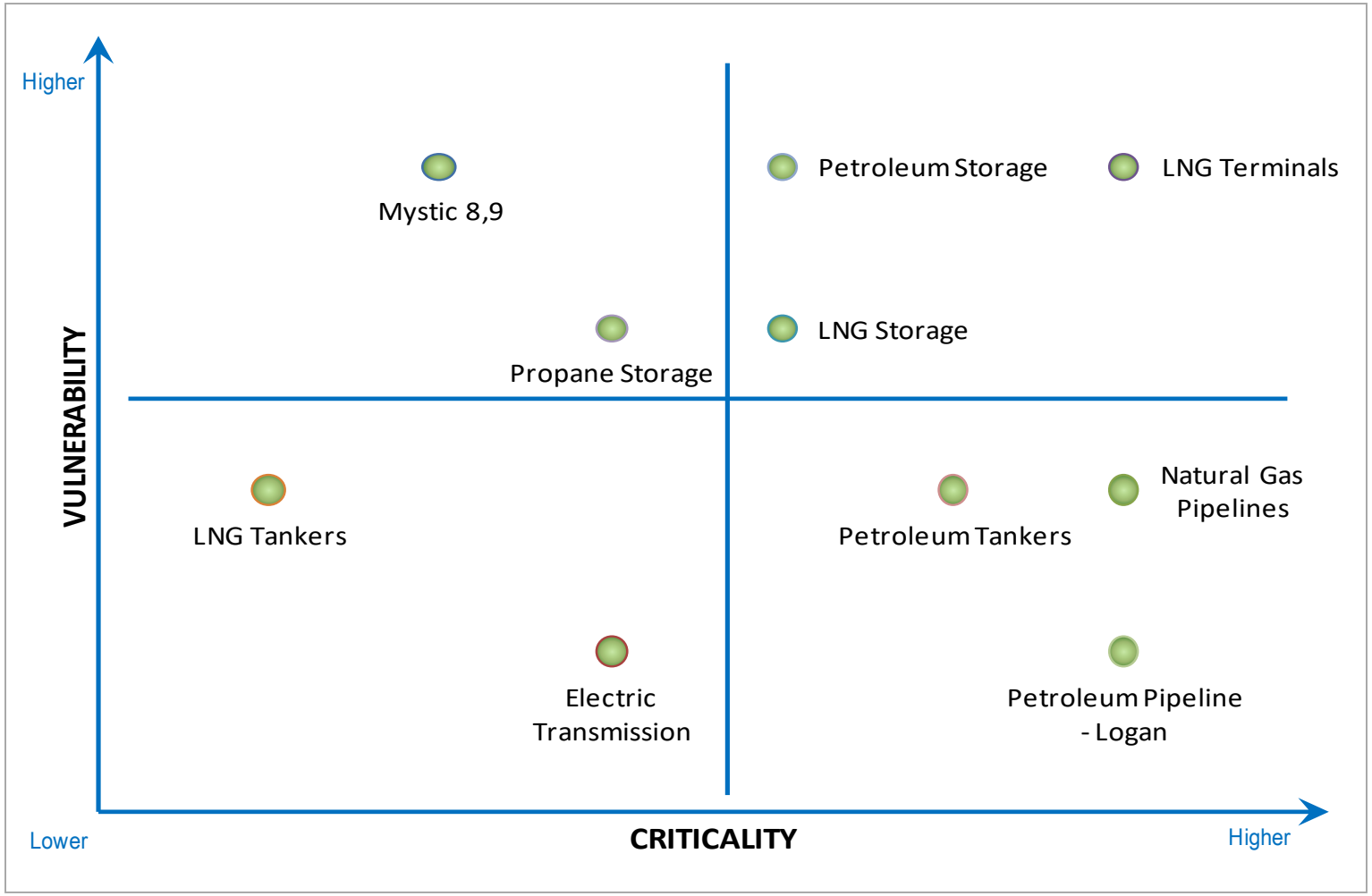
2018 Massachusetts Hazard Identification Risk Assessment (HIRA)

Critical Energy Infrastructure

Sector	Subsector	Critical Asset
Electricity	Generation	Mystic 8 & 9
	Transmission	Hydro Quebec HVDC and NSTAR 345 kV
Natural Gas	Pipelines	Algonquin and Tennessee Interstate Pipelines
Liquefied Natural Gas	Terminals	Distrigas Everett Terminal
	Satellite Facilities	Storage and Liquefaction
Petroleum	Terminals	High percentage (~ 70-80%) of terminal storage capacity in Boston harbor Three terminals upstream of Chelsea Creek Bridge Most Springfield terminals served by common pipeline
	Pipeline	Energy Transfer Partners jet fuel line to Logan Airport
Propane	Primary and secondary storage	Primary day storage in Selkirk, NY

Massachusetts - Critical Assets by Sector and Subsector

Vulnerability & Criticality by Sector



Also see - Threat vs. Consequence

Important to Know . . .

- Authorities and Responsibilities
  - Ex. Civil Defense Act, MGL 25A
  - Utility Regulators vs Energy Office vs EMA vs Industry
- Energy Supply Characteristics
  - Commodity (bought & sold at margins)
  - Changing market dynamics; renewables, just-in-time delivery, less on-site stored fuels
  - Retirements (Coal, Oil, Nuclear)
  - More Single Source Dependent = More Risk

Available Tools

- Pre-Winter Preparedness Mtg
- Hurricane Season WGs
- Prioritize resiliency and renewables and diverse sources of energy
- Maintain plans & contacts

- Driver Hour Waivers
- Emission Waivers
- Prioritize Delivered Fuels
- Voluntary & Mandatory Conservation
- Interruptible Gas
- Support to Industry

State Energy Context

Resilience

Methods to improve reliability and resilience at the end of a supply chain

1. **Action Plan**
   - ✓ Identify hazards, plan enduring strategies and acute responses
   - ✓ Massachusetts Hazard Mitigation & Climate Adaptation Plan
2. **Reduce consumption and reliance**
   - ✓ Massachusetts ranked #1 in efficiency 8 consecutive years
   - ✓ Distributed generation programs to incent generation co-located with load
3. **Harden load to impact of disruption**
   - ✓ $40M Energy Resilience Initiative & Municipal Vulnerability Preparedness
4. **Diverse & redundant supplies** (prevent single-points-of-failure)
   - ✓ 2016 Energy Diversification Bill; procure off-shore wind and hydroelectric resources
5. **Harden supply chain**
   - ✓ Grid Modernization docket for Utilities to automatically resection the distribution system to mitigate the impacts of outages

Massachusetts Policies

Supporting Energy Resiliency (1 of 2)

- Collaboration with Municipalities
  - Green Communities program provides technical assistance and grants
  - Municipal Vulnerability Preparedness (MVP) program provides technical assistance and grants
- Collaboration across State Agencies
- Leading by Example
  - Leading By Example Division energy resilience grants
  - Division of Capital Asset Management Resiliency Initiative
- Energy Efficiency Incentives
  - MA ranked #1 in Energy Efficiency by ACEEE 8 years in a row

Massachusetts Policies

Supporting Energy Resiliency (2 of 2)

- Distributed Generation Incentives
  - New SMART solar program incents pairing energy storage with solar
  - SMART program provides additional incentive for public consumers of solar energy
  - CHP and Fuel Cells incentivized through the Alternative Portfolio Standard (APS)
    - Also incents renewable thermal (solar thermal, air source heat pumps, ground source heat pumps, bio-fuels
  - Demonstration grants: $20M Energy Storage Initiative, $40M Clean Energy Resiliency (CHP for critical facilities)

Buying Down Risk

Other Resources

- Agency Plans/SOPs
- Hour Of Service (HOS) Waiver Guidance for Industry
- Continuity of Operations Plan (COOP)
- Industry ERP Plans (Power Utility and Gas LDCs)
- ISO/RTO Procedures
- Subject Matter Expertise
- State CEMP (ConOps)
- ESF-12 Annex (Energy)
- State Petroleum Fuel Coordination Plans
- Hazard Mitigation/ Climate Adaptation Plan
- 2018 Comprehensive Energy Plan
- 2017 Energy Storage Initiative
- 2020 Clean Energy & Climate Plan

Creating a Clean, Affordable and Resilient Energy Future for the Commonwealth

Paul Holloway
Emergency Planning & Energy Analyst
Massachusetts Department of Energy Resources
paul.c.holloway@mass.gov
617-626-7354

Trivia Time!

Question 7:

- Which state/territory claims to be the birthplace of the ice/cream sundae?

Wisconsin

- In 1881, in the town of Two Rivers, George Hallauer asked Edward C. Berners, the owner of Berners' Soda Fountain to drizzle chocolate syrup over ice cream. Berners wound up selling the treat for a nickel, originally only on Sundays.

Question 8:

- Which state/territory requires cars to drive on the left side of the road?

U.S. Virgin Islands

Policy Deep Dive: Electrifying the Transportation Sector

- Speaker:
  - **Kathy Kinsey**, Senior Manager, State Policy, American Council for an Energy Efficient Economy

NESCAUM

Transportation Electrification

HOW STATE POLICY MAKERS CAN ACCELERATE EV ADOPTION

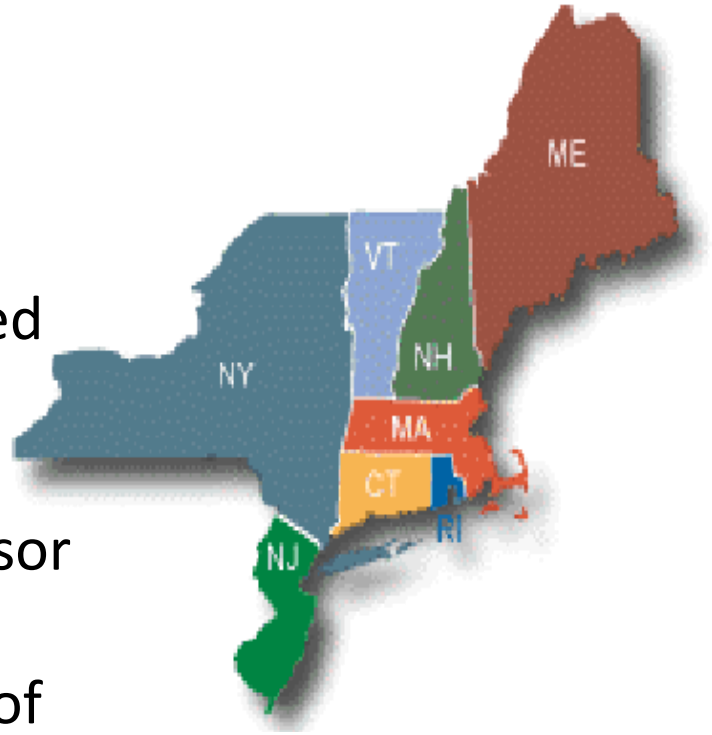
May 10, 2019

About NESCAUM

- An association of the air pollution control agencies of the states of CT, ME, MA, NH, NJ, NY, RI and VT formed in 1967

- Serves as a technical and policy advisor on air quality, climate and clean transportation issues and facilitator of multi-state coordinated action

- Significant focus on transportation electrification



Multi-State Initiatives

State Zero-Emission Vehicle Programs
Memorandum of Understanding

WHEREAS, the Signatory States have adopted regulations requiring increasing sales of zero-emission vehicles (ZEVs), or are considering doing so; and

WHEREAS, accelerating the ZEV market is a critical strategy for achieving our goals to reduce transportation-related air pollution, including criteria air pollutants, mobile source air toxics and greenhouse gas emissions (GHGs), enhance energy diversity, save consumers money, and promote economic growth; and

WHEREAS, our states are committed to reducing air pollution, including the emission of GHGs and other air pollutants from the mobile source sector; and

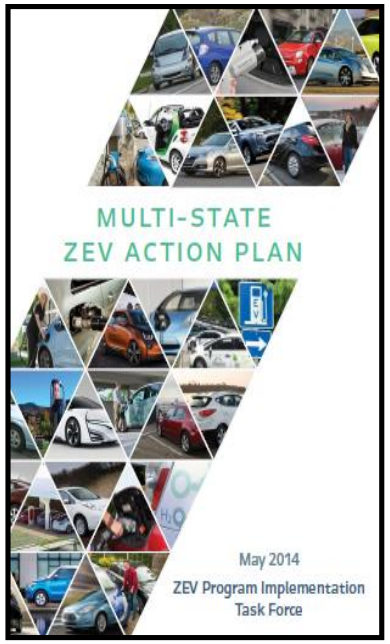
WHEREAS, many of our states have obligations or otherwise seek to reduce GHGs consistent with science-based targets by 2050; and

WHEREAS, motor vehicles are among the largest sources of GHGs and criteria air pollutants that adversely affect the health and well-being of our citizens in all of our states; and

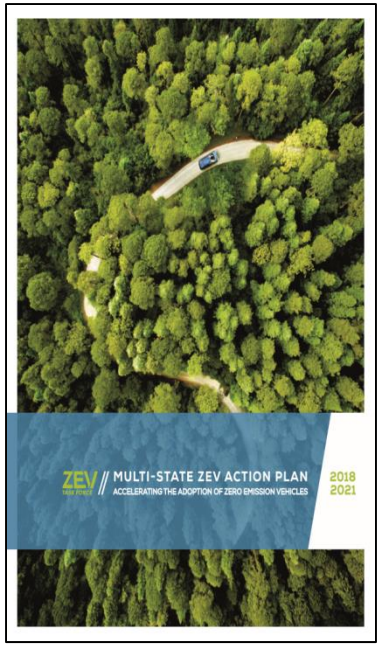
WHEREAS, providing transportation alternatives such as ZEVs will help improve air quality, reduce the use of petroleum-based fuels in the transportation sector, protect consumers against volatile energy prices, and support the growth of jobs, businesses and services in a clean energy economy; and

WHEREAS, an increasing variety of vehicles that operate on hydrogen and low-cost electricity are commercially available and have the potential to significantly reduce emissions of criteria pollutants and GHGs, enhance consumer choice, and allow for home fueling; and

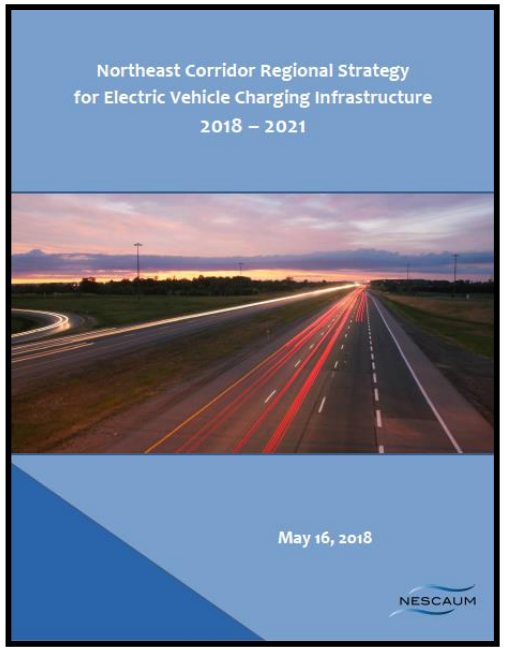
2013
Governors MOU



2014
ZEV Action Plan



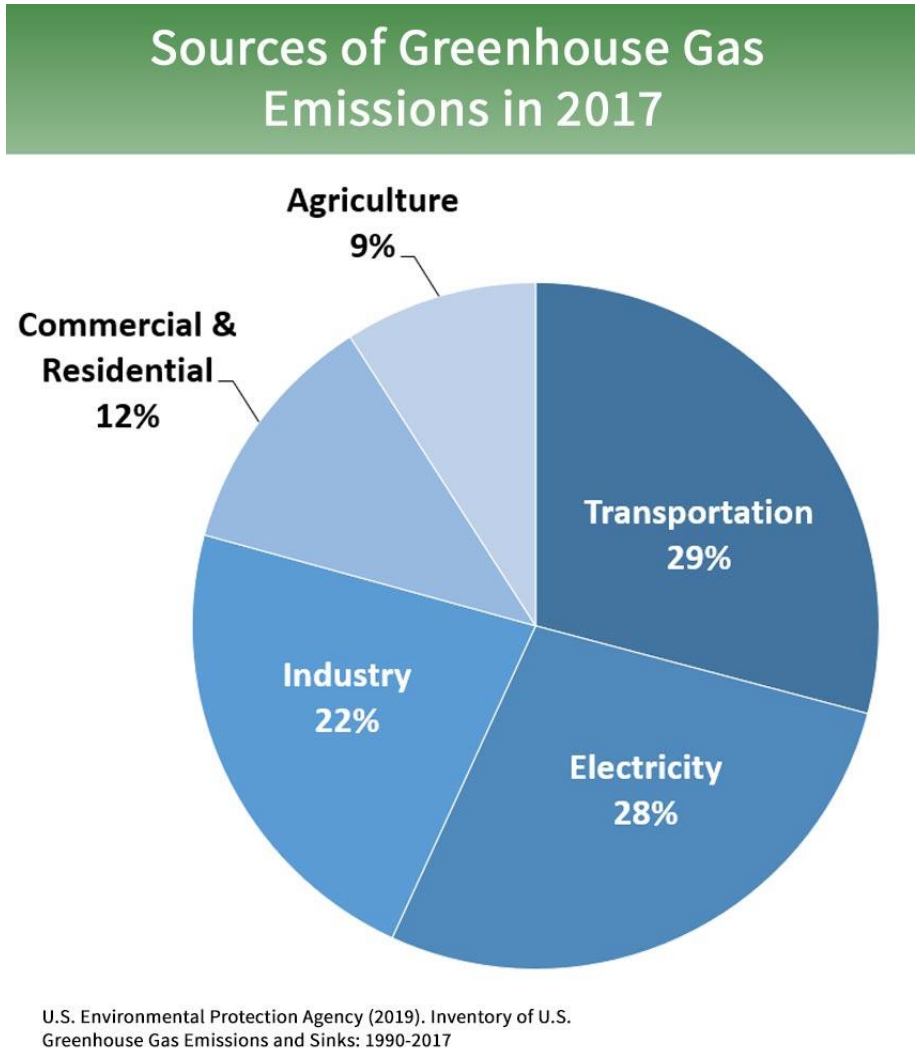
ZEV Action Plan
2018 – 2019



2018 Regional
Infrastructure Plan

TRANSPORTATION SECTOR EMISSIONS

- Account for nearly 30% of GHG emissions
- Single largest source of GHG emissions
- 60% attributable to passenger cars and light-duty trucks
- The only sector in which GHG emissions are increasing due to increasing VMT
- A major contributor to smog-forming pollutants, particulate matter and toxic air pollutants

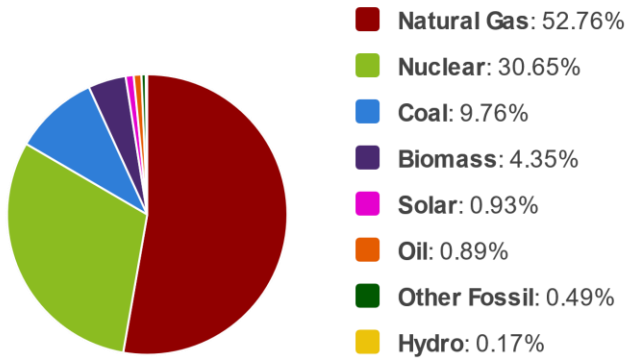


U.S. Environmental Protection Agency (2019). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017

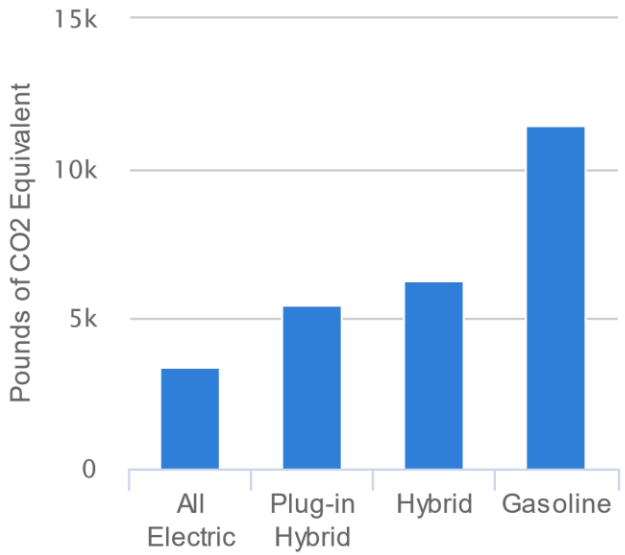
A Key Climate and Air Quality Strategy

Virginia

Electricity Sources



Annual Emissions per Vehicle



Source: https://afdc.energy.gov/vehicles/electric_emissions.html

- EVs two-thirds more energy efficient than gasoline and diesel powered cars
- Even with coal-fired generation, EVs produce one-third lower GHG emissions
- With managed charging, EVs facilitate grid integration of more wind and solar energy sources
- Zero tailpipe emissions means improved air quality

Consumer Benefits

- Significant fuel savings
- On average eGallon cost of electricity is $1.13 – roughly half the cost of a gallon of regular gas
- Lower maintenance costs
- Convenience of home charging
- Performance – quiet, smooth and fun to drive
- HOV lane access

Primary Barriers to Mainstream Consumer EV Adoption

- Higher purchase price
- Lack of charging infrastructure
- Lack of awareness and understanding
- Dealership engagement

The Path Forward:
Challenges and Opportunities

Purchase Incentives

- Consumer surveys demonstrate that incentives are often a determinative factor in the decision to purchase an EV – particularly for more affordable models
- Point-of-sale rebates that provide “cash on the hood” are the most effective approach
- A sustainable source of funding for incentives is needed to provide consumers and automakers with certainty
- Consider increasing incentives for low-income consumers and expanding to used EVs

Significant New Sources of Infrastructure Funding

While other investments by OEMs, EVSE providers, businesses and workplaces are expected and needed, there are three major current sources of infrastructure funding:

APPENDIX D FUNDS

Under the VW settlement, the states may invest up to 15% on ZEV charging and hydrogen fueling infrastructure.

electrify america

Pursuant to the VW settlement, Electrify America is investing $2 billion to promote ZEVs, which will include substantial infrastructure investments in the states.

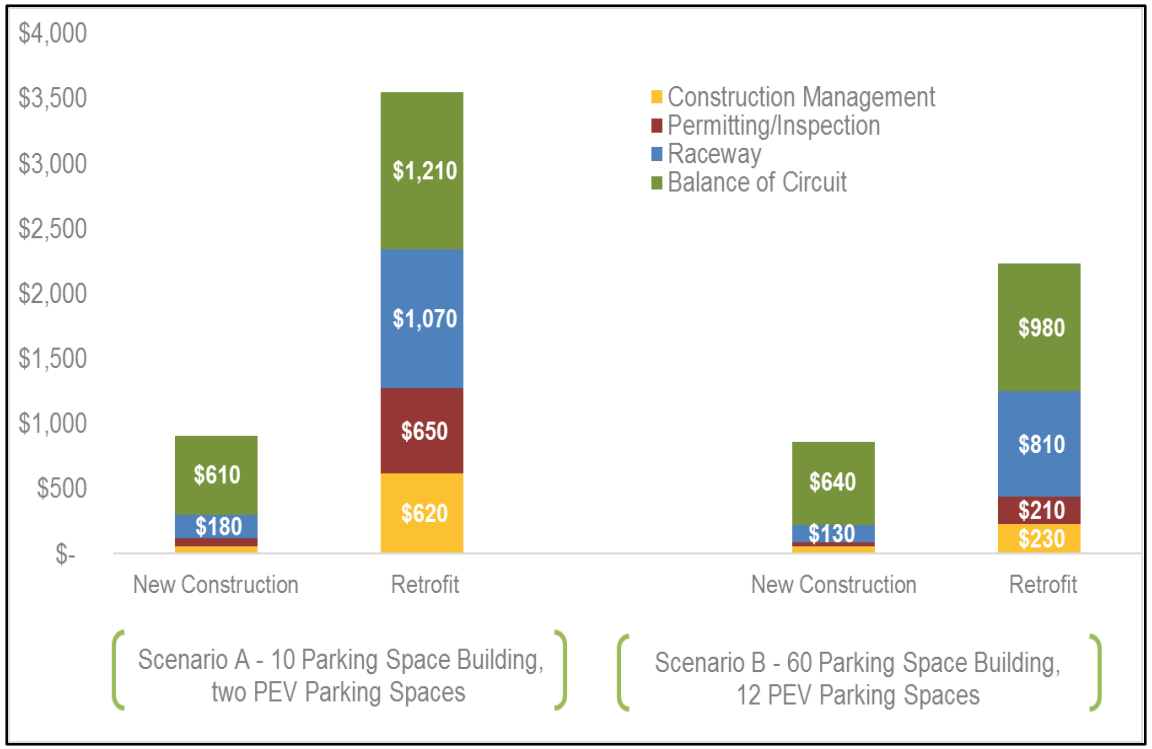
UTILITY PROPOSALS

Utility proposals representing an investment of more than $1 billion are approved or pending in states across the country.

THE BENEFITS OF UTILITY INVESTMENT

- Electric vehicles are a new source of needed load
- Properly managed EV charging will facilitate integration of renewable sources of energy and achieve grid operational efficiencies
- Puts downward pressure on electricity rates for all ratepayers

EV-READY BUILDING CODE STANDARDS



Relative Cost per PEV Charging Space of PEV Charging Infrastructure in New Construction vs. Retrofits (2016 dollars)

Source: *Plug-In Electric Vehicle Infrastructure Cost-Effectiveness Report for San Francisco*, November 17, 2016, accessible at http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf

Electric Cars 101: The Answers to all your EV Questions

Plugging in to the reality of EVs

Consumer Reports
March 29, 2017

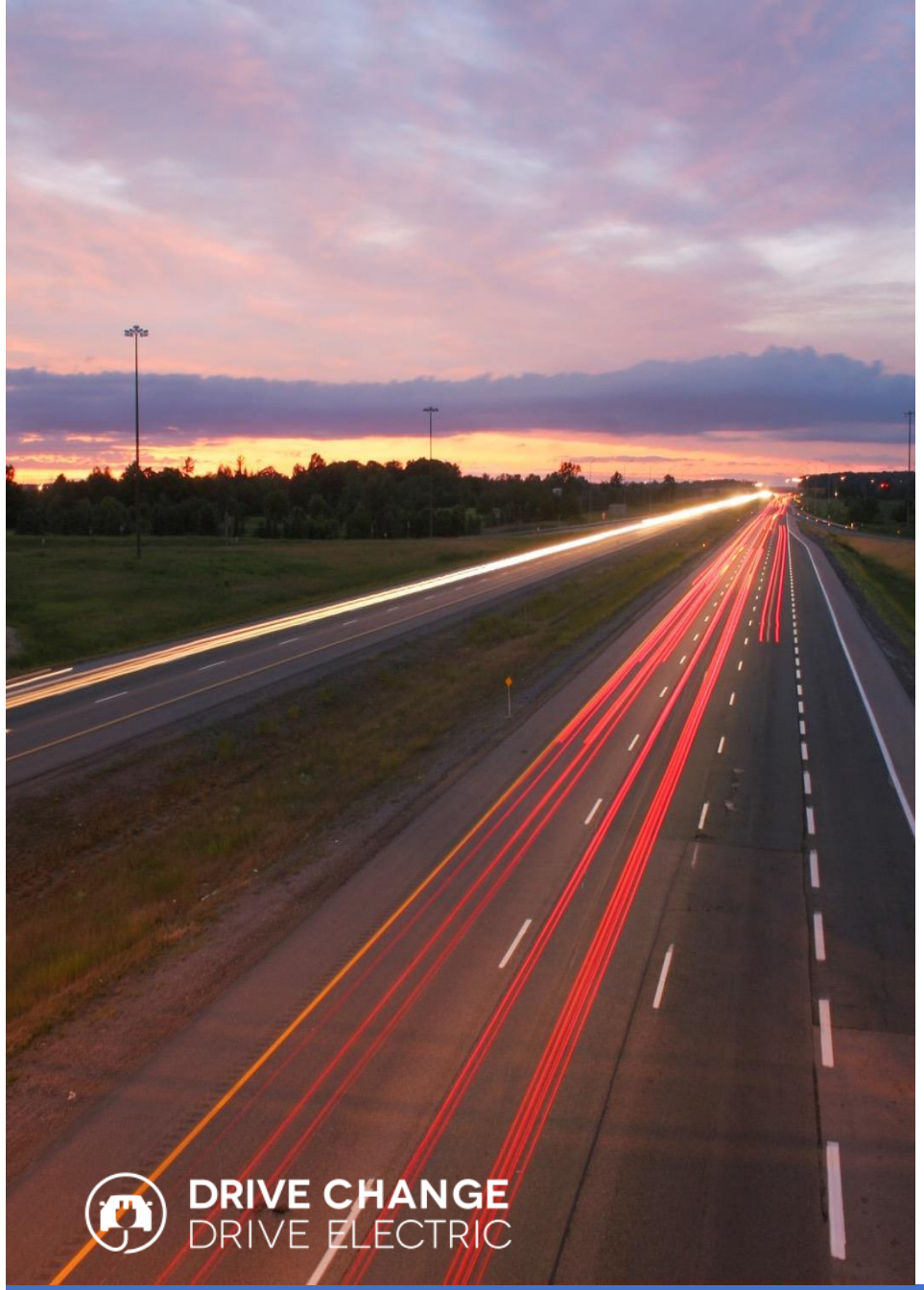
Less than half of Americans are able to name a specific EV model and make

Two-thirds of consumers surveyed in 21 U.S. cities had basic misunderstandings about the characteristics of EVs

Less than 35% of California households were aware of EV purchase incentives

Source: International Council on Clean Transportation, *Literature Review of Electric Vehicle Consumer Awareness and Outreach Activities*, March 21, 2017.

NESCAUM



DRIVE CHANGE.
DRIVE ELECTRIC.

- A joint state/industry funded brand-neutral multi-media educational campaign focused on the Northeast
- Launched in 2018
- Three target audiences
- Working to attract new funding partners

GOVERNMENT LEAD-BY-EXAMPLE INITIATIVES

ELECTRIFY PUBLIC SECTOR FLEETS

- Set light-duty fleet electrification targets
- Implement vehicle procurement policies that promote acquisition of EVs using a TCO analysis
- Make government EVs visible to the public using decals or special license plates
- Set targets for electrification of transit buses
- Provide workplace charging for government employees
- Develop award/recognition programs for leading agencies and private sector businesses

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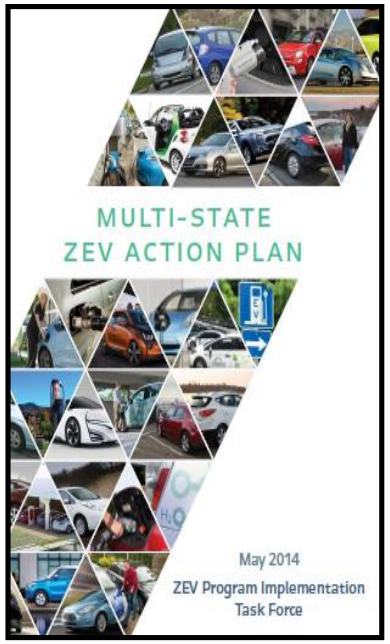

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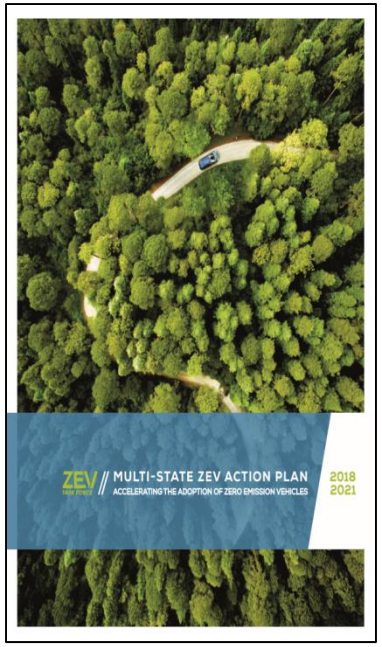
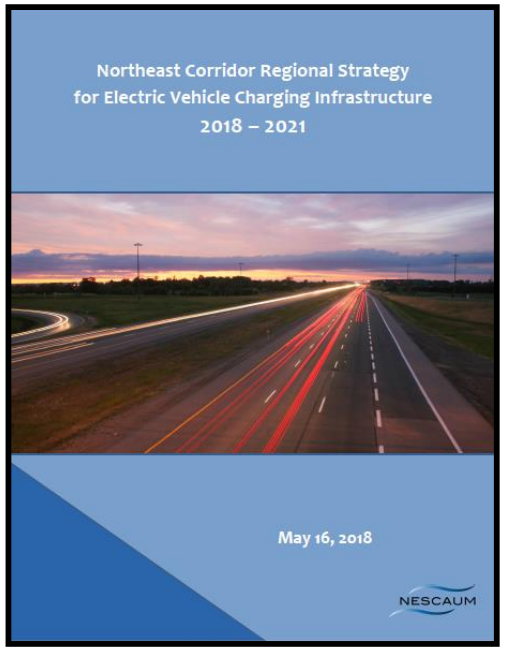


2018 Updated
ZEV Action Plan

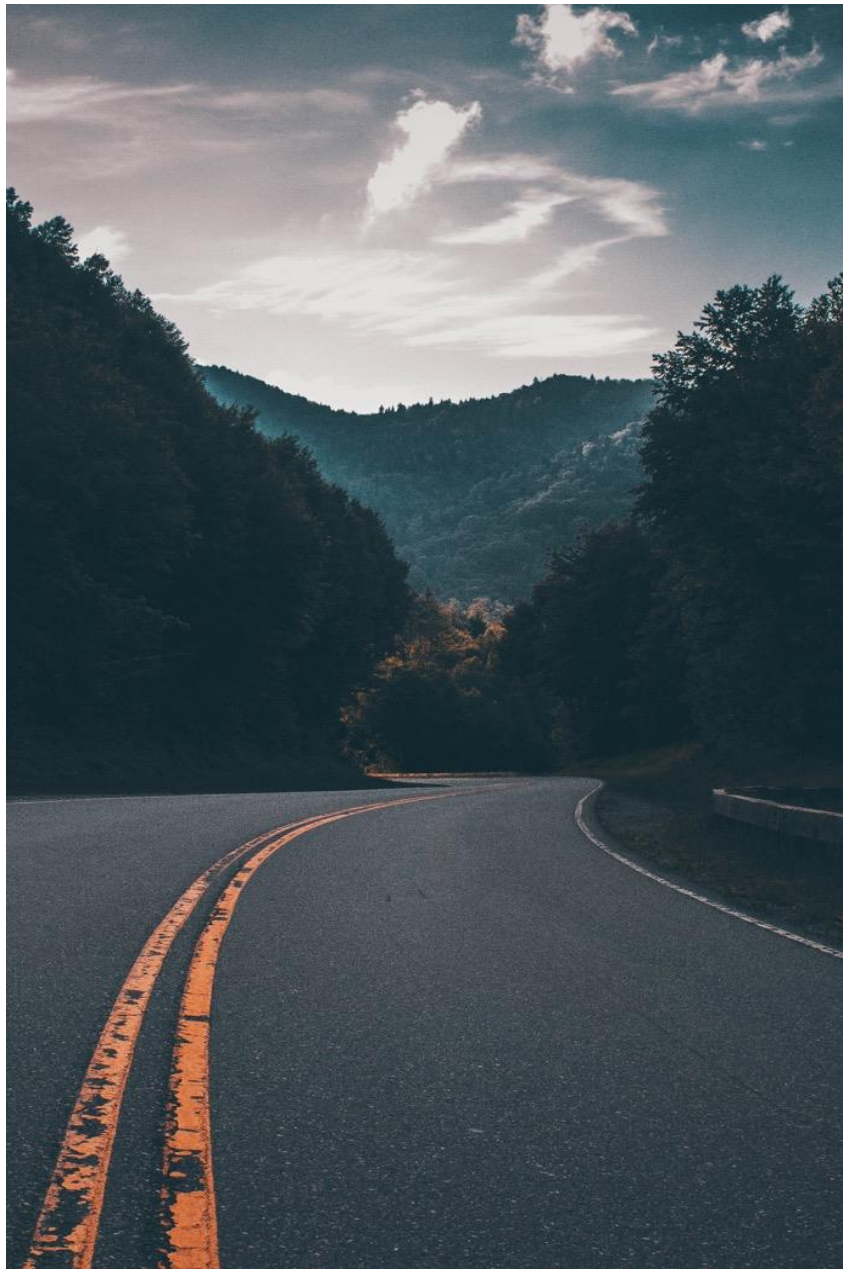


2018 Regional
Infrastructure Plan

RECAP

What State Policy Makers Can Do to Accelerate EV Adoption

- Adopt financial and non-financial incentives for vehicles and infrastructure
- Leverage state VW Appendix D funds for EVs and charging/fueling infrastructure
- Support utility investment in charging infrastructure, consumer outreach programs, and innovative pilot demonstration projects
- Invest in consumer outreach initiatives
- Adopt EV-ready building codes and MUD right-to-charge laws
- Electrify government fleets and transit buses by setting fleet and bus electrification targets and updating procurement policies
- Provide workplace charging for government employees and recognition programs for leading agencies and private sector businesses
- Collaborate with other states and local governments



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NATIONAL GOVERNORS ASSOCIATION

Bootcamp Wrap-Up

Dan Lauf, National Governors Association

#WeTheStates

Wrap-up Questions

- During this last session, state participants will be asked to answer the following three questions:

1. What did you hear over the last two days that resonated?
2. What are your top priorities and what do you hope to accomplish in your first year?
3. How can NGA support you in your role?

NATIONAL GOVERNORS ASSOCIATION

New Energy Policy Advisors Bootcamp

May 9 - 10, 2019

National Governors Association
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