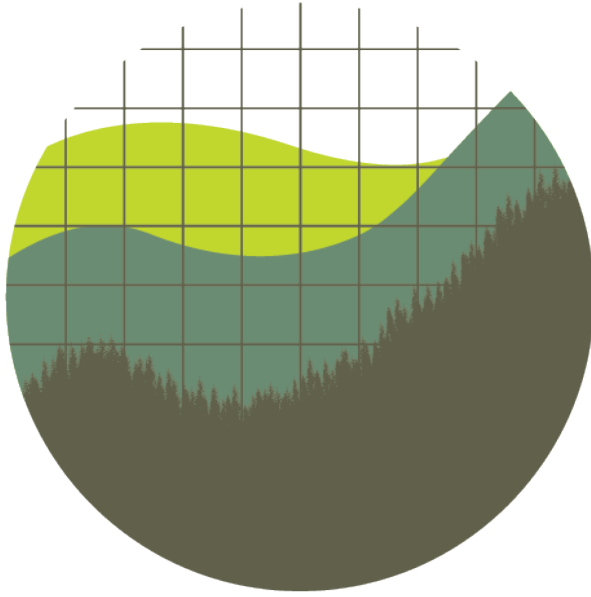


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***Green States: Energy, Climate, and a
Different Federalism***



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States Modernizing Energy Policy

INSTITUTE FOR POLICY INTEGRITY CONFERENCE

GREEN STATES: ENERGY, CLIMATE, AND A DIFFERENT FEDERALISM

“States Modernizing Energy Policy”

September 26, 2017

Lorraine H. Akiba, Commissioner
Hawaii Public Utilities Commission

September 26, 2017





State Commissions at the Forefront of Change

- Hawaii PUC issues orders in major dockets to outline the strategic road map for Hawaii's utilities of the future and provide directives to achieve the integrated grid of the future. Addresses DERs, community renewables, TOU and DR rates with energy storage options
- NY PSC initiates the NY REV proceeding to establish a market based energy system with utilities in new roles as distributed system platform providers to connect customers to distributed energy resource providers
- CPUC issues orders in major dockets to address NEM, TOU rates, and energy storage. Providing the impetus to create a competitive market for energy storage development to drive technology innovation and lower costs

- Minnesota PUC establishes the valuation of solar tariff and community solar programs to address the cost benefits of integrating distributed energy resources onto the grid
- Colorado PUC and Maine PUC address the regulatory framework for developing and encouraging community solar programs in their jurisdictions
- Illinois PUC issues orders regarding grid modernization and smart grid technology tools for the integrated grid of the future
- Ohio PUC issues orders and initiates regulatory proceedings to review technology and regulatory innovations regarding grid modernization

Hawaii Electric Systems –

4 Electric Utilities; 6 Separate Grids; % Renewable

Kaua'i Island Utility Cooperative

System Peak: 78 MW

52.6 MW PV / 7 MW Biomass / 9 MW Hydro
(+6.6 MW PV Under Review)

Installed PV: 67% of System Peak

Kaua'i

17%

O'ahu

15%

Hawaiian Electric

System Peak: 1,206 MW

329 MW PV / 99 MW Wind 69 MW WTE

(+138.5 MW PV & Wind
Approved to Install / +88.5
MW PV Under Review)

**Installed PV & Wind:
35% of System Peak**

Moloka'i

Lana'i

Maui

34%

Maui Electric

Maui System Peak: 202 MW

74 MW PV / 72 MW Wind

(+40 MW PV Approved or Under
Review)

**Installed PV & Wind:
72% of Sys. Peak**

Lana'i System Peak: 5.1 MW

2.53 MW PV (50% of Sys. Peak)

Moloka'i System Peak: 5.6 MW

2 MW PV (36% of Sys. Peak)

Hawai'i

47%

Hawai'i Electric Light

System Peak: 192 MW

75 MW PV / 30 MW Wind /
38 MW Geothermal / 16 MW
Hydro

(+31 MW PV Approved or
Under Review)

**Installed PV & Wind:
55% of System Peak**

% Renewable

Policy and Regulatory Reforms to Achieve Hawaii's Clean Energy Future

- Recent PUC directives and orders to Hawaii's utilities to implement new business models to become a world leading operator of a high renewable energy resource grid with affordable access for all customers
- Regulatory policies and pricing also need to reflect these new business models with new incentives to achieve Hawaii's clean energy future
- Review and revision of pricing of energy services to reflect new business and technical demands
- Recent legislation enacted into law effective July 1, 2015 adopting a renewable portfolio standard of 30% by 2020, 70% by 2040, and 100% by 2045

Envision the Integrated Grid of the Future

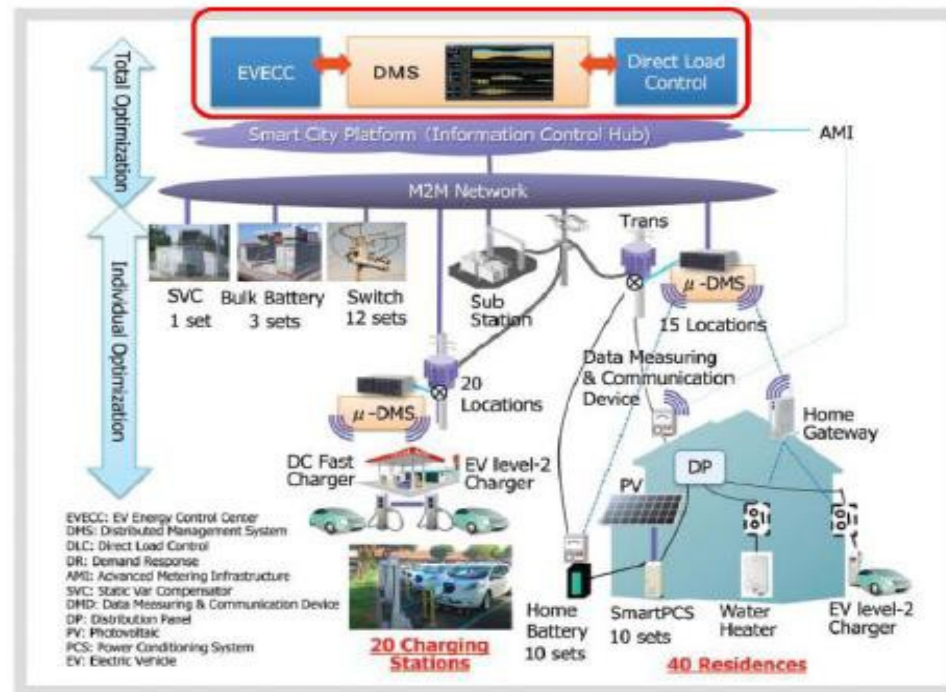
- Hawaii is the living laboratory for the integrated grid of the future to achieve the 100% renewable energy portfolio standard
- Implementing new programs like community renewables to give all customers access to renewable energy
- Implementing real time DER actions and combining the tools of both traditional central plant utility scale and decentralized distribution generation models

THE INTEGRATED ENERGY NETWORK





Overall View of System Configuration



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Hawaii Battery Energy Storage System (BESS) Projects; RFPs

Title	MW	MWh	Date
Kauai Island Utility Cooperative Koloa BESS	1.5	1	2011
Kauai Island Utility Cooperative Port Allen BESS	3	2	2012
Lanai La Ola Solar ... for 1.2 MW PV (solar) on 5 MW grid	1.125	0.5	2011
Kaheawa Wind I ... 1 st (30 MW) wind on 200 MW grid	1.5	1	2009
Auwahi Wind ... 2 nd (22 MW) wind on 200 MW grid	11	4.4	2012
Kaheawa Wind II ... 3 rd (22 MW) wind on 200 MW grid	10	20	2012
Maui Electric / USDOE Smart Grid BESS ... Wailea	1	1	2013
Hawi Substation ... for high wind penetration circuit	1	0.25	2012
HELCO Battery Energy Storage System ... utility owned	(2) 0.1	(2) 0.25	2012
KIUC Anahola Solar – for 12 MW PV	4.62	12	2015
KIUC / Solar City PPA – for dispatchable utility PV and storage for evening peak, 5 pm to 10 pm	13	52	2016
KIUC / AES Lawai Solar	28	20	2017
KIUC Energy Storage RFP ... pumped storage hydro	25		2019
HECO Campbell Industrial Park	1		2016
HECO / USDOE Sunshot SHINES Program – 20 commercial & industrial customer projects for onsite PV, energy storage at high PV penetration circuits and storage integration; \$2.4M award			2016-17

Distributed Energy Resources

- Distributed energy resources (DER) include distributed generation (DG), energy storage, demand response and energy efficiency
- Overview of the major developments in DER from rooftop PV and net metering to community solar and virtual net metering
- Distribution technology developments enable customer sided and customer sited grid support services
- DERs can be tools for increasing customer engagement and accessibility to affordable clean energy and energy management services

Customer Choice and Empowerment

- Key policy directive to involve the most important stakeholder - the customer
- Customers are active partners in the transformation of the utilities of the future
- Customer side and customer sited technologies including distributed generation, distributed energy storage systems and EVs support the grid of the future
- “Integrated energy districts” or microgrids directly assist in integration of more cost effective renewable energy onto the grid with DER while providing resiliency and reliability benefits
- Utilities of the future provide value to customers through offering energy management services vs. sales of kwh

PUC Orders Address DER Interconnection and New Customer Options

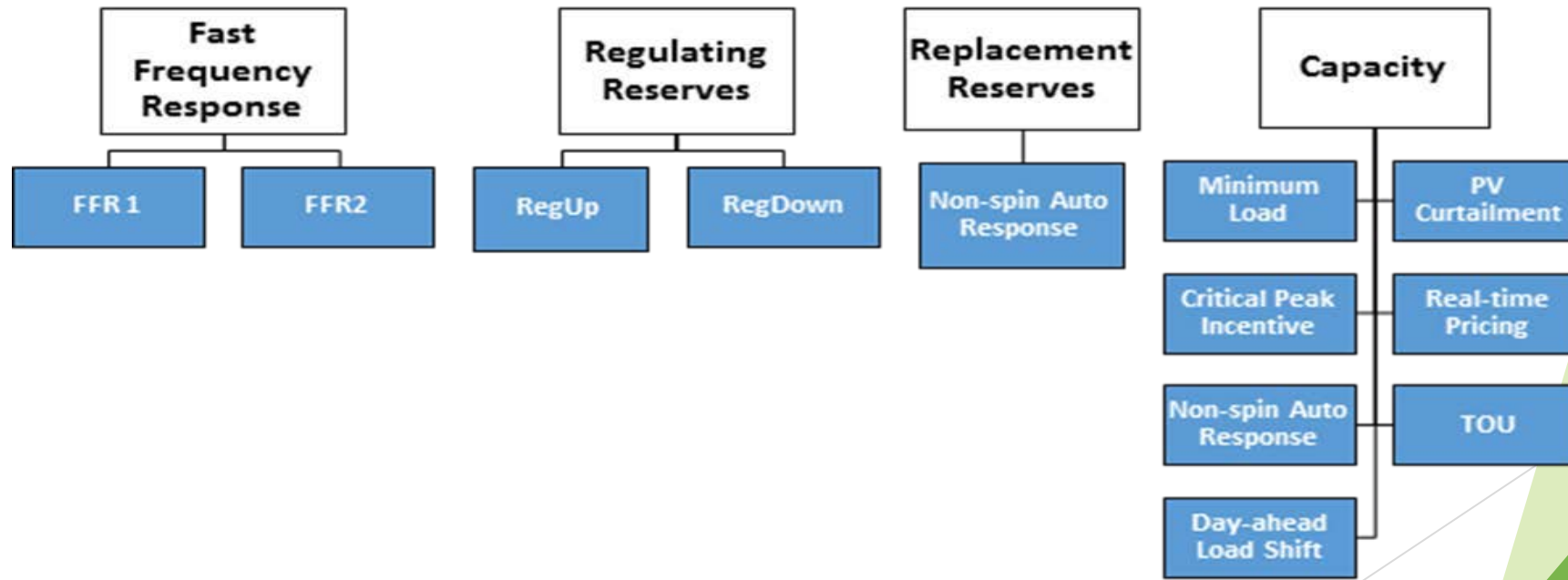
- Interconnection of Energy Storage Systems (Docket No. 2014-0130)
 - Storage systems will be reviewed for safety and reliability
 - Resolution of further technical issues moved to DER docket
- Distributed Energy Resources Policy Docket (Docket No. 2014-0192)
 - Established to investigate technical, economic, and policy issues
 - Opening order highlighted 3 key objectives:
 - 1) Clear interconnection backlog
 - 2) Enable DER market growth
 - 3) Create new DER market choices
- Included Staff Paper and Proposal
- Continues work started by stakeholders in the Reliability Standards Working Group (RSWG)

- October 2015 order approves two new rooftop PV programs for HECO customers to facilitate transition to long term technical and policy solutions that support continued distributed energy resources on the grid
- Customers given more choices and opportunities to utilize new energy storage technology on the customer side of the meter
- Grid supply option with bill credit at fixed rates based on wholesale rates for PV at approximately 15 cents per kwh on Oahu and Big Island, 17 cents per kwh on Maui, 24 cents per kwh on Molokai and 28 cents per kwh on Lanai.
- Self supply option designed for customers with rooftop PV systems and energy storage; expedited review and approval for interconnection
- KIUC customers already on similar schedule Q rates for NEM

Demand Response - Docket No. 2015-0412

- The HECO Companies have filed first set of comprehensive DR Portfolio Plans
- Core efforts include:
 - (a) identify system response requirements;
 - (b) define grid service needs in technology-neutral terms;
 - (c) model costs of requisite ancillary services (avoided cost basis);
 - (d) determine DR potential to meet said ancillary services
- HECO identified 4 broad ancillary service tariff categories : Fast Frequency Response; Regulating Reserves; Replacement Reserves; and Capacity.

- Under each of these tariffs, more granular service riders can be included:
- FFR1 and FFR2
- RegUp/RegDown
- Non-spin Auto Response
- Capacity services including time-of-use and PV curtailment



Community-based Renewable Energy (CBRE)

- Order 34388 and CBRE Program Framework issued on February 10, 2017, in Docket No. 2015-0389 identified key components and parameters of successful CBRE program and tariff
- Flexible structure to allow for business model innovation (any party can own and operate CBRE facility)
- Time-differentiated credit rates across three time periods:
 - Mid-day (9am to 5pm)
 - On Peak (5pm to 10pm)
 - Off Peak (10pm to 9am)
- Competitive procurement examined (reverse auction)

Community-based Renewable Energy (CBRE)

- Potential to include community storage paired with solar
- Focus on access and participation by underserved customers including renters, multi-family unit dwellers, and LMI

Key Factors to Address

- Cost sensitivity and access to financing
- Home ownership status and other physical barriers, i.e., apartments and multi-family unit dwellings
- Market forces
- Community engagement

Guiding Principles for Policies

- Accessibility and affordability
- Community involvement and engagement
- Consumer protection
- Sustainability and flexibility
- Integration into and compatibility with existing programs

Future Trends and Actions Transforming the Energy Industry

- Advances in technology lead to consumerization of energy and new wave of utility customer engagement solutions
- Advanced usage of data analytics for energy management services and operations of the grid
- With the internet of things (“IoT”), utilities become energy management service providers to customers and fill the role of advisor and facilitator of all things energy
- Utilities assume dynamic roles as conductors of the complex orchestra that makes up the integrated grid
- Energy is becoming more local. Community and utility engagement with community renewables, integrated energy districts, EE and DR

Roles of Digital Utilities of the Future

- The digital economy is being driven by technology developments including open cloud interoperable software platforms and grid control technology
- Big data analytics and technology tools allow for real time visualization and operation to help integrate more intermittent renewable energy resources and DER onto the grid
- We are moving from the digital economy to the virtual economy with development and usage of AI (artificial intelligence), sensors and machine to machine learning tools
- Blockchain technology and transactive energy transformation
- Utilities will need to leverage and facilitate usage of information and communications technologies across energy, water and transportation sectors



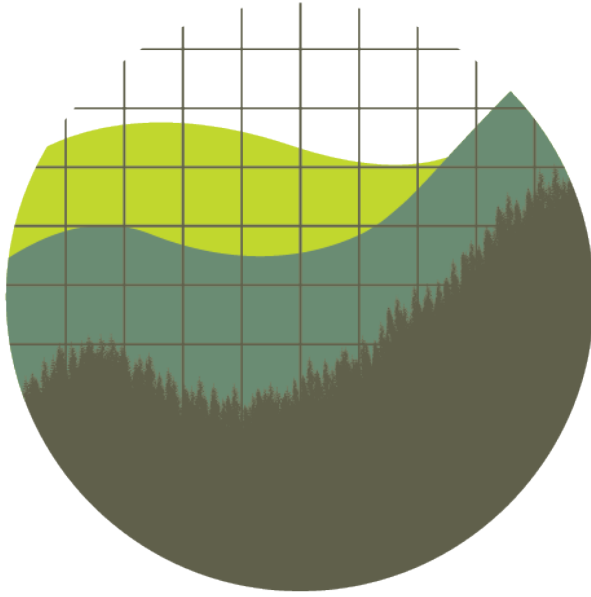
Mahalo!

For any questions, please
contact:

Lorraine.H.Akiba@hawaii.gov
(808) 586-2020

Lorraine H. Akiba, Commissioner
Hawaii Public Utilities Commission





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States Modernizing Energy Policy

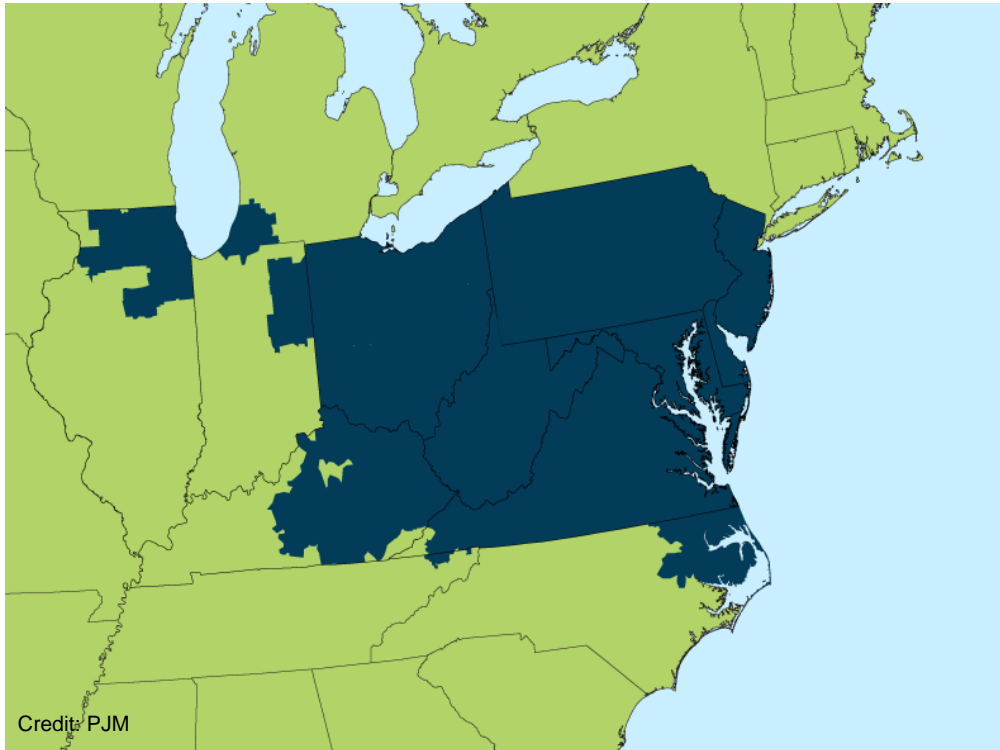
Modernizing Ohio's Energy Landscape

September 26, 2017

Asim Z. Haque, Chairman

Public Utilities Commission of Ohio

Wholesale Market



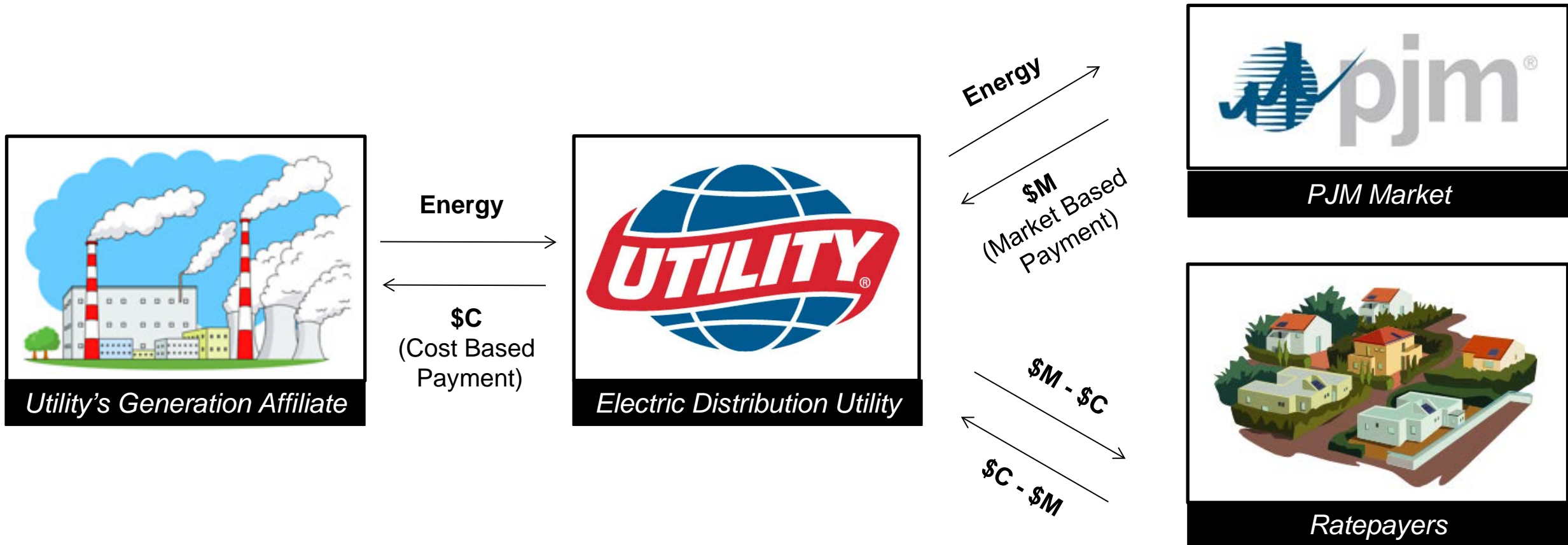
- ❖ Ohio is a member of PJM - a regional transmission organization that coordinates the movement of wholesale electricity across 13 states.
- ❖ PJM serves more than 65 million customers with its 176,569 MW of generating capacity.
- ❖ PJM's Role:
 - Continuously monitor the grid to balance the supply and demand of electricity
 - Administer competitive wholesale markets
 - Conduct long-range planning to identify any improvements needed to ensure reliability in its territory

Customer Choice

American Electric Power : Residential										
Search	Click to Compare	Supplier	\$/KWh	Rate Type	Renew. Content	Intro. Price	Term. Length	Early Term. Fee	Monthly Fee	Promo. Offers
109 RECORDS FOUND <input checked="" type="radio"/> American Electric Power My Current Rate (Optional) <input type="text"/> Price per kWh: From \$ <input type="text"/> to \$ <input type="text"/> Term Length (months): From <input type="text"/> to <input type="text"/> Early Termination Fee: From \$ <input type="text"/> to \$ <input type="text"/> Monthly Fee From \$ <input type="text"/> to \$ <input type="text"/> Renewable Content All <input type="text"/> Rate Type All <input type="text"/> Electric Supplier Listing All <input type="text"/> FILTER RESULTS	<input type="checkbox"/>	Just Energy PO Box 2210 Buffalo, NY 14240-2210 (877) 669-1027 Company Url Offer Details Terms of Service Sign Up	0.0729	Fixed	0%	No	36 mo.	\$50 details	\$0	Yes details
	<input type="checkbox"/>	Agera Energy, LLC 555 Pleasantville Rd, Ste 107-S Briarcliff Manor, NY 10510 (844) 692-4372 Company Url Offer Details Terms of Service Sign Up	0.0763	Variable	0%	No	12 mo.	\$100 details	\$0	No
	<input type="checkbox"/>	Nordic Energy Services LLC 1 Tower Lane Suite 300 Oakbrook Terrace, IL 60181 (630) 321-0888 Company Url Offer Details Terms of Service Sign Up	0.0350	Variable	0%	Yes 1 mo. details	1 mo.	\$0	\$0	No
	<input type="checkbox"/>	FirstEnergy Solutions Corp 341 White Pond Dr Akron, OH 44320 (888) 254-6359 Company Url Offer Details	0.0595	Fixed	0%	No	24 mo.	\$50	\$0	No

- ❖ Ohio is a restructured state, which means customers have the ability to select their electricity supplier.
- ❖ Today, competitive retail suppliers provide almost 80% of the electricity supplied to Ohioans.
- ❖ Customers that do not select a supplier are provided supply through a competitive bidding process administered by their distribution utilities.

State/Federal Conflict



Evolving Generation Mix



WIND

503 MW in operational
1,232MW certified



NATURAL GAS

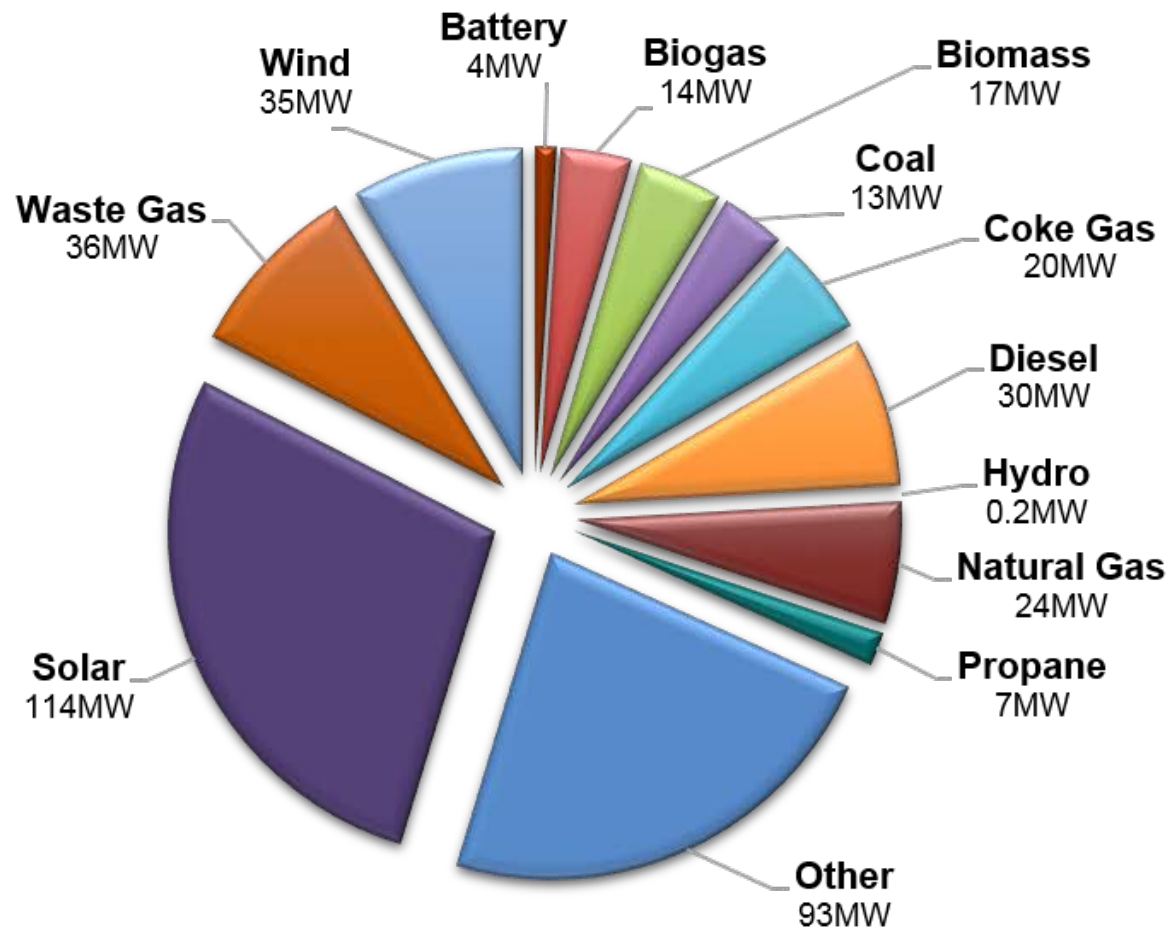
2,881 MW under construction
1,105 MW certified
4,030MW under review



SOLAR

153 MW operational
400 MW under review

Distributed Generation in Ohio



**TOTAL DISTRIBUTED
GENERATION CAPACITY
IN OHIO'S UTILITIES'
TERRITORIES:**

407MW

PowerForward



Public Utilities
Commission

The PUCO's review of the latest in technological and regulatory innovation that could serve to enhance the customer electricity experience.

Power**Forward**

Technology &
Regulation

Enhance Customer
Experience

Collaborative Process

Phase One: April 2017

A Glimpse at the Future

Phase Two: July 2017

*Exploring
Technologies*

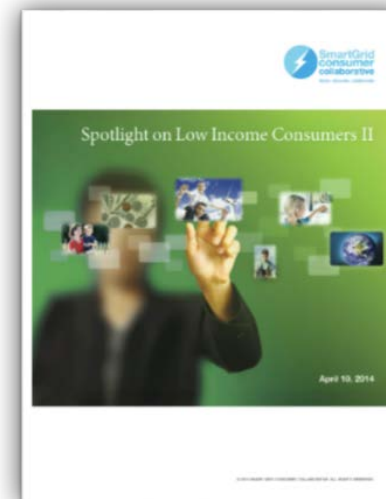
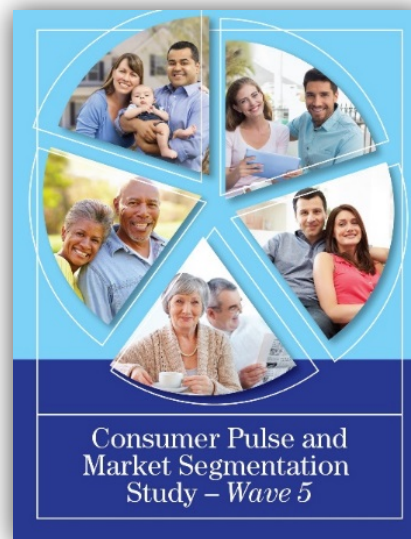
Phase Three: 1Q 2018

*Ratemaking
and
Regulation*

A Glimpse of the Future – What We Learned

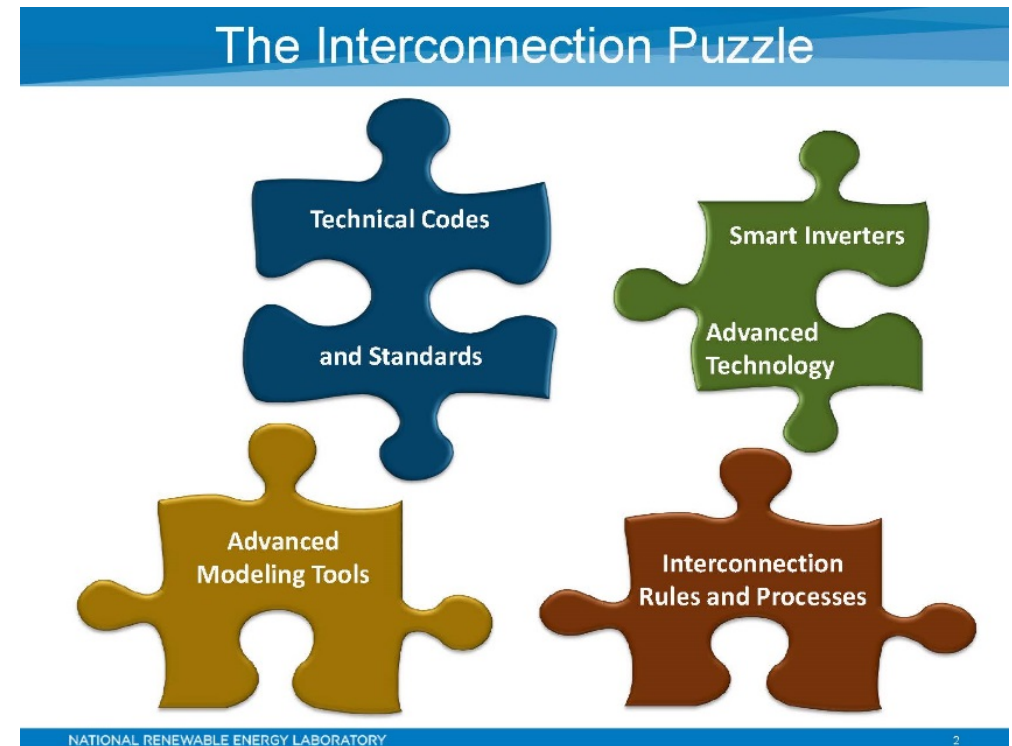
- ❖ Consumers' happiness with their utilities is low as compared to other consumer facing industries.
- ❖ Consumers want more from their utilities, as they are receiving more from other consumer facing industries.
- ❖ Consumers want more options and control.
- ❖ Consumer demographics are changing rapidly.
- ❖ Amazing technology exists to better the lives of consumers.
- ❖ Ohio is behind in allowing for this technology to be deployed to consumers.
- ❖ Utilities are going to advance in this space and push their desired outcomes regardless of PowerForward.

Recent Foundational Research



Exploring Technologies – What We Learned

- ❖ Grid Platform/Architecture
- ❖ Integration and Interoperability
 - IT/OT convergence
 - Communications requirements
 - Standards development
- ❖ Enabling Technologies
 - Data Management Systems (DMS)
 - Distribution Automation (DA)
 - Volt-VAR Optimization (VVO)
- ❖ Distributed Energy Resources (DERs)
- ❖ Examples of Modern Grid Applications



Stay Up To Date

Email

The screenshot shows the Ohio Public Utilities Commission website. The header includes the Ohio logo and navigation links for State Agencies and Online Services. A search bar and social media icons are also present. The main content area features the 'PowerForward' logo and a description of the initiative. A 'Latest news' section lists recent updates. At the bottom left, an email sign-up form is highlighted with a blue oval. The form includes a red envelope icon, the text 'Email updates', a text input field labeled 'Email Address', and a 'Submit' button.

Ohio | Public Utilities Commission

State Agencies | Online Services

Search

ABOUT ELECTRIC NATURAL GAS TELEPHONE WATER RAILROAD MOTOR CARRIER CONTACT US

PowerForward

PowerForward

Ohio | Public Utilities Commission

PowerForward is the PUCO's review of the latest in technological and regulatory innovation that could serve to enhance the consumer electricity experience. Through this series, we intend to chart a clear path forward for future grid modernization projects, innovative regulations and forward-thinking policies.

Read More

Latest news

April 26, 2017
PUCO accepts results of DP&L auction

April 20, 2017
PUCO highlights the benefits of energy efficiency and conservation

April 12, 2017
PUCO accepts results of DP&L auction

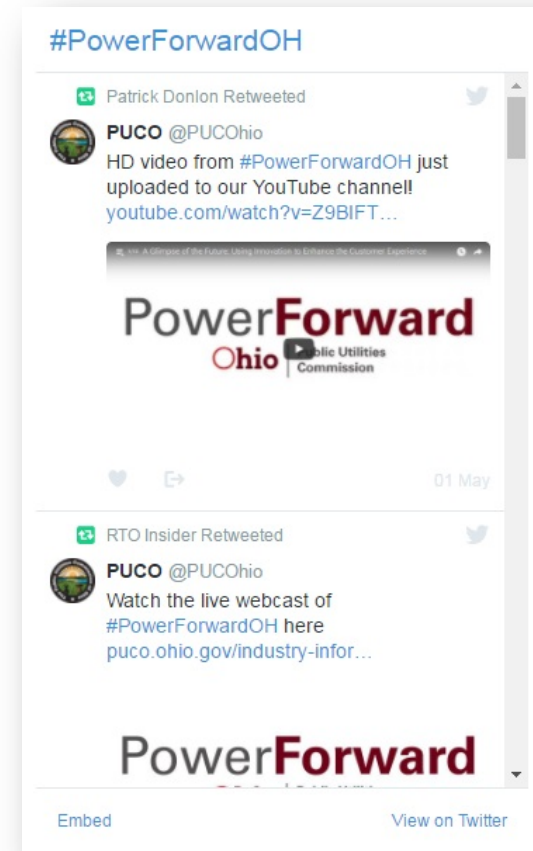
Media Room and more news

Email updates

Email Address

Submit

Social Media



Watch

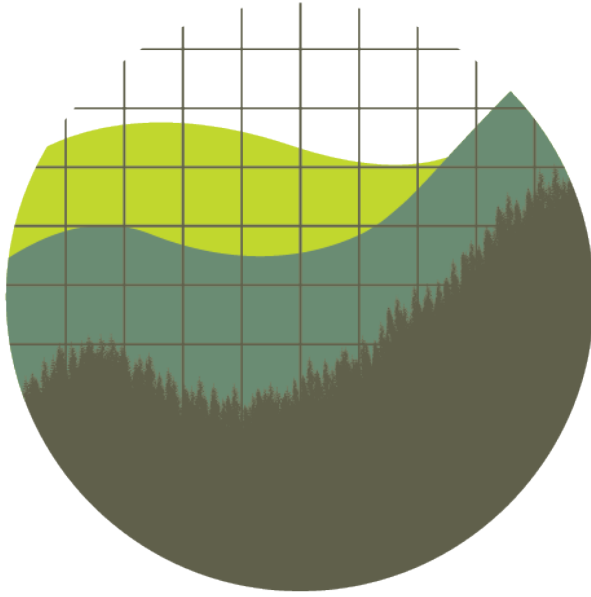


Thank you!

Public Utilities Commission of Ohio

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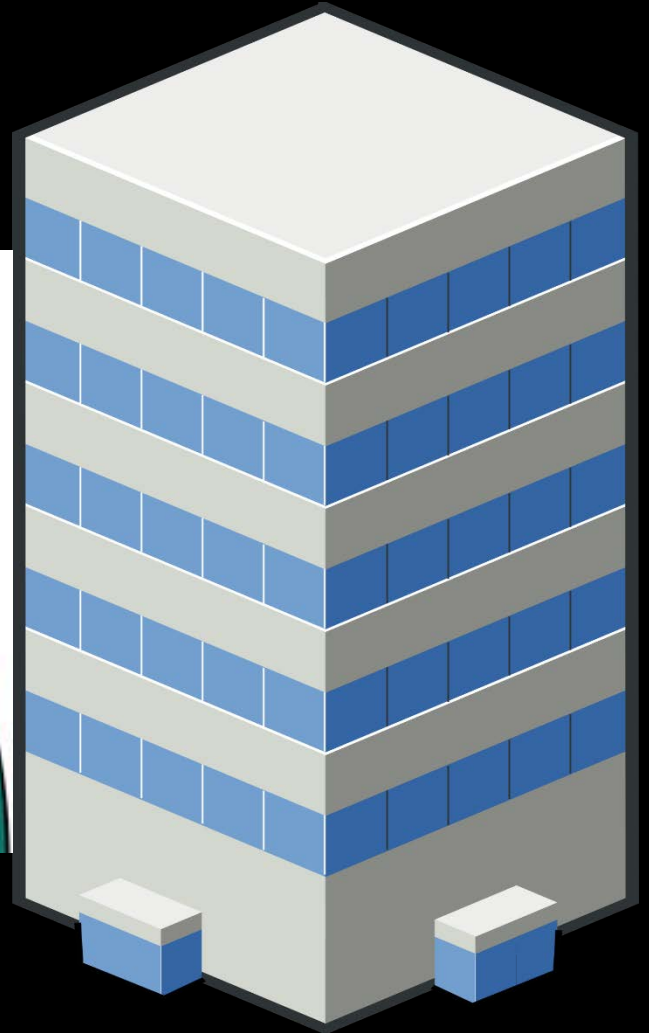


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EVOLVING ENERGY POLICY IN
MINNESOTA

Dan Lipschultz, Commissioner
Minnesota Public Utilities Commission
September 26, 2017

TRADITIONAL VERTICALLY INTEGRATED MODEL



REGULATORY FRAMEWORK

Resource Selection Proceedings

- Least Cost Principle
- Renewable Standards
- Renewable Preference
- Env. Externalities
 - (Updated 2017)

Rate Proceedings

- Prudence Review
- ROE Determination
 - Fair & reasonable
- Rate Design
- Riders
 - Renewable projects

Efficiency Program (CIP)

- Energy Savings Goals
- Utility Incentive
 - Retain 10% net savings

WHERE ARE WE AND WHERE ARE WE HEADED?

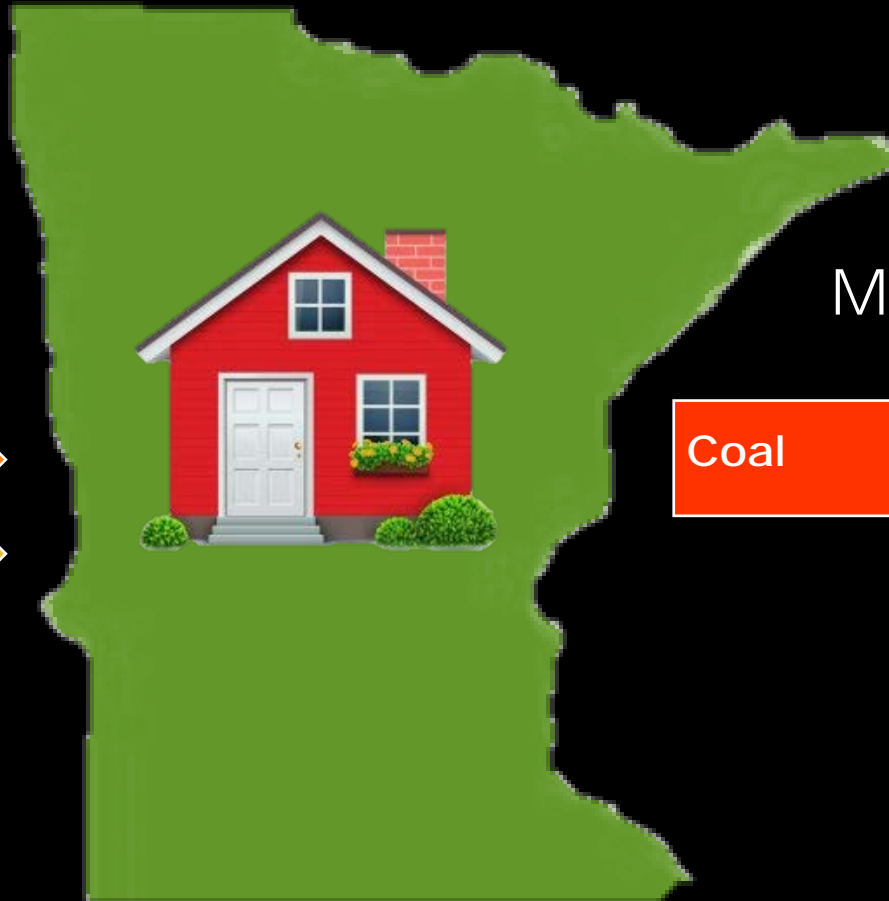
Moving In

Renewables

Energy Efficiency

Gas

DER

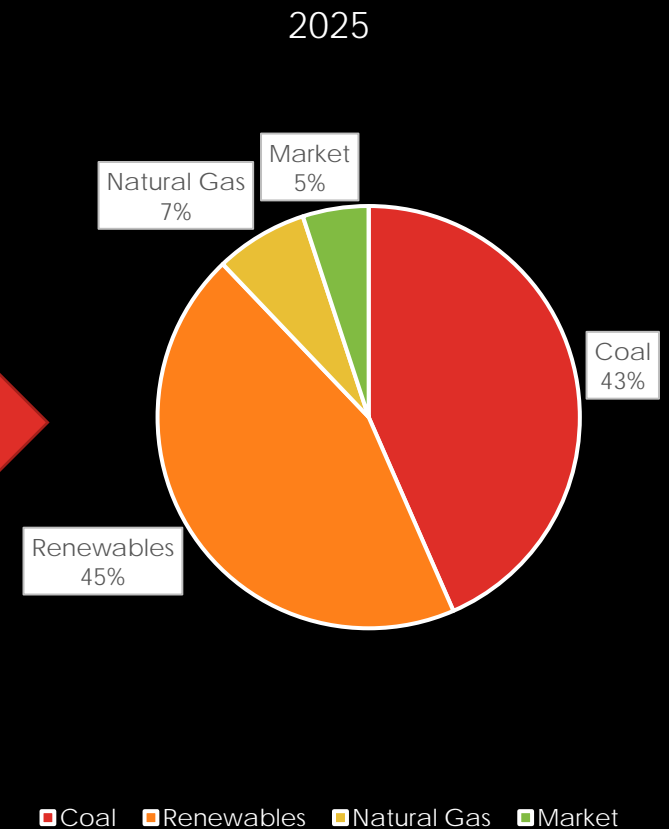
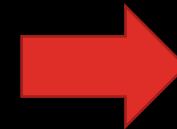
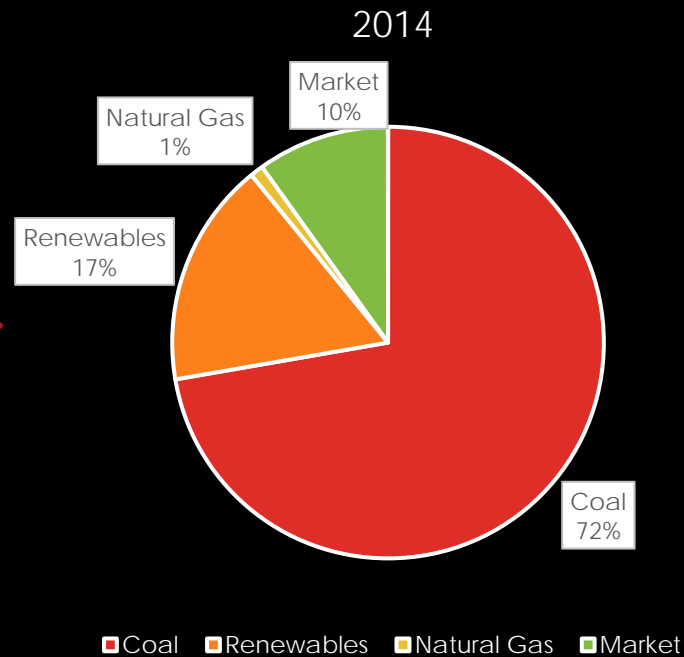
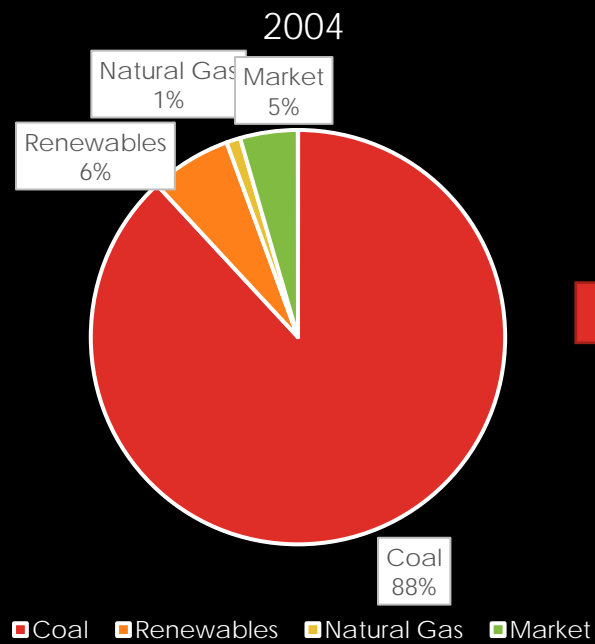


Moving Out

Coal

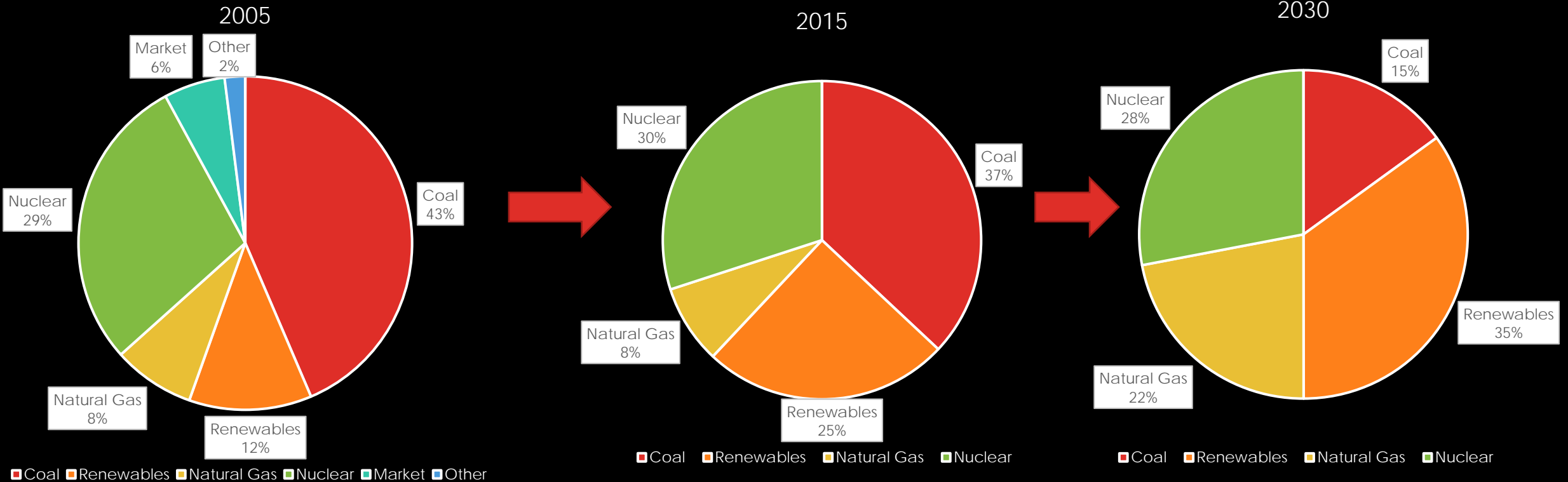
MINNESOTA POWER: COAL 88% → 72% → 43%

RENEWABLES 6% → 17% → 45%



XCEL ENERGY:

COAL: 43% → 37% → 15%
RENEWABLE: 12% → 25% → 35%



OTTER TAIL – THE SMALL RURAL IOU

- Trend



- Wind: The new baseload

- Retire 140 MW coal plan
- Replace with 200 MW wind, 30 MW solar & 250 MW gas peaker



CONSERVATION/CARBON REDUCTION

CONSERVATION – Saved 99,000 gigawatt hours/last 20 years

- Avoided equivalent of 10 Prairie Island Nuclear plants

CARBON REDUCTION – Down 20%

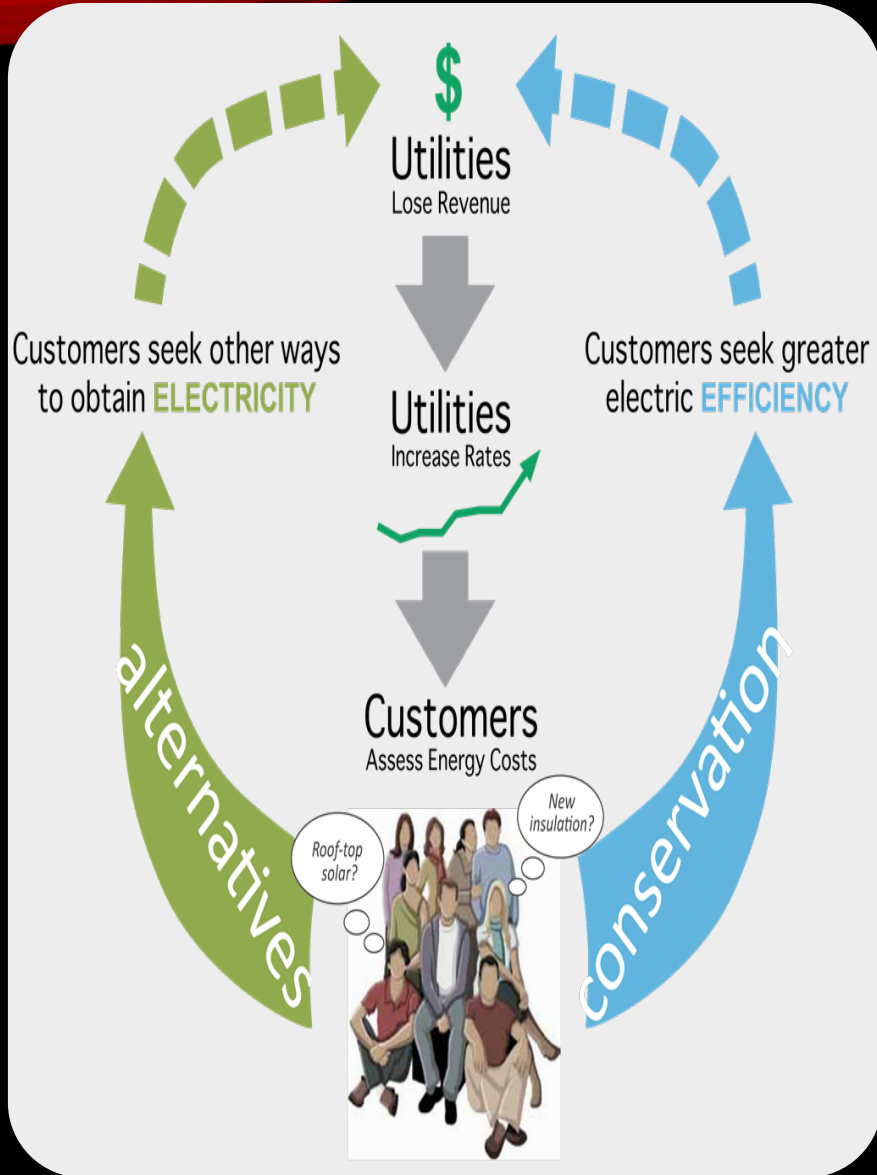
- Utility sector carbon declined approximately 20% since 2005

RATES AND RELIABILITY

	Minnesota	National Average
Price Rates Bills	Price 9.52c/kWh \$97/month	Price 10.44c/kWh \$114 /month
Reliability (SAIDI/SAIFI) Outage minutes Outage frequency	Reliability 91 outage mins (Xcel SAIDI) 0.88 interrupts/pc (Xcel SAIFI)	Reliability 111 outage mins(IEE Median) 1.1 interrupts/pc (IEE Median)
Customer Satisfaction (2015 ACSI Score)	Customer Satisfaction (ACSI Score) Xcel MN = 76	Customer Satisfaction (ACSI Score) Utilities Generally = 75 AT&T Wireline Phone = 65 Time Warner Broadband = 58 Comcast Broadband = 56

CHANGES & CHALLENGES

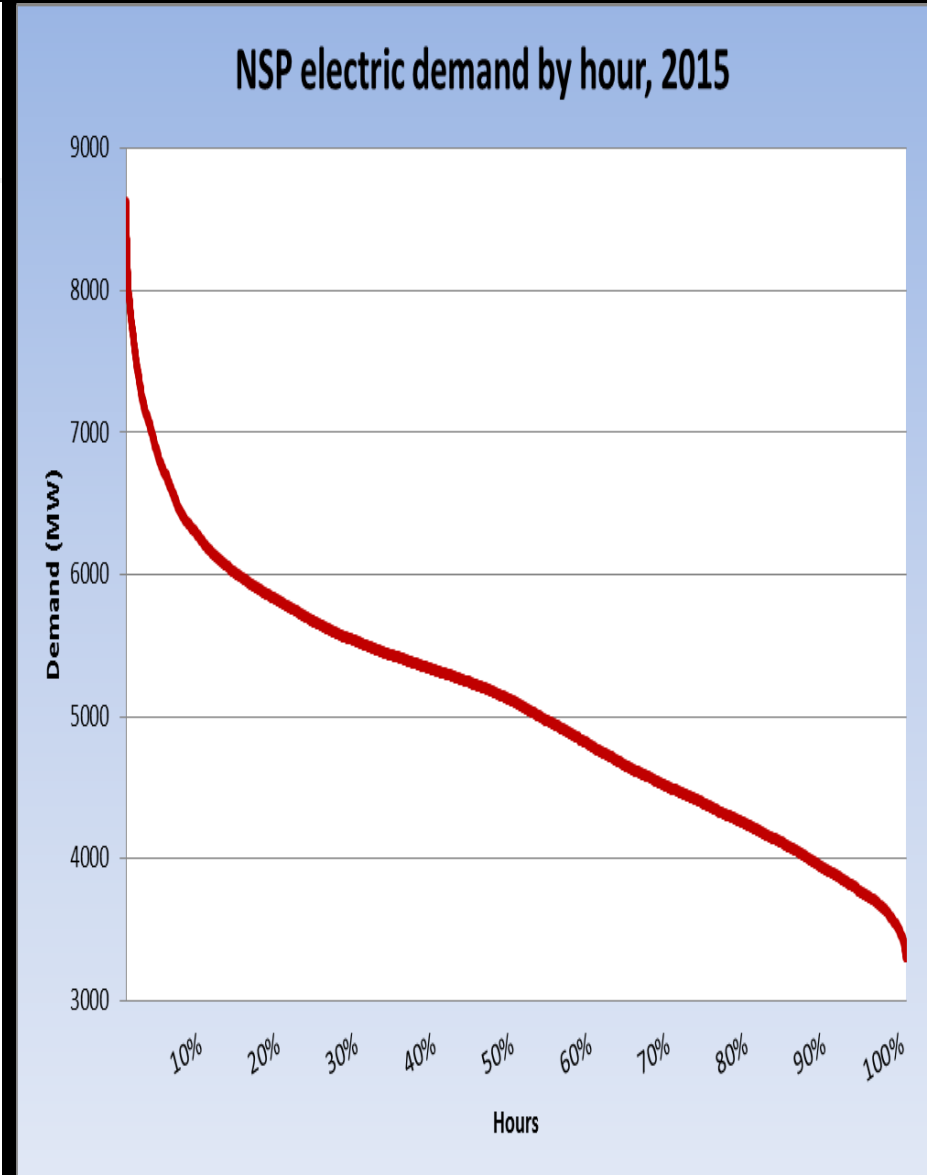
Flat Sales/QF Pwr/ECE



Slow Boil



System Inefficiency



FIRST STEP FORWARD?

Environmental Externalities (2017 Update)	CO2 per/ton	Criteria Pollutants (PM2.5) p/ton
PREVIOUS MPUC VALUES	\$0.44 – 4.64	Zero
Large Industrials	Old Values or Zero	Zero
Otter Tail & MP	\$7.88 – 18.89	No recommendation
Xcel	\$12.26 – 41.84	\$3,437 - 25,137
NEW MPUC VALUES (Commission Decision)	\$9.05 – 43.06 (time horizon & discount rate)	\$3,437 - 25,137 (regional v. national scope)
Agencies	\$12.30 – 63.56	\$26,012 – 140,102
Environmental Intervenors	\$12.30 – 126.10	\$125,000 – 218,000

WHERE WE'RE GOING FROM HERE?

Modernization

Distribution Grid

- AMI/ADMS
- Distribution System Planning

Rate Design

- TOU/Critical Peak Pricing

Performance Considerations

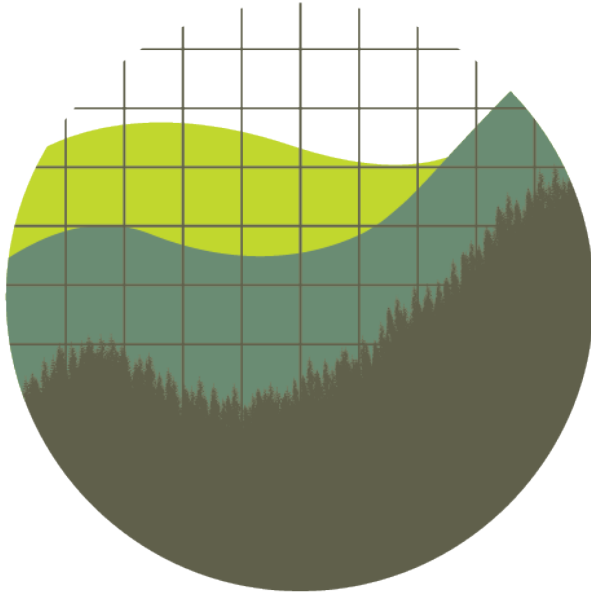
- Xcel Multi-Year Rate Case
- Metrics/Incentives

Xcel TOU/AMI PILOT

- Due November 2017

Otter Tail Rate Case ROE

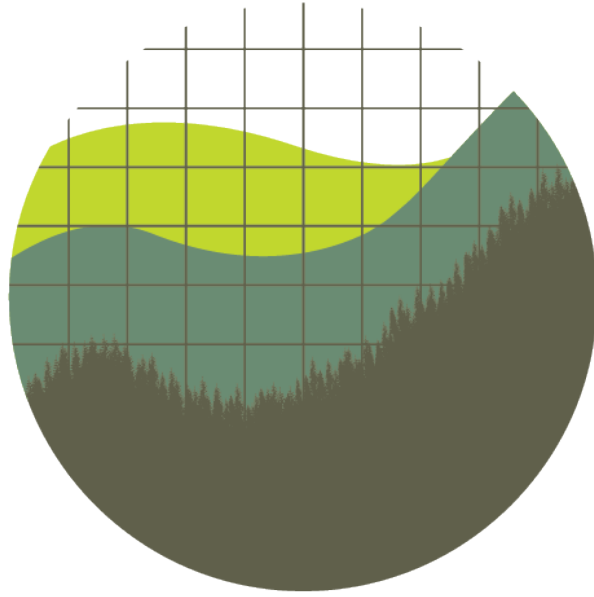




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State-Level Climate Action

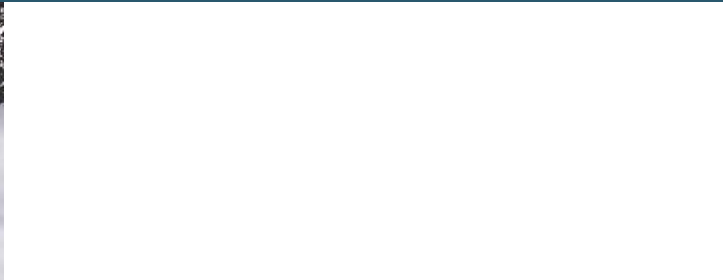
Advancing Climate Action and the Clean Energy Economy in Oregon

Lesley Jantarasami
Senior Climate Policy Analyst
Oregon Department of Energy



COMMITMENT TO CLIMATE LEADERSHIP

Oregon is committed to lead on climate and energy at every level



TRANSPORTATION & LAND USE

- Clean Fuels Program
- Zero Emissions Vehicles (ZEV)
 - Rule
 - ZEV Rebate Program
 - Charge Ahead Rebate
- Transit
- Climate-friendly Communities / Smart Growth



DECARBONIZING OREGON'S ELECTRICITY

Coal to Clean Transition

- By 2030, large investor-owned utilities can no longer sell electricity from coal-fired power plants in Oregon

Renewable Portfolio Standard

- By 2040, 50% of retail electricity sales by large investor-owned utilities in Oregon must come from qualifying renewable resources

CO₂ Standard for New Energy Facilities

- New energy facilities pay for carbon offset projects if they exceed a CO₂ emissions rate standard

FINANCE & INCENTIVES

- Loans Small-Scale Energy Loan Program
- Grants Renewable Energy Development Grant Program
- Incentives State Home Oil Weatherization Program



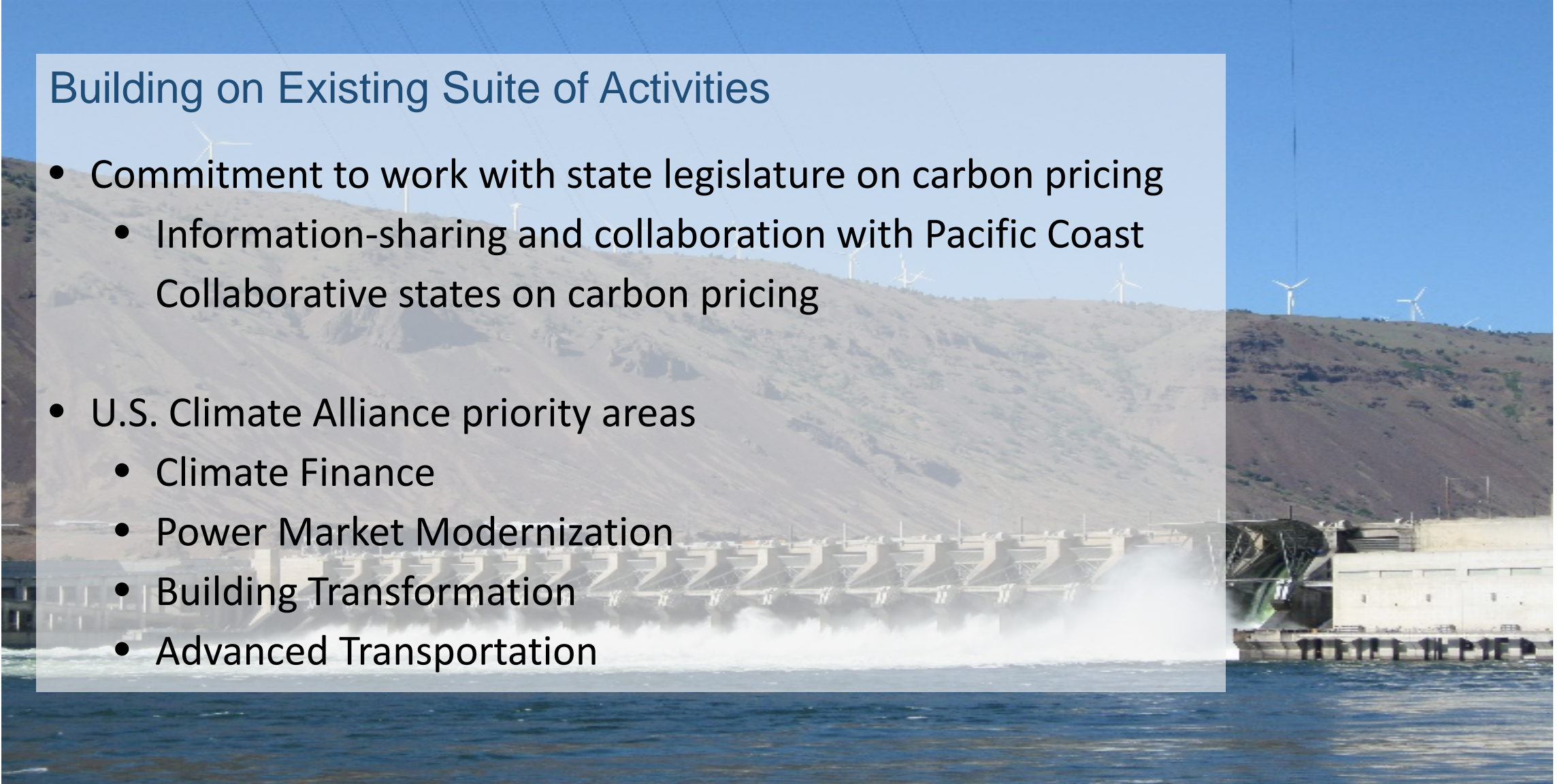
Energy Efficiency in Buildings

- State Energy Efficient Design Program
- Energy Efficient Schools Program
- Energy Performance Scoring
- 1.5% Green Energy Technology
- Building Codes

FUTURE DIRECTIONS

Building on Existing Suite of Activities

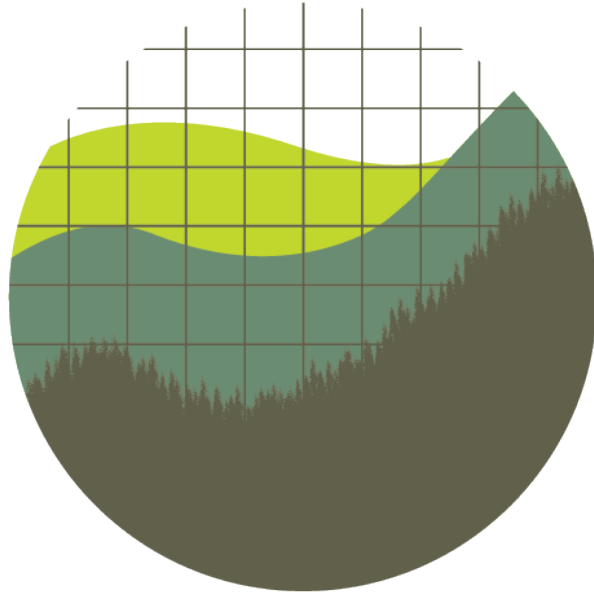
- Commitment to work with state legislature on carbon pricing
 - Information-sharing and collaboration with Pacific Coast Collaborative states on carbon pricing
- U.S. Climate Alliance priority areas
 - Climate Finance
 - Power Market Modernization
 - Building Transformation
 - Advanced Transportation



Thank You

Lesley Jantarasami
lesley.jantarasami@oregon.gov





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State-Level Climate Action

California: Reducing Greenhouse Gases Moving Forward (ever faster)

Ellen M. Peter, Chief Counsel

September 26, 2017 at NYU Institute for Public Integrity
Green States: Climate and a Different Federalism



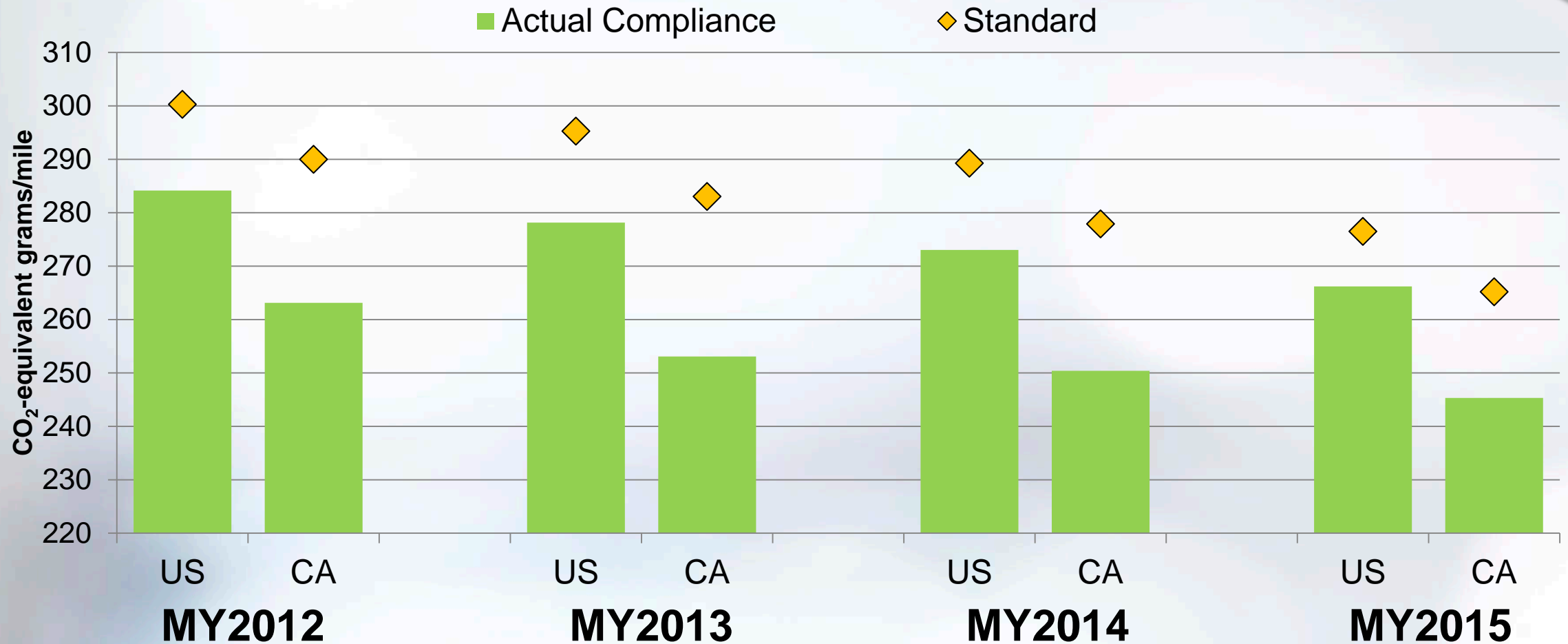
Opportunities and Actions

- Cars – model year 2026 and beyond
- Reducing industrial emissions-in part cap & trade
- Increasing renewable energy
- Decarbonizing the fuel supply
- Reducing the super pollutants
- Electrifying freight movement
- And more

Many Zero Emission Vehicle Options



Manufacturers are over-complying with current GHG standards



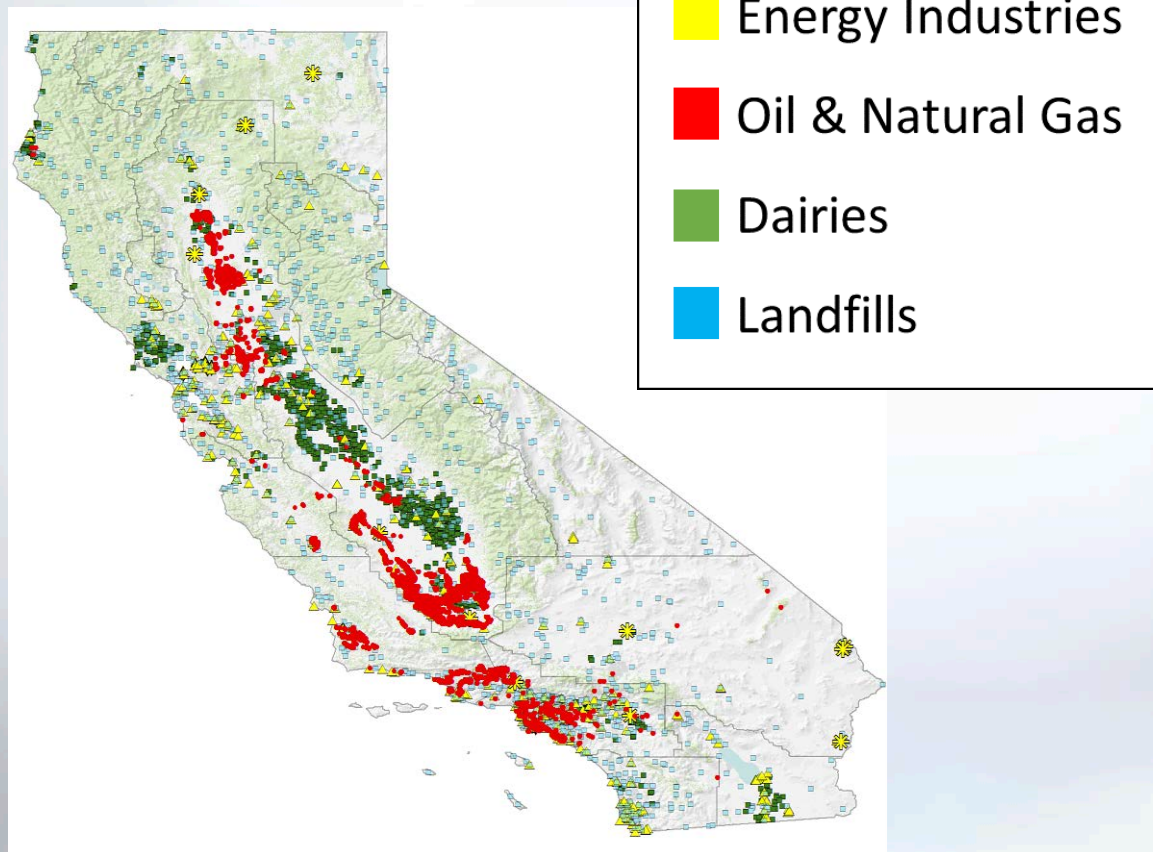
Standards calculated based on sales from the six large volume manufacturers subject to CA GHG regulations for MY 2012-2015 including credits.

Cars -- Avoiding Combustion

- Looking forward MY 2026 and beyond, including more types & sales of ZEV vehicles
- Opposing MY 2022 - 2025 changes since not needed; technology is here.
- Why is anyone discussing MY 2021?
- Expanding infrastructure for battery and hydrogen vehicles

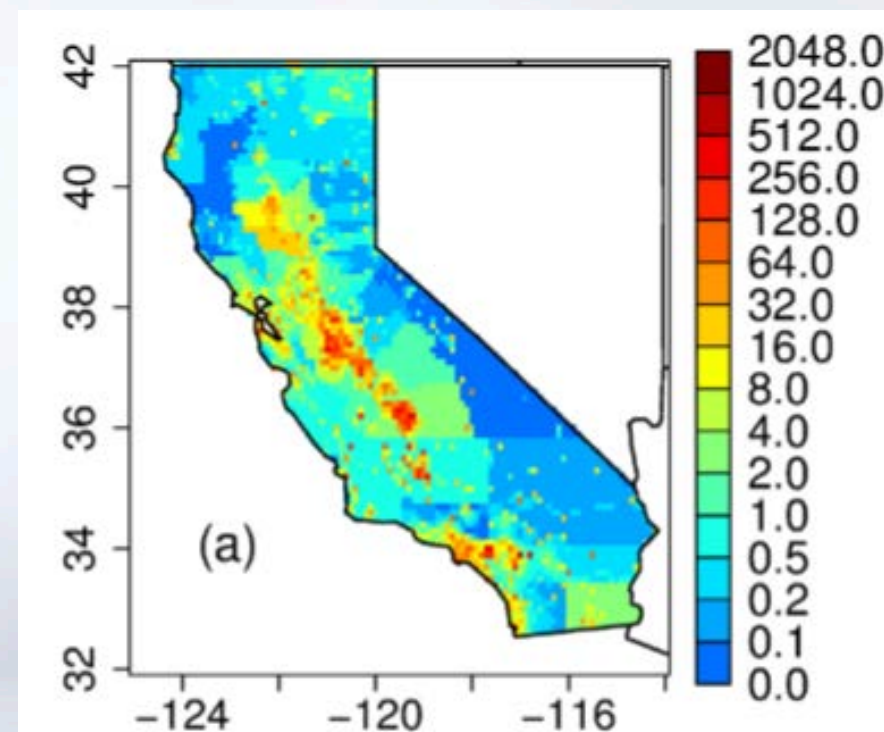
California Statewide Methane Studies

By Source



CARB-CEC-NASA/JPL Joint Study

By Emissions



Methane Emissions (nmole/m²/s)

Fischer and Jeong (2012). Inverse Modeling to Verify California's GHG Inventory, CARB Contract No. 09-348

CARB's Methane Hot Spots Efforts

- Detect methane leaks
- Evaluate persistence and episodic nature of methane emissions
- Identify other potential pollutants, including toxics in environmental justice and other neighborhoods
- Establish pre-regulatory baseline for CARB's recent oil & gas regulation

States Are Protecting Car Standards and Other Existing Federal Programs

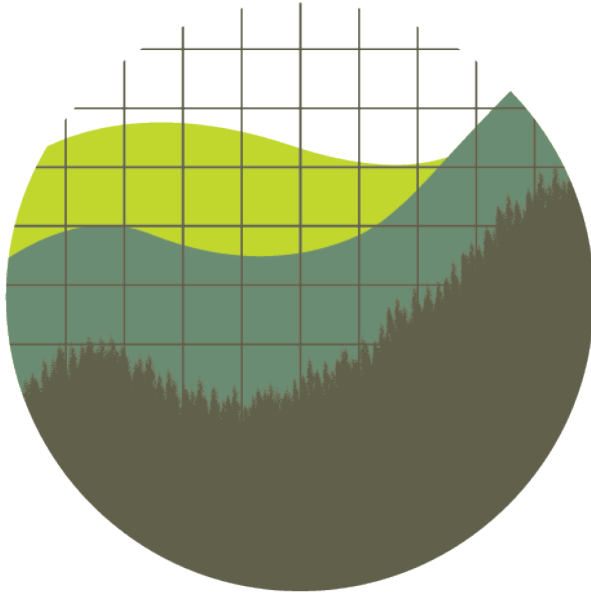
- BLM methane: oil & gas on federal lands rule
- EPA GHG: trailers pulled by trucks
- EPA methane: oil & gas rules
- EPA hydrofluorocarbon (HFC): SNAP rule
- EPA methane: reductions from landfills
- EPA GHG: Clean Power Plan
- And more

Without Enforcement – Why Bother?

- Employing new technologies, such as aerial surveillance
- Modifying certification rules for cars/trucks and increasing in-use vehicle monitoring
- Deploying enforcement resources to ensure a level playing field

CARB's Resources

- CARB Website:
 - <https://ww2.arb.ca.gov/>
- CARB Climate Program Website
 - <https://ww2.arb.ca.gov/our-work/programs/climate-change-programs>



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State-Level Climate Action



Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs

Institute for Policy Integrity at the NYU School of Law

An Integrated Climate Change Strategy for the Commonwealth

Katie Theoharides, September 26, 2017



Overview

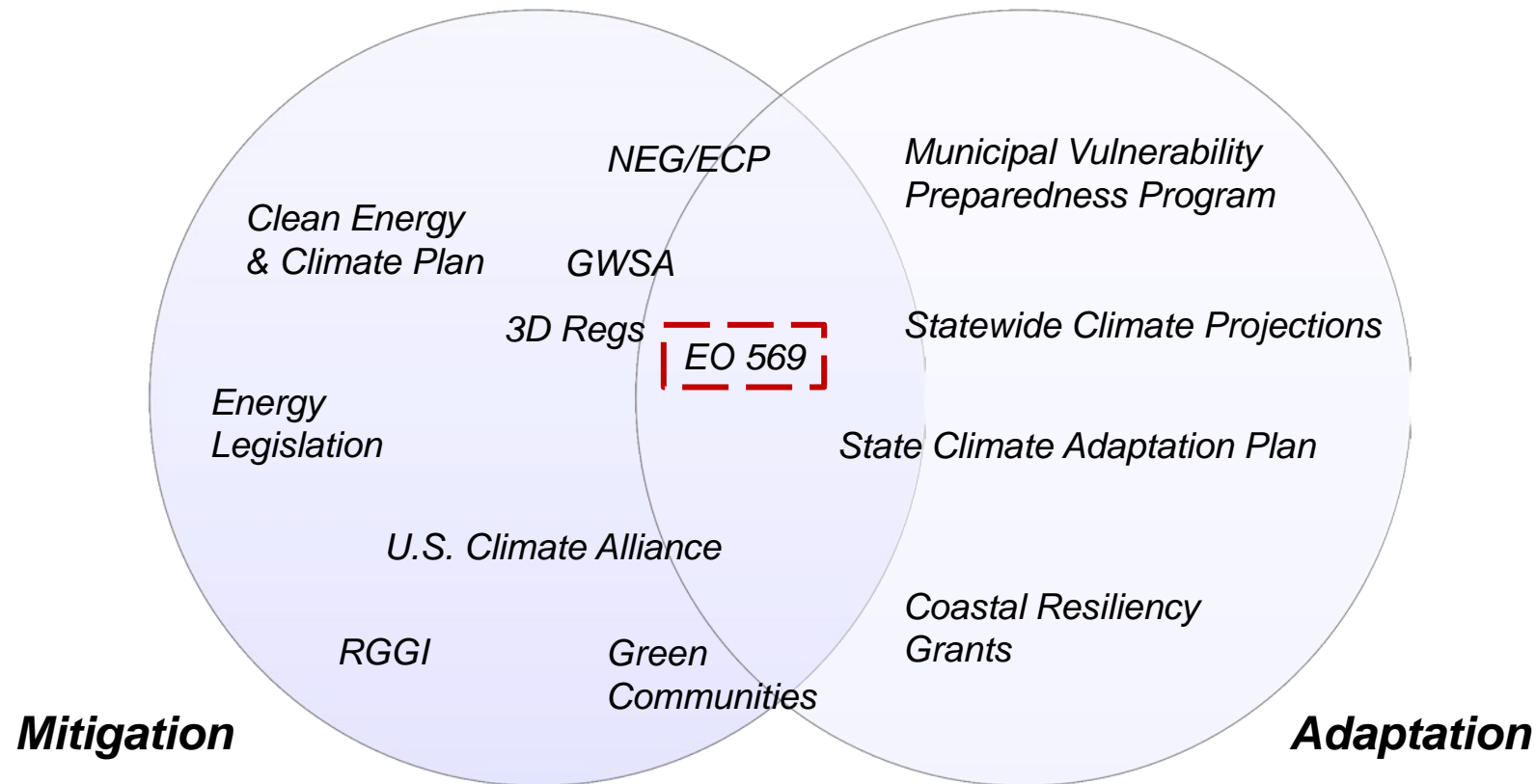
1. Climate Strategy
2. Policy Framework
3. Report on Progress





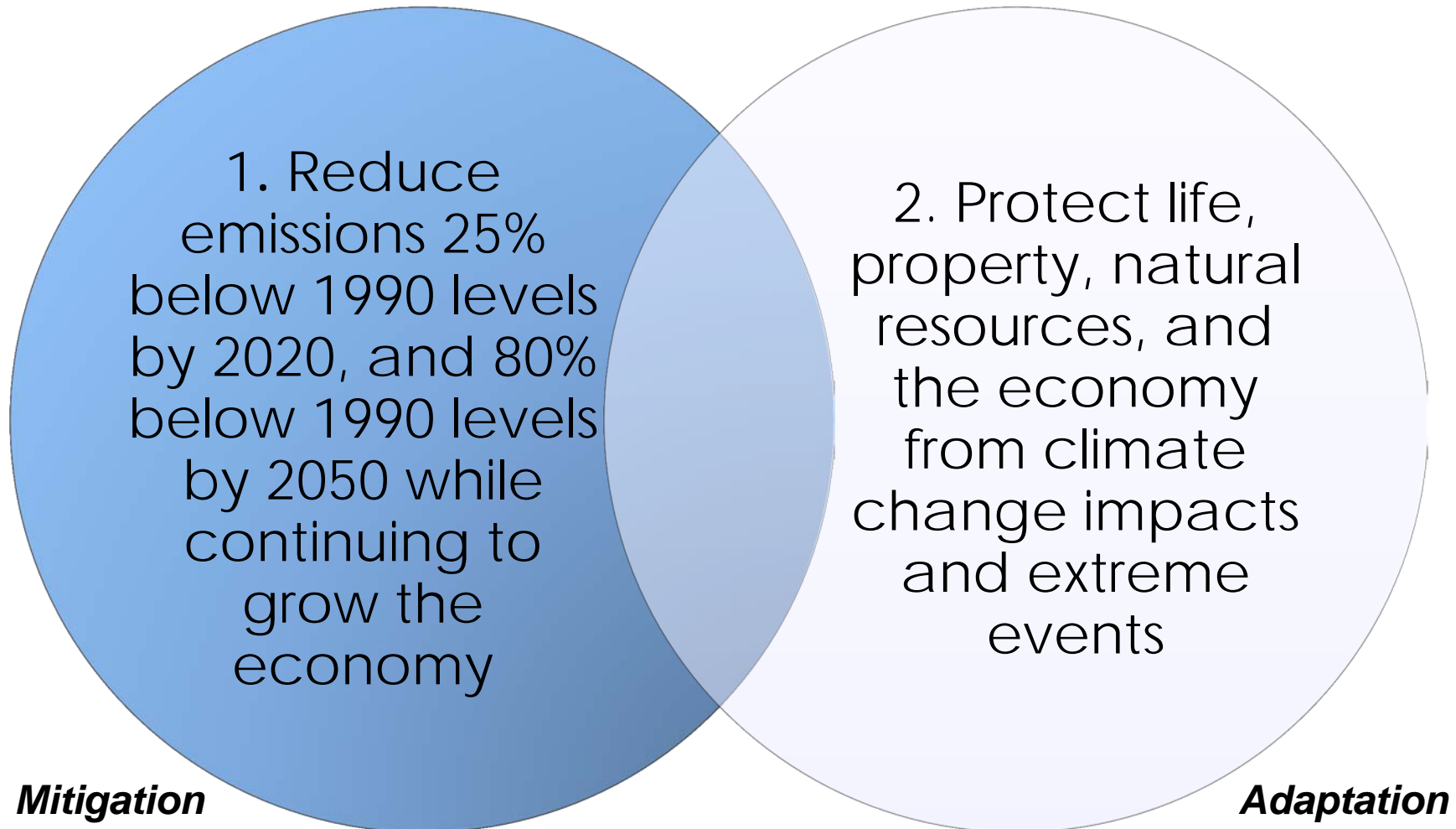
Vision

Lead the nation in reducing greenhouse gas emissions and safeguarding our Commonwealth from the impacts of climate change through citizen engagement, science, and cost-effective policy.





GOALS





Principles





Global Warming Solutions Act of 2008

GWSA Legislation enacted in August 2008, requires:

- EEA and MassDEP to collaborate with other agencies to reduce GHG emissions to the limits established in M.G.L. Ch. 21N
- reductions of GHG emissions by 10-25% below 1990 Baseline Levels by 2020 and 80% reduction by 2050. In 2010, 2020 goal was established for 25% below 1990 levels.
- establishment of a GHG emissions registry and reporting system, and publication of an inventory with comprehensive estimates of GHG emissions in the Commonwealth.
- Issue the “Clean Energy and Climate Plan for 2020” (the 2020 Plan), released in Dec 2010; implementation underway.
- 5-year update of 2020 Plan in Jan 2015
- Convene advisory committees
- Prepare Adaptation Report (released September 2011)



Kain and others vs. Department of Environmental Protection

- On May 17, 2016 the MA Supreme Judicial Court ruled that the steps mandated by the GWSA include promulgation of regulations by the Department of Environment Protection
- *“establish volumetric limits on multiple greenhouse gas emission sources, expressed in carbon dioxide equivalents, and that such limits must decline on an annual basis.”*
- G.L. c. 21N, Section 3(d)

Executive Order 569: September 16, 2016

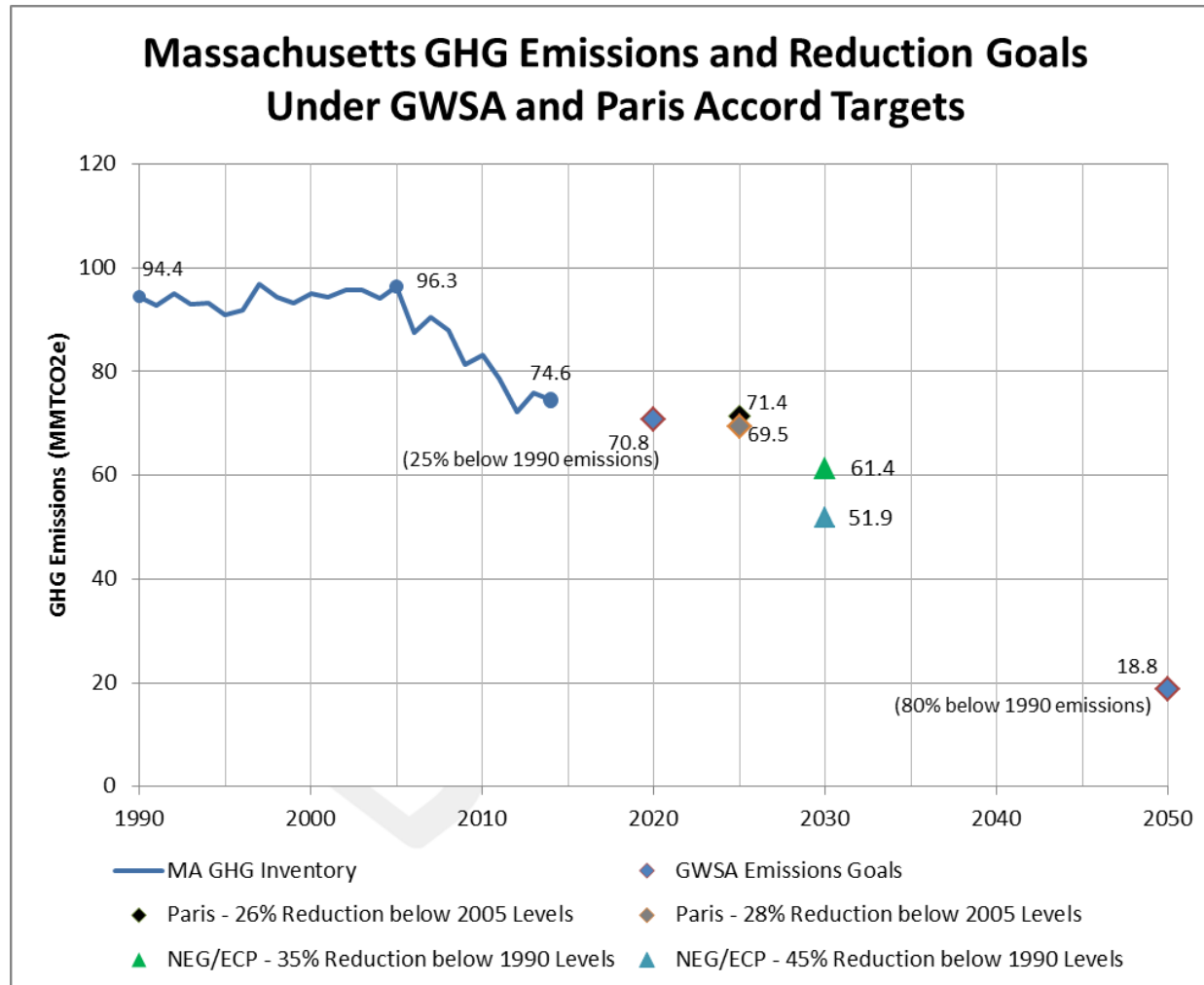


Recognizing the importance of climate change and directing state government to respond

1. *Enhancing Mitigation*
2. *GWSA Regulations*
3. *Adaptation and Resiliency*
4. *Coordination*
5. *Timeline*



Mitigation Highlights: Emissions are at 21% below 1990 levels



In addition to our in-state GWSA goal, Massachusetts has also signed onto the following commitments

- NEG-ECP Resolution 39-1: Reduce GHGs by at least 35-45% below 1990 levels by 2030 across the region
- Committed through U.S. Climate Alliance: In-state Paris Agreement levels = 26-28% below 2005 emission levels by 2025
- 300,000 EVs by 2025 per the multi-state ZEV taskforce
- Next step is to set 2030 and 2040 targets
- RGGI program review



Mitigation Highlights: Status Update on Energy



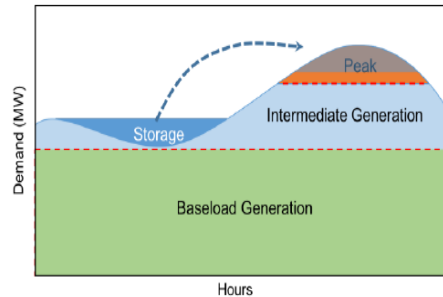
Expanding Clean Energy.

Hydropower and Clean Electricity. Bids have been submitted for the solicitation for additional clean electricity contracts. Selection is scheduled for the end of the year for as much as 15 percent of MA electric load. DPU reviews contracts.

SMART. Regulations for reformed solar incentives designed to maintain growth and reduce cost for additional 1600MW have been filed. DPU reviews and tentative schedule for tariff approval is June/July 2018.

Thermal Energy. Revising incentives to broaden eligibility for residential and commercial renewable thermal energy, including biomass. Rules are scheduled to be finalized in December.

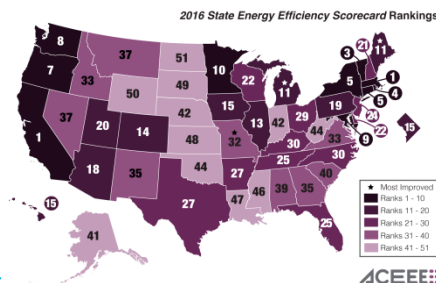
Offshore Wind. RFP has been issued for 400-800MW of capacity. Bids are due on December 20, 2018.



Accelerating Innovation

Storage. Prioritized research, development, and commercialization of electric storage technology. Bids have been submitted for a cost share of \$10 million in funding demonstration projects. Selections will be made in November.

Grid Modernization. Reviewing cost-effective deployment of smart meters, time-of use rates, storage, and electric vehicle infrastructure in pending cases at DPU.



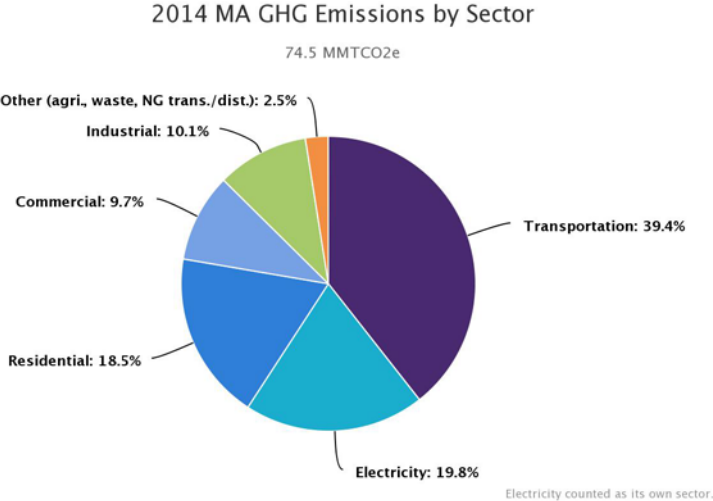
Maintaining Leadership on Energy Efficiency

Scorecard Legislation. Advancing legislation to promote understanding of residential energy efficiency and re-focusing RGGI auction revenue to thermal energy efficiency improvements rather than electric efficiency programs.

Three-year Plan. Initiating review for opportunities for energy efficiency savings with lighting having been significantly addressed.

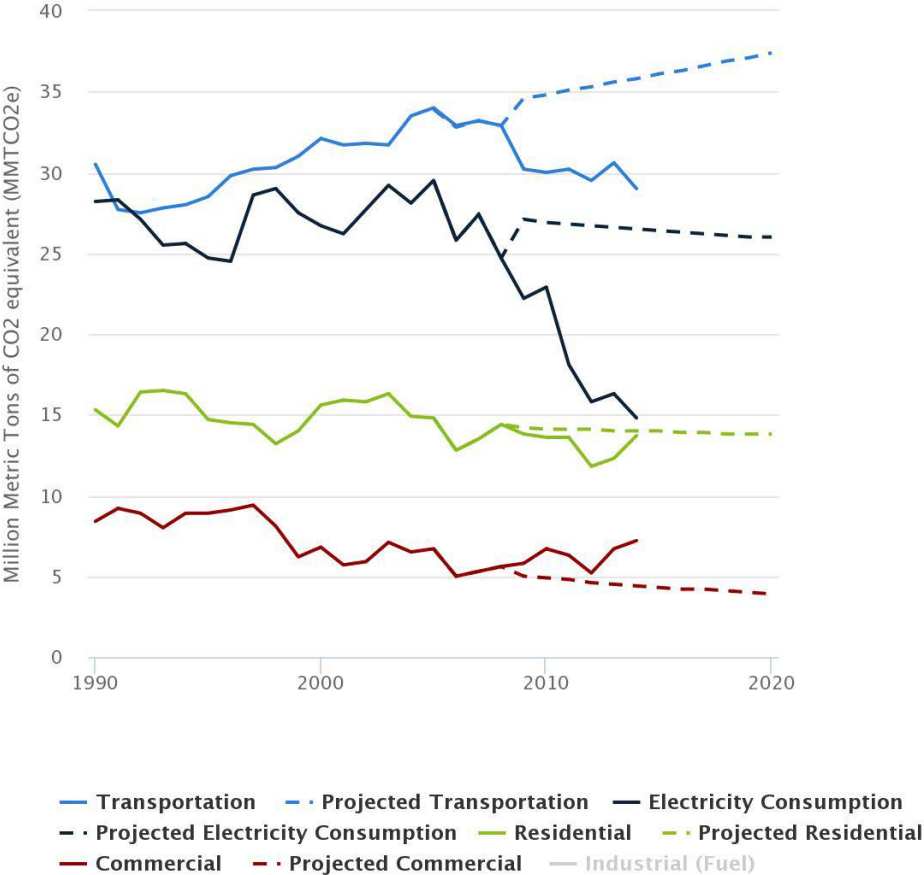


Transportation



MA GHG Emissions and Business-As-Usual (BAU) Projections for Major Sectors, 1990–2020

Source: MassDEP (2017). Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990 through 2014



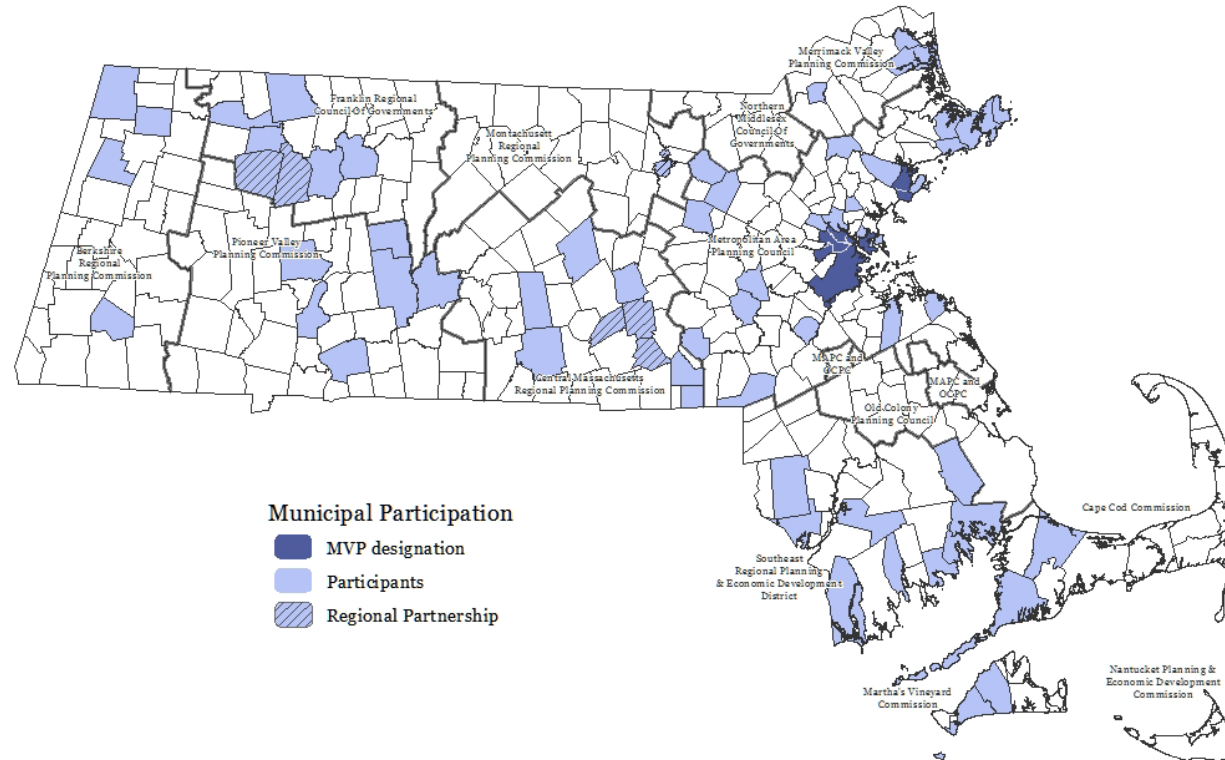


Adaptation Highlights: State Plan

- **Integrated Plan:** First in the nation Climate Adaptation and Hazard Mitigation plan
- **Includes:** Application of best climate change data to identify climate-related vulnerabilities, understand intersection with existing natural hazards, examine adaptive capacity and state capabilities, develop adaptation strategies with cost/benefit information, and delineate prioritized next steps
- **Vulnerability Assessments:** State agency vulnerability assessments will begin in September 2017 and will inform state plan
- **Climate coordinators:** Each Executive Branch Secretary has designated a CC. CC's are responsible for leading vulnerability assessments and incorporating state plan into agency operations, policies and programs
- **Stakeholders:** In 6 months over 200 stakeholders have been directly involved in plan development with more to come
- **Mainstreaming climate change:** Throughout planning, focus is on utilizing staff and resources that already exist and incorporating climate change into current planning, budgeting, and policy frameworks

III. Report on Progress

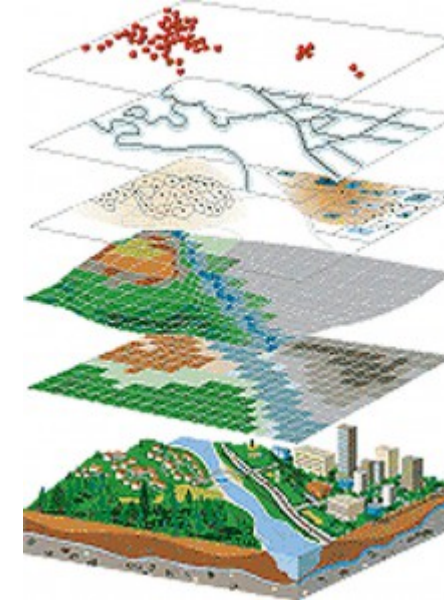
Adaptation Highlights: Municipal Vulnerability Preparedness (MVP) Program



- 20% of cities and towns, \$1.1 million
- Over 250 vendors will be trained as state service providers
- Helps communities use local knowledge, climate change data and existing plans to identify vulnerabilities and strengths and prioritize action steps
- Designated communities to receive advanced standing in EEA grant programs
- The Nature Conservancy is looking to MVP as a national model and EEA is sharing through U.S. Climate Alliance

Adaptation Highlight: Climate Data

- **Climate science to inform state and municipal planning**
 - Partnership with Northeast Climate Science Center to produce statewide coverage of localized climate data
 - Peer reviewed and stakeholder vetted
 - Climate data forms the basis for understanding vulnerability and risk in state plan, and MVP process, and will be open access to any user across the state
- **Science-based tools to understand risk**
 - Vulnerability assessments combine climate exposure, asset sensitivity, and adaptive capacity to identify vulnerability factors and adaptation solutions
 - Mass Climate Change Clearinghouse will allow climate data to be overlaid with other spatial and non-spatial datasets to map vulnerability of critical infrastructure, natural resources, and vulnerable populations





MA CCC

Massachusetts Climate Change Clearinghouse

Explore
Sectors

Identify
Changes

Take
Action

Maps

Data

Documents

Search for resources...

Q Search

Climate Planning

Lorem ipsum lorem mupsum,
lorem chewbacca applesauce
maybe? When the life and times
are here. We need to grow the
state budget for more waffles.

More »

Explore Sectors »



Agriculture



Coastal Zones



Economy



Energy



Forestry



Infrastructure



Local Government



Natural Resources /
Habitats



Public Health



Public Safety /
Emergency
Response

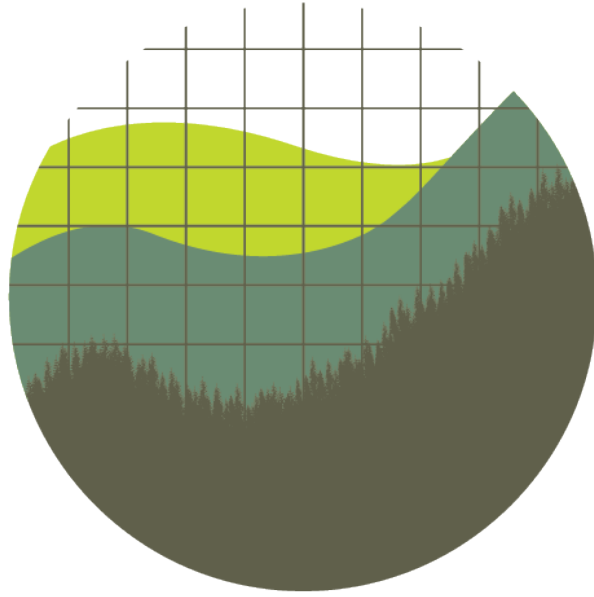


Recreation



Water Resources

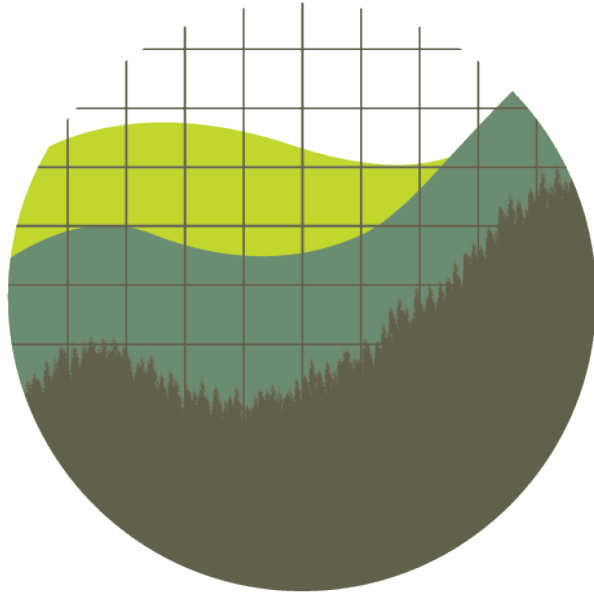
Identify Changes »



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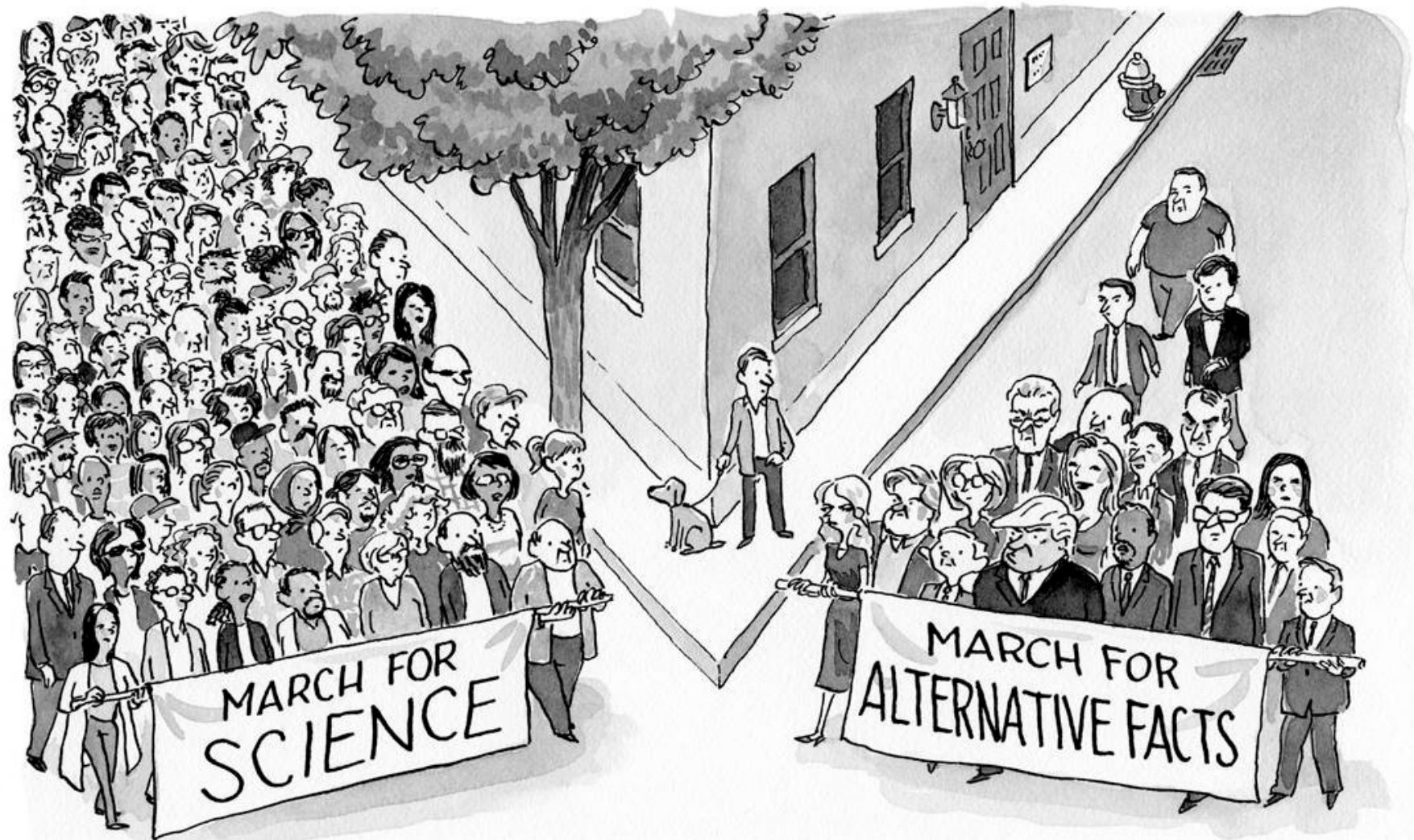
State-Level Climate Action

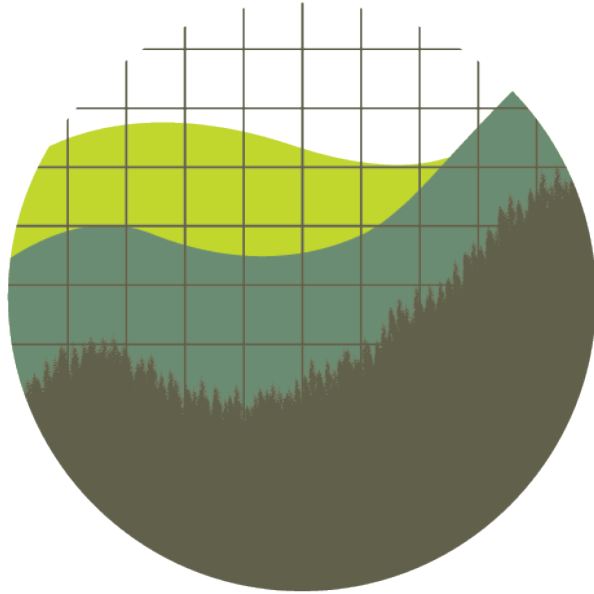


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