

# RESILIENT



# POWER

A Project of **Clean Energy Group**

## What States Should Do: A Guide to Resilient Power Programs and Policy

Tuesday, July 14, 2015



Todd Olinsky-Paul  
Project Director  
Clean Energy Group

# Housekeeping



All participants are in “Listen-Only” mode. Select “Use Mic & Speakers” to avoid toll charges and use your computer’s VOIP capabilities. Or select “Use Telephone” and enter your PIN onto your phone key pad.

Submit your questions at any time by typing in the Question Box and hitting Send.

**This webinar is being recorded.**

You will find a recording of this webinar, as well as previous Resilient Power Project webinars, online at:

[www.cleangroup.org/ceg-projects/resilient-power-project/webinars/](http://www.cleangroup.org/ceg-projects/resilient-power-project/webinars/)

and at

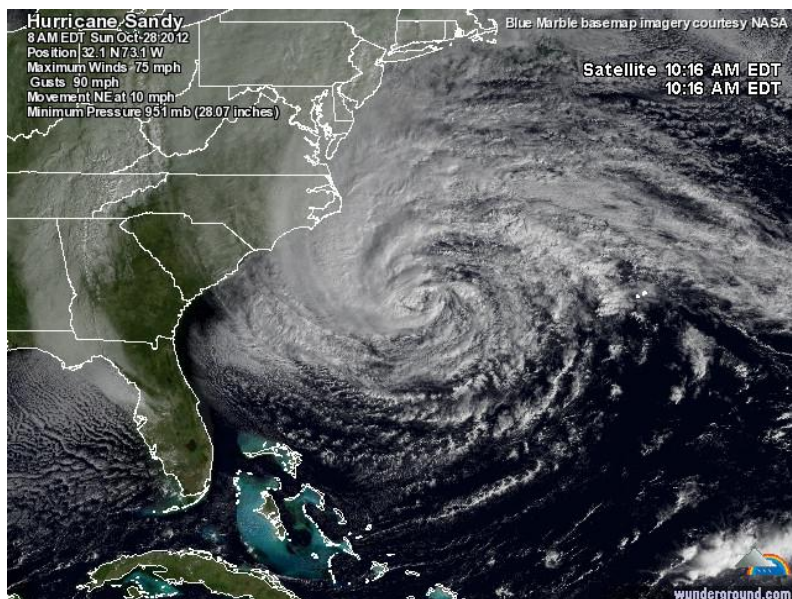
[vimeo.com/channels/resilientpower](http://vimeo.com/channels/resilientpower)

# Hurricane Sandy

October 29, 2012

\$37 Billion in damages

Disrupted electric service to more than 8 million people in 17 states



# Northeastern States Resilient Power Project

Following Superstorm Sandy, the Northeastern states came to Clean Energy Group seeking help in developing resilient power solutions.

## Our role:

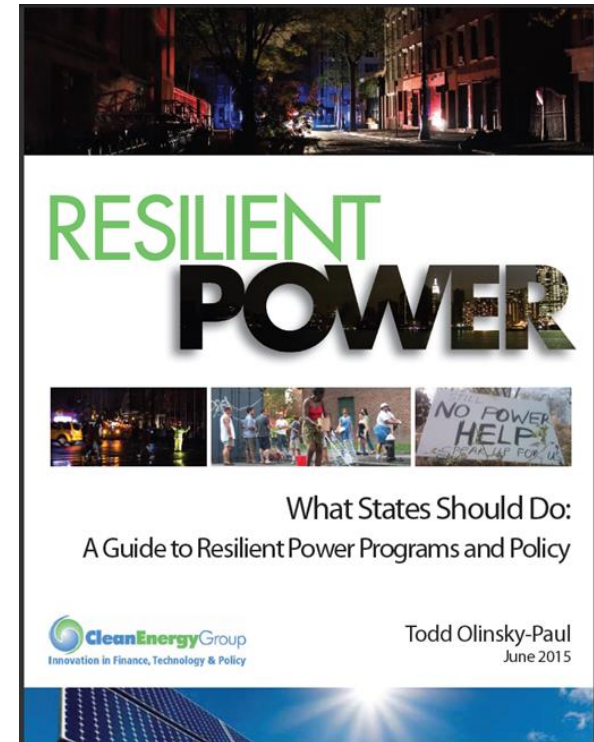
- Convening/knowledge sharing
  - Research on technologies, financing, markets, industry
  - Webinars, conferences, reports, newsletters
- Assist in state program development and marketing
- Monitor and evaluate progress
- Provide program documentation
- Other: technical assistance, work with municipalities and developers



# Introducing the State Resilient Power Handbook

The first comprehensive look at the emerging resilient power movement in the Northeast

- Information on state resilient power programs
- Focus on solar+storage
- Lessons learned
- Best practices and policy recommendations



<http://bit.ly/RPP-Resilient-States>

# Key Take-Aways

- **\$400 million** in new state-managed funds, leveraging millions more in private funds
- Millions of people will have resilient power for critical services in their communities
  - Schools/emergency shelters, wastewater treatment plants, fire station, and other first responder facilities
- States are evolving to more sustainable financing and incentive programs that leverage markets
- Solar+Storage also reduces energy costs and can provide income year-round in some markets
- Resilient power is a concept that is spreading beyond the Northeast

# State policy tools

- **Solicitations/RFPs:** MA, CT, NY, NJ, VT, OR
- **Renewable portfolio standards/stand-alone mandates:** CA, OR, PR
- **Adders, multipliers and carve-outs:** NY
- **Prescriptive rebates:** NJ?
- **Financing institutions (green banks, resilience banks):** NJ, CT, NY
- **Studies, roadmaps:** NY, MA, MD, RI, MN
- **Integrating solar+storage into longer-term state policy (energy plans, disaster preparedness):** CA, FL
- **Grid modernization efforts:** NY, MA, HI

# Recommendations to States

- **Engage in pre-program stakeholder process** (VT microgrid)
- **Target funding to real needs** (NJ WWTPs)
- **Support low-income communities** (MA income-sensitive grants)
- **Make program responsive to local needs (but define criteria!)** (MA program)
- **Market to municipalities** (CT microgrids)
- **Provide technical assistance** (MA program)
- **Provide financing assistance** (CT Green Bank, NJ ERB)
  - Allow flexible use of awarded funds
  - Allow market plays where available
  - Evaluate proposed financing
- **Monitor project performance**

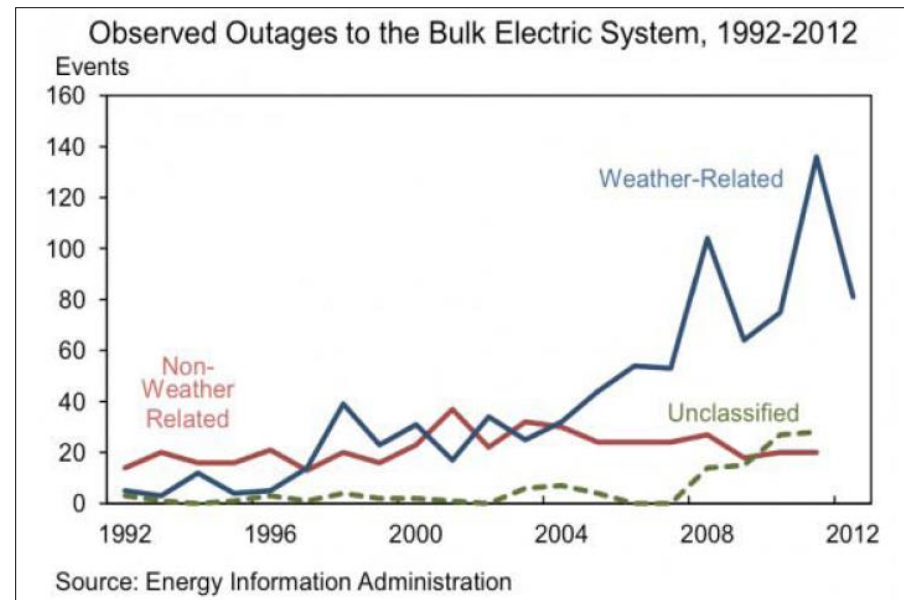
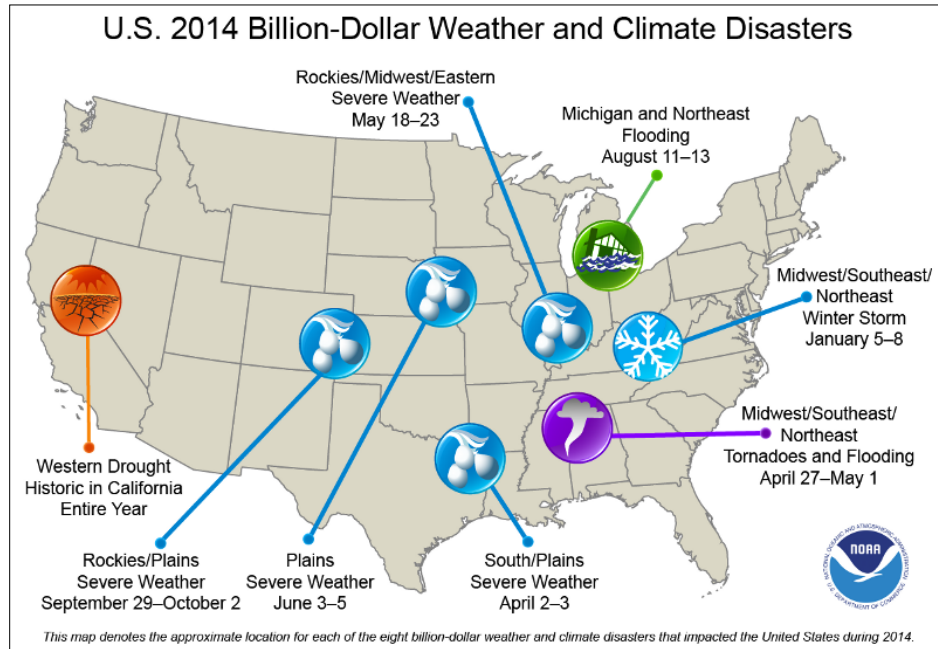


# Recommendations for addressing low-income communities

- Define “low-income” or identify eligible communities
- Include among weighted project evaluation criteria
- Focus support on market segments and facility types supporting underserved populations (affordable housing, assisted living)
  - Carve-outs or added incentives
  - Special financing assistance
    - Work with developer communities and CDFIs to finance projects
  - Dedicated technical assistance
- Support analysis of benefits to low-income communities

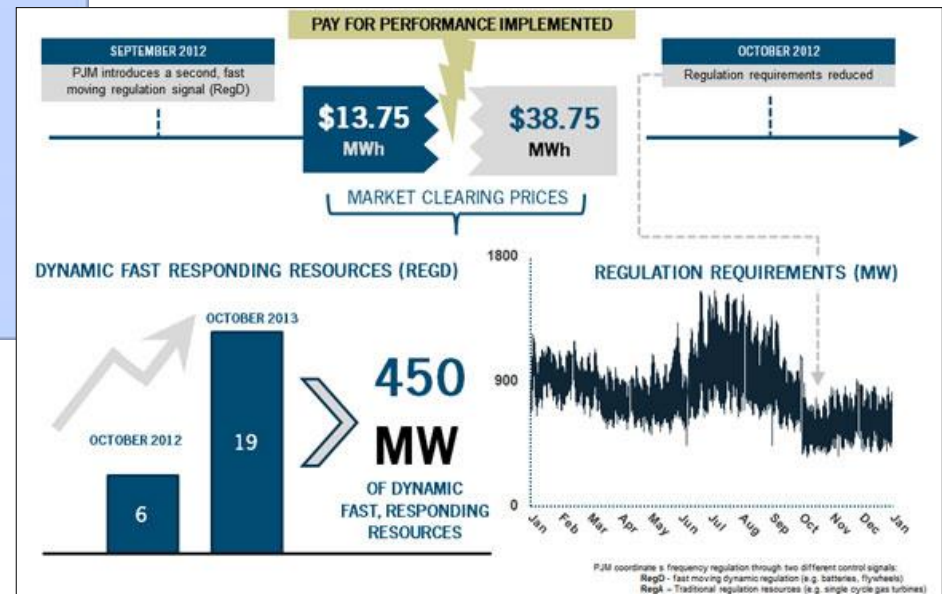
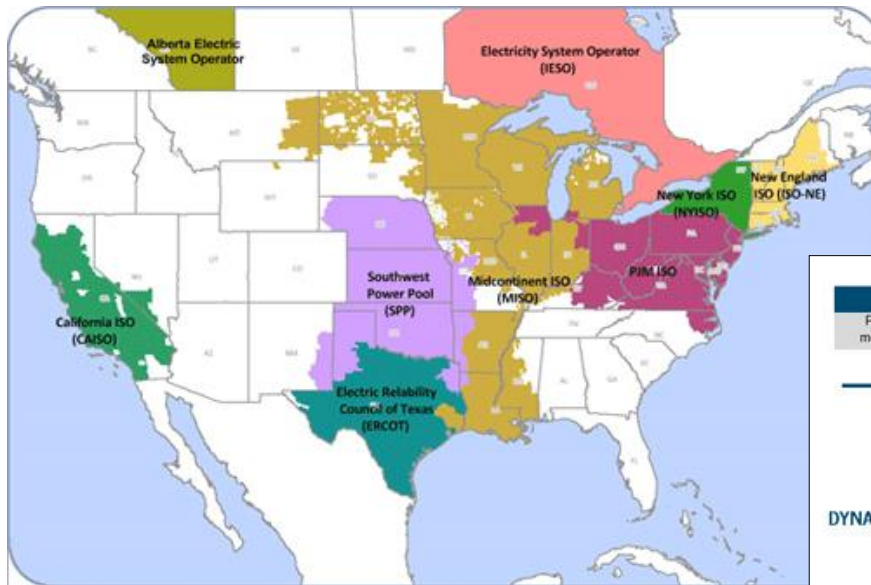
# Drivers are expanding

Extreme weather, power outages not limited to the Northeast



# Electric services markets are emerging

- Frequency regulation market – PJM
- Demand response and demand charge management – NY, CA



# Market Challenges

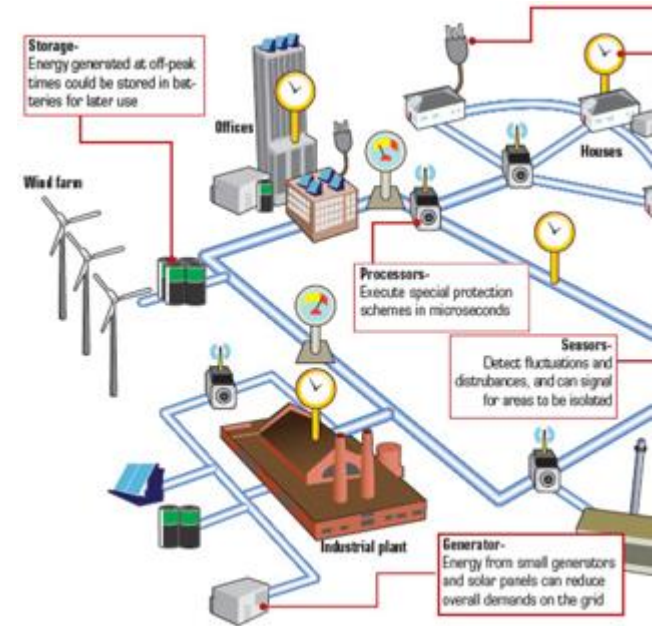
- Markets are highly locational
- Systems sized to sell electric services may not be large enough to provide a significant resiliency benefit
- Markets may become saturated
- Resiliency markets do not yet exist / overreliance on incentives
- Solar+storage systems may need to be oversized or extended (mCHP)
- Technologies have been proven, economics not so much
- Stacked benefits still needed in many locations
- Systems not yet off-the-shelf; custom engineering increases costs

# Grid Modernization

Some states have begun a process of modernizing the electric grid (NY, MA, HI)

Grid modernization initiatives are focusing on:

- More distributed clean generation
- Greater role for distribution utilities
- Smartgrid and microgrid development
- Peak shifting, reduction of overcapacity
- Reduced outages, greater resiliency
- Optimized demand
- Improved asset management

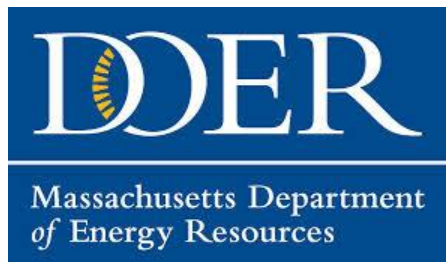


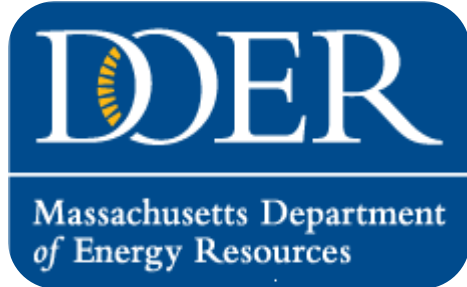
Opportunities for energy storage



# Today's Guest Speakers

- **Gerry Bingham**, Sr. Coordinator / Distributed Energy Resources, Massachusetts Department of Energy Resources (MassDOER)
- **Liza Nolan**, Program Manager, New Jersey Energy Resilience Bank (ERB)
- **Diane Broad**, Senior Policy Analyst, Oregon Department of Energy





# **Clean Energy Group Resilient Power Project Webinar**

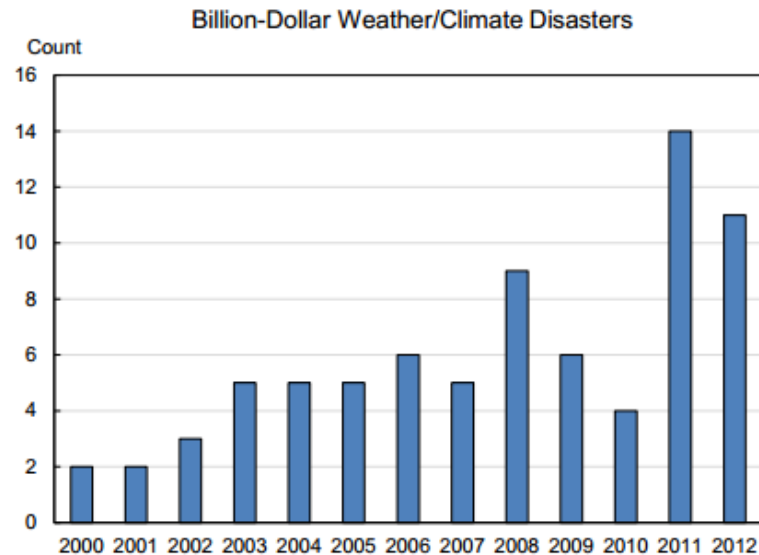
**MA Community Clean Energy  
Resiliency Initiative**

**Gerry Bingham, MBA  
*Sr. Coordinator, Distributed Energy Resources***

**July 14, 2015**

# A Multi-Dimensional Strategy

- **The Goal:** Prepare for climate change and the increasing incidence of severe and costly weather events
- **The Approach:** Invest in new technologies to increase energy infrastructure resiliency and reliability
- **The Climate Preparedness Initiatives:** \$52M in climate change initiatives announced in January 2014



Source: National Oceanic and Atmospheric Administration (NOAA)

# Community Clean Energy Resiliency Initiative

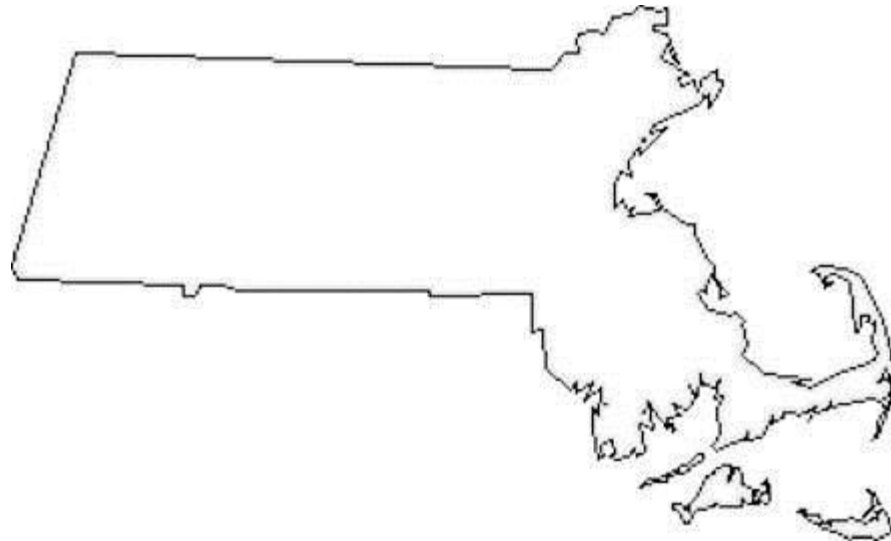
- \$40 million municipal grant program
- Energy resiliency at critical facilities using clean energy technology
- Round 1 applications were available for Technical Assistance or Project Implementation
- Round 2 applications were available for Project Implementation



# Eligible Applicants

**All Massachusetts municipalities were eligible**

- Single municipality
- Joint applications by multiple municipalities
- Regional Planning Agencies
- Regional districts (water, wastewater, school, etc)
- Public/private partnerships



*Creating A Cleaner Energy Future For the Commonwealth*

**DER**

Massachusetts Department  
of Energy Resources



# Eligible Critical Facilities

Critical facilities = *“buildings or structures where loss of electrical service would result in disruption of a critical public safety life sustaining function”*



**Critical facilities could include:**

1. Life safety resources
2. Lifeline resources
3. Community resources

# Eligible Clean Energy Technologies

- Projects including:
  - Clean energy generation
  - Energy storage
  - Energy management systems
  - Technology used for DG operation in island mode
- Single building facilities or microgrids



# Application Types: Technical Assistance

## An overview:

- Available at no cost to awarded applicants
- Provided by a consulting team – The Cadmus Group with MCFA and HOMER Energy
- Awarded applicants had the opportunity to use the resulting plan to apply for a follow-up round of project implementation funding

## By the numbers:

- 27 applications received, July 15, 2014
- 27 awards made, July – August 2014
- All 4 regions of the Commonwealth supported
- 43 stand-alone facilities analyzed
- 5 microgrid configurations analyzed
- 27 Technical Assistance reports completed October 2014



<b>Applicant</b>	<b>Facility</b>	<b>Technology</b>	<b>Applicant</b>	<b>Facility</b>	<b>Technology</b>
<b>ABRS</b>	High School - Shelter	Biomass heating/ CHP/PV/Storage	<b>Leverett</b>	Elementary School - Shelter	PV/Battery/Biomass CHP
<b>ABRS</b>	RJ Grey Junior High School - Shelter	Biomass heating/ CHP/PV/Storage	<b>Lincoln-MAPC</b>	Public safety building	PV/Battery
<b>Acton</b>	Public safety building	PV/Battery	<b>Medford</b>	Medford City Hall	PV/Battery
<b>Acton</b>	Department of Public Works	PV/Battery	<b>Medford</b>	Department of Public Works	PV/Battery
<b>Amherst/UMass</b>	Microgrid: Wastewater treatment plant, Fire Station, Champion Center	CHP/PV/Battery	<b>Medford</b>	Andrews School - Shelter	PV/Battery
<b>Andover</b>	Water treatment plant	NG Turbines	<b>Melrose</b>	Microgrid: City Hall, Main St. Fire Station, Memorial Hall - Shelter	PV/Battery (solar canopy)
<b>Andover</b>	Senior Center - Shelter	CHP/Absorption Chiller	<b>New Bedford</b>	High School - Shelter	CHP/PV/Storage
<b>Barnstable</b>	Middle School - Shelter	CHP	<b>New Bedford</b>	City Yard	Interconnect w/ High School
<b>Beverly-MAPC</b>	Regional emergency supply cache site	PV/Battery	<b>New Bedford</b>	Hillman Complex	CHP/PV/Storage
<b>Boston</b>	Microgrid: Boston Medical Center	CHP	<b>Newton</b>	Waban Comms Facility	PV/Storage
<b>Boston</b>	Madison Park High School - Shelter	CHP/PV/Battery	<b>Newton</b>	City Hall	PV/Storage
<b>Cambridge</b>	Sullivan water treatment plant	PV/Battery	<b>Northampton</b>	Microgrid: High school - shelter, Department of Public Works, Hospital	CHP/PV/Battery
<b>Cambridge</b>	Cambridge Rindge & Latin School	CHP/PV/Battery	<b>Sandwich</b>	High School - Shelter	CHP/PV/Battery
<b>Chicopee</b>	Safety Complex	CHP/PV/Battery	<b>Sandwich</b>	Emergency Operations Center	PV/Battery
<b>Chicopee</b>	Wastewater treatment plant	CHP/PV/Battery	<b>Saugus</b>	Senior Center - shelter	PV/Battery
<b>CVEC</b>	High School - Shelter	PV/Battery	<b>Saugus</b>	Public safety building	PV/Battery
<b>Falmouth</b>	High School - Shelter	PV/Wind/Battery/CHP	<b>Scituate</b>	Public safety building	PV/Battery
<b>Greenfield</b>	Wastewater treatment plant	AD/CHP or Gas Turbine	<b>Shirley</b>	Police Department	Biomass/PV/Battery
<b>Greenfield</b>	High School - Shelter	PV/Battery	<b>Somerville</b>	Public safety building	PV/Battery
<b>Holyoke</b>	Dean School - Shelter	PV/Battery	<b>Somerville</b>	Early Childhood Center	CHP/PV/Battery
<b>Holyoke</b>	Fire Station	PV/Battery	<b>Somerville</b>	Department of Public Works	PV/Battery
<b>Holyoke</b>	Mt. Tom Tower	PV/Battery/Wind	<b>Wayland-MAPC</b>	Middle School - shelter	PV/Battery
<b>Lawrence</b>	Water treatment plant	PV/Battery	<b>West Boylston</b>	Microgrid: 3x schools, DPW, Fire Dept., Library	Fuel Cell
<b>Leverett</b>	Public safety building	PV/Battery			

## Technical Assistance awards

*Creating A Cleaner Energy Future For the Commonwealth*



Massachusetts Department  
of Energy Resources

# Application Types: Project Implementation Round 1

## An overview

- Required to meet specific project threshold criteria
- Projects could be retrofit or new install

## By the numbers:

- 9 applications received, July 15, 2014
- 6 awards totaling \$7.4m made, September 25, 2014
- 4 applications to be reconsidered in the second round
  - Deadline – November 10, 2014
- 3 regions of the Commonwealth supported
- 8 stand-alone facilities considered
- 1 microgrid configuration awarded



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Applicant	Project Title	Grant Amount	Brief Description	Facility(ies)	Technology(ies)
<b>Berkley and Taunton</b>	<b>Taunton/Berkley Community Microgrid</b>	\$ 1,455,000	Community microgrid	(1) Middle School - shelter (2) Emergency Services Building - Police and Fire (3) Community School - shelter (4) Municipal fueling station/pump (5) Police/fire radio repeater	- Energy management system - Lithium Ion battery - Solar PV (existing) - Diesel generators (existing)
<b>Boston</b>	<b>Solar PV with Battery Storage for select Boston Community Centers</b>	\$ 1,320,000	Solar and storage based islandable community shelters	(1) Shelburne Community Center - shelter (2) Roslindale Community Center - shelter (3) Tobin Community Center - shelter (4) Curtis Hall Community Center - shelter	- Solar PV - Battery storage
<b>Greater Lawrence Sanitary District</b>	<b>Organics to Energy Upgrade Project</b>	\$ 611,000	Islandable and black start capable self-sustaining wastewater treatment facility	(1) Wastewater treatment facility	- Biogas storage - Combined heat and power system - Anaerobic digestion (existing)
<b>Northampton</b>	<b>Batteries and PV Islanding Capability for Fire HQ</b>	\$ 525,401	Solar and storage based islandable fire station, that incorporates existing backup generation for further resiliency	(1) Northampton Fire Department	- Solar PV - Battery storage - Diesel generators (existing)
<b>South Essex Sewerage District</b>	<b>Combined Heat and Power Facility</b>	\$ 700,000	Islandable and black start capable combined heat and power facility at wastewater treatment facility	(1) Wastewater treatment facility	- Combined heat and power system
<b>Springfield</b>	<b>Baystate Health Cogeneration Project</b>	\$ 2,790,099	Islandable and black start capable combined heat and power facility at regional hospital	(1) Baystate Health - hospital	- Combined heat and power system
<b>Total</b>		<b>\$ 7,401,500</b>			

## Round 1 Project Implementation awards



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# Application Types: Project Implementation Round 2

## An overview

- Applications are currently under review
- Awards to be announced in December 2014

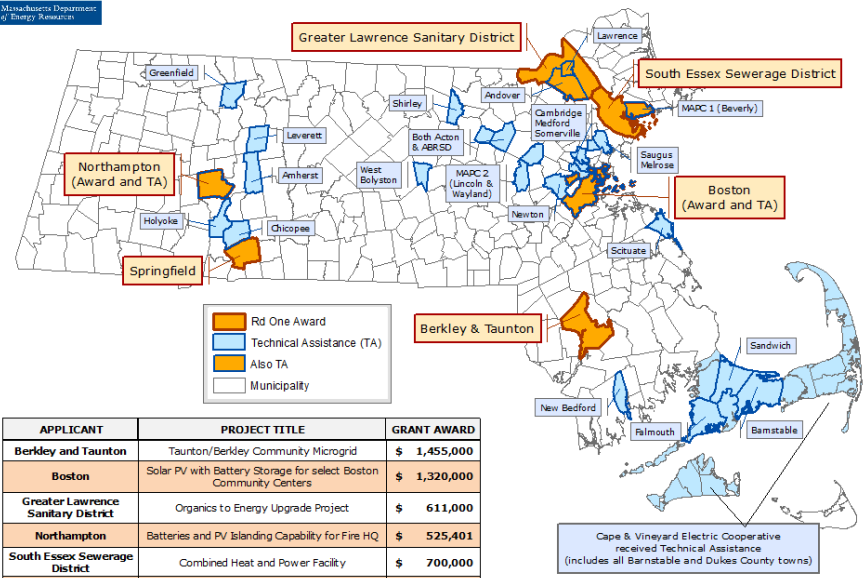
## By the numbers:

- 13 applications received, November 10, 2014
- All 4 regions of the Commonwealth supported
- 13 stand-alone facilities considered
- 3 microgrid configurations considered

# Program Achievements

- Geographic diversity among applicants
- Wide range of facilities and technologies considered
- Single facility projects and microgrid configurations
- Projects demonstrating daily benefits and ability to island, operate and provide resilient support

**DDER** Community Clean Energy Resiliency Initiative - Round One Awards  
Massachusetts Department of Energy Resources



DDER, #Fster, 9-24-14



# Lessons Learned

- Learn and share with as many people as possible
- Develop clear goals and program design
  - Critical facilities / Clean energy technology / Technical assistance support and/or direct project implementation
- Provide as much information as possible to applicants
  - Webinars / Extensive Q&A
- Flexibility and Agility in project implementation
  - Moving quickly, while mixing old and new = diversity
  - Creativity in geographic representation
  - Phased contract approach
  - Milestone funding disbursements

# What's Next?

- DOER: Reviewing options for remaining \$12 Million
- Governor Baker Announced [Energy Storage Initiative](#) (5/28/15)

**EPA Secretary Matthew Beaton:** “This Energy Storage Initiative will ensure the Commonwealth continues to be on the forefront of advancing innovative clean technology. Through this initial \$10 million announcement and the subsequent studies, Massachusetts is primed to leverage the expertise of the storage industry to reduce barriers to project implementation, and ultimately advancing a crucial component of modernizing our electric grid.”

- DOER/MassCEC Storage Studies
  - \$10 Million for demonstration projects
  - Energy Storage Expert/Stakeholder Forums
  - DPU Energy Storage Stakeholder Conference (7/9/15)
- Grid Modernization: Plans due 8/5/15



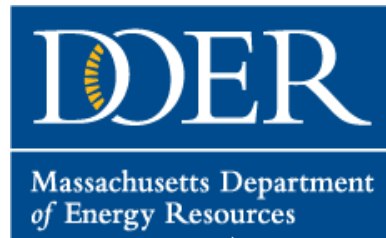




PHOTO: SCOTT OLSON/GETTY IMAGES



Questions?



# Thank you

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<http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/resiliency-initiative.html>



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# Additional Information

# Program Timeline – TA Application

DOER issues PON	May 15, 2014
DOER begins to review TA Applications (DOER will review on a rolling basis through final TA deadline)	June 16, 2014
Deadline for submitting TA Application questions	June 30, 2014
DOER begins TA Application awards	June 30, 2014
<b>FINAL TA APPLICATION DEADLINE</b>	<b>July 15, 2014</b>
Final TA Application awards announced (subject to change)	August 15, 2014
<b>FINAL ROUND 2 PI APPLICATION DEADLINE</b>	<b>November 10, 2014</b>
Final Round 2 PI Application awards announced (subject to change)	December 3, 2014



# Program Timeline – PI Application

DOER issues PON	May 15, 2014
Deadline for submitting PI Application questions	July 7, 2014
<b>FINAL ROUND 1 PI APPLICATION DEADLINE</b>	<b>July 15, 2014</b>
Round 1 PI Application awards announced (subject to change)	August 15, 2014
<b>FINAL ROUND 2 PI APPLICATION DEADLINE</b>	<b>November 10, 2014</b>
Final Round 2 PI A awards announced (subject to change)	December 16, 2014

# Evaluation Criteria



## The highlights:

- Proposal content
- Project commitment
- Proposal finances
- Proposal technical details



# Submission

- Incomplete applications will not be accepted.
- Proposals submitted via email to Amy McGuire at [Amy.McGuire@state.ma.us](mailto:Amy.McGuire@state.ma.us).
- This application information is available at: [www.commBuys.com](http://www.commBuys.com) as PON-ENE-2014-035 and PON-ENE-2014-036.



# New Jersey Energy Resilience Bank

Clean Energy Group Webinar July 14, 2015



**NEW JERSEY  
ENERGY  
RESILIENCE  
BANK**

Building a solid foundation for the future

# New Jersey Energy Resilience Bank (ERB) Overview

The extensive damage and outages caused by Superstorm Sandy prompted the state to prioritize its efforts to minimize the potential impacts of future major power outages and increase energy resilience.

The State has committed \$200 million in funding for the ERB to assist critical facilities with securing resilient energy technologies that will make them – and, by extension, the communities they serve – less vulnerable to future severe weather events and other emergencies.

## Mission

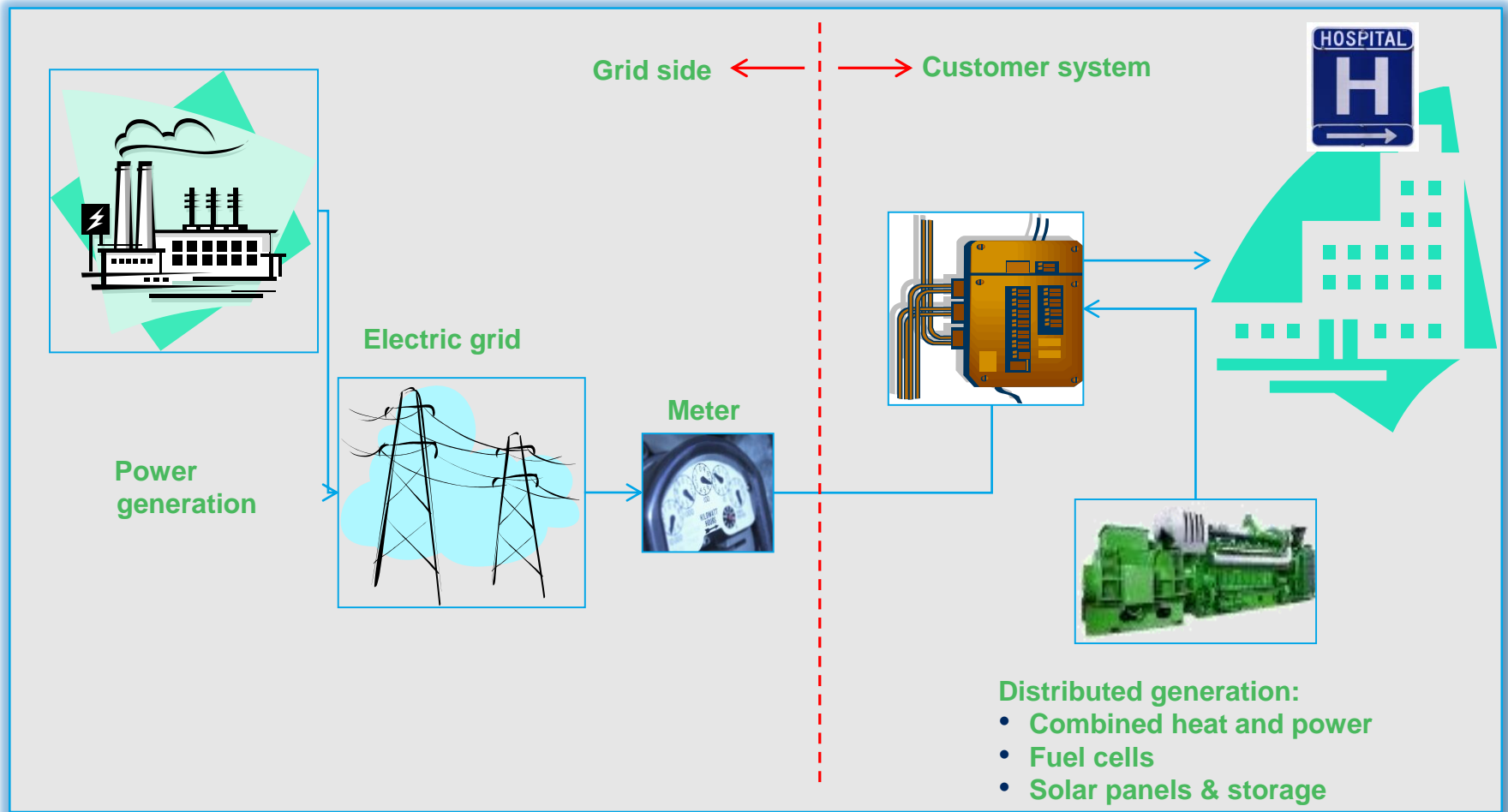
“Realizing energy resilience for New Jersey’s critical facilities through financing and technical assistance”

# Critical facilities based on list compiled by the state's Office of Homeland Security and Preparedness

- Water/ Wastewater facilities
- Hospitals
- Long term care facilities
- Transportation and transit infrastructure
- Colleges and University
- Schools that act as shelters
- Multifamily Housing Units
- Prisons
- Police departments and public safety answering points
- Certain municipal buildings and town centers
- Other Tier 1 and Tier 2 critical facilities

# ERB Support for Critical Facilities will Support Distributed Generation at the Customer Site

ILLUSTRATIVE



# The ERB will Fund Resilient Energy Systems for Critical Facilities

**RESILIENT TECHNOLOGY IS...**

...distributed generation or other technologies...

... that is islandable, capable of blackstart and can operate at critical load



CHP plants can use a reciprocating natural gas engines



Gas Turbine CHP Plant



Inverter system



Black Start Controls



Fuel Cells

**RESILIENT TECHNOLOGY IS NOT...**

...emergency backup generators



Generator



# The ERB can Cover a Range of Costs for New Systems

## ELIGIBLE COSTS

### New Resilient Systems

- Core system
- Piping & wiring
- Islanding controls
- Interconnection
- Fuel pre-treatment (e.g., biogas treatment, or gas compression)
- Installation
- Site work
- Engineering and project management
- Hardening of resilient energy system (e.g., elevation)

## NON-ELIGIBLE COSTS

### Backup Generators

- Emergency backup generators
- Onsite fossil fuel storage for emergency generators


### Other non-energy hardening

- Flood walls
- Elevation

### Other

- Used, refurbished equipment
- Solar PV panels

# The ERB is currently funded with HUD CDBG-DR funds:

Source	Allocated amount	Status
	<ul style="list-style-type: none"><li>▪ \$200M to be allocated by September 2017</li></ul>	<ul style="list-style-type: none"><li>▪ Limited to <b>public, non-profits, and small businesses</b> that satisfy the SBA definition</li><li>▪ Priority for <b>Low-Moderate Income</b> areas and for <b>most Storm impacted communities</b></li><li>▪ <b>Awaiting decision on SBA waiver</b>, submitted Fall 2014, which would allow HUD funds to be used for large private facilities and developers</li><li>▪ Conformance with HUD CDBG-DR program requirements (i.e. Davis-Bacon, Section 3, NEPA review, etc.)</li></ul>

# Eligibility Criteria

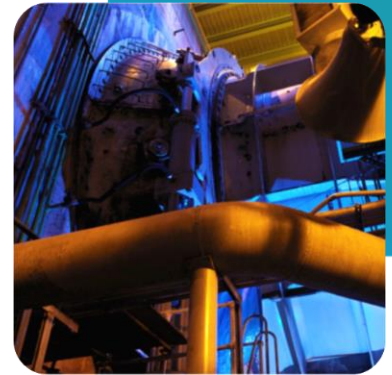
## Eligibility Overview

- **Eligible ERB Applicants**
  - Public facilities – municipal and county authorities
  - Non-profits
  - For-profit businesses that meet the SBA definition of “small business”
- **All other entities, and all privately owned utilities, are currently ineligible**
- **NJEDA is working with HUD toward regulatory flexibility for the ERB that would expand the list of eligible entities**



# HUD Requirements

- Direct impact by Sandy or other qualifying disaster.
- Per federal regulation, CDBG-DR funding may not be used within a Coastal Barrier Resource Area (CBRA).
- Project system must be installed at a facility and be operational within two years of the closing of the ERB incentive and loan funding.



# The ERB will support water and wastewater treatment plants with comprehensive financing for resilience projects

## Overview of Proposed Total ERB Funding

### Program size

- \$65M

### Eligible facilities

- Water and Waste Water Treatment Plants

### 100% unmet funding

#### Incentive:

- 40% Incentives

#### Loan:

- 60% Loan

### Terms

- **Interest rate:** 2% IG, 3% non-IG
- **Collateral:** Unsecured
- **Term:** Up to 20 years, based on useful life of assets
- **Principal Moratorium:** Up to 2 years' principal moratorium

# Scoring Criteria

- **Tech. Efficiency / Economic Cost Effectiveness**
- **Low Moderate Income Area Benefit**
- **Most Impacted Communities**
- **Readiness to Proceed**
- **Criticality**
- **Microgrid**
- **Facility Energy Efficiency**

**Additional detail on these criteria available**

# Application Overview



**Some steps in the application process will take place concurrently**





## Program Status

- Administrative changes to streamline process
- Working with HUD on programmatic waivers
- Program Document revisions
- Current Funding Round for Water/Wastewater

Treatment Facilities and interested applicants

- Working toward next Funding Round in the fall

# ERB Contacts



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# Resilient Power Programs and Policies The Oregon Perspective



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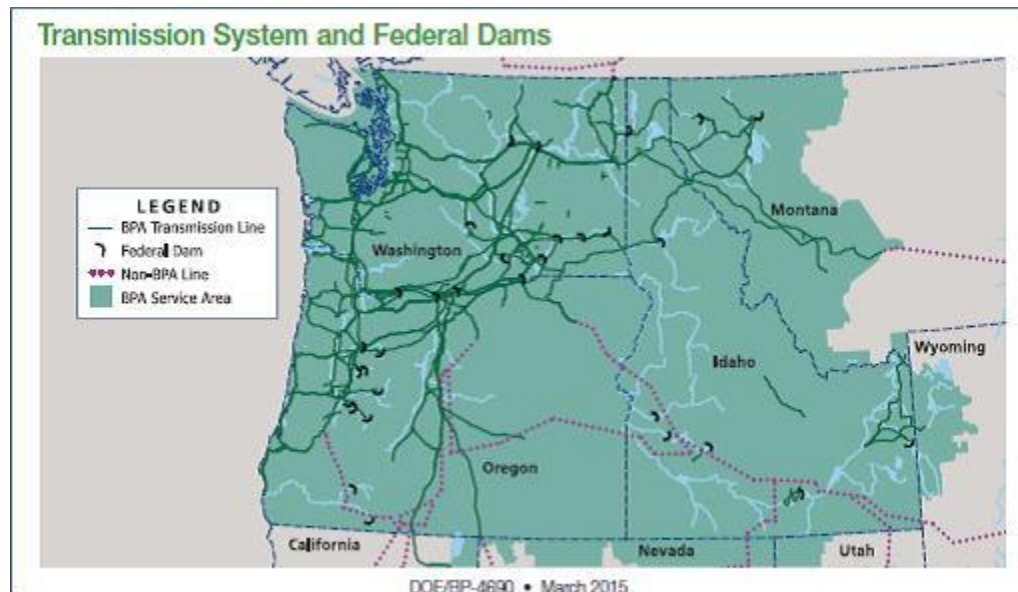
Diane Broad, PE  
Energy Planning & Innovation Division  
Oregon Department of Energy

*Leading Oregon to a safe, clean, sustainable energy future*

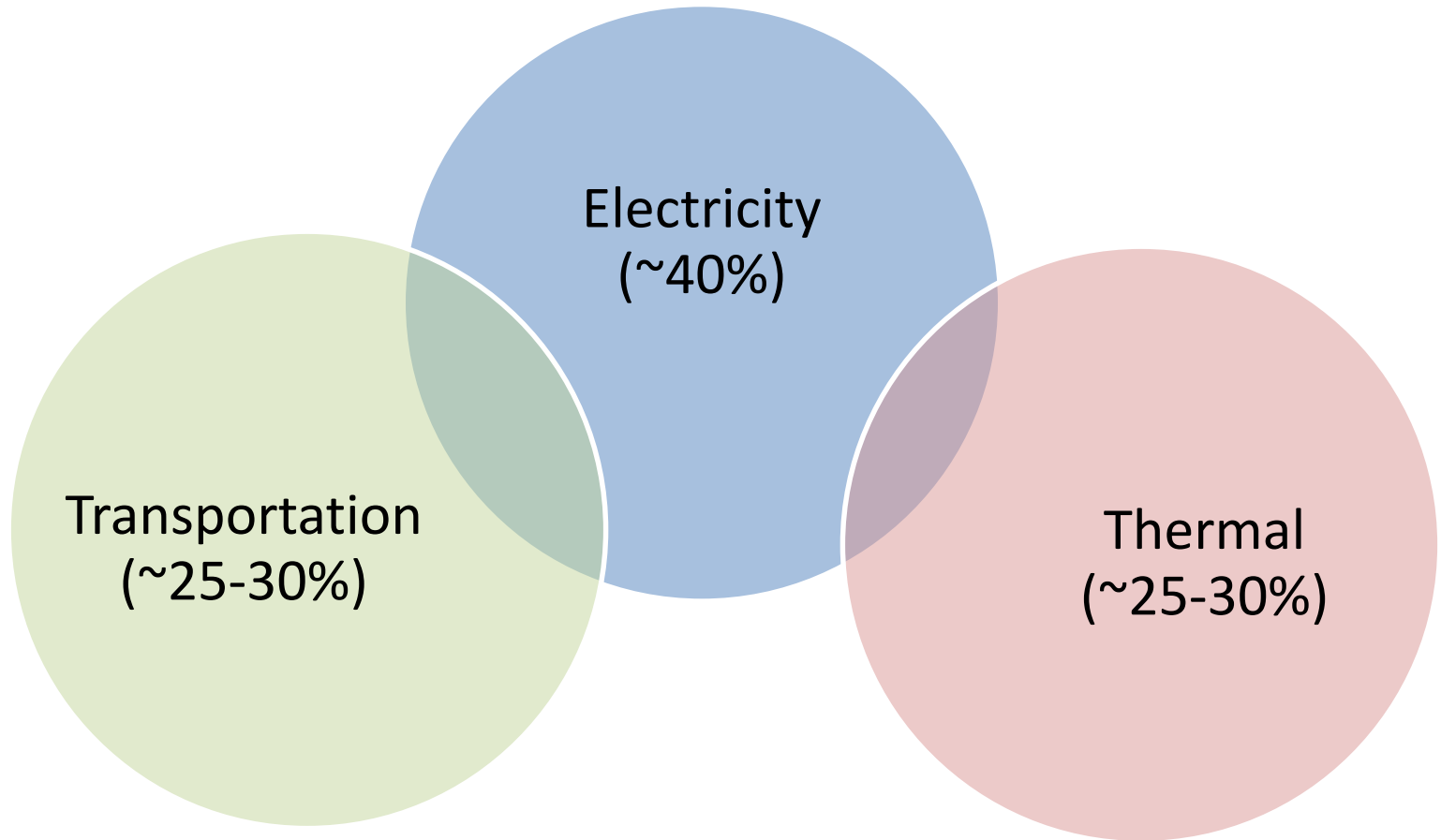


# Oregon and the Pacific Northwest

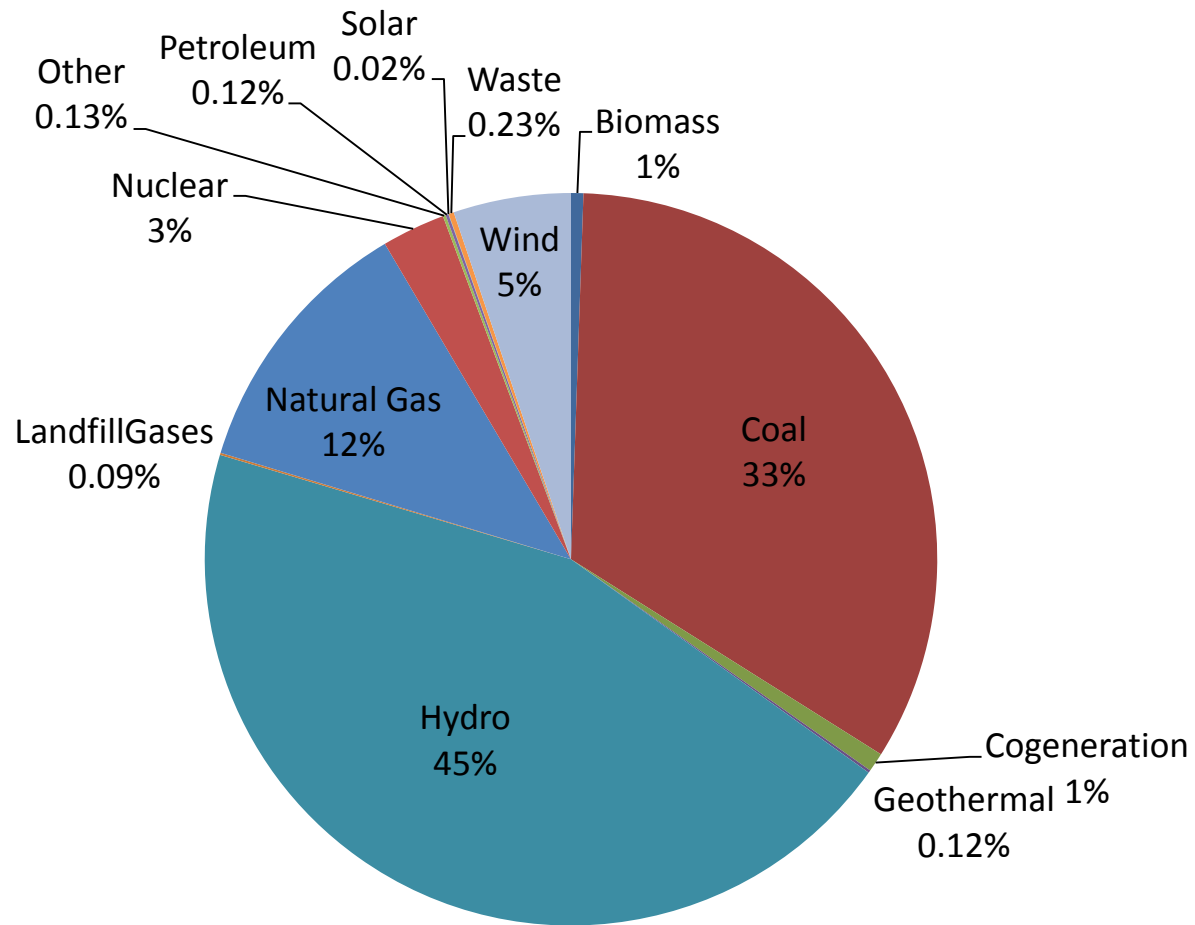
- Oregon, Washington, Idaho and Montana have interconnected economies and energy systems.
- The Northwest has historically been energy rich and long on capacity. The Federal Columbia River Power System has over 20 federal dams and nameplate generation capacity of 22,000 MW.



# Oregon's Energy Use Profile

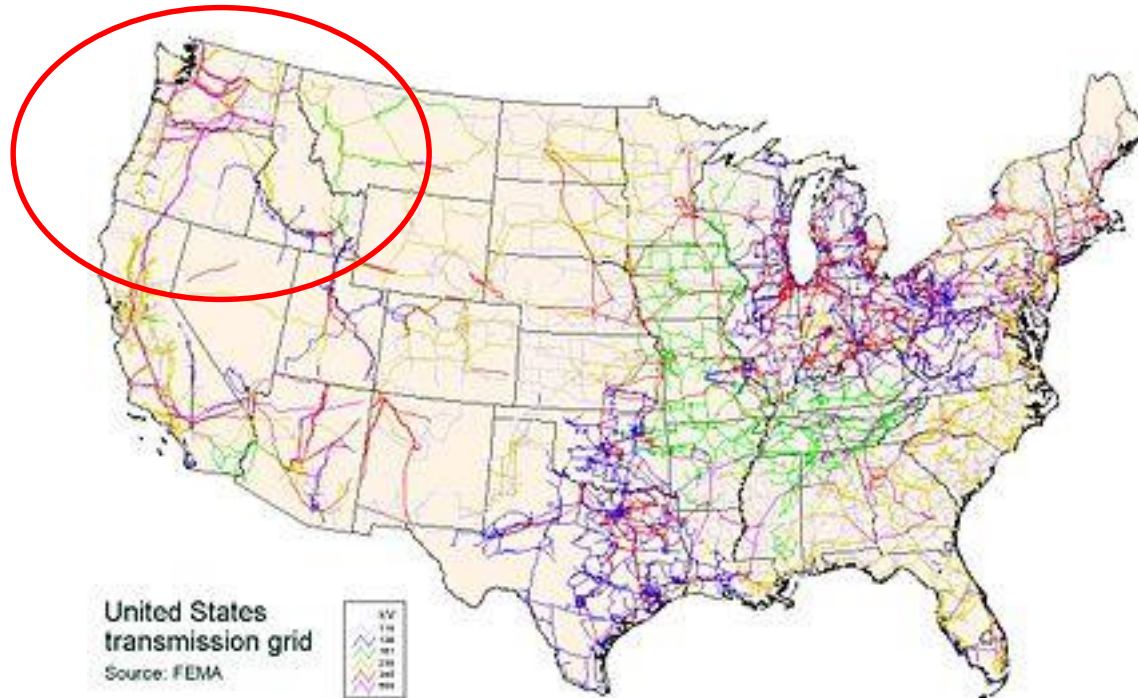


# Oregon's Electricity Portfolio



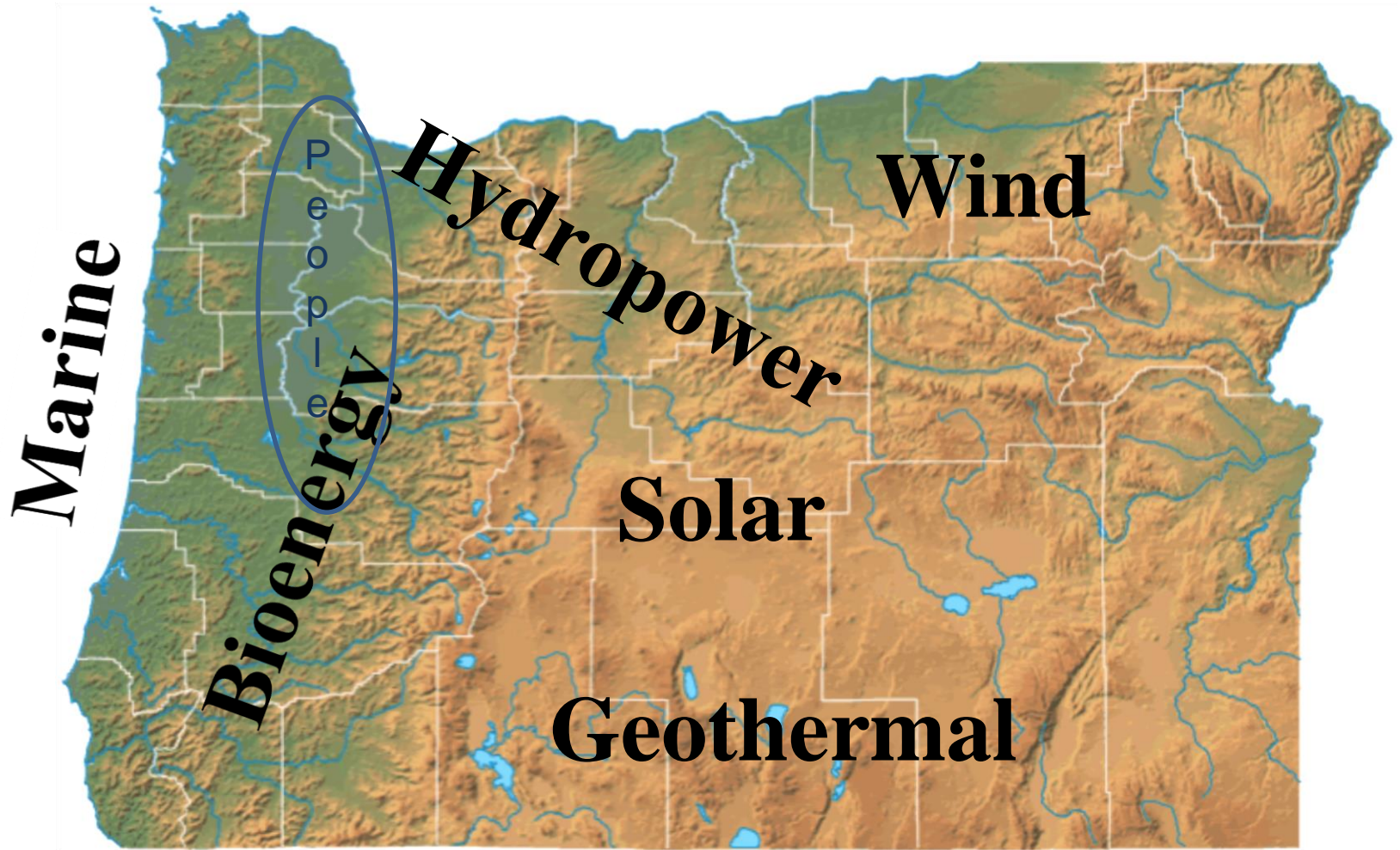
# The Pacific Northwest Electric Grid

- The Pacific Northwest transmission grid is more radial, with fewer meshes, than in the Midwest and East
- Some geographic regions are at higher risk for outages
- No RTO or ISO in the Northwest





# Characterizing Renewable Energy - Resource Location



# Oregon's Energy System Challenges

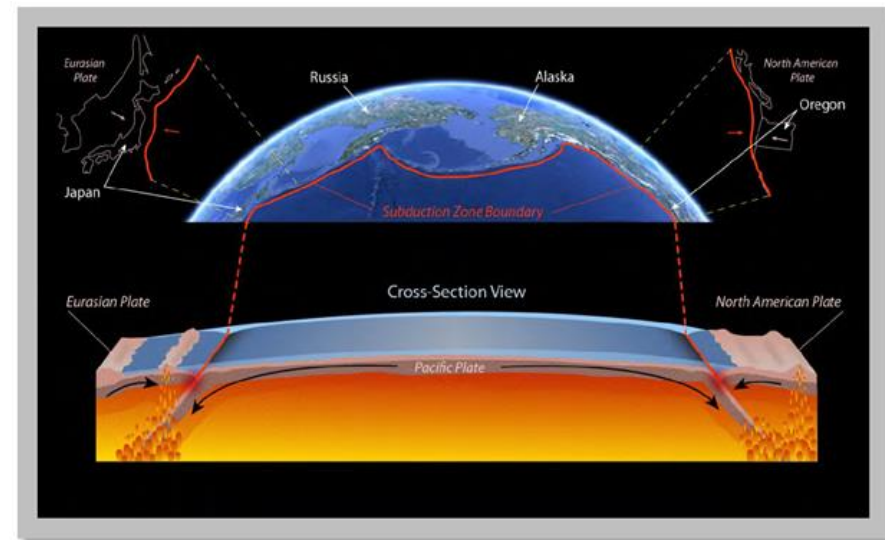
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- Oregon is rich in renewable resources, although wind dominates at present.
- Our infrastructure is at risk from a variety of natural hazards. Oregon's critical energy infrastructure (CEI) hub in Portland is located in an area with significant seismic hazard. Long transmission lines serve the coastal regions, increasing risk of isolation.
- Geographically diverse challenges are created by wildland fire, earthquakes, tsunamis, and extreme weather such as storms, heat waves and droughts.

# “The Big One”

## Cascadia Subduction Zone Event

- Oregon is mirror-image of Japan in Ring of Fire
- ~15% chance of occurring in next 50 years
- Magnitude 8-9 earthquake expected 300 years; last recorded event 1700 AD
- 1 to 6 **months** without power, Valley and Coast



Source: Dan Bihn, et. al, Portland State University

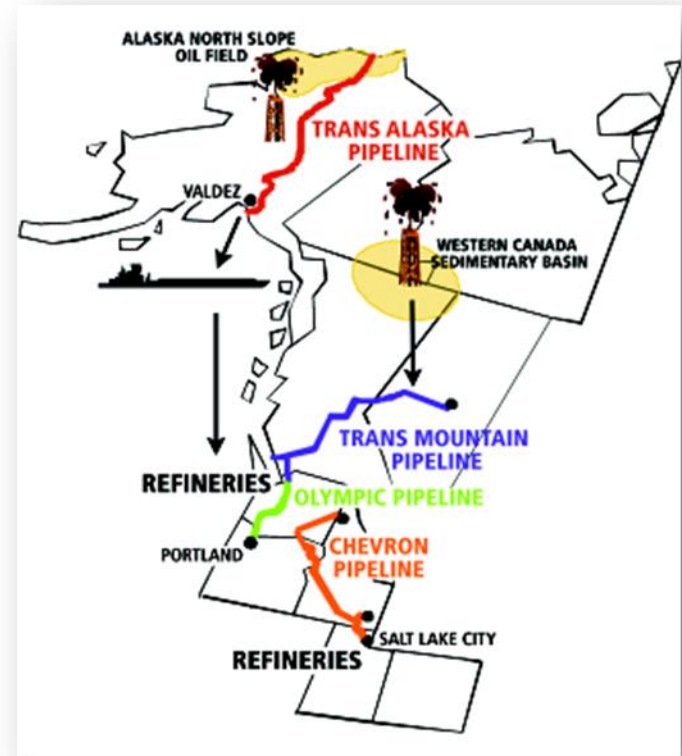
# DOGAMI 2013 Earthquake Risk Study

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- The energy sector facilities in the CEI Hub (along the Willamette River in Portland) include:
  - All of Oregon's major liquid fuel port terminals
  - Liquid fuel transmission pipelines and transfer stations
  - Natural gas transmission pipelines
  - Liquefied natural gas storage facility
  - High voltage electric substations and transmission lines
  - Electrical substations for local distribution

# Existing Work, Building Oregon's Resiliency

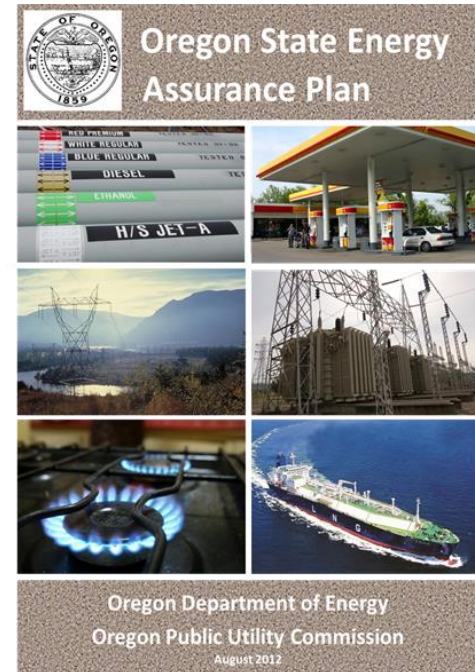
Oregon Resilience Plan - Statewide Oregon Seismic Safety Policy Advisory Commission (OSSPAC) developed the Oregon Resilience Plan to outline actions for the state related to preparation for a seismic event, and **specifically addresses the energy sector**. The plan was done at the direction of the Legislature and results were presented in February 2013.





# Existing Work, Building Toward Resiliency

Oregon Energy Assurance Plan - ODOE received an ARRA grant from the US DOE to create a statewide energy assurance plan. ODOE partnered with the OPUC and the Oregon Department of Geology and Mineral Industries (DOGAMI) to complete the plan, submitted in August 2012.



A companion study looked at the role of and opportunities for alternative technologies, distributed generation, and smart grid technologies in emergency planning. See Distributed Energy Resiliency Study.

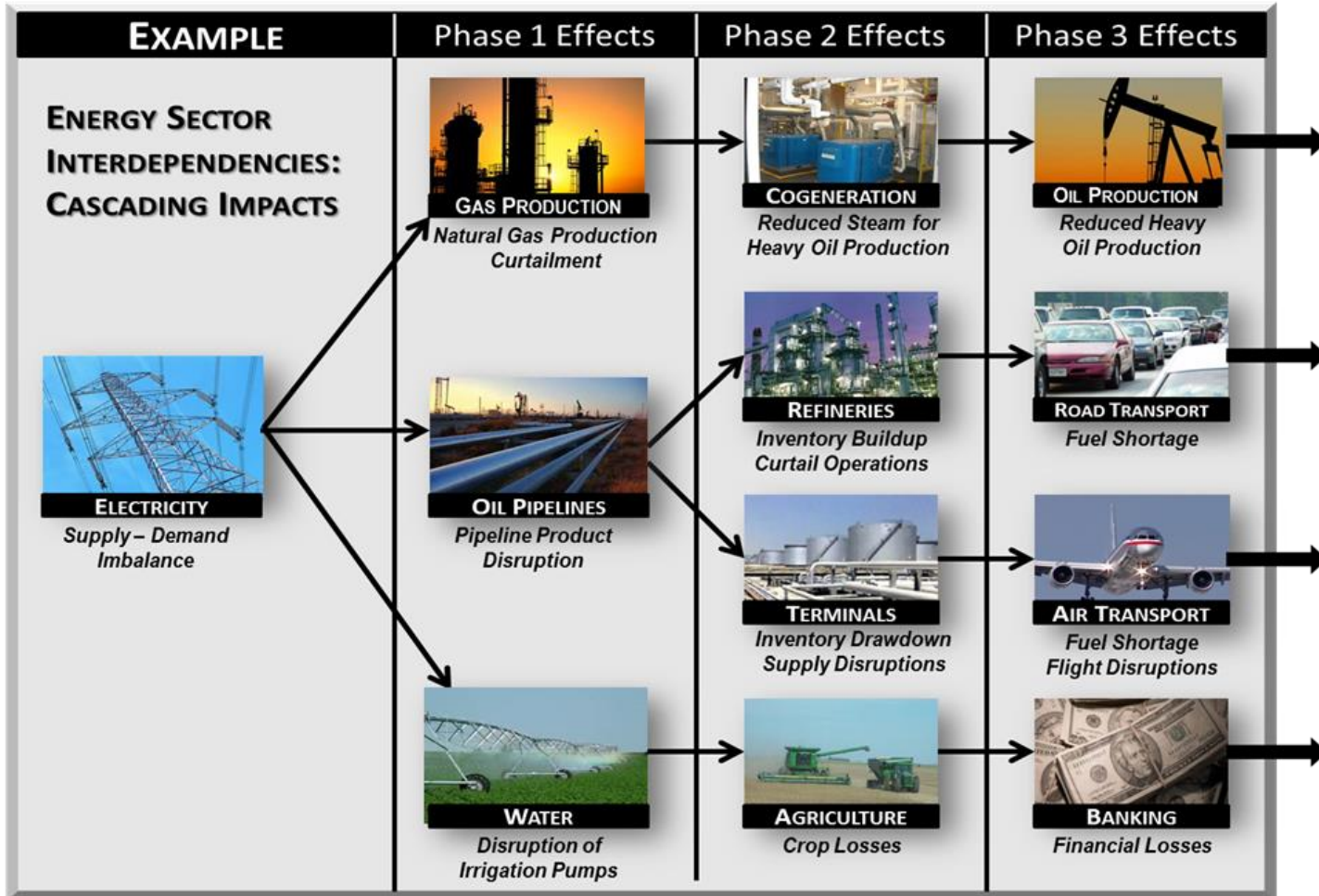
# Policy Approaches to Build Resiliency

- **Biomass** – Improve forest health, install distributed generation, provide resiliency
- Ensure availability of **natural gas** and increase in-state production of **biofuels**
- **Interdependencies** can be critical – many fuel storage facilities need electricity to pump the fuel and do not have backup





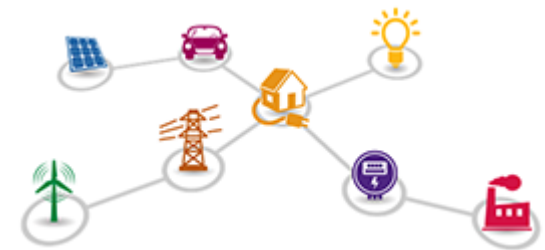
# Policy Approaches to Build Resiliency



Cascading impacts continue past Phase 3.

# Program Considerations for Resiliency

- **Energy Efficiency** – reduce consumption every day to save money; reduces size of energy storage or backup generation → “right sizing”
- **Demand Response** – increase flexibility of loads to manage peak demand or provide grid services; also part of “right sizing” the energy backup system
- **Smart Grid** – communication to strengthen grids when stressed, limiting system outages with real-time flow monitoring on transmission & distribution; enabling microgrids



# PGE – Salem Smart Power Project

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- 5 MW, 1.25 MWh Li-ion battery bank deployed in the distribution system
- 8,000 sq. ft. facility that opened in March 2013, can operate in a microgrid
- Operates on a feeder with 100 kW solar and dispatchable diesel generators
- \$25 million facility built in collaboration with Eaton Corporation and EnerDel, Inc., and received DOE matching funds as part of the PNW Smart Grid Demonstration



# PGE – Salem Smart Power Project

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- **Energy storage for resilience:** The lithium-ion batteries can run the microgrid for up to 30 minutes.
- **Back-up to the back-up:** The batteries also work in concert with nearby standby generators owned by the state of Oregon, creating a high-reliability zone designed to reduce service interruptions for customers in the area. The Oregon State Data Center and Oregon Military Department are participating.
- **Other demonstrations include integrating renewables, leveling out demand, and real-time transactive control (Pacific Northwest Smart Grid Demonstration Project)**
- **Replicating microgrids:** PGE is investigating other substations as good candidates for storage and DG

# Oregon upcoming Energy Storage RFP

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- Partnership with US DOE Office of Electricity, Sandia Natl. Lab and Oregon BEST
- Electrical energy storage, but no preference for technology
- 500 kW/500 kWh min. size
- Utility partner or letter of support
- Five high-interest applications
- Online within 18 months (one year preferred)
- Min. one year of operational data
- RFP published by Sept. 4 2015 [www.Oregon.gov/energy](http://www.Oregon.gov/energy)

# Oregon upcoming Energy Storage RFP

Application	Description	ESS location	Example Value Demonstrations
<b>T&amp;D Upgrade Deferral/ Management of Peak Demand</b>	Defer the installation or upgrade of power lines and transformers	Utility system, transmission or distribution, or C&I facility	\$/kW of peak load reduction; site specific benefits such as cost deferred and for how long the deferral will be adequate
<b>Service Reliability/Resiliency</b>	Backup power on the utility side of the meter or at commercial & industrial facilities	Utility distribution system, microgrid or C&I facility,	Response to grid disturbances; and emergency preparedness, Control and visibility to owner. Critical load being served.
<b>Power Quality/Voltage support</b>	Utilize the power conversion systems of ESS for dynamic, bi-directional VAR support	Utility system, transmission or distribution	Total cost of ownership; operating cost
<b>Grid Regulation</b>	Transmission system area regulation, faster response than conventional generators	Utility system, transmission or distribution	Total cost of ownership; operating cost; Cost savings compared to peaker plant or next best alternative.
<b>Renewable energy firming, ramp control, energy shift</b>	Smooth output of solar and wind generators, assisting in meeting interconnection standards	Utility system, transmission or distribution	\$/kWh of reduced curtailments; availability; capacity factor

# New State Resilience Officer



- Position in the Office of the Governor after passage of HB 2270
- Legislation creates the position and provides funds to perform studies and engage multi-agency efforts
- Engage the thirteen state agencies that have regulatory authority or a key emergency support function
- Look to the new Resilience Officer to bring together efforts at ODOE, OPUC, ODOT, DOGAMI, and others to support programs that advance state goals



Thank you for your  
attention.

Questions?

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# RESILIENT POWER

A Project of Clean Energy Group

Sign up for the RPP e-Distribution List to get notices of future webinars and the monthly *Resilient Power Project Newsletter*: <http://bit.ly/RPPNews-Sign-UP>

More information about the Resilient Power Project, its reports, webinar recordings, and other resources can be found at [www.resilient-power.org](http://www.resilient-power.org).

# Thank You

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