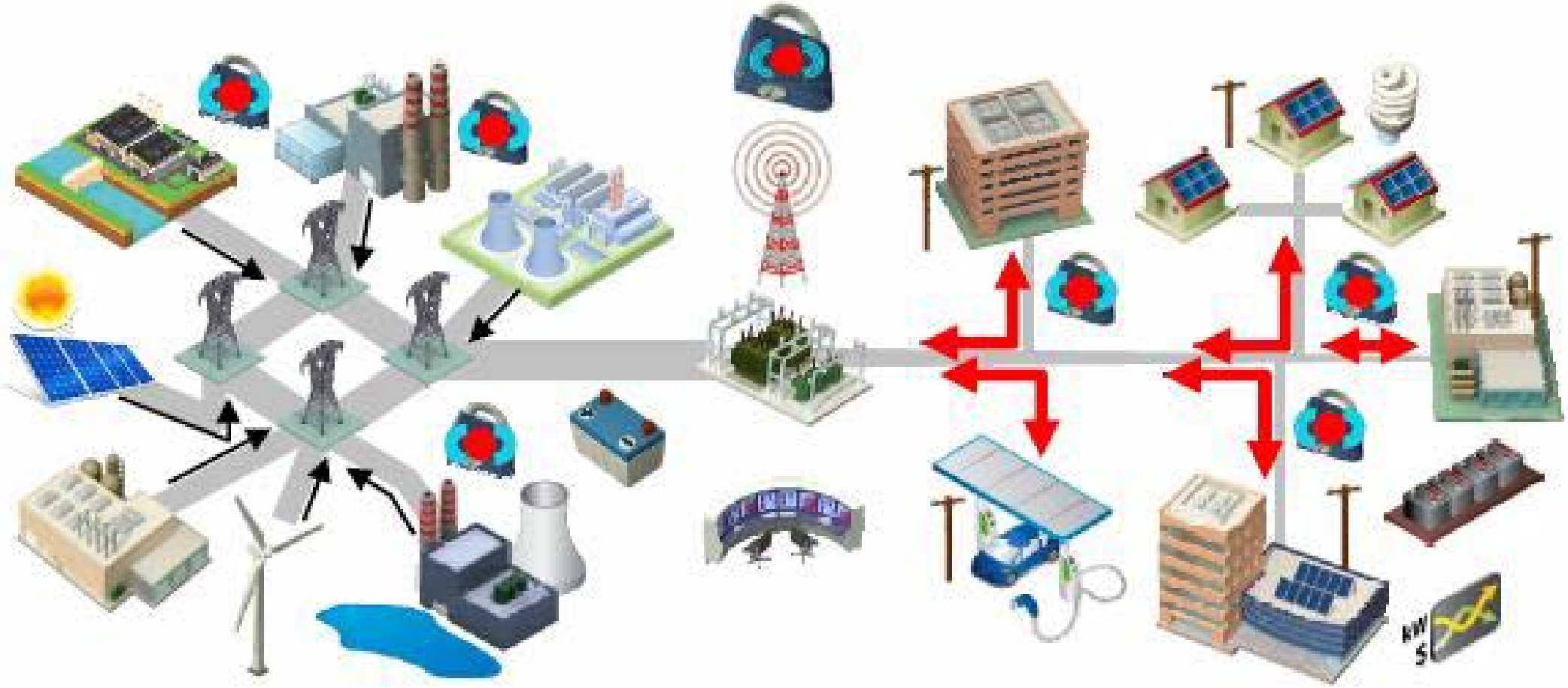
Rhode Island Power Sector Transformation

NESEA Building Energy 2017

Danny Musher, RI Office of Energy Resources

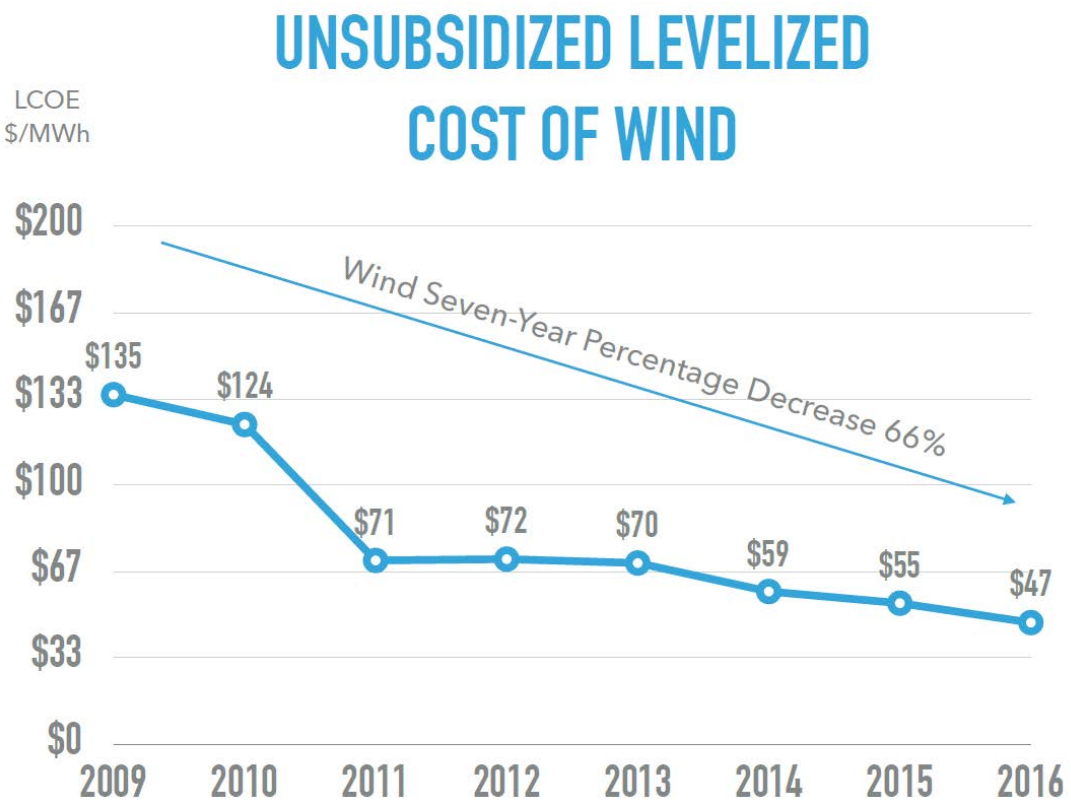
Rhode Island Office of Energy Resources

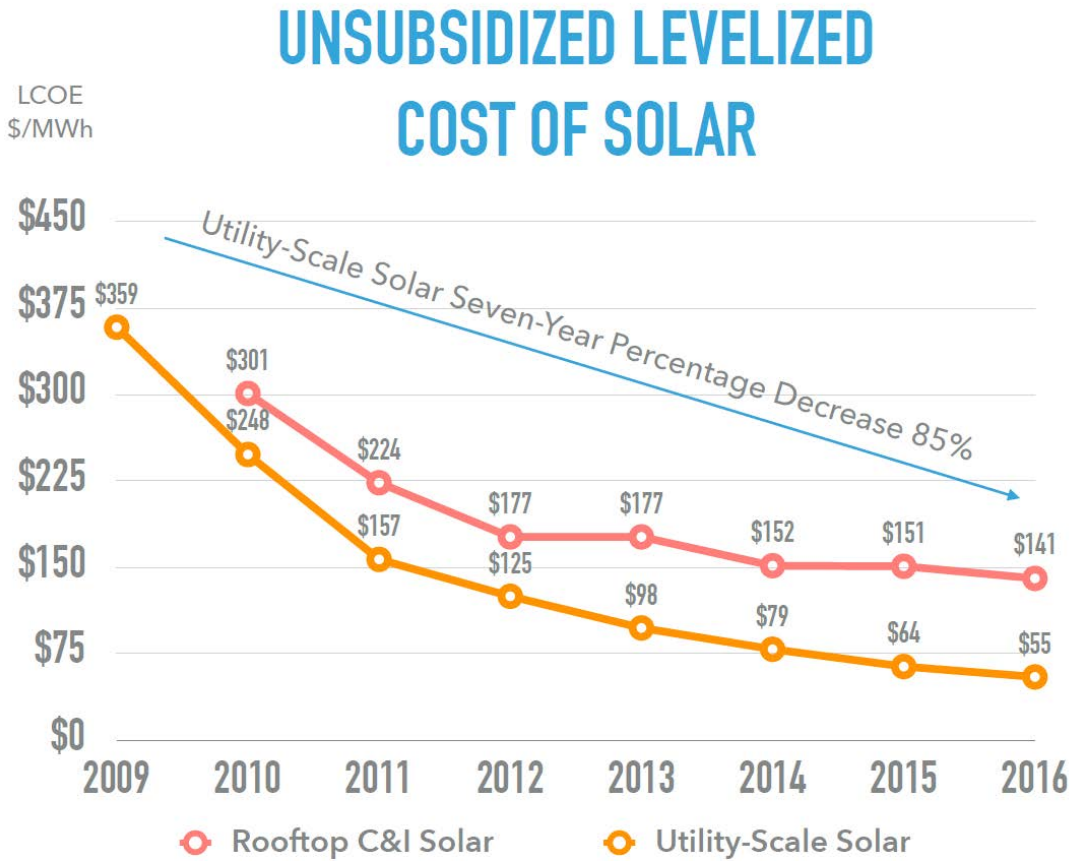
- OER is the lead state agency on energy policy and programs
- OER works closely with diverse partners to advance Rhode Island as a national leader in the clean energy economy



Credit: U.S. Department of Energy

RI's electricity system should **enable consumers to benefit** from clean energy technologies (DER)





Our focus areas...

- Distribution system planning
- Grid connectivity functionality
- Strategic electrification
- Utility business model

Partnership

Governor's Office

Office of Energy Resources

Public Utilities Commission

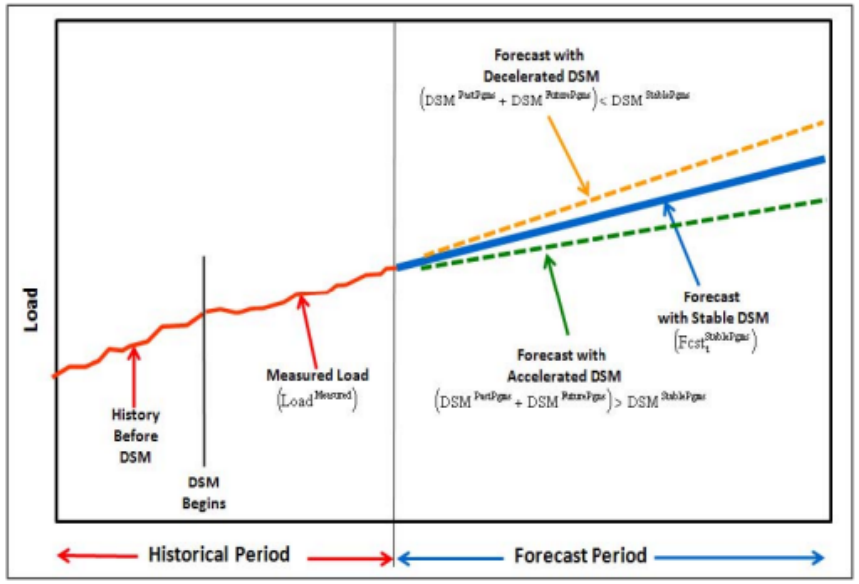
Division of Public Utilities & Carriers

Our utility, industry, & stakeholder partners

with support from National Governors Association

How does DER affect utility system planning?

DER impact forecasted grid needs…



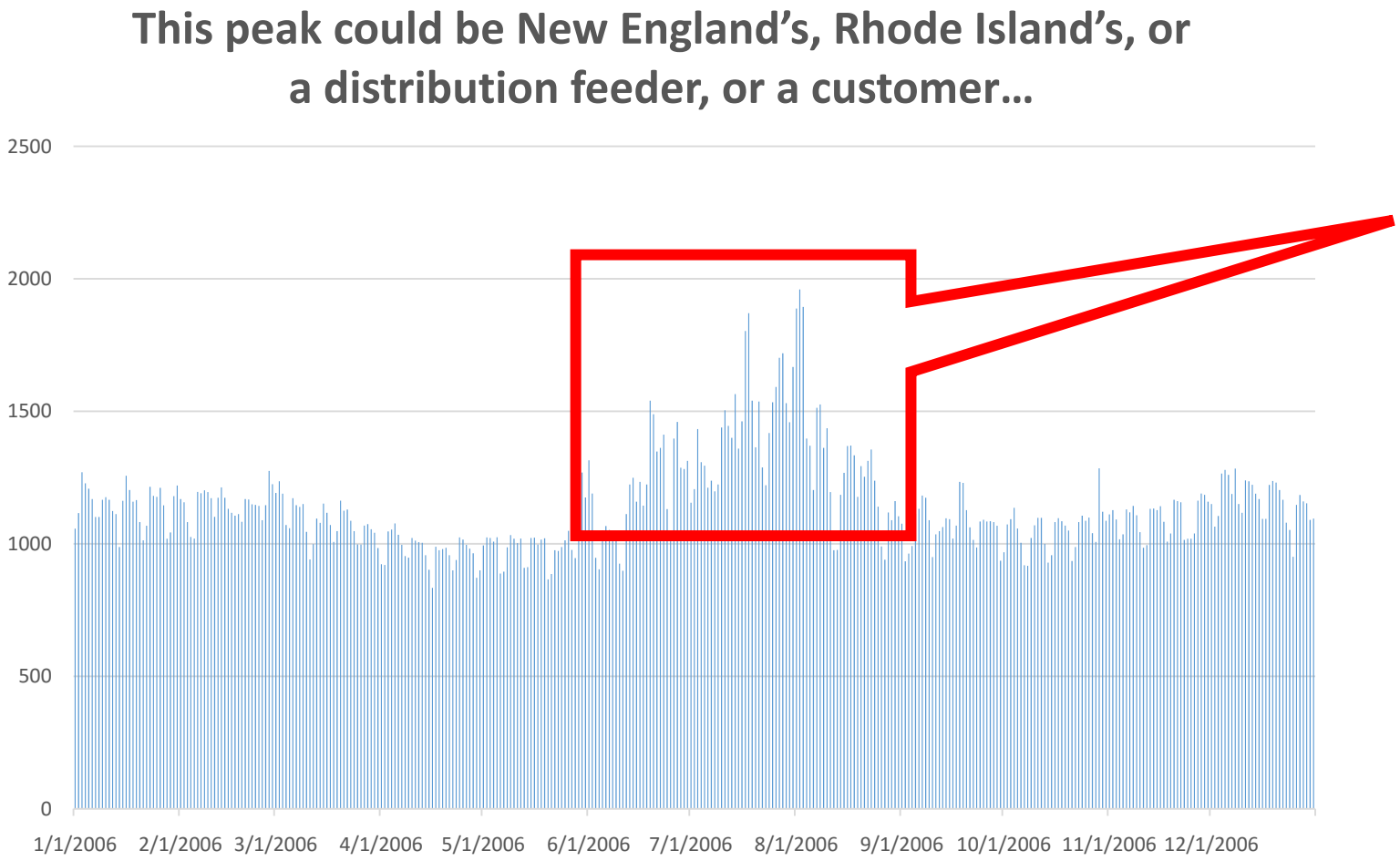
DER can substitute for traditional infrastructure – poles, wires, substations

…and investment decisions

▶ The System Reliability Procurement Solar Distributed Generation Pilot Project how dis PV can to RI's e

planning, and potentially deferring a new substation feeder by an estimated two to four years.

When and where can DER provide value?



Rhode Island Peak Demand 2006 (source ISO-NE)

EE, DG, Storage, Time-of-Use Rates

could avoid

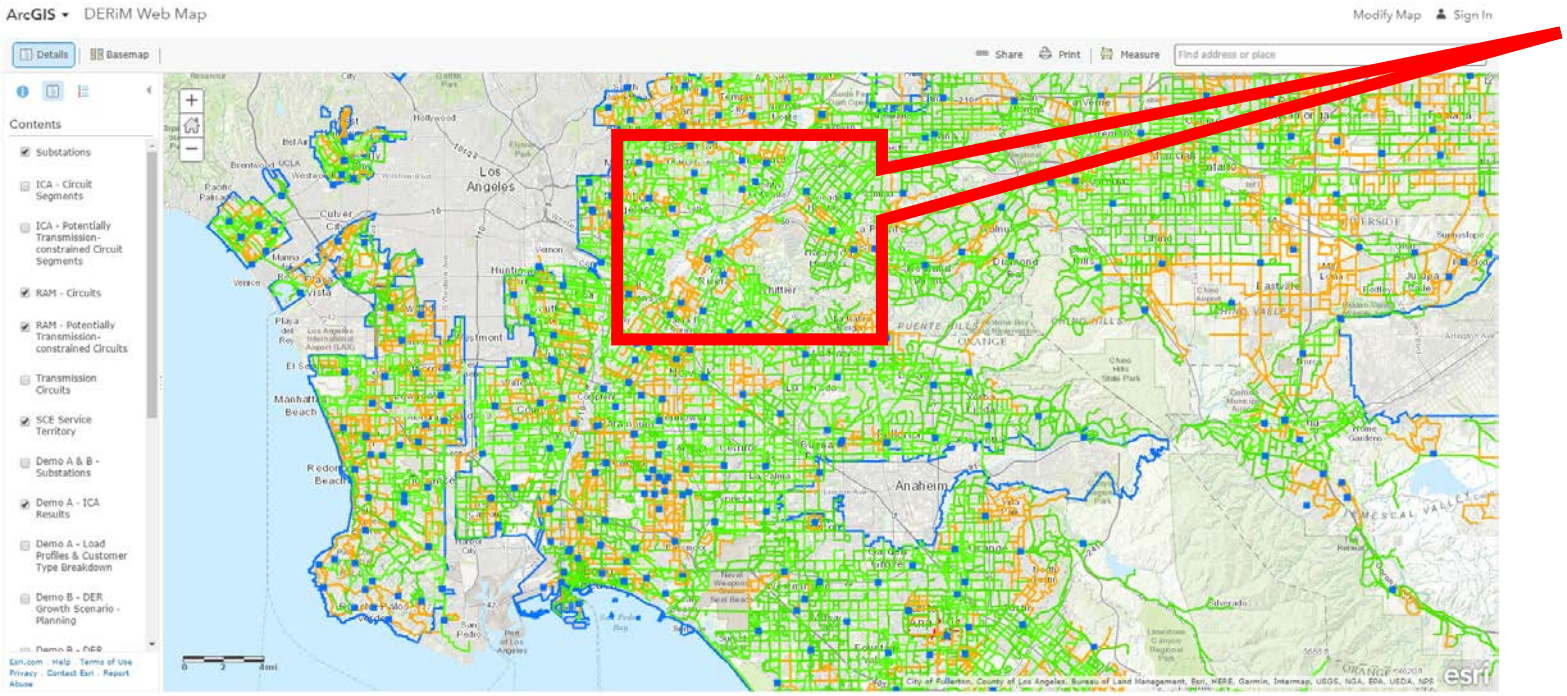
Generation ($$, CO2)

Transmission ($$)

Distribution ($$)

When and **where** can DER provide value?

This map could be New England, Rhode Island, or a neighborhood…



DERiM Web Map (source Southern California Edison)

EE, DG, Storage, Time-of-Use Rates

could avoid

Transmission ($$)

Distribution ($$)

Land Use ($$, CO2)

How does DER affect utility system planning?

- But we need better grid visibility to know **when** and **where** high value opportunities are

Today we don't have this data granular or in real-time

without

Advanced meters, communications, and other technology

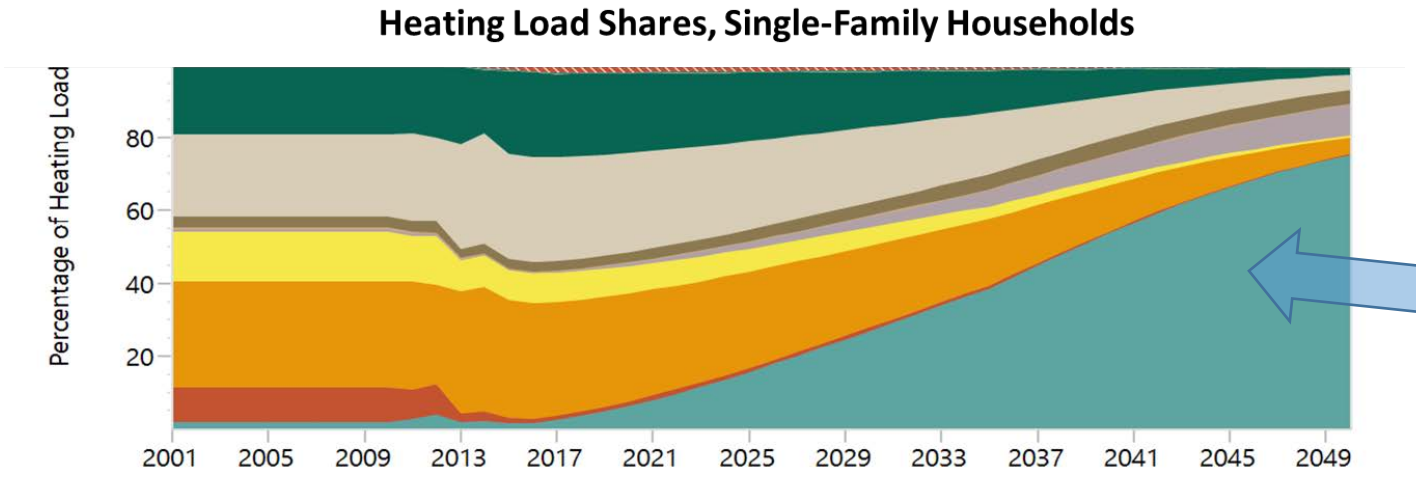
What grid connectivity functionality do we need for advanced planning and a nimble grid?

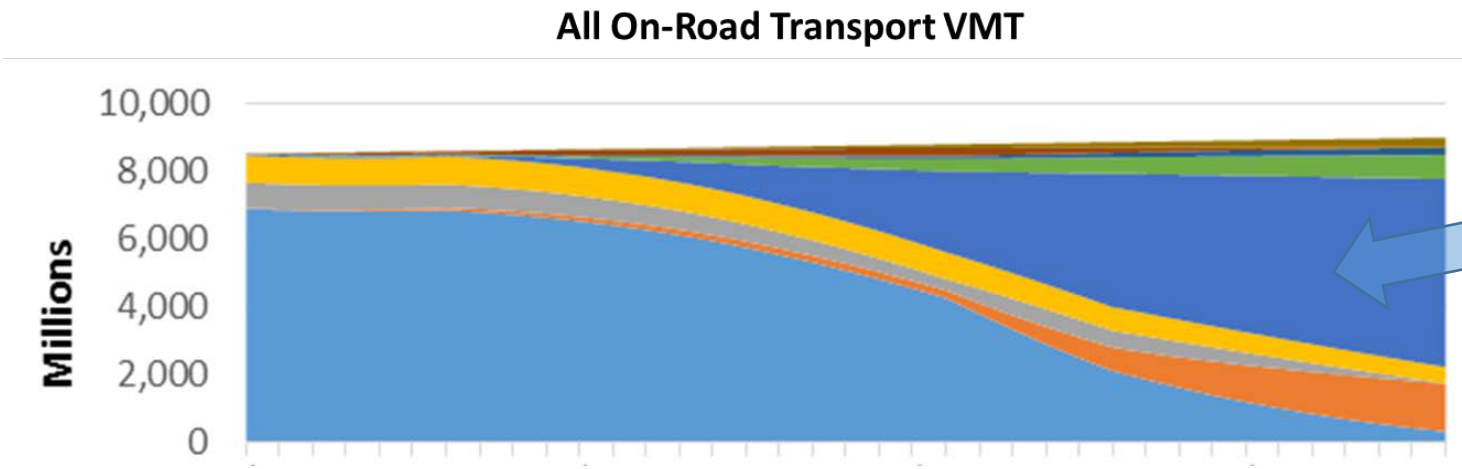
- Communications?
- Meters?
- Other?

Figure 3-1: Massachusetts Grid Modernization Taxonomy

Outcomes	Capabilities/Activities*	Network Systems Enablers
Reduce Impact of Outages	Fault Detection, Isolation and Restoration	• Communications • SCADA / Distribution Management System • Outage Management System • Geospatial Information System
	Automated Feeder Reconfiguration	
	Intentional Islanding	
Optimize Demand	Volt/VAR Control, Conservation Voltage Reduction	• Communications • SCADA / Distribution Management System • Metering System • Meter Data Management System • Billing System
	Load Control	
	Home Area Network Capability	
	Advanced Load Forecasting	
	Time Varying Rates	
Integrate Distributed Resources	Voltage Regulation	• Communications • SCADA / Distribution Management System
	Load Leveling and Shifting	
	Remote Connect / Disconnect	
	Mobile Workforce Management	• Communications • Outage Management System

How do we integrate new electric heat and vehicles into the grid?





Achieving GHG targets:

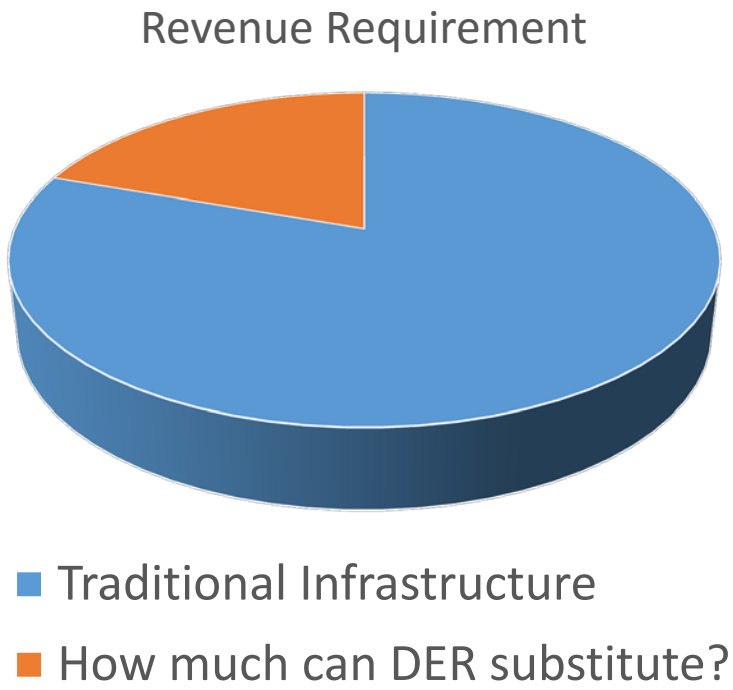
Heat pumps and EV's meet ~70-80% of heating and transportation needs in 2050

What utility business model will support RI's goals?

Today's "cost of service" ratemaking – utilities make money off rate base

$$R = O + (V-D)r$$

- R = utility's revenue requirement
- O = utility's operating expenses
- V = Gross value of utility's property
- D = utility's accrued depreciation
- r = utility's allowed rate of return



Connecting the dots… Docket 4600

This enables sophisticated grid planning to integrate DER

Utility should have consistent incentive to deliver desired benefits

DER provides a unique "value stack"

Visibility needed to measure the value in time and location

Level	Example Cost / Benefit Category	System Attribute / Cost Driver	How to Measure / Monetize?	Visibility Requirements?
Power System	Distribution Costs	Locational Constraints, Losses, Marginal Prices…	Dynamic, Multi-Layered Forecasts	Interval or AMI Meters, Modeling, Planning
Customer	Low-Income Participant Benefits	Improved Health, Comfort, Property Value…	Current Values in EE Program	Interval or AMI Meters?
Societal	Economic Development	Impacts on GSP, Employment…	Economic Modeling	Detailed Economic Modeling

Questions?

Danny Musher

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danny.musher@energy.ri.gov