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
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...

...and investment decisions

DER can substitute for traditional infrastructure – poles, wires, substations
When and where can DER provide value?

This peak could be New England’s, Rhode Island’s, or a distribution feeder, or a customer...

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?
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

DER provides a unique “value stack”

Visibility needed to measure the value in time and location

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

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
Questions?

Danny Musher
Rhode Island Office of Energy Resources
danny.musher@energy.ri.gov