Getting Ahead of the Curve: Connecticut’s First-in-the-Nation Statewide Microgrid Program
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October 18, 2013

Toward Cheaper, Cleaner, More Reliable Energy
Where we are coming from

Connecticut has been hard hit with severe weather in past three years

- 2010 snowstorms
- Tropical Storm Irene
- Freak October snowstorm
- Superstorm Sandy
- Blizzard of 2013

Storms have left hundreds of thousands without power for long periods of time, in some cases in excess of 10 days
Impacts from severe weather

- Storms have resulted in large-scale devastation
- Threat to safety and security of residents
- Disruptions to everyday rhythms of 21st century life
Predictable outcome

- Residents express frustration
- Policymakers scramble for ideas
- Somebody trots out a study on the cost of undergrounding power lines

“The most recent report in 2007 estimated the cost of placing the state's 1,330 miles of 345 kilovolt transmission line underground and maintaining it would be $27.8 million a mile compared to $6.8 million for the same length of overhead line.” —CTPost.com

- Clamor dies down quickly
A fresh approach in Connecticut

• Governor Dannel Malloy wanted to do something different

• Worked with Connecticut legislature to design a “microgrid” program

• Program provides enhanced levels of safety and quality of life for Connecticut residents in large-scale outage situations
Creation of microgrids across the state

• Severe weather events becoming new normal

• Threats facing the state become more multi-dimensional (weather, terrorism, cyber-attacks, etc.)

• Microgrids are a way to allow critical facilities to function even when all else fails
Vision for microgrids in Connecticut

• Microgrids will provide critical services to residents
  – Generating electricity with cleaner, 24/7 operational power sources
    • Natural gas turbines with combined heat and power, fuel cells, solar panels, etc.
  – Engineered to “island” from the grid when the larger grid is de-energized
  – Built in a cost-effective manner
  – Contribute to public good by islanding critical facilities
  – Connects more than one critical facility to reliable distributed generation resources
What is a critical facility?

• Hospital
• Police station
• Fire station
• Water treatment plant
• Sewage treatment plant
• Public shelter
• Correctional facility
• Municipal center
• Telecommunications equipment
• Gas station
• Pharmacy
• Grocery Store
• Etc.
### First round results

<table>
<thead>
<tr>
<th>Project</th>
<th>Facilities</th>
<th>Generation</th>
<th>Grant Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UConn Depot Campus/Storrs</td>
<td>Campus Buildings</td>
<td>400 kW fuel cell, 6.6 kW PV</td>
<td>$2,144,234</td>
</tr>
<tr>
<td>City of Bridgeport City Hall/Bridgeport</td>
<td>City hall, Police Station, Senior Center</td>
<td>(3) 600 kW natural gas microturbines</td>
<td>$2,975,000</td>
</tr>
<tr>
<td>Wesleyan/Middletown</td>
<td>Campus, Athletic Center (Public Shelter)</td>
<td>(1) 2.4 MW and (1) 676 kW Natural Gas Combined Heat and Power Reciprocating Engine</td>
<td>$693,819</td>
</tr>
<tr>
<td>University of Hartford-St. Francis/Hartford</td>
<td>Dorms, Campus Center, Operation Building</td>
<td>(2) 1.9 MW diesel (existing), 250 kW diesel, 150 kW diesel</td>
<td>$2,270,333</td>
</tr>
<tr>
<td>SUBASE/Groton</td>
<td>Various Buildings and Piers</td>
<td>5 MW cogen turbine, 1.5 MW diesel</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>Town of Windham/Windham</td>
<td>2 Schools (Various Public Purposes)</td>
<td>(2) 130 kW natural gas, 250 kW solar, 200 kWh battery; (2) kW diesel,</td>
<td>$639,950</td>
</tr>
<tr>
<td>Town of Woodbridge/Woodbridge</td>
<td>Police Stations, Fire Station, Department of Public Works, Town Hall, High School, Library</td>
<td>1.6 MW natural gas, 400 kW fuel cell</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>City of Hartford-Parkville Cluster/Hartford</td>
<td>School, Senior Center, Library, Supermarket, Gas station</td>
<td>600 kW natural gas</td>
<td>$2,063,000</td>
</tr>
<tr>
<td>Town of Fairfield-Public Safety/Fairfield</td>
<td>Police Station, Emergency Operations Center, Cell Tower, Fire Headquarters, Shelter</td>
<td>50 kw natural gas recip engine, 250 kW natural gas recip engine, 27 kW PV, 20 kW PV</td>
<td>$1,167,659</td>
</tr>
</tbody>
</table>
Lessons from first round

• Perceived strengths
  – Strong executive champion (Governor Malloy)
  – Rigorous evaluation process
  – Full service support from CT Microgrids team

• Opportunities to improve
  – Need to make program more accessible for municipalities
  – Financing support for distributed generation resources
Second round on tap

• Second round of microgrids program will kick off toward the end of October 2013
  – Refined procedure
  – Financing program in conjunction with nation’s first “Green Bank”
  – More technical support for municipalities

• Governor has authorized an additional $30m for the program in his budget, which was passed by the legislature
Preparing for the future

- Connecticut’s first-in-the-nation statewide microgrid program is a critical piece of a larger resiliency strategy.
- Power outages are inevitable, but the program provides enhanced safety and quality of life for residents in an outage situation.
- The program fits in with Governor’s larger vision for cheaper, cleaner, and more reliable energy future for Connecticut.
- In line with “portfolio approach” that encourages deployment of distributed generation.

[Graphs showing microgrid revenue by forecast scenario and world markets from 2013 to 2020.]
Thanks for listening

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