Connecticut Microgrid Initiatives
Results and Opportunities

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David Dobratz, P.E., CEM
Supervisor, Direct Install & Load Response
Eversource Energy

Microgrids 101

- Microgrids offer promising opportunities to improve grid performance and reduce cost.
- A precise definition does not exist because microgrids are not standardized in design but instead tailored to specific load and location requirements. One commonality is that microgrids are both providers and consumers of power.
- The majority of existing microgrids are off-grid systems used for rural electrification and in developing nations, and nanogrids that serve a single facility.
- Interest is growing in more complex interdependent systems integrated with the local grid that can coordinate and balance multiple technologies and operations.

Microgrids 101

- Microgrids can provide more than just electricity. Integrated energy functions can include heating, cooling, transportation, water, gas and thermal waste. Some of the best economic opportunities are combined heat and power applications.

- The regulatory framework for microgrids is still in infancy. It is unclear what the dominant market model will be – regulated utility assets, competitive products or hybrid.

Connecticut Microgrid Projects

- The Connecticut Microgrid Program was created in order to support local distributed energy generation for critical facilities.
- The program stems from Public Act 12-148, Section 7, which requires that the Department of Energy and Environmental Protection establish a pilot of such a program.
- The act was created after multiple episodes of severe weather caused widespread power outages for extended periods of time.
- The program is designed to create ways so that critical buildings will remain powered during electrical grid outages.
- Grants are distributed evenly between small, medium, and large municipalities. The total amount of grants is not to exceed $15 million each year.

Connecticut Microgrid Projects

Total funding for the Microgrid Program is $48M. The first round of grants $18M awarded July 2013 and second round of grants $5M October 2014.

Funding Cycle	Fuel Cell	Gas: Non-CHP	Gas: CHP	Diesel	Solar	Battery Storage	Total	Grants	Total
	kW	kW	kW	kW	kW	kWh	kW	$	$/kW
Round 1	800	4,560	8,076	5,700	304	200	19,460	**$17,953,995**	**$1,150**
Round 2	1,400	-	296	-	120	100	1,826	**$5,090,240**	**$2,790**

Last year Governor Malloy helped to power up the first microgrid project to come online under the inaugural round of the statewide microgrid program.

Prevailing Views

- Utilities can only earn revenue by owning assets and as a general rule they may not own generation.
- Microgrid adoption rates might be lower than otherwise due to uncertainty about its legal standing. A few states have created microgrid policies, but clarity about rules and requirements is the exception.
- Microgrids necessitate new business models that upend long established utility business models. Utility business conflicts can be impediment to third party owned generation.
- Utilities are hesitant to pursue ventures that necessitate new regulatory requirements.

Prevailing Views

- One concern is unintended consequences such as cross subsidization. Another is policies that favor one energy source (natural gas) over electricity.
- There is no certainty how regulators will designate microgrids. In New York, for example, they are considered a public utility.
- Public rights of way are a source of concern for power lines that must cross streets.
- Interconnection Integration and Trans-active billing
- Circuit map Documentation and off-customer-site equipment ownership

Industry Best Practices: Strategy

- Start with a strategic vision aimed at achieving specific goals. Make reduced power consumption one of these goals. Evaluate options for using local energy resources.
- Develop project concepts, scope and benchmarks that are aligned with this vision.
- Focus project requirements on specific needs and outcomes. Look to technology providers for the solutions.
- Understand key policy issues such as how to monetize asset ownership (e.g., utility ratebase).
- Consider that lowest first cost solutions are usually the least sustainable. Too much emphasis on a short payback normally means more fossil fuel usage and a lower share of renewable power.
- Leverage existing finance programs. Create a team of advisors with subject matter expertise.

Industry Best Practices: Project Architecture

- Match technology choices to the needs of microgrid customers. Avoid making generation decisions to accommodate a specific supply source. Keep the focus on the nature of the loads that will be served.

- Yet anchor the overall solution with generation of some kind (e.g., CHP, renewables).

- Integrate advanced technology and integration (automated payment collection, load control) into the initial architecture rather than an add-on.

- Use a flexible open architecture that is incrementally expandable over time. Develop project attributes and requirements that can be scaled up.

- Design to optimize the primary distribution system with services to engineer resiliency, demand response and frequency regulation.

Industry Best Practices: Stakeholders

- Engage stakeholders in front-end microgrid project discussions.
- Consider a broad range of interests, including independent power producers, transmission operators, distribution companies, utilities, technology providers, government and targeted microgrid customers.
- Seek out creative organizations and customers to energize the project.
- Balance the need for financial and operational project sustainability with the need for microgrid community support.

Key Utility Objectives – Microgrid Integration

- Understand how to leverage existing core competencies toward successful engagement in the microgrid space
- Define which areas will need resources with new skills for successful engagement in the microgrid space
- Clarify stakeholder roles and define the optimal mix from a Utility perspective
- Enhance knowledge of customer engagement dynamics and better understand customers' "nature of demand" for microgrids

Microgrid Opportunities

- Utilities develop microgrids
- Non-utility microgrid ownership
- Utilities operate microgrids for greater distribution system control
- Utilities operate microgrids for economic reasons

Thank You

David Dobratz, P.E., CEM
Eversource Energy
David.Dobratz@eversource.com