NYS SmartGrid Consortium

New York Microgrid Initiatives

DOE Electricity Advisory Committee

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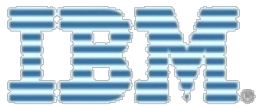
Consortium Overview



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Consortium Mission

Ongoing advocacy of Smart Grid / grid modernization

- Maintain vision of future grid
- Advocate benefits for producers, suppliers, and consumers
- Support initiatives that demonstrate capabilities of advanced grid technologies
- Provide technical resources for industry and policy makers
- Priorities for 2015
  - Real world projects - - Multiple microgrid demonstrations
  - Strengthen research and international collaboration
  - Utility of the Future (REV)

NY Microgrid Inventory and Case Studies

Objectives

- Increase understanding of community microgrids
- Support future policy making and advocacy based on the analysis and recommendations
- Provide insight for critical stakeholders in evolving markets in New York and nationwide:
  - Aligns with NY Prize and REV initiatives

Microgrids Inventory Report

Scope

- Provides factual information on existing NY Microgrids
- 20 microgrid projects selected from an extensive candidate list of NY located microgrid projects
- Projects down-selected using Consortium-supplied selection criteria.
  - e.g. Eliminated nano-grids

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Microgrids Inventory Report (cont'd)

No.	Project Name and Location	Project Status	Total Capacity (MW)	Generation Types
1	Eastman Business Park Microgrid *Rochester, New York*	Online	125	Coal
2	SUNY Stony Brook *Stony Brook, New York*	Online	45	Natural gas (NG) combined heat and power (CHP)
3	Co-op City *Bronx, New York*	Online	40.8	NG and steam
4	Cornell University CHP Microgrid *Ithaca, New York*	Online	37.9	NG, diesel, steam, hydro
5	NYU Microgrid *New York, New York*	Online	13.4	Diesel and steam
6	Burrstone Energy Center *Utica, New York*	Online	3.6	NG co-gen
7	Van Blarcom Closures, Inc. *Brooklyn, New York*	Online	1.2	NG CHP
8	Town of Denning *Denning, New York*	Online	1	Diesel
9	Linden Plaza *Brooklyn, New York*	Online	0.5	NG CHP
10	Jewish Home & Hospital *Bronx, New York*	Online	0.3	NG CHP

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Microgrids Inventory Report (cont'd)

No.	Project Name and Location	Project Status	Total Capacity (MW)	Generation Types
11	Silver Towers *New York, New York*	Online	0.3	NG CHP
12	Hudson Yards *New York, New York*	Under development	14.5	NG and diesel
13	Kings Plaza Shopping Mall *Brooklyn, New York*	Under development	12.8	NG CHP
14	Clarkson University-Potsdam *Potsdam, New York*	Under development	10	NG, solar photovoltaics (PV), hydro, diesel
15	Nassau County *Seaford, New York*	Proposed	15.1	Diesel, methane
16	Suffolk County *Yaphank, New York*	Proposed	12.1	Diesel and PV
17	Metropolitan Hospital *New York, New York*	Proposed	6.15	Diesel
18	Rockland County *New City, New York*	Proposed	3.25	NG, diesel
19	Broome County *Binghamton, New York*	Proposed	2.47	Diesel
20	Buffalo Niagara Medical Campus *Buffalo, New York*	Proposed	unknown	NG CHP, PV

Microgrids Case Studies Report

Scope

- Provides in-depth analysis of a few projects of interest
- Assess trends, success and failure factors, as well as provide practical action recommendations.
- Six community microgrid programs from across the U.S. and Europe.
  - Five existing microgrids were selected for detailed analysis, and one as a developmental highlight.
- Emphasis on community engagement, interesting business models

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Case Studies Report (cont'd)

Project	Location	Ownership	Customers	Generation
Borrego Springs	San Diego, CA	Utility-owned	Mixed use; 2,800 customers	15 MW peak load. Diesel, PV, storage
Stafford Hill	Rutland, VT	Utility-owned	High school shelter	2.5 MW PV, 4 MW storage
Co-op City	New York, NY	End user owned	50,000 residents	40 MW capacity. Gas, steam
Hamden	Hamden, CT	Third party-owned	Mixed use across seven buildings	1.7 MW. CHP, diesel, fuel cell, PV, storage
Bornholm Island	Denmark	Hybrid ownership	~28,000 customers including res/com/ind loads	>100 MW. Diesel, wind, CHP, steam, PV, biogas
Hudson Yards	New York, NY	Third party-owned	Mixed use	38 MW demand 14.5 MW CHP

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Case Studies Report (cont'd)

Metric	Co-op City	Hamden	Stafford Hill	Bornholm Island	Borrego Springs
Diversity of residential and commercial	X	X	X	X	X
Collection of companies financing and providing tools	X	X	X	X	X
Major incorporation of EE,DR, and load optimization		X		X	X
Diversity of DER		X		X	X
Utility/community involvement in management and operation	X		X	X	X

Case Studies Report (cont'd)

Analysis of the success and failures of each project based on 16 different elements.

- Ownership
- Cost
- Finance
- Regulation
- Development
- Technology
- Interconnection
- Operations
- Energy Delivery
- Vendor Relationships
- Community Relationships
- Benefits
- Revenue
- Business Model
- Customer Impact
- Energy Efficiency

Case Studies Report (cont'd)

Principal Lessons Learned

- **Asset ownership** has a significant impact on business model viability and the ability to monetize benefits.
- **Diversification of monetization strategies** can enhance access to capital, mitigate financial risk, and optimize value.
- Optimal system design may require greater complexity and more robust control, **experienced operation** is key to optimizing community microgrid value.
- **Focusing on key stakeholders** while maximizing the effectiveness of engagement with those stakeholders, early in the process, is key to community microgrid project success.

Case Studies Report (cont'd)

Recommendations

- **Business Model Optimization**
  - Reduce Legal and Regulatory Barriers to Development.
  - Enable and Encourage Comprehensive Benefit Monetization.
  - Enable and Align Full Cost Recovery to Cost Causation and Benefit Receipt.
- **Project development**
  - Enable and Encourage Optimal Project Development and Finance.
  - Encourage Early and Robust Stakeholder Engagement.
  - Standardize Key Processes, Requirements, Technologies and Agreements.
  - Support Best Practices for Optimizing Project Technology, Design and Operation.

New York Prize

The $40 million NY Prize community microgrid competition (RFP 3044)

- **Stage 1** Feasibility Assessment (**CLOSED)**
  - Awards to Conduct Feasibility Assessments
  - ~80 awards for studies (up to $100K)
- **Stage 2** Engineering Design and Financial /Business Plan
  - Feasibility Evaluated Awards for Audit Grade Design
  - 4-8 Awards (up to $1M)
- **Stage 3** Microgrid Build-out and Operation
  - Designs Evaluated Awards for Build-out/ Operation
  - ~5 Awards of $3-$5M
- Open enrollment structure to accelerate pipeline of projects
- Can enter without having been awarded for previous stage

Source: NYSERDA

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New York Prize (cont'd)

Desired Features of Community Microgrids

Provide power to critical facilities and a diverse group of customers

- Move beyond campus style projects
- Community actively engaged in planning and operation
- Demonstrate tangible community benefits
- Not dependent on utility command and control

Incorporate innovations that strengthen the surrounding power grid

- Employ active network control
- Provide platform for active customer interaction with grid
- Incorporate clean energy, energy efficiency, storage

High potential to be economic and replicated without future subsidies

- Leverage private capital to maximum extent

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