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MICROGRIDS

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WHAT ARE MICROGRIDS?

A "microgrid" generally refers to a small-scale electric distribution network that (1) links several users to one or more nearby distributed (on-site) energy resources and (2) can be operated in conjunction with or independently from the larger electrical grid.

When operating independently (i.e. in "island" mode), a microgrid can continue to supply power to its users even if the larger grid suffers a power outage.

Microgrids use energy from local connected sources, which can include renewable sources (solar panels or wind), fuel cells, batteries, or fossil fuels.

ISSUE

This report provides background information on microgrids in Connecticut. It updates OLR Report 2012-R-0417.

SUMMARY

Public acts passed in the last several years have encouraged the development of microgrids, which connect several electricity users to on-site energy sources and may operate independently of the larger electrical grid.

The Department of Energy and Environmental Protection (DEEP) operates a microgrid grant and loan program that has provided funding for microgrids to support critical facilities in several municipalities. DEEP awarded grants to (1) nine projects in the pilot round of the grant program and (2) two projects in the second round. DEEP began accepting applications for the third round of the microgrid grant program in December 2015, but has yet to receive any applications.

ACTS AFFECTING MICROGRIDS

The state began considering proposals related to microgrids largely in response to widespread power outages caused by storms in 2011. As shown in Table 1, enacted legislation since 2012 (1) created, funded, and expanded a microgrid grant and loan pilot; (2) expanded certain Green Bank incentives to include microgrids; and (3) directed electric companies to submit proposals for grid-side system enhancements that may include microgrids.

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Table 1: Overview of Acts Affecting Microgrids (2012-Present)

Act	*Microgrid Provisions*
PA 12-148	• required DEEP to establish a microgrid grant and loan program to support up to 65 megawatts of onsite electricity generation (the amount of power needed to serve approximately 50,000 homes) at critical facilities, including hospitals, police and fire stations, water and sewage treatment plants, and correctional facilities
PA 12-189	• authorized $25,000,000 in general obligation bonds to fund DEEP's microgrid pilot program in FY 13
PA 13-239	• authorized $15,000,000 to fund the microgrid pilot program in FY 14 and again in FY 15
PA 13-298, §§ 34, 35, 39 & 40	• expanded the pilot program by including production and transmission facilities of Federal Communication Commission-licensed TV and radio stations as critical facilities; • expanded the state's virtual net metering policy to allow municipal and state accounts to share credits with facilities connected to a microgrid; • required the Public Utilities Regulatory Authority (PURA) to authorize municipal, state, or federal entities to independently distribute electricity generated from certain resources across a public highway or street if the resource is connected to a municipal microgrid; and • allowed energy improvement districts to own, lease, or finance microgrids
PA 14-94, § 23	• expanded the Green Bank's commercial property assessed clean energy program (C-PACE) to include microgrids, and their related infrastructure, that incorporate clean energy
PA 15-1, June Special Session	For funding DEEP's microgrid grant program: • cancelled $10,000,000 in prior bond authorizations; • authorized $0 in FY 16; and • authorized $15,000,000 in FY 17
PA 15-5, June Special Session, §§ 102-103	• required each electric company (i.e., Eversource and United Illuminating) to submit at least one proposal to DEEP for a pilot program to build, own, or operate grid-side system enhancements; and • required proposed programs to demonstrate and investigate how distributed energy resources, which may include microgrids, can be reliably and efficiently integrated into the electric distribution system in a way that maximizes the value they provide to the electric grid, electric ratepayers, and the public

MICROGRID GRANT AND LOAN PROGRAM

Project Requirements

By law, municipalities, electric companies, municipal electric utilities, energy improvement districts, and private entities may apply to DEEP's microgrid grant and loan program (CGS § 16-243y(b)). Applicants may collaborate and submit applications together. The proposed microgrid must support critical facilities, which are:

1. hospitals,
2. police and fire stations,
3. water and sewage treatment plants,
4. public shelters,
5. correctional facilities,
6. certain television and radio production and transmission facilities,
7. commercial areas,
8. municipal centers identified by the municipality's chief elected official, and
9. any other facility or area identified by DEEP (CGS § 16-243y(a)(2)).

After reviewing submissions to its request for information, DEEP released a request for proposals (RFP) in April 2013 for the pilot round of the microgrid program. The RFP discussed the program's purpose, eligibility requirements, and additional review criteria, including:

1. the project's reliability, overall costs and benefits, projected performance, and contribution to the public need;
2. inclusion of a mix of public and private facilities;
3. overall experience and capabilities of the applicant, the microgrid developer, and the microgrid operator;
4. geographic diversity; and
5. use of clean, renewable, and reliable generation resources.

DEEP released an RFP for a second round of the program in March 2014 (available here).

Funded Projects

Table 2 describes projects that received funding through the pilot round and the second round of the microgrid grant program. According to DEEP, in the pilot round, applicants submitted 36 projects, nine of which received funding. In the second round, applicants submitted five proposals, two of which received funding. DEEP disbursed $17,953,995 in the pilot round and $5,090,240 in the second round, for a total of $23,044,235. Generally, the grants cannot be used for generation, and instead fund microgrid design, engineering services, and interconnection infrastructure (CGS § 16-243y(c)).

Table 2: Microgrid Grant Recipients

City or Town	*Project*	*Facilities*	*Generation*	*Grant Amount*
		Pilot Round		
Bridgeport	City of Bridgeport, City Hall	• City Hall • Police station • Senior Center	• Natural gas microturbines	$2,975,000
Fairfield	Town of Fairfield	• Police station • Emergency operations center • Cell tower • Fire head-quarters • Shelter	• Natural gas reciprocating engines • Photovoltaic units (PV, i.e., solar)	$1,167,659
Groton	Naval Submarine Base New London (SUBASE)	• Various buildings and piers	• Cogeneration turbine • Diesel	$3,000,000
Hartford	University of Hartford – St. Francis	• Dorms • Campus Center • Operation Building	• Diesel	$2,270,333
Hartford	Parkville Cluster	• School • Senior Center • Library • Super-market • Gas station	• Natural gas	$2,063,000
Middletown	Wesleyan University	• Campus • Athletic Center (public shelter)	• Natural gas combined heat and power reciprocating engines	$693,819

Table 2 (Continued)

City or Town	Project	Facilities	Generation	Grant Amount
Pilot Round				
Storrs	UConn Depot Campus	• Campus buildings	• Fuel cell • PV	$2,144,234
Windham	Town of Windham	• Two schools	• Natural gas • PV • Battery • Diesel	$639,950
Woodbridge	Town of Woodbridge	• Police stations • Fire stations • Department of Public Works • Town Hall • High school • Library	• Natural gas • Fuel cell	$3,000,000
Second Round				
Bridgeport	University of Bridgeport	• Campus buildings	• Fuel cell	$2,180,899
Milford	City of Milford	• Parsons Complex • Middle school • Senior center • Senior apartments • City Hall	• Natural gas combined heat and power units • Battery	$2,909,341

Source: DEEP (pilot round, second round)

According to DEEP, of the eleven funded projects:

- three projects are operational (Wesleyan University, University of Hartford – St. Francis, and Town of Fairfield);
- five projects are in progress (Town of Woodbridge, Hartford – Parkville Cluster, City of Bridgeport, Town of Windham, and University of Bridgeport);
- one project (SUBASE) is no longer in progress; and
- one project has yet to obtain a signed contract (City of Milford).

According to DEEP, the UConn project will require a new grant award and UConn is currently evaluating its scope, timeframe, and project components before resubmitting a revised proposal.

DEEP began accepting applications for a third round of the microgrid grant and loan program in December 2015, but has yet to receive any applications.

HYPERLINKS

DEEP, *Microgrid Award Winners: Pilot Round.* July 2013.

DEEP, *Microgrid Award Winners: Round 2.* October 2014.

DEEP, *Request for Proposals: Microgrid Grant and Loan Program.* April 2013.

DEEP, *Request for Proposals: Microgrid Grant and Loan Program*. March 2014.

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