



OLR RESEARCH REPORT

September 12, 2012

2012-R-0417

MICROGRIDS

By: Lee R. Hansen, Legislative Analyst II

You asked what steps Connecticut and other states have taken to develop microgrids.

SUMMARY

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.

Nationally, relatively little has been done by state governments to encourage microgrid development specifically. However, in Connecticut, PA 12-148 established a pilot program to provide grants and loans to help develop microgrid infrastructure. Administered by the Department of Energy and Environmental Protection (DEEP), the program is in development but plans to issue an initial request for proposals (RFP) in October 2012 with grants awarded in February 2013.

It appears that only New York and California have taken significant steps to encourage microgrid development. In New York, the New York State Energy Research and Development Authority (NYSERDA) issued a 2010 report on microgrids that laid out numerous recommendations for

addressing legal and regulatory issues, financing, and research and development. In California, the state energy commission's Public Interest Energy Research (PIER) program has helped fund research and development for new microgrid control technology and provided demonstration grants for microgrid projects.

CONNECTICUT

PA 12-148

In response to the widespread power outages caused by Tropical Storm Irene and the October Nor'easter in 2011, the General Assembly enacted [PA 12-148](#), *An Act Enhancing Emergency Preparedness and Response*. Among other things, the act requires DEEP to establish a microgrid grant and loan pilot 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. Under the act, a "microgrid" is a group of interconnected electricity users and generators that (1) is within clearly defined electrical boundaries that acts as a single controllable entity in respect to the larger electrical grid and (2) can operate as either a part of the larger grid or independent of it, in "island mode."

The pilot program is open to municipalities, investor-owned electric companies, energy improvement districts, and private entities that propose supporting these facilities by developing micro-grid energy generation or converting existing renewable generation for micro-grid use. Eligible parties can collaborate to submit a proposal.

The program can issue up to \$15 million in total grants and loans and, to the extent possible, the awards must be evenly distributed between small, medium, and large municipalities. The grants and loans can only be used for the costs of microgrid design, engineering services, and interconnection infrastructure.

The Microgrid Pilot Program

DEEP recently began developing the program in a three-stage process that includes (1) information gathering and a request for information from stakeholders and potentially interested parties, (2) a phase one RFP to determine project feasibility and a qualified applicant pool, and (3) a phase two RFP to evaluate pre-qualified projects from phase one and make awards. DEEP issued its request for information on August 30, 2012, with responses due by September 28, 2012. It plans to issue the

phase one RFP on October 15, 2012 and the phase two RFP in January 2013, with awards announced in February 2013. In addition, the department intends to hold a stakeholder technical meeting on September 18, 2012; a microgrid workshop on October 10, 2012; and a phase one participants' conference on October 29, 2012.

DEEP's suggested eligibility for the program's phase one bidders include requirements for:

1. a minimum of two or more critical facilities located in close proximity to each other,
2. all interconnection facilities to be underground to ensure maximum reliability during extreme weather,
3. distributed energy generation in close proximity to the users it will be serving,
4. a demonstrated ability to switch to "island" mode upon request and automatically during a loss of power to the larger grid, and
5. a demonstrated ability to operate in "island" mode continuously for an extended period of time during an extreme weather event.

For additional information on the pilot program, including other phase one eligibility requirements, see:

[http://www.dpuc.state.ct.us/DEEPEnergy.nsf/\\$EnergyView?OpenForm&Start=1&Count=30&Expand=1&Seq=1](http://www.dpuc.state.ct.us/DEEPEnergy.nsf/$EnergyView?OpenForm&Start=1&Count=30&Expand=1&Seq=1)

OTHER STATES

Although many states have established programs to promote and develop renewable energy and distributed generation resources, there have been relatively few measures specifically aimed at developing microgrids. The two most notable have occurred in New York and California.

New York

In 2010, NYSERDA issued a report: "[Microgrids: An Assessment of the Value, Opportunities, and Barriers to the Deployment in New York State](#)." Among other things, the report studied the legal and regulatory framework in New York and other states to identify potential obstacles to microgrid development. Its findings noted that in most other states microgrids were either not being considered or just beginning to be

discussed at the regulatory level. However, the most common legal obstacles to microgrids included (1) laws forbidding private wires to be strung across public ways, (2) requirements for entities with distributed generation to obtain electricity marketer or public utility status in order to sell electricity to others, and (3) franchise issues related to entities with distributed generation selling electricity to customers within an established utility's service territory.

The report noted that from a regulatory perspective, the least problematic microgrids would be those that (1) operate on a single customer or property owner's site, (2) do not attempt to sell electricity to previously unaffiliated entities, and (3) do not need wires to cross property lines or public rights-of-way.

Regarding financing and incentives, the report recommended:

1. inventorying the state's energy incentives to determine which create favorable conditions for microgrid project development;
2. providing incentives for development and demonstration microgrid projects, with a priority on new development and redeveloping areas;
3. developing a multi-stakeholder, peer reviewed process to create screening criteria and project guidelines for state investment in microgrid projects; and
4. conducting state supported research to create protocols for incorporating microgrids into existing and prospective energy markets.

The report also recommended that the state promote microgrid research and development by:

1. conducting a national survey of microgrid research and development to identify critical funding gaps and resources for filling them;
2. expanding collaboration among researchers, entrepreneurs, investors, and other parties involved with microgrid commercialization;
3. instituting a collaborative process to streamline the development of microgrid standards and protocols; and

4. promoting public-private partnerships to accelerate the development and deployment of critical microgrid technologies.

California

California's PIER program is the state's energy research and development program for energy efficiency, renewable energy, advanced electricity technologies, energy-related environmental protection, and transmission, distribution, and transportation technologies. In the past, the program helped fund research that led to the development of [new microgrid controls technology](#) at American Electric Power's Dolan Technology Test Center in Ohio.

The PIER program is also funding [Renewable Energy Secure Communities](#) (RESCO) projects to enable communities to rely primarily on locally-available renewable resources to provide electricity at competitive rates. The projects include exploratory projects, which develop an energy action plan for a community; pilot projects, which demonstrate specific renewable energy projects within the community and to full-scale RESCO implementation projects. The program aims to (1) develop models and tools for integrating renewable energy into a community in an economically-optimum way, (2) develop and implement local energy infrastructure that works in harmony with the state-wide energy system, and (3) demonstrate the community-scale integration of renewable energy technologies in a way that allows energy to be supplied on a consistent basis.

The state's RESCO microgrid projects include demonstration grants (1) to explore microgrid islanding of an entire substation area and (2) for a project at the [Santa Rita Jail](#) that, among other things, will show how the jail's distributed energy resources can automatically go into "island" mode during an abnormal disturbance in the larger electrical grid.

LH:ro