

Town Center Distributed Energy Resource Microgrid Feasibility Study Incentive Program

Phase 1 Application Process

Background

For a more detailed discussion of the definitions, classifications, costs, benefits and other issues on microgrids see the BPU’s Microgrid Report, which was issued on November 30, 2016.

The U.S. Department of Energy Microgrid Exchange Group defines a microgrid as:

“An integrated energy system consisting of a group of interconnected loads and distributed energy resources (DER) with clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid and can connect and disconnect from the grid to enable it to operate in both grid connected or island mode.”¹

A Town Center (TC) DER Microgrid, for the purpose of this incentive program, distributes energy to a cluster of critical facilities within a municipal boundary that are capable of providing essential municipal services and shelter for the public during and after an emergency situation. TC DER microgrids could also function during non-emergency “blue sky” conditions. TC DER microgrids could include facilities such as, but not be limited to, multifamily buildings, hospitals, police and fire headquarters, and other local or state government critical operations in a relatively small radius.² These critical facilities could be connected to a single or series of DER technologies that are capable of operating while isolated and islanded from the main grid due to a power outage. In some cases, TC DER microgrids are called advanced microgrids or community microgrids since they connect multiple customers across multiple rights of ways within a municipality.

Based on a review of the events and consequences from several recent extreme weather events on New Jersey’s energy systems, the 2015 Energy Master Plan Update (EMP Update) established a new overarching goal: “Improve Energy Infrastructure Resiliency & Emergency Preparedness and Response.” One of the EMP Update’s new Plan for Action’s policy recommendations included: “Increase the use of microgrid technologies and applications for Distributed Energy Resources (DER) to improve the

¹ <https://building-microgrid.lbl.gov/microgrid-definitions>

² As general rule of thumb guidance this distance would be at a maximum 1 mile or less since overall costs will increase with the distance between multiple facilities.

grid's resiliency and reliability in the event of a major storm.”³ This new policy recommends that:

“The State should continue its work with the USDOE, the utilities, local and state governments and other strategic partners to identify, design and implement Town Center DER microgrids to power critical facilities and services across the State.”

The TC DER Microgrid – Feasibility Study Incentive Program (Program) is the first step in implementing this new policy goal.

Because of the impacts of these weather events, the State of New Jersey has entered into two Memoranda of Understanding (MOU) with the U.S. Department of Energy (USDOE) to evaluate the potential of developing DER microgrids on two key projects: (1) a microgrid within the northeast portion of the NJ Transit system (NJT Grid) and (2) a microgrid within the PSE&G service area in the City of Hoboken. To test the feasibility of these two projects, the USDOE provided funding for both the NJT Grid and the Hoboken microgrid to evaluate the improved resiliency in these proposed systems when the grid is down. In addition, the Board of Public Utilities (BPU) worked with the New Jersey Institute of Technology (NJIT) to map potential TC DER Microgrids. The resulting report (NJIT Report) mapped 24 potential TC DER Microgrids across the 17 municipalities in the 9 Sandy-designated counties attached as Appendix A.

New Jersey has at least 50 operating DER microgrids. These microgrids are single building or a campus setting microgrid with mostly a single DER technology. Several of the campus microgrids may have multiple and redundant DER technologies. The current prevailing New Jersey DER microgrid technology is natural gas combined heat and power systems (CHP).⁴

As documented in the Energy Power Research Institute (EPRI) report *The Integrated Grid*,⁵ DER systems can:

1. benefit the distribution grid because of their increased efficiencies;
2. assist in managing the quality of power on the grid including enhanced voltage controls and balancing real and reactive power; and
3. provide energy, capacity and other ancillary services to the larger grid, which can potentially provide additional revenues to the DER system;

A key aspect noted by EPRI's report is that DER can help to optimize the operations of the distribution grid by being fully integrated with distribution grid operations. That

³ http://nj.gov/emp/docs/pdf/New_Jersey_Energy_Master_Plan_Update.pdf

⁴ See the NJBPU Microgrid Report for a complete listing.

⁵ <http://www.epri.com/Our-Work/Pages/Integrated-Grid.aspx>

optimization requires the input, cooperation, and coordination by the Electric Distribution Companies (EDC) and in some cases the Gas Distribution Companies (GDC). It should be clear to any applicant that while there are strong benefits including security, reliability, resiliency, energy saving and environmental, there are also costs and impacts of those costs. All of these costs and benefits need to be evaluated and assessed in an open and fair process. EPRI advanced the principles of the benefits of DER on the distribution system as an integrated grid through their Integrated Grid Benefits-Cost Framework.⁶ This Program will require the development of a detailed cost benefit analysis. At a minimum, this will include an initial assessment through the Rutgers' DER Cost Benefit analysis model.⁷ The Rutgers DER model provides analysis at the annual level and this analysis may need to be supplemented with a more detailed hourly cost benefit model.

Per USDOE's various energy laboratory microgrid reports, microgrids, if designed, constructed and operated properly, can increase distribution grid system reliability, resiliency and efficiency with the use and integration of DER technologies.⁸ However, these general statements depend on case specific design details. A significant barrier to developing TC DER Microgrids is the availability of detailed data on the costs and benefits of specific projects. This Program will assist in the development of this case specific data for the evaluation, assessment and demonstration of potentially successful implementation of advance microgrid pilots on a community scale throughout the State.

This Program is intended to serve as one part of guidance for the BPU in establishing a statewide microgrid policy for connecting multiple customers across multiple rights of ways (ROW) and can include both electric and thermal energy. The focus in this initial program is on critical facilities at the local level.⁹ Critical facilities will be classified as:

- A public facility, including any federal, state, county, or municipal facility,
- A non-profit and/or private facility, including, without limitation, any hospital, water/wastewater treatment facility, school, multifamily building, or similar facility that :

⁶ <http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002005003>

⁷ <http://ceep.rutgers.edu/combined-heat-and-power-cost-benefit-analysis-materials/>

⁸ <http://www.energy.gov/oe/services/technology-development/smart-grid/role-microgrids-helping-advance-nation-s-energy-syst-0>

⁹ While not limited to this definition a reference for the definition of critical facilities related to flooding is FEMA at <https://www.fema.gov/critical-facility>, https://www.fema.gov/media-library-data/1436818953164-4f8f6fc191d26a924f67911c5eaa6848/FPM_1_Page_CriticalFacilities.pdf . Specific FEMA definitions for critical facilities as it relates to Sandy can be found here https://www.fema.gov/media-library-data/1385591327349-677ba8c4e88360b7436338fb87221af2/Sandy_MAT_AppI_508post.pdf

- is determined to be either Tier 1 or critical infrastructure by the New Jersey State Office of Emergency Management or the State Office of Homeland Security and Preparedness or
- could serve as a shelter during a power outage.¹⁰ The applicant must be able to fully document the ability of the critical facility to be a shelter during an emergency when there is a major grid outage.

Target Market and Eligibility

The Program will be managed by BPU through a Memorandum of Understanding (MOU) between the TC DER public partners and the BPU. With its application, the Town Center DER public partners will provide a letter of support (LOS) from the EDC and GDC (EDC LOS and GDC LOS). These LOSs shall detail the Utilities' willingness to assist in the study and their intended scope of support. The full data to evaluate and optimize the feasibility of a microgrid is only available through the Utilities. The level of data acquisition and use should be clarified between the TC DER applicant and the Utilities.

The MOU and the LOSs will be part of BPU staff's recommendation in the Board's Order to approve the TC DER Microgrid Feasibility Study Incentive.

The Program will be managed in two phases; first, for a feasibility study; and second for detailed engineering design.¹¹ This application is only for phase 1 feasibility studies. Initial feasibility evaluations are capped at \$200,000. An applicant must have a BPU approved feasibility study or equivalent to be eligible for any subsequent detailed engineering design incentives.

The applicant must be a State or Local government entity that owns or manages critical facilities. There must be one lead government entity but all other government entity partners will be required to enter into the overall agreement. The BPU seeks applicants that show a high degree of planning and ability to implement every aspect of a TC DER Microgrid proposal. This will include the ability of the government entity to enter into agreements with the BPU, its partners and the local electric and gas utility to assist in the feasibility study.

This Program is initially open to proposed Town Center DER microgrids that include critical facilities identified in the NJIT report within the 9 Sandy designated counties or similar Town Centers that can document that they satisfy the screening criteria set forth in the NJIT Report.

¹⁰ A shelter must have the ability to provide food, sleeping arrangements, and other amenities to the public during and after an emergency.

¹¹ The second detail engineering design incentive is TBD and depends on the Board's approval of the budget allocation and program details.

This Program is not open to single-building (Level 1) or campus-setting (Level 2) microgrids controlled by one meter at the point of common coupling.¹² This Program is not to evaluate or perform a feasibility study for an individual customer or single building microgrid; or a campus setting microgrid controlled by one meter. New Jersey has at least 50 Level 1 or Level 2 microgrids. Public sector, not for profits and colleges/universities single building (Level 1) or campus setting (Level 2) microgrids controlled by one meter at the point of common coupling can obtain a high level assessment of their potential microgrid through the Local Government Energy Audit (LGEA) program.

This Program is exclusively intended for a project that includes multiple critical facility customers in a single municipality developed as an advanced microgrid. The advanced microgrid must have a nucleus of critical buildings and customers that can provide essential services and emergency energy services under “black sky” conditions in a cost effective manner, as well as operate in a cost effective manner 24–7 under “blue sky” conditions.

Applicants must demonstrate an ability to incorporate multiple critical facility stakeholders into the TC DER Microgrid. Each applicant must identify the proposed stakeholder groups, how they were identified, and level of commitment to participate in the Program. Applicants must demonstrate a firm understanding of the technical and power infrastructure needs of each critical facility stakeholder. This would include initial early stage studies of the overall Town Center’s energy needs both electric and thermal, the types of DER technologies, interconnection technologies, utility requirements and initial microgrid cost/benefit modeling. This Program is not for early stage planning needs and such studies will not be funded.

While the application for this Program requires some prior early stage evaluation and data collection, this Program will not fund data, reports or evaluations that have been previously completed or funded by other agencies or private sector sources.

The applicant’s residents must be serviced by a regulated electric utility that pays a Societal Benefits Charge (SBC) on their electric bill.

For the first round of applications the prime consultant for the applicant is capped at \$200,000. Consultants can be subs on other applications but, in the first round, total funding for any particular consultant will be capped at \$300,000. After the first round of application requests this condition will not be limited. If there is not a full allocation of the budgeted funds in the first round, BPU staff may waive this requirement.

¹² As classified by Board Staff in its Microgrid Report 2016 – as accepted by the Board at its November 30, 2016 agenda meeting under Docket No. QO1610097.

Program Technical Requirements

TC DER Microgrid applicant must submit an application that includes, at a minimum, the following:

1. Project Name;
2. Project Description including all potential critical facilities with a description of why they are critical facilities within the proposed TC DER Microgrid. This should include the following:
 - i. approximate size of the project in energy (electrical and thermal);
 - ii. approximate electric and thermal load of each building;
 - iii. estimated square footage of each building and the total project;
 - iv. overall boundaries of the proposed project and distance between critical facilities;
 - v. FEMA Category Classification of each building; and
 - vi. any previously installed EE or energy conservation measure (ECM).
3. If the applicant is not a Town Center identified in the NJIT Report, documentation indicating that it satisfies the screening criteria set forth in the NJIT Report is required. Criteria in the NJIT Report were based on a cluster of critical facilities and their building energy usage that included the following ranking:
 - i. Criticality based on the FEMA Category Classification of Facilities.
 - ii. Total electric and thermal loads based on Btu's per square foot.
 - iii. A TC DER Microgrid should have at least two (2) Category III or IV facilities within 0.5 miles and a facility with an energy usage of approximately 90 M Btus per square foot.
4. A list of all potential partners to be included in the TC DER Microgrid MOU. This should include a general description of any/all procurement issues between the various local government partners and a general mechanism to consolidate these requirements.
5. A general description of the technology to be developed and the general location within the TC DER Microgrid. This should include a description of the proposed connections (electric, gas and/or thermal) of the critical facilities and the DER

technologies. This should also include a location of the electrical connections to the EDC's facilities/equipment and a description of the type of system the TC DER would be interconnecting into (radial or network).

6. A general description of the overall cost and potential financing that may be available.

7. A general description of the benefits of the proposed Town Center DER Microgrid as well as the need for the proposed project. This should include a brief discussion of the potential revenue markets for any ancillary services, demand response including EE, capacity or energy markets. Both 7 and 8 should be detailed with any available microgrid modeling efforts that have been performed. Applicants must also demonstrate that their proposed project is consistent with the use of the Societal Benefit Charge as set forth in N.J.S.A. 48:3-60(a)(3).

8. A general description of the communication system between the TC DER microgrid and the EDC's system. This should include a general description of distribution management systems and controls.

9. Timeframe for the completion of the feasibility study.

10. The specific microgrid modeling to be used in the overall feasibility study.

11. The requested funding amount.

12. Any cost share by the Lead Government Entity or any of the stakeholder partners.

13. A listing of all consultants as prime or subs that will perform work on the feasibility study and the level of expertise in this area of microgrid development.

14. An EDC and GDC LOS.

Application Review Process

Staff reserves the right to reject an application because it represents previously funded data or reports.

Given the initial limited funding BPU is implementing a quasi-competitive process for the review and approval of the TC DER Microgrid Feasibility Study Incentive. BPU staff will open a window for applications to be submitted based on the criteria in this application process. The window will be open for 60 days from the date that this application is posted on the BPU website. Based on a review by BPU staff the applications will be

ranked based on the below criteria if more applications funding requests are received than total funding available:

1. Distribution of feasibility study projects throughout all electric utilities. The objective of this criterion is to favor approving at least one Town Center DER Microgrid Feasibility Study project in each of the PSE&G, JCPL, ACE, and RECo territories. However, staff may select 2 or more feasibility studies in one specific electric distribution company service territories based on criteria 2 and 3 below.
2. Distribution of feasibility study projects throughout the State. The objective of this criterion is to have TC DER Microgrid Feasibility Study projects in various areas of the state based on the qualities of the distribution system, the availability of local services, and the proximity of vulnerable communities that would shelter in place.
3. The applicant demonstrates understanding of the technical, financial and power infrastructure needs of each TC DER Microgrid stakeholder.
4. The evaluation of the applicant's proposed project based on the criteria identified in the NJIT Report as follows:
 - i. The number of FEMA Category III or IV facilities; and
 - ii. The total electric and thermal loads based on Btu's per square foot.

If the total available funding for this program is not allocated after the review of the applications submitted in the 60 day time period, the BPU will make recommendations for awards based on a first come first serve basis and will open subsequent funding request windows.

Incentive

The application submittal must be approved by the Board. The Board will issue a Notice to Proceed to confirm the availability and commitment of funding. Phase 1 funding is capped at a maximum of \$200,000. The BPU anticipates between 5 to 10 approved Phase 1 Notice to Proceed letters. The Notice to Proceed will include an MOU between all the Town Centers' DER Microgrid public partners, the BPU, and the EDC and GDC LOS. It will detail the terms of the commitment including timeframes for the completion of the feasibility study.

All payments for the Phase 1 Feasibility Incentive will be made after the completion and acceptance of the final report. A Phase 1 approval is no guarantee of any subsequent incentive nor is it the BPU approval of the TC DER Microgrid. **The Board has sole**

discretion over the approval of projects, awards of incentives, and may change criteria or available funding at any point during the duration of this program.

Applications must be submitted to TCDERmicrogrid@bpu.nj.gov