Agenda Date: 6/30/17
Agenda Item: 9D

STATE OF NEW JERSEY

Board of Public Utilities
44 South Clinton Avenue, 3rd Floor, Suite 314
Post Office Box 350
Trenton, New Jersey 08625-0350
www.nj.gov/bpu/

MISCELLANEOUS

IN THE MATTER OF THE TOWN CENTER DER MICROGRID INCENTIVE PROGRAM AUTHORIZATION OF INCENTIVE FUNDING TO GALLOWAY TOWNSHIP FOR PHASE I FEASIBILITY STUDY	))))	ORDER DOCKET NO. QO17060632

Party of Record:

Vince Polistina, Galloway Township

BY THE BOARD:

The 2015 New Jersey Energy Master Plan Update (EMP Update) established a new overarching goal to "Improve Energy Infrastructure Resiliency & Emergency Preparedness and Response" in response to several extreme weather events that left many people and businesses without power for extended periods of time. These new policy recommendations included the following:

1. Increase the use of microgrid technologies and applications for Distributed Energy Resources ("DER") to improve the grid's resiliency and reliability in the event of a major storm; and

2. 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 ("TC DER") microgrids to power critical facilities and services across the State.

At its November 30, 2016 agenda meeting Docket number QO16100967, the Board authorized the release of staff's Microgrid Report ("Report"). The following recommendations in the Report specifically address the development of a TC DER microgrid feasibility study incentive program and pilot:

1. Develop and implement a TC DER microgrid feasibility study incentive program as part of the current New Jersey Clean Energy Program ('NJCEP") budget. This TC DER microgrid feasibility study incentive program should provide funding for the upfront feasibility and engineering evaluation project development costs of

a Town Center TC DER microgrid at the local level. This incentive should be a phased approach beginning with an initial feasibility study, followed by detailed engineering design phase. Staff should implement a stakeholder process to determine the terms and conditions of the TC DER microgrid feasibility study incentive program. This incentive should be provided through an MOU structure.

2. Initiate a TC DER microgrid pilot within each electric distribution company ("EDC") service territory. This should initially be limited to the municipalities within the 9 Federal Emergency Management Agency ("FEMA") designated counties or municipalities that meet the same criteria identified in the New Jersey Institute of Technology ("NJIT") report. These pilots should include, at a minimum, an initial feasibility study of the TC DER microgrid. This process should assist in the development of a TC DER microgrid tariff.

On August 5, Board staff issued a TC DER microgrid feasibility study draft application for public comment. On August 23, 2016, a public meeting was held to discuss the draft application and written comments were received and considered in the final application. Board staff's responses to the comments were published as part of the release of final application.

At its January 25, 2017 agenda meeting Docket number QO16100967 the Board authorized the release of TC DER microgrid feasibility study application. Incentive funding was capped at $200,000 per feasibility study. The Board directed staff to release the application and to open a 60-day application submission window. Applications submitted during that period would be reviewed by Staff and selected on a competitive basis. Any application submitted after this time period would be accepted on a first-come-first-served basis subject to available fund. The 60 day period ended on March 27, 2017

Prior to March 27, 2017, the Galloway Township submitted an application to the Board.

Galloway Township's TC DER) Feasibility Study will examine the potential of connecting the following critical facilities to a TCDER Microgrid: Galloway Town Hall and Police Station, AtlantiCare Regional Medical Center, Sunrise of Galloway and Seashore Assisted Living facilities, Stockton University, Reeds and Roland Elementary Schools, Galloway Middle School and Absegami High School and ShopRite. The project, should all target facilities be included, would represents approximately 47,000,000 kWh of usage and 1,400,000 therms over 2,510,714 sq. ft. The applicant will evaluate most commercially-viable technologies, including but not limited to fuel cells, battery energy storage systems, solar, combined heat and power ("CHP"), thermal loops and water exchange systems.

After review of the application Board Staff recommends that the Board approve the above-referenced application.

The Board **HEREBY ORDERS** the approval of the aforementioned application for the total incentive amount of $175,000 for Galloway Township and **AUTHORIZES** the President of the Board to execute the MOU attached hereto which sets forth the terms and conditions of the commitment of these funds.

This effective date of this order is July 10, 2017.

DATED: 6/30/17

BOARD OF PUBLIC UTILITIES
BY:

RICHARD S. MROZ
PRESIDENT

JOSEPH L. FIORDALISO
COMMISSIONER

MARY-ANNA HOLDEN
COMMISSIONER

DIANNE SOLOMON
COMMISSIONER

UPENDRA J. CHIVUKULA
COMMISSIONER

ATTEST:

IRENE KIM ASBURY
SECRETARY

I HEREBY CERTIFY that the within document is a true copy of the original in the files of the Board of Public Utilities

IN THE MATTER OF THE TOWN CENTER DER MICROGRID INCENTIVE PROGRAM
AUTHORIZATION OF INCENTIVE FUNDING TO GALLOWAY TOWNSHIP FOR PHASE I
FEASIBILITY STUDY

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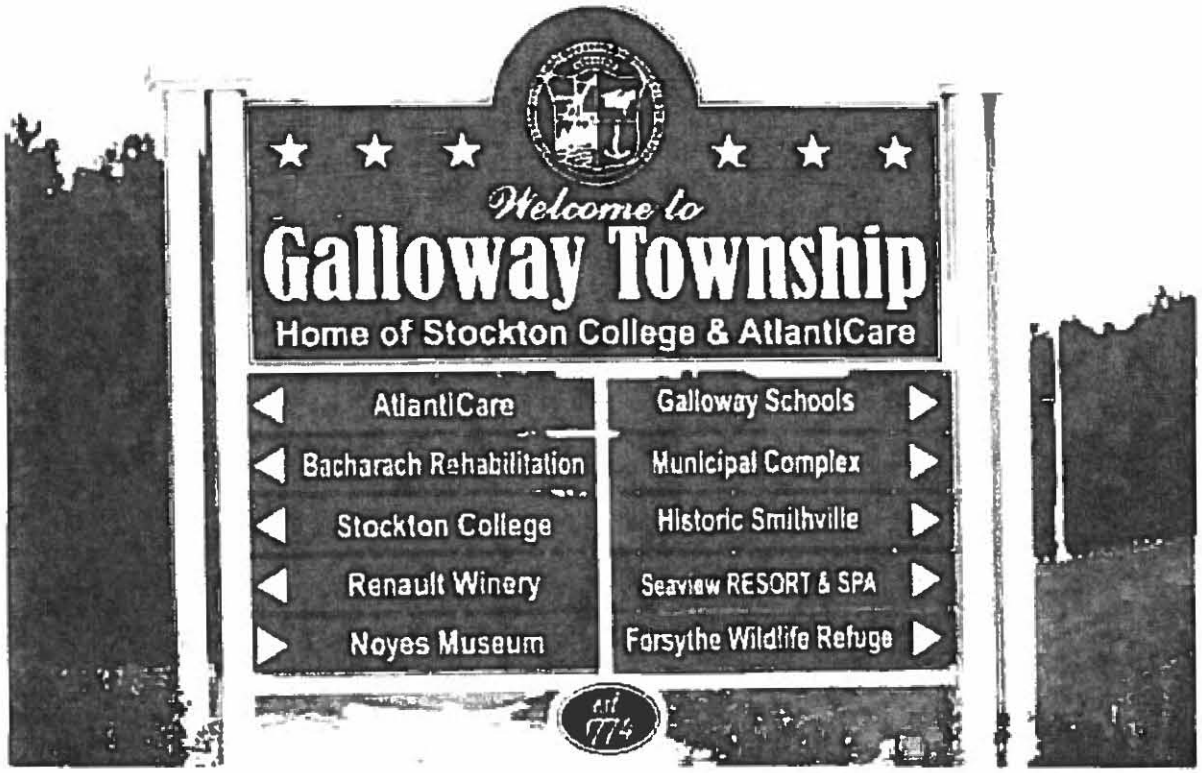
Galloway Township
Resiliency Energy Hub Microgrid Application



March 27, 2017

Submitted by:

Galloway Township
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TOWNSHIP OF GALLOWAY
MAYOR & TOWNSHIP COUNCIL

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Don Purdy, Mayor **Anthony J. Coppola, Jr., Deputy Mayor**
Council Members:
Rich Clute, Tony DiPietro, Frank Gargione, Robert Maldonado, Timothy Meadows

March 27, 2017

Mr. Michael Winka
Sr. Policy Advisor
NJ BPU
44 S. Clinton Avenue
Trenton, NJ 08625

Dear Mr. Winka,

We are very pleased to participate in the Town Center Distributed Energy Resource Microgrid Feasibility Study Incentive application process. Galloway would be an ideal location for a micogrid. Our Township takes pride in our sustainability efforts, from our silver certification from Sustainable Jersey in 2016 to our work with the Pinelands Preservation Alliance. In addition, we house many critical facilities, such as AtlantiCare Regional Medical Center, that would be essential to power in an emergency situation. Finally, our community needs it. At one point during Hurricane Sandy, over seventy-five percent of our residents were without power. We would like to be better prepared in the event of any future storms.

We will be working with Hitachi, which will be the main consulting firm aiding us if the incentive is awarded to Galloway. Hitachi, founded in Japan in 1910, is a global leader in technology solutions, with nearly $90 billion in worldwide sales. Hitachi has established itself as a global leader in distributed generation and microgrid technology. By leveraging its experience in software, energy generation, energy storage, and distribution hardware, Hitachi is able to bring an industry-leading understanding of microgrid systems to bear on new projects.

Hitachi will also be subcontracting out to Greener by Design, who provide a comprehensive energy investment and environmental management platform that allows their multidisciplinary team of technical, financial, energy management, and environmental planning professionals to bring a thorough understanding to the creation of a microgrid. They are uniquely qualified to assist in microgrid projects, based on both their experience and relationships with the various

utilities and state and federal regulators who will be essential to this type of project's success.

We appreciate the opportunity to apply for this incentive, and we look forward to working with you in the future.

Sincerely,

Don Purdy, Mayor
Township of Galloway

1. **Project Name:** Galloway Microgrid

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).**

Introduction:

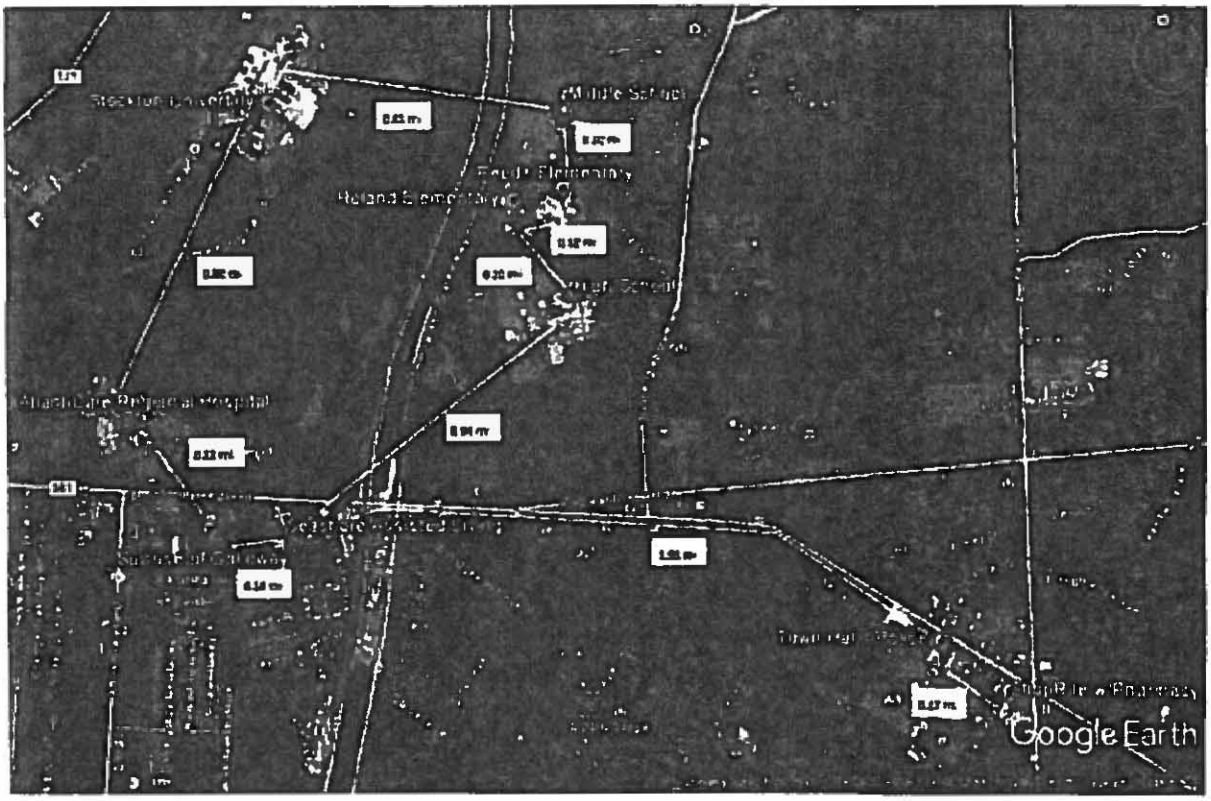
Galloway Township has developed an innovative concept for a microgrid that serves a diverse set of critical facilities in the local area. The system would connect facilities focused on public safety, healthcare, senior care, and education. The feasibility assessment would determine whether these facilities could be connected with an underground cable or grouped into smaller, coordinated nodes. This would ensure economic optimization during times of grid connection and redundant, multi-site redundancy when the grid is down – all at the lowest possible cost.

The strength of the Galloway Township microgrid approach lies in the diversity of critical facilities it leverages, their proximity to each other, and their central location for citizens of Galloway. The primary driver of this application is the Township government, but the inclusion of other facilities will broaden its resilience and sustainability benefits while also increasing the total system size and, therefore, the ability to finance it as a project. Resilience benefits of the targeted sites include:

- The **town hall and police station** facility are critical for serving public safety, coordinating any disaster response and maintaining public services.
- The recently expanded **AtlantiCare Regional Medical Center** has 540 beds and was recently ranked the fifth best hospital in New Jersey by US News and World Report. Keeping this facility operating at full strength is a critical lynch pin in the energy resilience of this part of New Jersey.
- The **Sunrise of Galloway** and **Seashore Assisted Living** serve over 100 of Galloway's senior citizens. These residents have additional energy requirements in terms of safety and cannot easily relocate in times of emergency.
- **Stockton University** teaches almost 9,000 students. In addition to protecting their security and the integrity of on-going research, a microgrid would enable Stockton to leverage its facilities for shelter and triage should that become necessary.
- **Reeds Elementary, Roland Elementary, Galloway Middle School and Absegami High School** are located on a tightly clustered campus across the Garden State Parkway from Stockton University. Maintaining the safety and security of Galloway's youth is an extremely high priority of this system. In addition, school facilities could be utilized for shelter, triage and response coordination in the event of an emergency.

- **The Shoprite grocery store and pharmacy is located next to the town hall and plays a critical role in maintaining services during an energy outage event. While access to food and medicine may not be critical during the first hour or even day of an outage, major storms can cause mutli-day outages that can create a real need for these services. It should also be noted that many medications require refrigeration and extended power loss at this facility could leave local residents without access to those medications for some period of time.**

Cluster of Critical Facilities



Critical Class:
II III IV

Extended Cluster Critical Class Facilities: 1(II), 7(III), 2(IV)

This cluster of critical facilities is located directly adjacent to the Garden State Parkway, a critical artery for evacuation or public services during times of emergency. The table below outlines the facilities to be included in this analysis, their energy usage (estimated in all cases except the Town Hall/Police facility) and information about these facilities contribution to energy resilience for Galloway. While the township has not yet engaged the school district or other facilities yet in terms of securing data on their facilities, the existing relationships with these organizations are positive and we believe it highly likely that work with each on this feasibility analysis would be collaborative and constructive.

Microgrid Critical Facilities

Facility Name	Facility Type	Address	Square Footage (ft^2)	Annual Energy Usage (Annual kWh)	Annual Energy Usage (Annual therms)
Galloway Township Municipal Complex	Offices, Police, Courtrooms	300 E Jimmie Leeds Rd, Galloway, NJ 08205	64,929	734,198	13,434

Reeds Road Elementary	Elementary school	103 S Reeds Road, Galloway, NJ 08205	89,638*	986,018**	21,967**
Roland Rogers Elementary	Elementary school	105 S Reeds Rd, Galloway, NJ 08205	98,579*	1,084,369**	24,158**
Galloway Middle School	Middle school	100 South Reeds Road, Galloway, NJ 08205	158,791*	1,746,701**	38,913**
Galloway High School	High school	201 S Wrangleboro Rd, Galloway, NJ 08205	290,428*	3,194,708**	89,764**
Seashore Gardens Living Center	Assisted living	22 W Jimmie Leeds Rd, Galloway, NJ 08205	137,922*	2,110,207**	86,636**
Sunrise of Galloway	Assisted living	46 W Jimmie Leeds Rd, Galloway, NJ 08205	118,660*	1,815,498**	74,536**
AtlantiCare Regional Medical Center	Hospital	65 W Jimmie Leeds Rd, Pomona, NJ 08240	486,070*	15,068,170**	491,534**
Stockton University	University	101 Vera King Farris Dr, Galloway, NJ 08205	1,010,882*	17,589,347**	452,983**
ShopRite	Grocery store	401 S Pitney Rd, Galloway, NJ 08205	54,815*	2,669,491**	32,897**

*Estimated from Google Earth
**Estimated using Energy Information Administration's CBECS data (Commercial Buildings Energy Consumption Survey)

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.**

This feasibility analysis would evaluate a group that includes one Class 2 facility, seven Class 3 facilities and two Class 4 facilities. The total project, should all target facilities be included, would represent approximately 47,000,000 kWh of usage, and 1,400,000 therms over 2,510,714 square feet. Multiple groupings of facilities in this group are less than 0.5 miles apart. Multiple facilities, including the hospital, have an energy usage in excess of 90 MBtus per square foot.

3. **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.**

Galloway Township will be working closely with the Galloway School District, Seashore Gardens Living Center, Sunrise of Galloway, AtlantiCare Regional Medical Center, Stockton University and Shoprite while leaving the option open for adding additional facilities in the course of the feasibility analysis.

4. **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).**

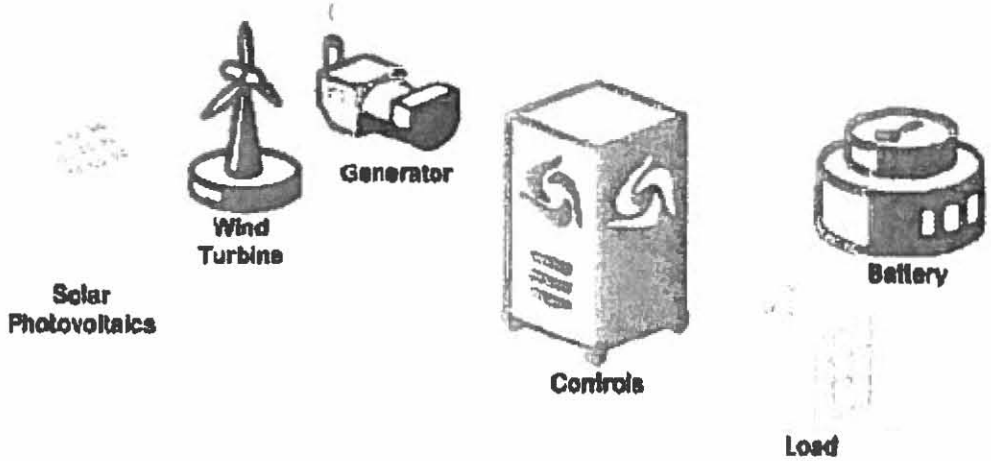
Galloway Township is looking to establish a community microgrid in the region. This concept will utilize energy generation and storage distributed between the various critical facilities, with specific connections at the facilities determined during an engineering site visit. Anticipated connections between the facilities are represented on the site map above, but these are highly speculative at this time. The feasibility study will balance technical and financial burdens and benefits to determine where it will make sense to physically trench lines to connect multiple facilities and where it will instead make sense to develop multiple nodes and operate them as one system when the grid is up and independent resilience nodes when the grid is down.

Project team members will evaluate most commercially-viable technologies for use within the microgrid including but not limited to fuel cells, battery energy storage systems, solar photovoltaics, combined-heat and power (CHP) systems, thermal loops, and water exchange systems. The microgrid feasibility study will evaluate the technical and financial viability of providing distributed energy resources to provide most of the study areas' electrical needs while using any excess heat from on-site power generation for applications such as space heating and hot water production. These systems and their benefits are described below.

Electric

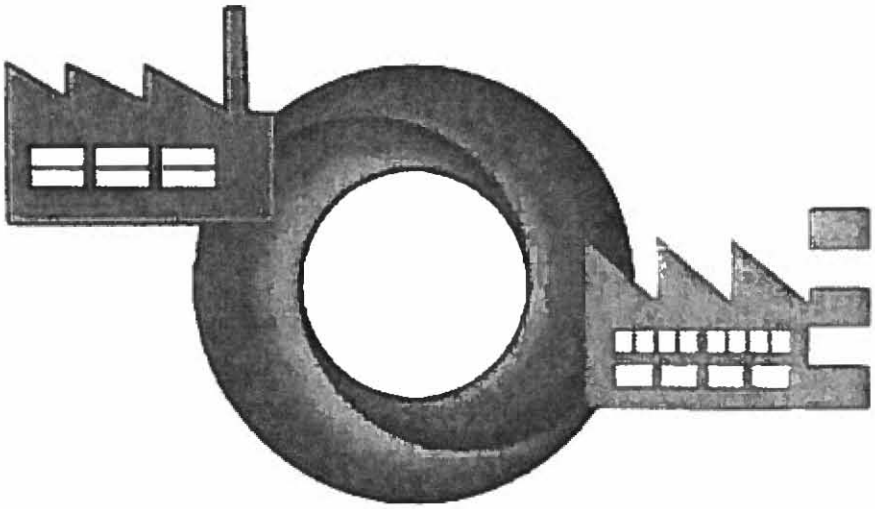
Similar to the traditional utility grid, a microgrid will connect energy generating sources with the end users. A parallel distribution system will be designed to provide redundancy to the utility grid in order to alleviate any breaks in the traditional grid and to provide instant back-up power when the grid does fail. This also provides an opportunity to incorporate locally produced renewable energy and sustainable technology such as wind, solar, storage, and efficient natural gas generators.

The power sources will work both during times of emergencies as well as times of non-emergency, or "blue sky" days. When operating during blue sky days, the local facilities will be able utilize energy from both the microgrid and the main power grid. During a utility grid outage, the microgrid will "island" and continue to operate while isolating itself from the utility grid to allow utility workers to safely restore their distribution system.



Thermal Loop

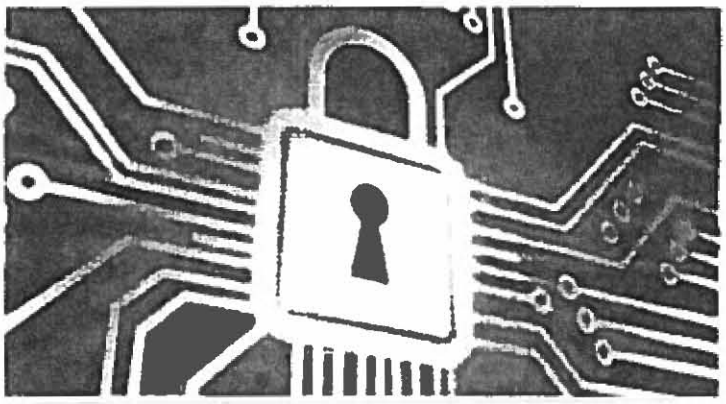
A thermal loop is the movement of heat from one place to another with the use of air and/or liquids. A system can incorporate the use of steam, hot water, and chilled water for the use in another facility or process. In practice, this means any waste heat produced through normal operations can be transferred to a neighboring facility to be used be within their own operations. This greatly reduces the need for individual energy intensive equipment such as boilers, furnaces, chillers or air conditioners. Similar to the greywater system, piping will connect several facilities to exchange heat through the system.



Controls and Security

Modern control technologies allow the microgrid systems to optimize operation for economics or uptime as well as fully island itself from the main grid. This means that, once the power from the grid is cut off, the microgrid will continue to operate independently. Once the grid is operational again, the microgrid will be able to sync up and either draw power from both systems. During times of non-emergencies, the control system can blend energy from the microgrid and utility grid to continually deliver the lowest cost energy to system off-takers. While emergency power is expensive, the concept of distributed energy will provide additional revenue and cost savings to help fund the system.

In addition to energy surety, the system will include cyber security measures to prevent cyber-attacks, an increasingly frequent occurrence at utility systems. To the microgrid, a cyber-attack on the main grid is seen just like any other outage and the microgrid simply goes into "island" mode to provide continuous power.



Hitachi Energy Solutions Division approaches each feasibility assessment using our own proven and comprehensive methodology. In order to determine if a microgrid project is feasible given the constraints of the project, we gather data, run models and simulations, determine the preliminary budgets and perceived benefits for the project, and ultimately provide a report to the customer to help facilitate a decision about moving forward with a project. As needed, we adjust our feasibility approach to accommodate the specific needs and constraints of the project.

A typical feasibility assessment takes 8-12 weeks to complete and is dependent upon availability of data and the customer to resolve questions.

1. Technical Approach

Galloway Township Municipal is prepared to complete this work using a team of highly experienced energy engineers and microgrid professionals to conduct the necessary analysis, modeling and simulations over a 12-18 month period. The team will complete the following high-level tasks:

- Task 1 – Data Collection
- Task 2 – Modeling and Analysis
- Task 3 – Conceptual Design

Task 1 – Data Collection

The team will immediately begin working with Galloway Township to gather the information required for the feasibility assessment. Our team uses a data collection form to guide and facilitate collection of all relevant information for conducting a comprehensive feasibility assessment. While the list below is high-level, it provides a sense for the data we request from prospective customers. We recognize that not all data may be available, and will discuss with you the impacts and risks to the assessment should data not be available. Upon start of the project, we request the following.

- Building plans or as-built drawings - including schedule of equipment
    - Construction (building envelope)
    - Civil
    - Electrical
    - Mechanical
- Site Plans
- Site development growth plan (if any)
- Electric Usage Data
    - Three years of electrical interval data
    - Three years of electric utility bills
- Natural Gas Usage Data
    - Three years of gas utility bills
- Existing Distributed Energy Resources (DER) with unit names and numbers
    - Solar Photovoltaic or other renewable energy
    - Energy Storage Systems, e.g. Battery Systems and Thermal Storage

- Generators
- Cooling Equipment (make, model, and additional details)
- Heating Systems (make, model, and additional details)
- Controls Systems (including building management systems and device-level controls)
- Lighting Systems (lighting type, controls, sensors)
- Resiliency requirements
- Building Use Type – how is (or will) the building being used
- Climate data

Task 2 – Modeling and Analysis

The Hitachi team will utilize the data provided to develop load profiles and projections of energy usage intensity for Galloway Township and potential additional buildings.

The team will then utilize modeling software, trending analysis and/or regression techniques to develop three long term (15, 20, or 25-year) cumulative scenarios (low, expected and high) for the total load for Galloway Township for the tariff scenario. The output of this analysis will include:

1. Annual power and energy forecast data for each building, per scenario
2. Number of customers per customer class/block of consumption, per scenario
3. Customer load shapes, including the following cumulative system outputs:
    a. Typical monthly load profile (hourly)
    b. Seasonal variations in the load profile
    c. Load profile of seven days, including Peak day load profile (hourly)
    d. Load profile of seven days, including Minimum day load profile (hourly)
    e. Percent of Load Served, by Resource
    f. Monthly Load Served by Resource
4. Analysis of the impact of Distributed Generation additions to the system

In certain cases, if sufficient data cannot be gathered for a particular site, we will use specialized modeling techniques to create estimated load profiles. This analysis will be very similar to work the Hitachi team conducted for multiple communities in New York State when data was not available for certain facilities, included in the analysis of community-wide microgrids. The Hitachi team utilized our understanding of the operational profile of each building and gathered load profile data from similar facilities in the region in order to make effective, forward-looking assumptions about system performance.

The analysis will include the estimated impact on load profiles of rooftop solar PV, battery storage, natural gas combined heat and power, and any other feasible technology.

Hitachi will provide this analysis in a draft final report approximately twelve months after the project is initiated. Once critical stakeholders have had a chance to review this analysis and provide input, Hitachi will take thirty days to revise the analysis and update the report. The final report will be delivered after

feedback is provided and will be accompanied by an Excel tool that Hitachi develops as the basis of the analysis.

Task 3 – Conceptual Design

The conceptual design will take into account technical factors, costs and benefits to Galloway Township , and other qualitative considerations important to the stakeholders. The conceptual design will include the following preliminary design elements:

- An optimal site and equipment layout and configuration analysis;
- A load profile analysis including description and location of electrical and thermal load profiles, being served by the microgrids. The data for multiple facilities will be aggregated as applicable based on the microgrid configuration;
- DER and thermal resource characterization including resource type, capacity factors, efficiency, and fuel management;
- An electrical and thermal infrastructure characterization including analysis of resiliency to forces of nature and other emergency situations;
- A microgrid control architecture design including, controller hardware/software specifications, integration with BMS and AEMS, and configuration;
- IT and telecommunications infrastructure design

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

As part of the feasibility analysis process, the Hitachi team will analyze the financial performance of the microgrid concept, and will hone the design to maximize both technical and financial performance. The results of the final financial analysis will help determine which ownership and financing model is best for the project.

In particular, the Hitachi team will determine the rate at which the off-takers would be able to purchase energy from the microgrid under a power purchase agreement (PPA). Under this model, sometimes known as "microgrid as a service," a third party would own all microgrid assets, and cover all capital costs associated with the project. The off-takers would purchase energy from the microgrid directly from this third party at a set rate. Hitachi will evaluate whether this rate would be lower than the current cost of energy for these customers. If not, the financial analysis will also indicate the costs and benefits associated with the Township purchasing and owning the microgrid outright.

6. **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).**

The need for microgrids is ever increasing with volatile weather conditions such as Hurricane Sandy and polar vortexes as well as constraints on our aging electrical distribution infrastructure and cyber-attacks

on our electrical supply chain. Microgrids provide a reliable backbone to local resiliency, while also providing the opportunity for locally produced clean energy and a secure energy supply. A microgrid is an integrated energy system consisting of interconnected loads and distributed energy resources (DER) with the ability to connect and disconnect from the main utility grid. Simply put, microgrids are modern, small-scale versions of the traditional utility system. The advantages of a microgrid system include reliability, redundancy, fuel flexibility, energy efficiency, a cleaner environment locally and regionally, reductions of energy transmission loss, and improved grid security.

Microgrids incorporate locally produced energy sources such as solar photovoltaic arrays and combined heat and power generators, and connects this power to critical facilities within a defined region. Microgrids provide benefit by not relying on a fragile distribution system that moves powers across great distances, which not only allows for redundancies, but provides cost savings through efficiencies and clean energy. Finally, microgrids can provide ancillary services to the primary utility grid via load reduction during peak usage periods, as well as voltage and frequency regulation.

While this concept is not new and has been seen on military bases and single ownership campuses, the idea of community- and city-based microgrids is an emerging field. Cities and local communities are taking steps to improve their energy security and resiliency, which appeals to residents, businesses, and local government.

Additionally, Hitachi's experience with microgrid designs will ensure the maximization of benefits for resilience, sustainability, and cost savings based on their individual needs and priorities. Hitachi has worked with several communities to design microgrids that would aid in economic development such as Syracuse's Near Westside neighborhood. The team conducted a feasibility study for a highly economically depressed area with a mixture of residential, small commercial and education facilities.

Finally, as a large ratepayer, Galloway Township contributes to societal benefits charge and incorporating the concepts and renewable technology stated above would be consistent with the Societal Benefit Charge under N.J.S.A. 48:3-60(a)(3) and further the objectives of the Department of Environmental Protection and Board of Public Utilities. For these reasons, Galloway Township is eager to apply for the Board of Public Utilities' Town Center Distributed Energy Resource Microgrid Feasibility Study.

7. **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.**

The microgrid control system would be able to connect directly to Atlantic City Electric's resources and telecommunication/IT systems using software adapters and standard semantic models and protocols (e.g., Modbus, DNP3, BACnet, CANbus) over IP networks. The microgrid control software asset catalog enables a mapping from asset capabilities to the controller's Energy Resource (ER) and Energy Resource Managers (ERMS). The ERMS send commands and setpoints directly to Atlantic City Electric's SCADA system, if available at the proposed feeders, to allow the utility to monitor the microgrid and the point of common coupling. Atlantic City Electric would always have the ability to disconnect the microgrid from the point of common coupling to ensure the safety of their crews and their system.
The Hitachi team will work closely with Atlantic City Electric to ensure that we understand their current and planned smart grid telecommunications plans so they can be incorporated into our microgrid feasibility study for Galloway Township.

8. **Timeframe for the completion of the feasibility study.**

12-18 months upon the reward of the grant:

- Initial Data Collection: Broad range of data collection aimed at understanding all the possible places and categories of facilities that may require power during a blackout. (2 months)
- Ranking data: Ranking initial data into tiers such as 1. Highest ranking – police, fire, pumps, repeaters, hospital, etc.; 2. Middle ranking – gas stations, pharmacy, elder care, and supermarket; 3. Lower ranking – gathering places, buildings with elevators, etc. (less than 1 month)
- Mapping: Map via GIS system the locations of each of the ranking properties including information such as location, height of location, flood plain mapping, right of ways, vulnerability, and clusters. Next, working with the GIS data and other data, begin to pare down the site list based on the information and feasibility of location. Then assess varying strategies to have these sites islandable during a storm; cluster of sites can support microgrid, individual buildings stand alone. (2-3 months)
- Site Visit and Stakeholder Meeting: Meet with all the Tier 1 stakeholders to confirm support on participation. Visit each location to understand location of power distribution system, potential types of power match (e.g. cogeneration vs. solar at a site) and any other on-site details necessary for the microgrid or standalone islandable power. (2 months)
- Engineering: Analysis of the generation and distribution costs to fund the microgrid build-out. Work with the Utility to have them price the distribution system. (2-3 months)
- Board of Public Utilities Approval: Once the Utility has completed its cost assumptions for the distribution system, have the BPU approve the rate basing of the distribution system. (1 month)
- Develop and Issue Bid: Once a cost outline has been completed and the Utility has agreed to build the distribution system, create an RFP for the construction of the generation, security and associated controls to build out the microgrid. (3-6 months)

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

The Hitachi team will use HOMER Pro, Rutgers' cost/benefit analysis (CBA) model and its own proprietary toolkits and modeling.

10. The requested funding amount.

Galloway Township and its partners anticipate that this project will cost $200,000 and is requesting that amount.

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

Galloway Township can contribute services in kind as well as staff time from all partners. Galloway Township was part of the $400,000 NJIT microgrid study report and this study will leverage the resources used in and contributed to that study.

12. 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.

This project will be led by *Hitachi Americas Energy Solutions Division*, a provider of end-to-end microgrid solutions, and supported by *Greener by Design*, an energy and environmental management consulting firm located in New Brunswick, NJ.

HITACHI
Inspire the Next

Hitachi, founded in Japan in 1910, is a global leader in technology solutions, with nearly $90B in worldwide sales. Hitachi has established itself as a global leader in distributed generation and microgrid technology. By leveraging its experience in software, energy generation, energy storage, and distribution hardware, Hitachi is able to bring an industry-leading understanding of microgrid systems to bear on new projects. Hitachi has been using its experience with on-site generation and electric utility infrastructure to deploy microgrids for many years in Japan and Southeast Asia. This microgrid work took on greater urgency after the Fukushima disaster of 2011. This led not only to Hitachi's increased focus on energy resilience and microgrid capabilities, but also to a broader look at the microgrid market and how Hitachi can engage its customers with these solutions. Hitachi is delivering a unique approach to microgrid development in three ways.

1. A technology and vendor-neutral approach – Hitachi works with each client to understand their energy needs and design the best system to meet those needs. Unlike many other microgrid developers in the market, Hitachi does not insist on using our own products and technology in the systems – instead, selecting the best solution and vendor for each project.
2. Lifecycle cost design approach – Our engineers do not attempt to over-design systems focusing only on the annual peak demand that typically occurs only a few hours out of the year. Instead, our systems are designed to address the annual energy usage over the year, leveraging the existing grid for additional power during peak times. When in island mode, our system leverages energy storage and integrated demand response capabilities to meet power needs 24/7.
3. Multiple ownership options – Hitachi can design, develop and build a system for clients interested in ownership. However, for the many clients that aren't interested in owning the equipment, Hitachi is prepared to finance the entire project as well as provide operation and maintenance services, providing the energy to the client via a long-term energy services agreement.

As microgrid developers, the Hitachi America Ltd. Energy Solutions Division has deep experience assessing the technical and financial feasibility of potential microgrid projects. To date we have conducted over 20 feasibility assessments in North America as a Hitachi Team with individual team members conducting dozens more prior to joining Hitachi. Our team's direct experience with projects like New York Prize (12 community microgrid feasibility studies), JumpSMART Maui, and Borrego Springs (the first community microgrid in North America) provide applicable insight into the evaluation of a variety of microgrid models, including multi-building and clustered microgrids.
The NJ BPU Town Center Microgrid program aligns perfectly with Hitachi's "Social Innovation" strategy. Social Innovation at Hitachi is the imperative to develop and implement technological solutions to create positive social outcomes.

Key Hitachi Personnel

Steve Pullins
Mr. Pullins has more than 35 years of utility industry experience in operations, maintenance, engineering, microgrids, and renewables project development. He previously led the nation's Modern Grid Strategy for DOE's National Energy Technology Laboratory. He has worked with more than 20 utilities in Smart Grid strategies, renewables strategies, power system optimization with Smart Grid technologies, and microgrids.

Scott Almond
Mr. Almond has over 24 years of experience as an energy engineer focused on the design, implementation and construction management of utility plants and energy reduction projects. He has been involved with the commissioning, retro-commissioning, design, and energy audits of new buildings and renovations. His roles on projects have included project management, Lead PE, and creating construction drawings, specifications commissioning plans, engineering and energy audits.

Michael Uhl
Mr. Uhl is a Certified Energy and Demand Side Manager. He has ten years of experience as a an energy engineer focused on facility energy management and distributed generation systems. He provided energy assessments and sustainable solutions to federal and commercial clients in more than six million square feet of space. He modeled over 90 microgrids across North America. His is an expert in the optimization of software tools to model microgrid design and performance.

Brian Levite
Mr. Levite is a Certified Energy Manager with 17 years of experience in the energy industry focusing on building energy efficiency, strategic planning and program development. He served as project manager for eight community microgrid feasibility studies under NYSERDA's NY Prize Program. His book Energy Resilient Buildings and Communities - A Practical Guide focuses on how communities can improve their energy resilience while lowering their energy costs.

Greener by Design (GbD) provides a comprehensive energy investment and environmental management platform that allows our multidisciplinary team of technical, financial, energy management, and environmental planning professionals to bring a thorough understanding of the still complex world of DG and Microgrid development.

Greener by Design

Greener by Design is uniquely qualified to assist in microgrid projects based on both its experience and relationships with the various utilities and state and federal regulators (NJ BPU, FERC, PJM, and Rate Counsel) that will be essential to a project's success. Working with experts from across the United States including Sandia National Lab, the Rocky Mountain Institute, the U.S. Department of Energy, and a host of utilities, regulators and universities, Greener by Design was engaged by a variety of public and private sector clients after Superstorm Sandy to assist in the design, financing and implementation of several microgrids from Washington DC to New York. Walter Reed Hospital, John Hopkins University / EBDI, Staten Island EDC, Cities of Hoboken, Seaside Heights, Woodbridge and a host of private sector

portfolios began the process of designing 'islandable' systems that recognized the need for both emergency power and economic viability of a microgrid.

GbD has developed a unique understanding of the complexities that surround the evolving world of energy deregulation and market dynamics that make DG or microgrid's economically viable. This expertise extends to related emerging technologies such as vehicle-to-infrastructure and "virtual pipelines".

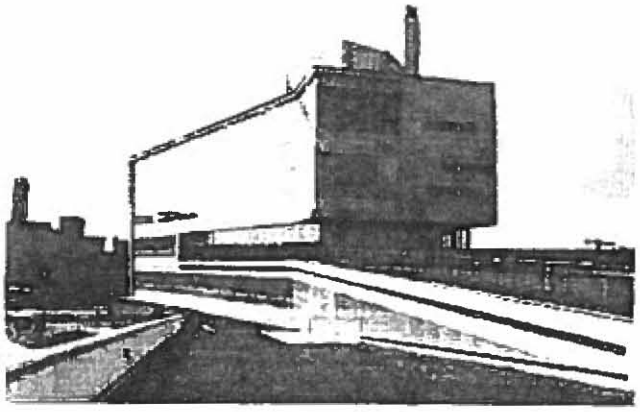
This comprehensive experience, combined with ongoing work with a host of federal, state and not for profit entities developing microgrids throughout the United States makes GbD unique among other firms. Our background in energy, environment, regulatory and utility work in the United States is unmatched.

TEAM QUALIFICATIONS

Hitachi Microgrid Qualifications

New York Prize Feasibility Studies (12 Total)

Approx. value of contracts (in current US$):
$727,000



Country: USA

Location within country: New York State

Duration of assignment (months): 14

Name of Clients:

- Tompkins County
- Syracuse University Center of Excellence
- Village of Canton
- Albany County
- City of White Plains
- Village of Croton-on-Hudson
- Village of Irvington
- Village of Ossining
- Village of Warwick
- Village of New Paltz
- Hamlet of Port Washington
- Village of East Hampton
- New York State Energy Research and Development Authority (NYSERDA)

Total No of staff-months of the assignments: 80

Address/email/phone number of example client (info for other NY Prize clients available upon request):

Ed Bogucz
Director, Syracuse Center of Excellence
727 East Washington Street, Syracuse, NY 13244
Phone: (315) 443-4815
Email: ebogucz@syracusecoe.org

Approx. value of the services provided by our firm under the contract (in current US$ or Euro): $425,000

Start date (month/year): 6/2015

Completion date (month/year): 8/2016

Narrative description of Project:

As part of the NY Prize program, NYSERDA provided grants up to $100,000 to New York communities to conduct feasibility studies for multi-stakeholder microgrids. These systems needed to include both government and non-governmental off-takers and cover critical infrastructure. Hitachi developed proposals for eight New York communities to apply for these funds, and was awarded funding for all eight. In addition, Hitachi won bids with four other communities to perform their feasibility studies after they had been awarded funding.

Hitachi designed microgrid concepts for each community based on their individual needs and priorities, ensuring in all cases that the proposed microgrid would maximize benefits for resilience, sustainability, and cost savings. We also worked with several communities to design microgrids that would aid in economic development.

As an example, Hitachi teamed with the Syracuse Center of Excellence to conduct a feasibility study for Syracuse's Near Westside neighborhood – a highly economically depressed area with a mixture of residential, small commercial and education facilities. The Hitachi design focused on placing distributed energy resources right at the site of the local sub-station to allow the entire neighborhood to island as a single node.

Services provided by Hitachi staff:
In all twelve projects, Hitachi designed the microgrid concept to be evaluated in the study, conducted all technical and economic modeling, drafted report language for NYSERDA, and evaluated the ownership and financing options for a potential system. Hitachi also did stakeholder management and organizing throughout each project to educate community members about the potential benefits of the microgrid project, and their role in the feasibility process.

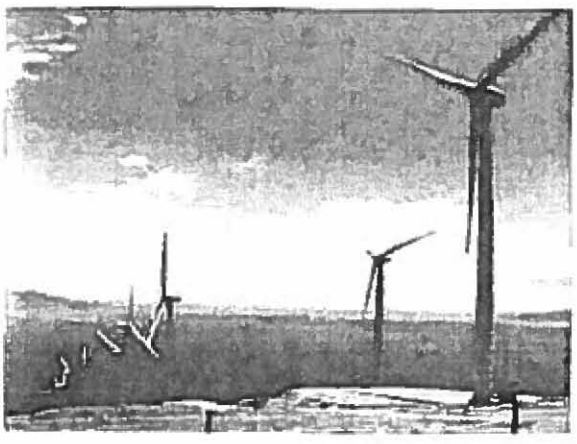
JUMPSmartMaui

Approx. value of the contract (in current US$): $30M

Country: US

Location within country: Maui Island, HI

Duration of assignment (months): 47 months



Name of Client: New Energy and Industrial Technology Development Organization (Japanese Government Organization)

Total No of staff-months of the assignment: Over 500 staff-months

Address/email/phone number of Client:

Mr. Kazuyuki Takada,
New Energy and Industrial Technology Development Organization (Japanese Government Organization)
Tel : +81- 44-520-5269
E-mail : Takadakzy@nedo.go.jp

Approx. value of the services provided by your firm under the contract (in current US$ or Euro):

Start date (month/year): May /2011

Completion date (month/year): March/2015

No of professional staff-months provided by associated Consultants: 0

Narrative description of Project:

The JUMPSmartMaui project, a joint undertaking by the U.S. and Japan, will be aimed at demonstrating a world-leading smart grid on Maui, a Hawaiian island. The Project is supported by NEDO, in cooperate with the U.S. State of Hawaii, Hawaiian Electric Company, Inc., the University of Hawaii, and Pacific Northwest National Laboratory, whose involvement is based on the Japan-U.S. Clean Energy Technologies Action Plan, which was agreed to following the Japan-U.S. heads of state summit held in November 2009. On the island of Maui, 15% of the electricity supply is already generated by renewable energy, and there are plans to increase this percentage going forward. The goal of the Project is to verify cutting-edge technologies in a smart grid under the use of large volumes of renewable energy already in place, contribute to smart grid standards, and implement a low-carbon social infrastructure system that efficiently uses renewable energy on a remote island where electricity costs are relatively high. Hitachi built and tested a system that applies the latest technologies that include: power distribution control, demand side load control, IT/OT platform & communications, electric vehicles (EVs) operation and charging control, EV DC Fast chargers. One main focus of the project was to leverage EVs for energy management and distribution grid reliability on the island, that is, to mitigate the excess wind generation and the fluctuations in power frequency and voltage when large volumes of renewable energy with weather-dependent are added to a power grid.

Services provided by Hitachi staff:

Hitachi provided the following services as part of the JUMPSmartMaui project:

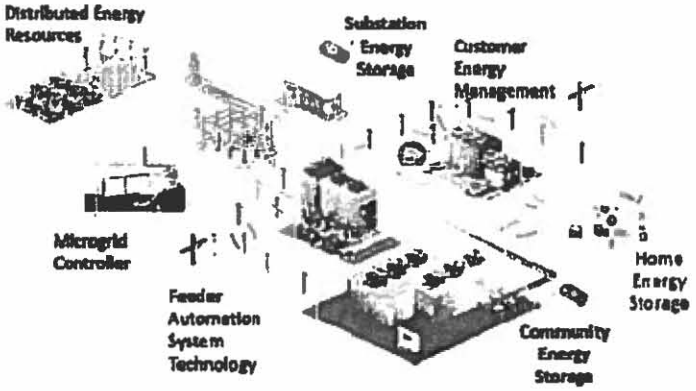
- Project feasibility study
- Products : Battery energy storage system, EV DC-Fast Charger and low-voltage monitoring & control devices
- Software and system integration: residential demand response, EV charging station and services, battery energy storage system and distribution management system.

EPC: Battery energy storage system and EV charging stations

Customer engagement for EVs and households

Operation & Maintenance

Borrego Springs Microgrid, California



The project leader for this proposal, John Westerman, led the project to design, install, and operate the first community scale microgrid in the U.S., at Borrego Springs, CA. The microgrid was located on an existing utility circuit with a peak load of 4.6 MW, serving 615 customers, with a significant installed base of PV (800 kW), in a remote area of the service territory. The Borrego Springs project was a first test for many of the technologies and practices that now form the basis of modern community microgrids, and Mr. Westerman's experience developing these applications. The Borrego Springs microgrid project was based on detailed load studies and projections, so DER could be carefully sized to run continuously and meet loads without exporting to the grid.

This project differed from previous efforts and has extended the knowledge base as follows:

- The microgrid supported actual customers in a real operating environment.
- The project is at significant scale (>4MW).
- The microgrid design incorporates both reliability and economic-oriented operations.
- Microgrid operations investigate the technical and economic interactions of multiple resources.
- The project used pricing signals to guide operations.

The project focused on the installation, integration and operation of the following key technologies:

- Distributed Energy Resources (Diesel Generators, DG)
- Advanced Energy Storage (grid-scale, community-scale, and residential-scale)
- Feeder Automation System Technologies
- Price-Driven Load Management
- Integration with DMS/OMS and Microgrid Controls

Greener by Design Microgrid Qualifications

CITY OF HOBOKEN, NJ

GbD was retained by Hoboken days after Hurricane Sandy devastated the infrastructure of the City.

- Working with our partners at Sandia National Labs, PSE&G, the City of Hoboken and the NJ BPU, GbD helped to create the concept paper for the development of the nation's first community scale MicroGrid.
- GbD was given full responsibility for the planning, regulatory, financial and operating construct of the project. As the only private firm in New Jersey to work with the stakeholders involved in this project, GbD developed a unique understanding of the challenges and opportunities a community based MicroGrid can bring and helped turn that into a tool kit for MicroGrid planning and design.
- This ongoing work has been nationally recognized for its innovative approach and for the cooperative agreements established between the various stakeholders, including the utility and regulatory community.
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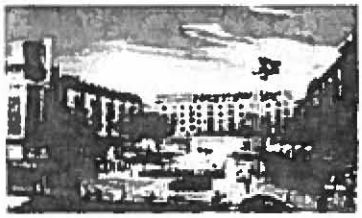
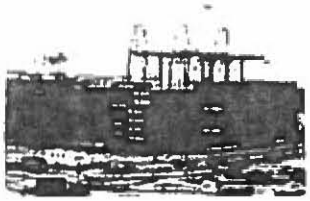


WALTER REED HOSPITAL AND EASTERN BALTIMORE REDEVELOPMENT, WASHINGTON DC & BALTIMORE, MD

These unique Northeast Corridor projects represent some of the highest profile redevelopment projects in the US looking at using DG and MicroGrid design as part of a comprehensive redevelopment planning effort.

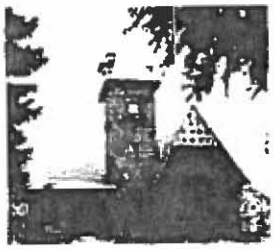
- GbD worked with a variety of public and private stakeholders including the US Army, PJM, John Hopkins University, Forrest City, the PUC and various State regulators to develop the blue print for distributed energy as these two critical sites.
- Geothermal, CHP, Solar with storage were all analyzed as part of the creation of an energy master plan for both sites.
- GbD developed a variety of regulatory and incentive strategies that were used in the final master plans.
- Currently, both sites are in construction or final planning and are expected to be completed over the next several years.



MAHER TERMINALS, ELIZABETH, NJ

Working with Maher Terminals, the largest container terminal on the East Coast, GbD conducted a comprehensive analysis of energy use and environmental impacts from operations at this large intermodal facility.

- Worked with US EPA, NJ DEP to complete comprehensive audit of Maher's various consent orders, fines and other enforcement actions related to the operations of the facility.
- Developed Energy and Operations Master Plan aimed at reducing emissions and energy use for regulatory compliance and ROI.
- Implemented ECMs and facility wide upgrades on a variety of equipment including electric cranes, hybrid straddle and other equipment and installation of roof top solar, building controls and a various demand response and load shedding assets.
- Currently conducting MicroGrid study for the islanding and operations of the facility during emergent times. This 5 MW project will also include homeland security, cargo container monitoring and logistic operation.



WOODBRIDGE TOWNSHIP, NJ - Community Based MicroGrid Development

GbD has been assisting Woodbridge Township for the last 8 years and has been recognized as the leader in sustainable development by the New Jersey League of Municipalities for each of those years.

- Working with the Township, GbD successfully obtained grant money for the development of a MicroGrid Feasibility Study. This study identified and ranked critical facilities and provided information on flood plain, traffic circulation and land use issues critical for emergency response.
- Presentations to stakeholders, utility data gathering, cost benefit analysis, partnership development and management and control of the MicroGrid were developed for final funding requests to the NJ BPU.
- GbD has management oversight of Woodbridge's Local Government Energy Audit program and implementation of recommended energy efficiency retrofits and renewable energy installations on municipal buildings. This also includes the preparation of Energy Efficiency and Conservation Strategy (EECS), Carbon Footprint Analysis, and Climate Action Plan.
- Sustainable Jersey Award Recipient (2009-2015)

HUDSON COUNTY IMPROVEMENT AUTHORITY

HUDSON COUNTY IMPROVEMENT AUTHORITY, JERSEY CITY, NJ

GbD is assisting the Hudson County Improvement Authority in a wide range of Energy Planning and funding activities including master planning for demand response and energy resiliency.

- Beginning with an outline of each facility, age, infrastructure, use and future use, GbD developed a procurement and energy efficiency strategy to create a true baseline of energy costs and consumption.
- Upon completion of the audits and reducing the overall energy commodity cost, GbD developed a cost benefit analysis for the implementation of the various ECM's identified.
- In addition, GbD analyzed the various opportunities for demand response.
- Working with EPA and NJ DEP, HCIA developed a spec for all generators that would allow for running on non-attainment days.
- Hudson County is in the process of installing those generators as part of their overall Energy Master Plan that will allow critical facilities to island themselves in times of emergency.

GBD MICROGRID EDUCATION AND SPEAKING

GbD is a policy leader in MicroGrid development and design. GbD has participated as an invited guest, in top think tanks and public and private sector programs on MicroGrid development including:

- **ROCKY MOUNTAIN INSTITUTE**
  Invited to participate with the City of Hoboken Sundance, Utah for the e-Lab Accelerator on the development and implementations of the future of microgrids. Other members of our team were from Concord Engineering, NJ-BPU, PSE&G, and the City of Hoboken.
- **THE PEW CLEAN ENERGY INITIATIVE**
  Featured in The PEW Clean Energy Initiative video, "How Microgrids Improve Resiliency in Power Outages", to view go to:
  https://www.youtube.com/watch?feature=player_embedded&v=X5RI7HhPskI
- **TED TALK**
  Adam Zellner, GbD President, featured at TEDxHoboken: "Is your cell phone charged? America's addiction to energy.

VEHICLE TO GRID – EMERGENCY FUEL

MOBILE FUEL SOLUTIONS, Natural Gas Virtual Pipeline

- GbD is providing a full slate of regulatory and business development consulting to Mobile Fueling Solutions (MFS).
- In addition to serving locally based public and private fleet customers, MFS's Virtual Pipeline© uniquely allows compressed natural gas stations to serve geographically dispersed industrial, commercial or fleet customers without the need to develop additional costly pipeline or other infrastructure, effectively turning existing stations into super-regional fueling center.
- MFS delivers CNG to customer locations in modular containers transported on specially designed. This transport capability also provides resilient emergency services in that it provides backup to other natural gas users in the event of a supply disruption.

NASEO
National Association of State Energy Officials

Initiative for Resiliency in Energy Through Vehicles, National Association of State Energy Officials

- Under contract to the non-profit NJ Clean Cities Coalition, GbD is an integral partner in this national effort to catalyze state and local acceptance and deployment of alternative fuel vehicles and infrastructure in preparing for and responding to man-made and natural disasters and emergency situations.
- In support of NASEO's transportation program and resiliency planning efforts, GbD staff serves as national strategic advisor and as the NJ lead, and participate on the national Steering Committee for the development and dissemination of information to support state and local decision making regarding the use of alternative fuels in emergency response and preparedness operations.

Letters of Support

Galloway Township is served by Atlantic City Electric Company (ACE) and South Jersey Gas. Both of these firms have provided a letter of support for this project which can be found below.

atlantic city electric

An Exelon Company

Vincent Malone
President
Atlantic City Electric Region

5100 Harding Highway
Mays Landing, NJ 08330

609.625.5864 – Telephone
609.625.5274 – Facsimile

vincent.malone@atlanticcityelectric.com

March 24, 2017

The Honorable Don Purdy
Mayor, Township of Galloway
Galloway Township Municipal Complex
300 East Jimmie Leeds Road
Galloway, NJ 08205

Re: Atlantic City Electric Company
Letter of Support for Town Center Distributed Energy Resource Microgrid Feasibility Study Incentive Program

Dear Mayor Purdy:

On January 25, 2017 the New Jersey Board of Public Utilities ("BPU" or the "Board") approved the Town Center Distributed Energy Resource ("TC DER") Microgrid Feasibility Study Incentive Program (the "Program"). The BPU has recognized that significant information and data to evaluate and optimize the feasibility of a microgrid is needed from the utilities and, as part of the application process[1] for the Program, has required that Program applicants obtain a Letter of Support for the feasibility study from the electric and gas distribution companies that operate in the service territory where the proposed microgrid project will be located.

[1] There is a two-phase application process for the Program. The first phase is the feasibility study. The second phase is detailed engineering of the proposed microgrid project. The Board must approve an applicant's feasibility study in order for the applicant to move on to the second phase of the application process.

Representatives from Atlantic City Electric Company ("ACE" or the "Company") have met with the Township of Galloway and their project consultant, Greener by Design, LLC, regarding a proposed TC DER microgrid project. ACE is pleased to offer this Letter of Support in connection with the Township's proposed TC DER Microgrid Feasibility Study Application (the "Application"). ACE agrees to provide to the Township of Galloway with reasonable and relevant information regarding the Company's distribution and transmission infrastructure which exists, is available, and is not subject to an enhanced level of system/operational security (referred to in this letter as the "Information"), that is necessary for the Township of Galloway to complete a microgrid feasibility study. The Township of Galloway acknowledges and agrees that any Information provided by the Company shall be returned at any point in the process that the Application is withdrawn, rejected by the BPU or delayed for a period of six months or more. ACE will provide the Information with the understanding that the Township of Galloway will execute all Company required forms and agreements, including, but not limited to, confidentiality and/or non-disclosure agreements.[2]

Although ACE agrees to provide the Information to the Township of Galloway, to the extent that special studies are required, the Company reserves the right to bill the Township of Galloway for these special studies, according to ACE's tariff and/or customary practice. In addition, to the extent that interconnection applications are required for the distribution utility, PJM Interconnection, LLC or both, the Township of Galloway acknowledges and agrees that it will be responsible for all applications and associated fees. Nothing in this Letter of Support shall be interpreted as circumventing or accelerating well-established practices for processing interconnection applications.

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[2] In accordance with N.J.A.C. 14:4-7.8, the Company will also require signed consent forms before personally identifiable customer information will be released to any Program applicant.

ACE further reserves the right to review, comment, and take positions on the Township of Galloway's feasibility study throughout the BPU's review process, including, but not limited to, any final report that may be issued by the Board as well as the remaining phases of the Program.

The Company is pleased to provide this Letter of Support and looks forward to working with the Township of Galloway throughout this application process.

Respectfully submitted,

Vincent Maione
Regional President
Atlantic City Electric Company

cc: Irene Kim Asbury, Esquire, Secretary, BPU (First Class Mail and Electronic Mail)
Michael Winka, BPU (First Class Mail and Electronic Mail)
C. Johansen, Township Manager (First Class Mail and Electronic Mail)
V. Polistina, Township Engineer
G. Lalla, VP of Operations, Greener by Design, LLC (Via Electronic Mail)

South Jersey Gas

March 27, 2017

Irene Kim Asbury, Secretary
NJ Board of Public Utilities
44 South Clinton Avenue, 3rd Floor
P.O. Box 350
Trenton, New Jersey 08625-0350

Re: South Jersey Gas Company's Letter of Support of the Township of Galloway's Application for Town Center Distributed Energy Resource Microgrid Feasibility Study Incentive Program

Dear Secretary Asbury:

On January 25, 2017, the New Jersey Board of Public Utilities ("BPU" or the "Board") approved the Town Center Distributed Energy Resource ("TC DER") Microgrid Feasibility Study Incentive Program (the "Program"). The BPU recognized that significant information and data to evaluate and optimize the feasibility of a Microgrid is needed from the utilities and, as part of the application process[1] for the Program, requires Program applicants to obtain a Letter of Support for the feasibility study from the electric and gas distribution companies that operate in the service territory where the proposed Microgrid project will be located.

South Jersey Gas Company ("SJG" or the "Company") has been notified by the Township of Galloway (the "Township") and their project consultant, Greener by Design, LLC, regarding its proposed TC DER Microgrid project. SJG is pleased to offer this Letter of Support in connection with the Township's proposed TC DER Microgrid Feasibility Study Application (the "Application"). In so doing, SJG agrees to provide the Township with reasonable and relevant information regarding the Company's distribution and transmission infrastructure as it exists and is maintained by the Company, which is not subject to an enhanced level of system/operational security (collectively referred to hereafter as the "Information"), to the extent necessary for the Township to complete a Microgrid feasibility study. The Township must acknowledge and agree that any information provided by the Company will be returned to the Company at any point in the process if the Application is withdrawn, rejected by the BPU, or delayed for a period of six months or more. SJG will provide the information with the understanding that the Township shall execute all Company required forms and agreements, including, but not limited to, confidentiality and/or non-disclosure agreements.

[1] There is a two-phase application process for the Program. The first phase is the feasibility study. The second phase involves a detailed engineering of the proposed Microgrid project. The Board must approve an applicant's feasibility study in order for the applicant to be eligible for the second phase of the Program process.

South Jersey Gas

To the extent that any special studies are required, the Company reserves the right to bill the Township for these special studies according to SJG's tariff and/or customary practice. Nothing in this Letter of Support shall be interpreted as circumventing or accelerating the Company's existing practice for processing new gas service applications.

SJG further reserves the right to review, comment and take positions on the Township's feasibility study throughout the BPU's review process, including its right to revoke support of the project pending receipt of additional information that may become available through the Program process.

The Company is pleased to provide this Letter of Support and looks forward to working with the Township throughout this application process.

Sincerely,

David Robbins, Jr.
President, South Jersey Gas

cc: The Honorable Don Purdy, Township of Galloway
Chuck Feinberg, Greener By Design, LLC

State of New Jersey
BOARD OF PUBLIC UTILITIES
44 SO. CLINTON AVENUE
THIRD FLOOR, SUITE 314 – P.O. BOX 350
TRENTON, NEW JERSEY 08625-0350

CHRIS CHRISTIE
GOVERNOR

KIM GUADAGNO
LT. GOVERNOR

RICHARD S. MROZ
PRESIDENT
TEL: (609) 777-3310
FAX: (609) 292-2264

April 17, 2017

Mayor Don Purdy
Township of Galloway
300 E. Jimmie Leeds Road
Galloway, NJ 08205

Dear Mayor Purdy:

The NJBPU Town Center DER Microgrid Evaluation Team (Evaluation Team) has received your application for a TC DER microgrid feasibility study incentive. While this application was accepted for evaluation, there are a number of items that are required to be submitted in order to complete that evaluation. These items are listed below:

1. A general description of the overall cost

BPU has received 13 proposals for feasibility study incentives. The Board's approved DER microgrid line item budget is $1 million. The 13 proposals significantly exceed that budget. The TC DER evaluation team is requiring that you submit a best and final offer (BAFO) for your proposal. This BAFO should include your estimated breakdown of the budget for the prime investigator and all subcontracts including any estimated fees to be paid to the EDC/GDC. The above noted items, the BAFO and the budget breakdown of the prime investigator and subcontractors should be submitted to TCDERmicrogrid@bpu.nj.gov by close of business (COB) 5:00 p.m. on May 1, 2017. Non-submittal of the additional items, the BAFO and budget breakdown will result in a non-completeness determination of the proposal.

As noted in the TC DER microgrid feasibility study application, the Board has the sole discretion over the approval of projects and awards of incentives, and may change criteria or available funding at any point during the duration of the program.

Sincerely,

Michael Winka
Senior Policy Advisor

TOWNSHIP OF GALLOWAY
OFFICE OF THE TOWNSHIP MANAGER

300 E. Jimmie Leeds Road, Galloway, N.J. 08205
(609) 652-3700 X. 260 Fax: (609) 652-1967
E-mail: manager@gtnj.org

TOWNSHIP MANAGER
Christian Johansen

April 28, 2017

Mr. Michael Winka
Sr. Policy Advisor
NJ BPU
44 S Clinton Avenue
Trenton NJ 08625

RE: Town Center MG Grant Application

Dear Mr. Winka,

As requested, Galloway is pleased to provide the Best and Final Offer for the NJBPU Town Center DER Microgrid Grant Program. Below you will find a general breakdown we anticipate for our consultants. At this time, we do not have an estimate for fees to be paid to the utilities, but will happily provide one, once more information is available.

Lead Investigator – Hitachi Americas Energy Solutions Division $125,000
Sub-Consultant – Greener by Design $75,000
Total Request - $200,000

Thank you.

Sincerely,

Christian Johansen
Township Manager

Town Center Distributed Energy Resources Microgrid Feasibility Study Report Requirements

As set forth in the MOU the Town Center (TC) Distributed Energy Resource (DER) Microgrid Feasibility Study Report should be of sufficient detail to demonstrate how the TC DER Microgrid's functional and technical requirements will be executed, the proposed approach to solve technical problems, and how project goals will be accomplished.

The TC DER Microgrid Feasibility Study Report should include an Executive Summary including all project definitions and special terms used in the Report.

The full report must include, but is not necessarily limited to, the following

1. Table of Contents

2. Project Name

3. Project Applicant – This should be the local government or state agency that is the MOU signatory.

4. Project Partners – This should include any agreements entered into by the partners.

5. Project location – This should include a detailed mapping of the boundaries on the TC DER microgrid within the municipality.

6. Project Description including a detailed description of all included critical facilities with a description of why they are critical facilities within the proposed TC DER Microgrid. The Project Description should include the following: [1]

    i. The electrical and thermal loads for each critical facility over the month and year. This should include a description and illustration of any variability in loads including daily, weekend or seasonal loads that impact on the peak, minimum and average loads.

    ii. The electric and thermal load of the total microgrid project over the month and year. This should include a description and illustration of any variability in loads including daily, weekend and seasonal loads that impact on the peak, minimum and average loads as well as the coincident loads of the overall system.

[1] The energy data in this section and the full report should be provided through metered data were available but may also be provided through simulated data from models such as EnergyPlus. If the data is simulated the specific software and model should be identified and available.

iii. The monthly and annual energy costs for each critical facility and the overall project including both energy and demand costs. This should include the monthly cost and any variations over the year that could impact demand costs.

iv. The square footage of each building and the total project.

v. The overall boundaries of the proposed project and distance between critical facilities should be provided. A map should be provided showing the locations of any Right of Way (ROW) crossings.

vi. The size of the available emergency shelter facilities and for what periods they can serve during and after an emergency.

vii. The specific FEMA Category Classification of each building and whether they are a state or federal designated critical or emergency facility.

viii. A listing of all potential permits, permit issuing agency, and general timeframe for issuance.

ix. Any previously installed EE or energy conservation measure (ECM) or currently implemented demand response (DR) measure.

6. A detailed description of the ownership/business model for the overall project including all procurement issues between the various local government and state government partners. This should include a detailed description of the statutory and regulatory provisions of proposed ownership models, EDC/GDC utility roles, as well as any billing systems for electricity and thermal energy.

7. A detailed description of the technology, business and operational protocol to be developed and/or utilized and the location within the TC DER Microgrid. This should include the following:

i. A detailed description of the proposed connections (electric, gas and/or thermal) of the critical facilities and the DER technologies.

ii. A one line diagram of the microgrid and location of the electrical connections to the EDC's facilities/equipment.

iii. A detailed description of the type of distribution system the TC DER would be interconnecting into (radial or network) and the interconnection procedures and requirements.

iv. A detailed description of how the TC DER will black start and operate and over what time period in island mode and in sync with the distribution system.

v. A detailed description of the NJBPU and EDC tariff requirements/issues including any smart grid or distribution automation upgrades proposed or under development by the EDC.

vi. A detailed description of the FERC and PJM tariff requirements/issues.

8. A detailed description of the overall cost including site prep, equipment and equipment installation, construction, operations and maintenance including a detailed construction schedule. This should include a detailed description of the overall energy costs for each critical facility and the overall project as well as any proposed ECM or DR measure to be constructed or operated within each critical facility and the overall project and its impact of the overall operation costs.

(Both 7 and 8 should be detailed through an available microgrid modeling efforts. 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)).

9. A detailed cash flow evaluation. This should also include a description of the potential revenue markets for any ancillary services, demand response including EE, capacity or energy markets and any available emission or energy certificate trading markets.

10. A detailed description of the potential financing of each location/critical facility and/or the overall project.

11. A detailed description of the benefits of the proposed Town Center DER Microgrid as well as the need for the proposed project. This should include an estimate of the value for reliability, resiliency, flexibility, sustainability including avoided environmental impacts such as air emissions, water usage, wastewater discharges, land use and waste generation, affordability and security.[2]

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

13. The estimated timeframe for the completion of the construction and commencement of operations of the individual critical facilities and the overall project.

14. A description of the on-going work with the EDC and GDC.

The overall quality of the TC DER microgrid feasibility study report and the data provided will be one factor used by the Board to determine which projects proceed to a Phase 2 – Detailed Engineering Design and TC DER microgrid pilot.

[2] This valuation should follow the Grid Services and Technologies Valuation Framework developed by the USDOE in their Grid Modernization Initiative.

MEMORANDUM OF UNDERSTANDING
BETWEEN AND AMONG
THE NEW JERSEY BOARD OF PUBLIC UTILITIES,
AND
GALLOWAY TOWNSHIP

THIS MEMORANDUM OF UNDERSTANDING ("MOU"), is made this _____ day of _____, 2017, by and between **The GALLOWAY TOWNSHIP** ("Recipient") **and The NEW JERSEY BOARD OF PUBLIC UTILITIES** ("BPU" in general or "Board" when referring to Board of Commissioners) (collectively the "Parties") setting forth the roles and responsibilities of the Parties in connection with the Town Center Distributed Energy Resource (TCDER) Microgrid Feasibility Study Incentive Program ("Program").[1]

WHEREAS, the BPU is charged with the authority to ensure that safe, adequate, and proper utility services are provided at reasonable, non-discriminatory rates to all members of the public who desire such services and to develop and regulate a competitive, economically cost effective energy policy that promotes responsible growth and clean renewable energy sources while maintaining a high quality of life in New Jersey; and

WHEREAS, as set forth in N.J.S.A. 48:2-13, BPU is responsible for regulatory oversight of all necessary services for transmission and distribution of electricity and natural gas including but not limited to safety, reliability, metering, meter reading and billing; and

WHEREAS, the BPU is chair of the Energy Master Plan Committee and is responsible for the preparation, adoption and revisions of the Energy Master Plan (EMP) regarding the production, distribution, and conservation of energy in this State; and

WHEREAS, the BPU 2015 Energy Master Plan Update (EMP Update) established a new overarching goal to "Improve Energy Infrastructure Resiliency & Emergency Preparedness and Response" in response to several extreme weather events that left many people and businesses without power for extended periods of time. One "Plan for Action" policy

[1] Acronyms related to this program are referred to herein are as follows: Town Center (TC); Disributed Energy Resource (DER);

recommendation included in the EMP Update is to "Increase the use of microgrid technologies and applications for Distributed Energy Resources (DER) to improve the grid's resiliency and reliability in the event of a major storm."; and

WHEREAS, specifically, this new policy recommends that:

"The State [of New Jersey] should continue its work with the [United States Department of Energy], 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."; and

WHEREAS, The Board approved the FY17 Clean Energy Program Budget which established as part of the Office of Clean Energy Distributed Resources Program, the Town Center DER Microgrid Program and budget.; and

WHEREAS, The BPU staff has, under the direction and approval of the Board, issued a full report and recommendations regarding the utilization of TCDER Microgrids and subsequently issued an application for this Program; and

WHEREAS, the Recipients who are Parties to this MOU freely and voluntarily, in full consideration of the costs and benefits incident hereto, submitted an application to participate in the Program; and

WHEREAS, BPU Staff issued a draft application for public comment regarding this Program on August 5, 2016, a public meeting to discuss the draft application on August 23, 2016, and written comments were received and considered and staff responses were published; and

WHEREAS, the Board, by virtue of proper procedure, and execution of this MOU, has determined that the Recipient's application is approved and incentive funds will be awarded to the Recipient, pursuant to the terms included herein;

NOW THEREFORE, in consideration of the promises and mutual representations, warranties, and covenants herein contained, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

I. INCORPORATION

All of the above recitals, the entirety of the TCDER Micrigrid Feasibility Study Incentive Program Application (attached hereto as Appendix A), the entirety of the Recipient's submitted application (Sumbittal letter which references recipient's application is attached hereto as Appendix B), The Best and Final Offer request letter and recipient's response thereto (attached hereto as Appendix C), and final Feasability Study Report Requirements (attache hereto as Appendic D) are hereby incorporated by reference into this MOU as if set forth at length herein.

II. SCOPE OF THE AGREEMENT

This MOU applies only to the Feasibility Study phase of the Program which encompasses the incentive award funding for the satisfactory completion and submission of the Recipient's TCDER Microgrid Feasibility Study only. Conformance to the terms of this MOU and timely completion of the Feasibility Study does not guarantee Recipient's future participation in this Program or any other related programs. Furthermore, the terms and conditions included herein represent the entire scope of this agreement and supersede all former representations whether written or verbally communicated.

III. DUTIES OF THE PARTIES

A. The Recipient will submit a complete and final TCDER Microgrid Feasibility Study (The Study) in accordance with the terms and conditions of this MOU and incoporated documents.

B. The Recipient shall have one (1) year from the date that this MOU is executed to complete The Study, unless a timely request for extension is submitted by the recipient for good cause and is granted by Board Staff.

C. Recipient shall include in the Feasibility Study a Conceptual Design that should be of sufficient detail to demonstrate how the TCDER Microgid functional and technical requirements will be executed, the proposed approach to solve technical problems, and how project goals will be accomplished. The Recipient's Conceptual Design shall include at a minimum: (1) Design Analysis including design narrative and design calculations for all diciplines, an intended specifications list, environmental permitting memorandum that identifies any and all required permits and the detailed outline of process required to obtain the identified permits; (2) Schematic or one-line concept drawings; (3) Conceptual cost estimate; (4) Preliminary construction schedule in bar chart format; and, (5) Project definitions and special conditions.

D. Recipient shall report to Board Staff regarding the status and progress of The Study upon request.

E. The Recipient is solely responsible for fully complying with the terms and conditions of this MOU, the above-referenced incorporated documents, and any and all duly executed subsequent agreements between the Parties.

F. Effective upon execution of this MOU, BPU agrees to firmly commit the sum of $175,000, to cover costs to be incurred by the Recipient to administer, complete, and deliver the Feasibility Study.

G. All requisitions, pay applications, and invoices submitted for costs or expenses associated with the Feasibility Study shall be subject to review and approval by Recipient according to its standard procedures. Upon approval, Recipient shall promptly submit to BPU for

payment all such requisitions, pay applications and invoices. In reviewing, approving, submitting and paying such requisitions, pay applications, Recipient and BPU shall be cognizant of and shall comply with the requirements of the New Jersey Prompt Payment Act, N.J.S.A. 2A:30A-1 et seq.

H. Recipient shall submit all final invoices of expenditures and a final draft of the Study within one year of the execution of this MOU or at the end of an approved extension pursuant to Section III B of this MOU.

I. Upon receipt of the Study and final invoices of expenditures, BPU Staff shall determine if the Study meets the requirements of the program and the MOU at Section III C. If BPU Staff determines that the Study does not meet any requirement(s), BPU Staff shall provide to Recipient a list of requested revisions which recipient shall forward to the consultant that completed the Study. The consultant shall then be afforded a reasonable period of time to make the requested revisions and will then resubmit the Study. Final payment shall be made upon BPU Staff approval of the Study.

J. Incentive funds for this program may not be diverted to pay for any work conducted prior to the date of execution of this MOU. Furthermore, Incentive funds must only be used in furtherance of the completion of the Feasibility Study specifically.

K. Recipient shall procure the services necessary to complete the Feasibility Study in compliance with N.J.S.A. 52:32-2, N.J.S.A. 52:34-9.1, et seq., and N.J.S.A. 52:35-1, et seq., and any and all applicable State and local procurement laws, rules, and procedures.

L. The BPU reserves the right to withhold or deny incentive funding for any invoice items submitted by Recipient that BPU determines to be unlawful or otherwise inappropriate for this Program.

IV. DESIGNATED REPRESENTATIVES

Written communication between the Parties for the purpose of this MOU as defined above shall be delivered to the following representatives.

New Jersey Board of Public Utilities
Attn: Michael Winka Sr Policy Advisor
44 S. Clinton Ave, Trenton, NJ 08625
Michael.Winka @bpu.nj.gov

Galloway Township
Attn:
Addresss
XXXX.YYY@abc.gov

V. MISCELLANEOUS

A. No Personal Liability. No official or employee of BPU shall be charged personally by Recipient, its employees, agents, contractors, or subcontractors with any liability or held liable to Recipient, its employees, agents, contractors, or subcontractors under any term or provision of this MOU or because of its execution or attempted execution or because of any breach or attempted or alleged breach of this MOU.

No official or employee of Recipient shall be charged personally by BPU, its employees, agents, contractors, or subcontractors with any liability or held liable to BPU, its employees, agents, contractors, or subcontractors under any term or provision of this MOU or because of its execution or attempted execution or because of any breach or attempted or alleged breach of this MOU.

C. Captions. The captions appearing in this MOU are inserted and included solely for convenience and shall not be considered or given effect in construing this MOU, or its provisions, in connection with the duties, obligations, or liabilities of the Parties or in ascertaining intent, if a question of intent arises. The preambles are incorporated into this paragraph as though set forth in verbatim.

D. Entirety of Agreement. This MOU and its attachments represent the entire and integrated agreement between the Parties and supersedes any and all prior agreements or understandings (whether or not in writing). No modification or termination hereof shall be effective, unless in writing and approved as required by law.

E. Amendments. This MOU may be amended by the written request of any Party and with the consent of the other Party. Any proposed amendment of this MOU shall be submitted by one Party to the other Party at least five (5) business days prior to formal discussion or negotiation of the issue. Any agreed amendment of this MOU shall be set forth in writing and signed by an authorized representative of each Party in order to become effective.

F. No Third-Party Beneficiaries. This MOU does not create in any individual or entity the status of third-party beneficiary, and this MOU shall not be construed to create such status. The rights, duties, and obligations contained in this MOU shall operate only between the Parties and shall inure solely to the benefit of the Parties. The provisions of this MOU are intended only to assist the Parties in determining and performing their obligations under this MOU. The Parties intend and expressly agree that only the Parties shall have any legal or equitable right to enforce this MOU, to seek any remedy arising out of a Party's performance or failure to perform any term or condition of this MOU, or to bring any action for breach of this MOU.

G. No Assignment. This MOU shall not be assignable, but shall bind and inure to the benefit of the Parties hereto and their respective successors.

H. Governing Law. This MOU and the rights and obligations of the Parties shall be interpreted, construed, and enforced in accordance with the laws of the State of New Jersey.

I. Authority. By execution of this MOU, the Parties represent that they are duly authorized and empowered to enter into this MOU and to perform all duties and responsibilities established in this MOU.

J. Term. This MOU shall be effective as of the date hereinabove written and, unless terminated sooner as set forth below, shall remain in effect until the completion of the Feasibility Study and payment of funds as set forth in Section III.

K. Termination. Board Staff and the Recipient may terminate this contract in whole, or in part, when both parties agree that the continuation of the project would not produce beneficial results commensurate with the expenditure of funds. The two parties shall agree upon the termination conditions including the date on which the termination shall take effect, and, in case of partial terminations, the portion to be terminated.

K. Counterparts. This MOU may be executed in duplicate parts, each of which shall be an original, but all of which shall together constitute one (1) and the same instrument.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties have signed this Memorandum of Understanding the date first written above.

Witness: Galloway Township

_____ By: _____

.....

Dated: _____

Witness: New Jersey Board of Public Utilities

_____ By: _____

Richard S. Mroz, President

Dated: _____

APPROVED AS TO FORM:
Andrew Kuntz
Attorney General, State of New Jersey

By: _____