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

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 NEPTUNE TOWNSHIP FOR PHASE I FEASIBILITY STUDY	))))	ORDER DOCKET NO. QO17060638

Party of Record:

Vito Gadaleta, Director, Neptune 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, Neptune Township submitted an application to the Board.

The Neptune Township Advanced Microgrid ("NTAM" or "Project") was submitted by Neptune Township. The project partners include Neptune Township, Neptune Township School Board, Neptune Township Housing Authority, Monmouth County and several private sector entities. The NTAM critical facilities as part of the Project include Jersey Shore University Medical Center ("JSUMC"), Monmouth County Academy of Allied Health & Science, Meridian Dentistry for Children, Pediatric Associates, Neptune Municipal Building (including the Police Department and Library), Neptune Department of Public Works, Gables Elementary School, Neptune Middle School, Brookdale Community College, Monmouth County Vocational School, Neptune High School, Neptune Aquatic Center, County Sheriff Backup Communications Center and Emergency Medical Squad ("EMS") Training Center, Neptune Senior Citizens Center, Neptune Housing Authority, Employment Services, US Post Office, Senior Housing, DaVita Neptune Dialysis Center, Excelsior Medical Corporation, Walgreens, Neptune Getty Station, ALDI Supermarket, Neptune Township Sewage Department and Wastewater Treatment Facility, New Jersey American Water Company, Monmouth County Emergency Communications Tower, Shark River Hills Fire Company, Shark River Hills First Aid Squad, and the Neptune Township Housing Authority. Based on the list of partners and proposed critical facilities there are two FEMA category IV designated facilities (the JSUMC and the Neptune Township Police Department) and seven FEMA category III facilities can provide

shelter in an emergency. The estimated total annual fuel usage of all 12 buildings in the proposed Area A Project is 131,225 MM Btus. The FEMA category III and IV facilities in the proposed Area A Project that have a combined energy usage per square foot of approximately 83,676 Btu's per square foot.

The Project will include an existing 3.8 MW combined heat and power ("CHP") facility at theJSUMC. The Project will evaluate approximately 15 MW of new power capacity which may include solar and dispatchable generation such as CHP and other new electric infrastructure to allow the proposed Project to operate during normal and emergency conditions. The Project proposes to use HOMER Pro microgrid software to model the proposed Project as well as the Rutgers' CEEEP Cost/Benefit model. The estimated timeframe to complete the feasibility study is 12 months. JCP&L is the electric utility and New Jersey Natural Gas (NJNG) is the natural gas utility for tNeptune Township and both JCP&L and NJNG provide a letters of support (LOS) to participate in the feasibility study.

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 $150,000 for Neptune 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:

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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 NEPTUNE TOWNSHIP FOR PHASE I
FEASIBILITY STUDY

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1. Project Name

The Neptune Township Advanced Microgrid (NTAM)

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www.tb-tech.net

Submitted by:
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2. Project Description including all potential critical facilities with a description of why they are critical facilities within the proposed Town Center DER Microgrid. This should include the following:

Neptune Township has a land area of 8 square miles and is situated in the central easternmost part of Monmouth County. Neptune is a community with several diverse neighborhoods including Ocean Grove, Shark River Hills, Mid-Town, Bradley Park, the Gables, Seaview Island and West Neptune. The Township is situated in a strategically favorable location for Microgrid implementation because the Township can effectively manage and maintain critical primary evacuation, rescue and supply routes to the shore communities from Asbury Park to Avon by the Sea. The Township is locally known as the Crossroads of the Jersey Shore due to the major corridors which cross through and border the Township. Neptune Township is accessible from Garden State Parkway exits 100 and 102, with State Highways 18, 33, 35, 66 and 71 within its' borders. Neptune Township is also accessible by New Jersey Transit trains (Bradley Beach/Neptune Station), and major bus routes. Neptune Township is home to Jersey Shore Medical Center, the Regional Trauma Center for Central Jersey. The critical assets located in Neptune Township span numerous Department of Homeland Security (DHS) sectors and include: transportation; healthcare; energy; chemical/hazardous material; petroleum; communications; banking/finance; information technology; emergency services; government facilities; water; commercial; food/agriculture and the postal/shipping sectors. The complimentary nature of critical assets serving Neptune Township represent a practical and potentially economically feasible location to host and operate a Town Center Advanced Microgrid to serve the local communities and to potential provide a safe "fall back" safe harbor for events that impact the shoreline most severely.

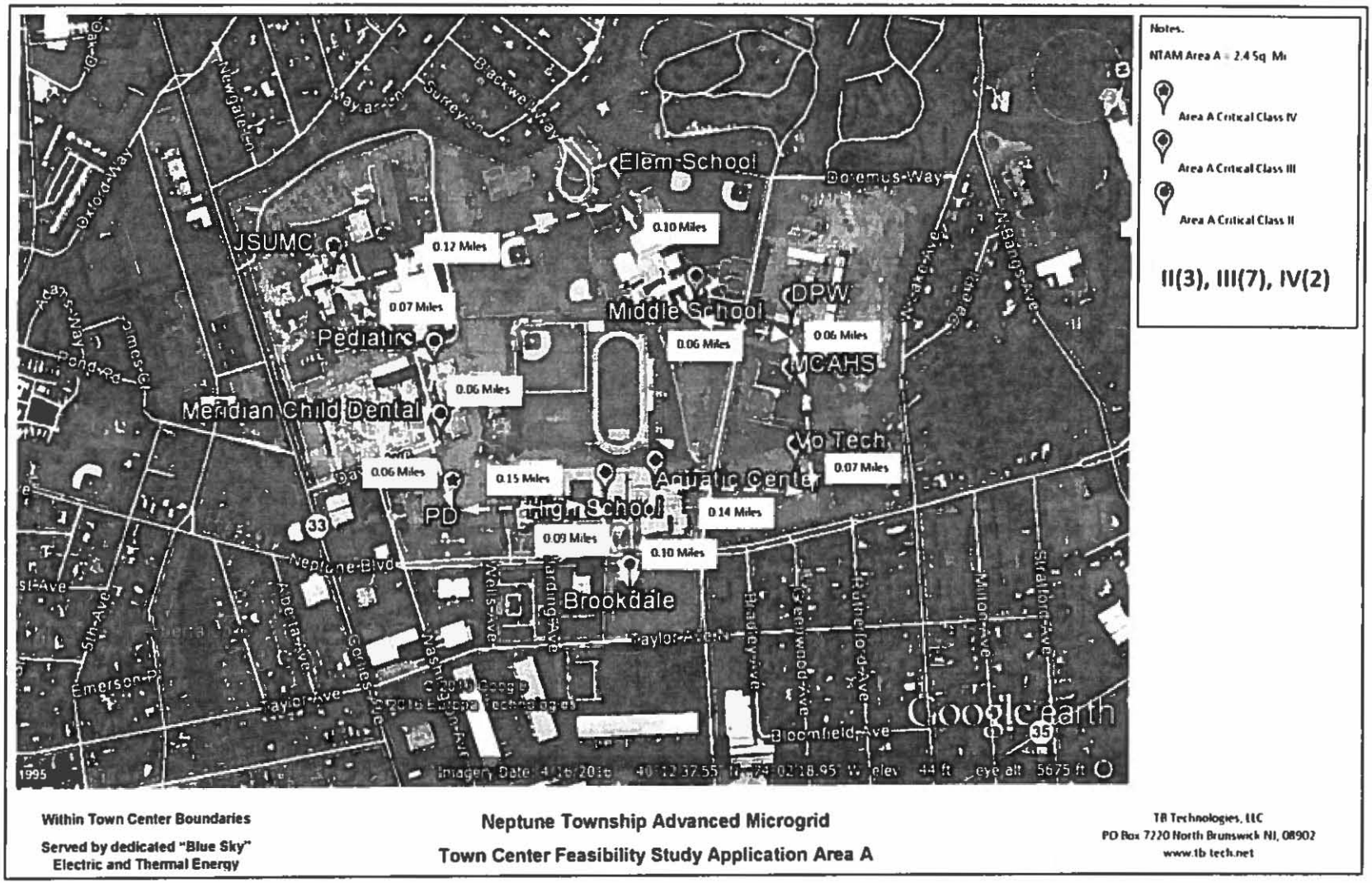
NTAM presents an overwhelming case to maximize the value of incentive support because the Township has already planned, procured and installed utility interconnectivity conduits and infrastructure in anticipation of smart-grid adaptation or long term resiliency support systems. The Township's application meets the BPU's criteria for multiple critical facility customers in a single municipality that provide essential services and emergency services under emergency conditions in a cost-effective manner, as well as operate in a cost-effective manner 24/7 under normal conditions. Neptune Township is particularly favorable because of the high summer peak-load within the electric utilities distribution circuits serving the Township and shoreline communities. We anticipate the potential implementation of the Advanced Microgrid would be completed before the long term JCP&L circuit enhancements are completed. Neptune Township's approach contemplates significant effort to collaborate with JCP&L to maximize the local network enhancement cost avoidance to the utility and subsequent rate payers.

Facility Description Within Town Center Microgrid Boundaries Served by Dedicated (Blue-Sky) Electric and Thermal Distribution	Risk Category	Area (Sq. Ft.)	MMBTU (Major Fuel Annual)
Jersey Shore University Medical Center	IV	815,955	70,172
Monmouth County Academy of Allied Health & Science	III	44,299	7,619
Meridian Dentistry for Children	II	16,500	1,104
Pediatric Associates	II	20,000	1,338
Neptune Municipal Building (incl. PD & Library)	IV	83,000	7,636
Neptune Department of Public Works	II	11,000	646
Gables Elementary School	III	53,332	3,669
Neptune Middle School	III	167,190	11,503
Brookdale Community College	III	44,149	3,435
Monmouth County Vocational School	III	20,038	1,379
Neptune High School	III	278,371	19,152
Neptune Aquatic Center	III	25,000	3,573
Subtotal:	**II(3), III(7), IV(2)**	**1,578,834**	**131,225**

Facility Description Within Town Center Microgrid Boundaries And to be Served During Emergencies by Sectionalized JCP&L Grid	Risk Category	Area (Sq. Ft.)	MMBTU (Major Fuel Annual)
County Sheriff Backup Communications Center and EMS Training Center	IV	10,000	920
Neptune Senior Citizens Center	III	12,566	1,218
Neptune Housing Authority	III	15,941	1,545
NJ Employment Services	II	19,800	1,540
US Post Office	II	9,000	700
Sr Housing	III	30,000	2,907
DaVita Neptune Dialysis Center	III	8,125	770
Excelsior Medical Corporation	III	54,300	4,827
Walgreens	II	19,631	4,113
Neptune Getty Station	II	2,150	126
ALDI Supermarket	II	17,000	3,562
Subtotal:	**II(5), III(5), IV(1)**	**198,513**	**22,228**

Facility Description Potentially Connected to Town Center Microgrid by Emergency Circuits Only	Risk Category	Area (Sq. Ft.)	MMBTU (Major Fuel Annual)
Neptune Township Sewage Department and Wastewater Treatment Facility	IV	5,064	2,026
New Jersey American Water Company	IV	29,698	8,909
Monmouth County Emergency Communications Tower	IV	624	89
Shark River Hills Fire Company	IV	11,872	1,092
Shark River Hills First Aid Squad	IV	5,200	478
Neptune Township Housing Authority	III	3,461	269
Subtotal:	**II(0), III(1), IV(5)**	**55,919**	**12,863**
Total:	**II(8), III(12), IV(7)**	**1,833,266**	**166,316**

The NTAM approach includes 27 critical facilities with major-fuel consumption totaling approximately 163,000 MMBTU annually. The Primary area contemplated for dedicated "blue sky" electric and thermal distribution (Area A) totals approximately 0.34 Square Miles. NTAM Area A includes three Class II, seven Class III and two Class IV critical facilities with a maximum distance between facilities of 0.15 Miles.



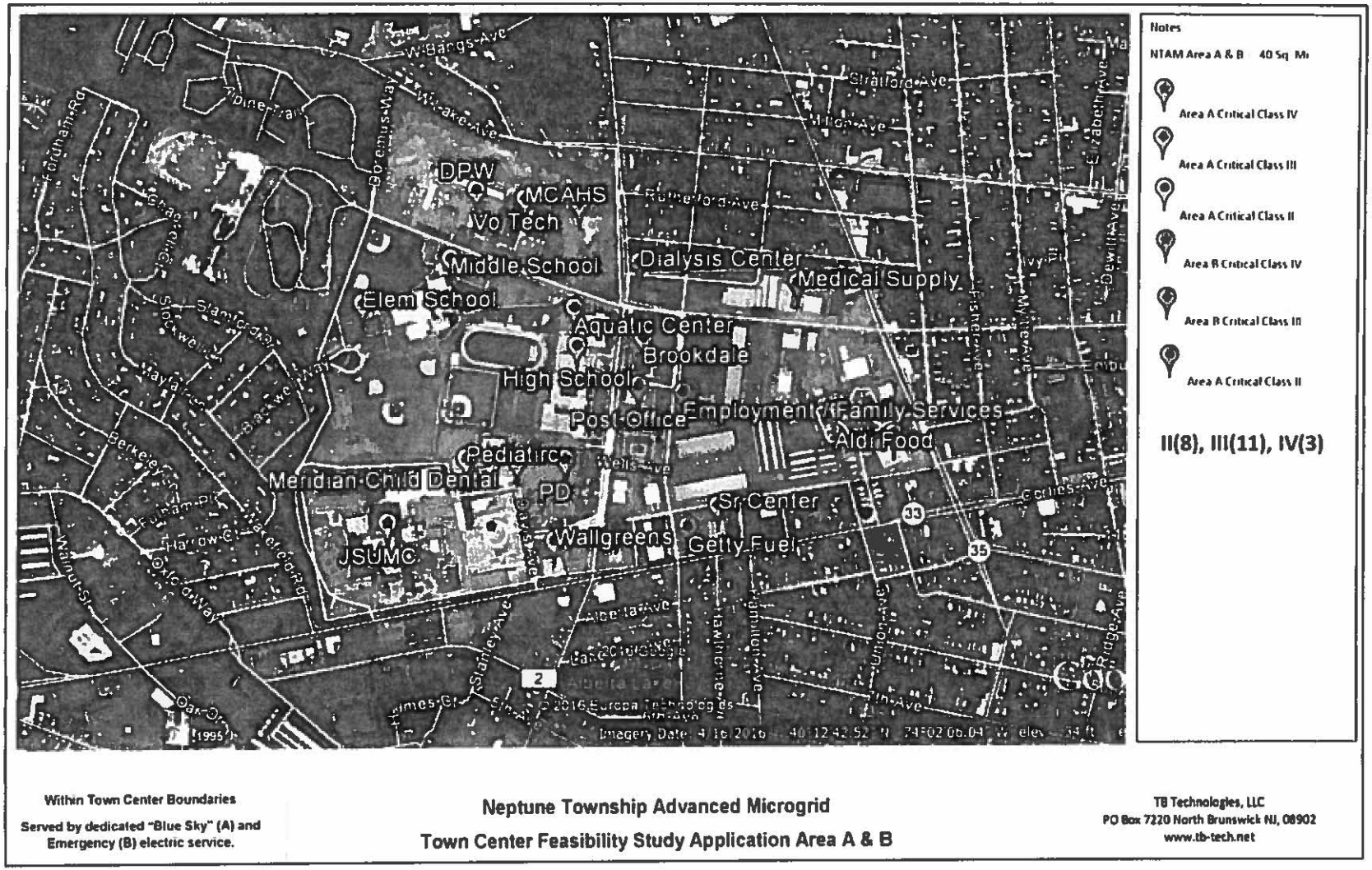
Within Town Center Boundaries

Served by dedicated "Blue Sky" Electric and Thermal Energy

Neptune Township Advanced Microgrid

Town Center Feasibility Study Application Area A

TB Technologies, LLC
PO Box 7220 North Brunswick NJ, 08902
www.tb-tech.net



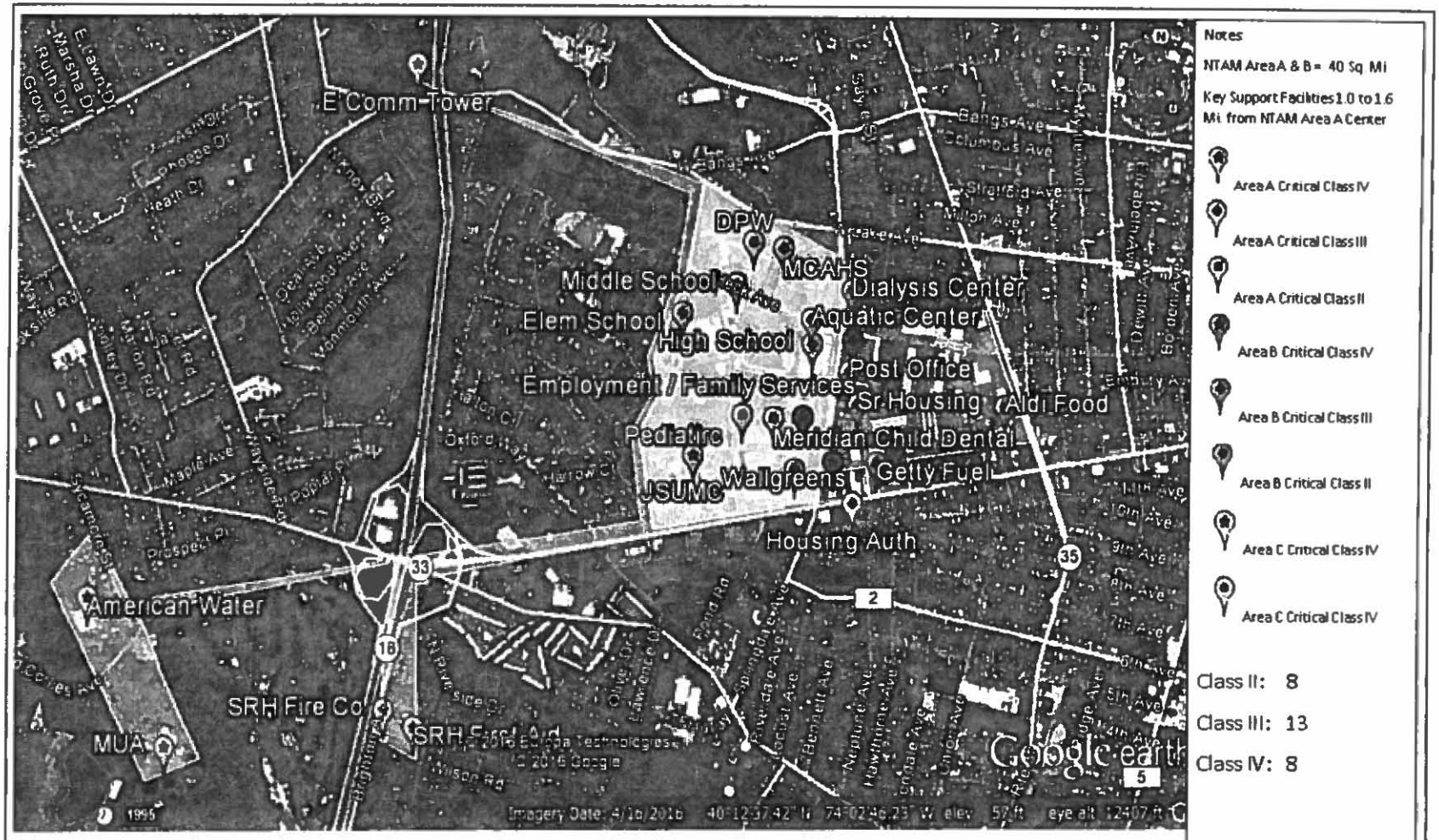
Within Town Center Boundaries

Served by dedicated "Blue Sky" (A) and Emergency (B) electric service.

Neptune Township Advanced Microgrid

Town Center Feasibility Study Application Area A & B

TB Technologies, LLC
PO Box 7220 North Brunswick NJ, 08902
www.tb-tech.net



Town Center Boundaries + Key Strategic Facilities Served by dedicated "Blue Sky" (A) and Emergency electric service (B) and emergency only circuits (C)	**Neptune Township Advanced Microgrid** **Town Center Feasibility Study Application Area A, B & C**	TB Technologies, LLC PO Box 7220 North Brunswick NJ, 08902 www.tb-tech.net

3. If 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 as follows:

Neptune Township was not identified as a Town Center in the NJIT study report; however, NTAM satisfies the screening criteria set forth in the NJIT Town Center report.

The selection of facilities and conceptual development criteria were based on a cluster of critical facilities that included the following ranking:

1. **Criticality based on the FEMA Category Classification of Facilities.**

   In NTAM's Area A, there are three Category II facilities, seven Category III facilities, and two Category IV facilities.

2. **Total electric and thermal loads.**

   The facilities selected in Area A represent annual consumption of electric and thermal energy totaling approximately 131,225 MMBTU annually.

3. **A Town Center should have at least two Category III or IV facilities within 0.5 miles and a facility with an energy usage of approximately 90 M Btus per square foot.**

   Area A contains Jersey Shore University Medical Center, a Category IV facility, within 0.19 miles of the Police Department, another Category IV facility. Jersey Shore University Medical Center is an inpatient hospital, so according to the 2012 Commercial Buildings Energy Consumption Survey, its consumption is about 231.1 MBtus 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.

The project partners of NTAM include Local, School, State and County Government and Public agencies with a long history of collaboration and shared services. The Neptune Township administration and elected officials play an active role in nurturing the Township's relationship with local private Medical, Retail and Service enterprises.

Public	Private	Not for Profit
Neptune Municipal (Lead Agency) Neptune Department of Public Works Neptune Schools Neptune Housing Authority Monmouth County Sheriff Monmouth County Monmouth County Vocational School State of NJ* non-local State USPS* - non-local Federal	Meridian Health Meridian Dentistry DaVita Dialysis Pediatric Associates Excelsior Medical New Jersey American Water Company Walgreens Brookdale Community College ALDI Supermarket Neptune Getty Station	Shark River Hills Fire Company
Neptune Township may act as lead agency for the "Neptune Township Advanced Microgrid Cooperative". Each partnering local contracting unit can participate in compliant procurement activities with Neptune Township acting on each local contracting unit's behalf.	The private partners may enter a public-private partnership with the Cooperative. The private partnering entities may assemble a common holding company or single-purpose LLC.	Cooperatives with local governments as lead agencies may include not for profit agencies.

5. A general description of the technology to be developed within the Town Center DER Microgrid. This should include a description of the proposed connection (electric and/or thermal) of the critical facilities and the DER

The Neptune Town Center DER Microgrid will combine multiple distributed energy resources into a seamless "island-able" system for emergency services during a blackout and for clean, affordable energy during blue-sky operations. These resources will be optimized during the proposed design effort, but are currently expected to include:

- 3.8 MW of recently-installed CHP at the Jersey Shore Medical Center
- Additional co-located CHP of comparable size to provide power and thermal energy to additional loads (described below)
- Existing back-up generation at the medical complex, with modern Tier IV engines reconfigured to run as peaking resources in island mode and demand response resources in blue-sky mode.
- Roughly 5 MW of new PV installations on large flat roofs within the microgrid area, supplemented as needed by parking canopies. To eliminate wind-loading in severe storms, many of the panels would be installed flush with their roof, slightly diminishing the output.
- Modest amount of battery storage, sited at the hospital complex, to serve multiple roles including uninterrupted power during back-up generator start-up, enhanced power quality for sensitive medical equipment, ancillary services to increase the stability and efficiency of the JCP&L local distribution system, ramp-rate leveling for PV output, and additional load-following flexibility during islanded operations.
- In subsequent stages, wind resources may also be investigated, including building-integrated wind on the tallest of the hospital buildings.

These coordinated microgrid resources will total roughly 15 MW of flexible generation capacity, sufficient to meet the critical loads for ongoing operations at a wide variety of facilities within the microgrid:

- Critical Classification 4:
  - The Jersey Shore University Medical Center, including K. Hovnanian Children's Hospital, the Regional Trauma Center, Meridian Cancer Care Center, Stroke Rescue Center, and so on
  - Public-safety facilities, including the police headquarters, fire department, an ambulance company, and Shore Area Communications Center (Sheriff's Department)
- Criticality Classification 3:
  - Neptune High School and adjoining Middle and Elementary Schools
  - Additional school campuses, such as the Monmouth County Vocational Complex and the Brookdale Community College, which in combination with township school buildings can also serve as evacuation centers and emergency shelters

- Criticality Classification 2:
  - The Neptune Township municipal complex, including the administrative offices, library, and municipal court
  - Other government facilities, including the Department of Public Works and US Post Office
  - Other medical facilities, including pharmacies, dialysis center, doctor's offices, etc.
- Criticality Classification 1:
  - Retail establishments that can serve the broader community, including supermarkets, gas stations, etc.
- The study will also explore the feasibility of providing reliable power supply to the wastewater treatment and water pumping station, just over one mile SW of the hospital complex.

These critical loads and the integrated generation resources will be connected by a combination of existing and new distribution elements and controls:

- The medical complex already has steam and chilled water distribution, as well as redundant electrical circuits.
- The Township schools and the municipal complex are already connected by a system of conduits, which includes additional duct-bank space for new power cables that can support islanded operations.
- PV installations can export their excess generation via the existing JCP&L service at each location, with voltage regulation and other power-system management functions centralized in conjunction with the microgrid controllers and the battery storage system.
- In cooperation with JCP&L, the existing distribution wires can be sectionalized to incorporate the planned critical loads within the islandable boundaries of the Town Center Microgrid.
- For the largest nearby loads (such as the educational campuses), new hot water and chilled water distribution from the CHP plant will ensure high efficiency and maximum utilization of recycled waste heat.

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

The full build-out of the Neptune Town Center DER Microgrid as described above requires capital investments in the range of $30 million to $40 million. Fortunately, most of that investment will pay for itself, and can be implemented incrementally over time.

Ideally, Neptune Township will successfully implement a "utility authority," which will be in-but-not-of the Township. Such an arrangement could maximize the benefits for all stakeholders, enabling outside financing, the bonding capacity of an independent authority, competitive contracting for 3rd party construction and operations, and both oversight and credit support from the municipality. A single entity working with 3rd-party implementation partners will also facilitate earning any relevant tax incentives, including the Investment Tax Credit and accelerated depreciation. The municipality also has the ability to create a commercial-only PACE financing program, an additional financing tool that has been successful in other jurisdictions (such as Washington DC), and which is already authorized under P.L.2011, c.187 (C.40:56-1.4 et al.).

The bulk of the microgrid's capital resources will derive from each individual element's ability to achieve its own financing independently, with those elements brought together incrementally to form the full microgrid capability. In particular, extensive flat-roof PV installations throughout the area and an expanded CHP system based at the medical complex can both achieve attractive financial returns simply from their own energy revenues, and should be the easiest elements to implement quickly.

Solar: Multiple megawatts of rooftop and parking-canopy PV can be installed under standard PPA arrangements to secure 3rd-party financing. The PPA price should be set at or below market rates for electricity, with SRECs, the ITC, and MACRS providing the economic wherewithal for the end-users to save money without any upfront cost – especially if the projects move quickly enough for bonus depreciation before that provision expires in 2019. The solar installations will operate and pay back their investment, independent of other microgrid components.

CHP: As witnessed by the recent installation of 3.8MW of CHP at part of the medical complex, the combination of steady 24-hour loads, and consistent year-round thermal demand yields a profitable investment. The CHP expansion for the microgrid would also generate supplementary revenue from schools and municipal loads, and would qualify for existing CHP incentives, making 3rd party finance easily achievable, with industry-

acceptable payback in the 5-7 year range. A modest capital investment from the hospitals will integrate both their HVAC and power systems, which should be justified in their capital budget plans by the ability to clear deferred maintenance backlogs, which will be obviated by the larger system.

Storage: Islandability for the microgrid will be significantly enhanced by the addition of modest amounts of battery storage, which can provide uninterrupted power bridge for the hospital complex during back-up generator start-up, can handle rapid load variations during islanded operations, and can compensate for cloud-cover events that create rapid ramping of the PV output, either up or down. Current incentive programs, including the Renewable Electric Storage incentive of $300/kWh, recognize these essential roles and will help cover capital costs. At least as important, during blue-sky operations, batteries provide value by enhancing power quality for sensitive medical equipment (in some cases reducing the need for stand-alone UPS systems). They also enable the high levels of solar saturation envisioned for the Town Center properties, by helping the existing distribution system accommodate such a large percentage of integrated PV assets. Finally, storage assets can earn everyday revenues by providing ancillary services that increase the stability and efficiency of the JCP&L local distribution system, leveling ramp-rates for PV output, and participating in existing markets such as frequency regulation and demand response. As such tariffs and markets continue to develop, those projected revenues should increase. With a combination of incentives for islanded operations, and concrete delivered value plus market-based revenues for blue-sky operations, the batteries should pay for themselves with an acceptable payback.

Distribution System: Integration of sources and loads requires additional pipes and wires, whose cost will be reduced by focusing distribution connections only on the hospital, municipal, and educational campuses for blue-sky operations. That cost will be further reduced by the pre-existing conduit system connecting the schools to each other and to the municipal complex. By sharing in the electric and thermal output from the CHP system, the distribution system investment should be recoverable via lower energy and O&M costs, with a seven to ten year payback.

Controls: At the medical complex, existing central plant operations already cover both steam and the first CHP increment. Given that foundation, a relatively minor investment would expand the operations and controls, first to integrate significant rooftop solar and modest energy storage for blue-sky operations, and second to cover islanded operations for the whole Town Center Microgrid, including the output from existing back-up generators at the medical complex. Given the manifest public-safety benefits of this capability, the investment should match up well with grant funding from appropriate agencies, including FEMA and NJOEM (especially PDM grants), in the subsequent

phases.

Islanding: The final element to create the Town Center Microgrid is the sectionalized distribution system that will provide power to the full suite of essential services identified above. In view of the benefits provided to a broad cross section of Neptune's residents, and the essential services provided by the hospital complex to the surrounding region, we believe the grid-upgrade costs should be approved for rate-basing by JCP&L. Under this approach, the JCP&L-owned distribution system would provide the core connectivity to reach the additional islanded loads during an outage. Since that function would not be utilized during blue-sky operations, the rate-based capital costs should not be constrained by standard rate-recovery. Part of the benefit of this pilot program is to work with the BPU and the utility to identify the preferred arrangements that will mitigate any incompatibilities with existing tariffs.

In summary, a layered and modular financing approach pairs up with the diverse stack of microgrid benefits and with the ability to incrementally implement the individual microgrid components.

7. A general description of the benefits of the proposed Town Center DER Microgrid as well as the need for the proposed project. Both 6 and 7 should be detailed with any available microgrid modeling efforts that have been performed.

The central benefit of the Neptune Town Center DER Microgrid is to keep essential services up and running regardless of the impact of storms, black-outs, heat-waves, cyber-threats, or other potential grid disruptions. Hospitals, fire and police, emergency communications, heliport, evacuation shelters etc., must all have resilient and reliable power in order to serve the Township. These services are also essential for the surrounding region, for example, by serving as a state-designated Comprehensive Stroke Center and as the only Level II trauma center with pediatric commitment in Monmouth and Ocean counties. Providing gas stations, grocery stores, dialysis centers, public internet, and so on with energy can make even extended outages and disaster recovery periods manageable for the residents and businesses of the Township.

Jersey Shore University Medical Center (JSUMC) is a key Stakeholder with unmatched crisis assistance resources for miles from the evacuation routes which pass through Neptune Township. The trauma center provides expertise and specialty capabilities unavailable at any other hospital in Monmouth or Ocean County. Designated by the state as a Level II Trauma Center in 1990, JSUMC treats more than 1,600 trauma patients per year.

A Level II Trauma Center means patients are cared for by a team of experts who specialize in traumatic injury. JSUMC is staffed 24-hours-a-day, seven days a week, 365 days a year. JSUMC provides vital elements not available at other hospitals, including: full time board-certified trauma surgeons, 24-hour CT scans, operating rooms staffed around-the-clock, a dedicated Surgical Intensive Care unit and a Pediatric Intensive Care Unit. The trauma admitting area is staffed by specialized nurses and technicians whose sole responsibility is to care for trauma patients. All of these elements ensure that trauma patients will receive the specialized care they need to increase the chance of survival from serious injury. NTAM will center on providing adequate support to the necessary services and infrastructure required to protect and maintain the essential needs of the facility, staff and suppliers of this hospital.

Fortunately, the microgrid also provides a long list of additional benefits. The new generation and improved operational efficiencies both create concrete value, with associated revenue streams, meaning that most elements of the microgrid pay for themselves, thus minimizing the capital cost associated with achieving the desired resiliency and emergency response capabilities. These blue-sky benefits and value streams include:

- The kWh output from the solar panels, monetized as avoided electricity bills, net-

metering, and power exports.

- The zero emissions from solar power, monetized as SRECs and other incentives.
- The kWh output from the existing and future expansion of the CHP facilities at the medical complex, monetized as avoided electricity bills and power exports.
- The recycled waste heat from the CHP facilities, monetized as avoided heating and cooling bills and the avoided costs of operating, maintaining and then replacing aging boilers and chillers.
- The lower emissions from the use of recycled waste heat for heating and cooling, currently poorly monetized.
- The avoided or deferred investment in transmission and/or distribution system equipment to serve Neptune Township and surrounding communities, since a significant fraction of the load (including peak loads) will be met by local resources, currently monetized through BPU-authorized incentives for CHP and microgrids and potentially through future capacity-like markets for DER.
- The avoided costs of providing ancillary services and peak reduction through the microgrid's combination of resources, load control, and storage, instead of relying on other more expensive or less efficient means. This is somewhat monetized through existing PJM and JCP&L programs and markets, hopefully receiving more robust compensation as those mechanisms continue to develop.
- The avoided costs of equipment malfunctions and failures due to poor power quality, especially for sensitive medical equipment but also for computers, electronics, and electric motors (such as elevators), poorly monetized except when avoiding the expense of stand-alone UPS systems.
- The real-options value of the physical components of the microgrid, enabling future investment flexibility in the face of the evolution of energy markets and energy-system performance.
- The real-options value of the operational capabilities of the microgrid, enabling minute-to-minute flexibility in the production and procurement of electricity and thermal energy.

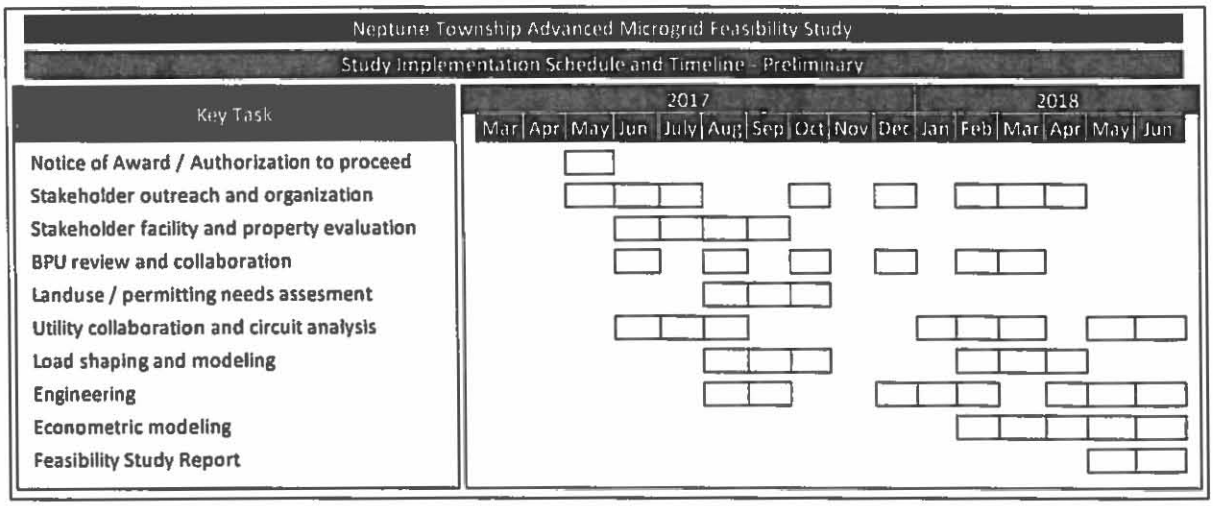
These everyday and every-minute benefits, especially those with full monetary compensation for value delivered, are the backbone for the vast majority of the required microgrid investment. The resiliency and emergency response benefits described above will outweigh any remaining capital cost contribution needed to achieve full "island-ability" for the complete set of critical loads and functions within the boundaries of the microgrid. All of the Partner facilities identified in the application maintain electric and natural gas utility accounts in good standing with standard contributions to the Societal Benefits.

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.

The NTAM resources will be dispatched and coordinated through a central microgrid controller, located adjoining the CHP plant, which will also provide real-time communication with JCP&L data systems and with PJM ancillary services and demand-response markets. The medium-voltage service to the hospital complex will serve as the Point of Common Coupling to main grid for islanded operations; any other service connections for the microgrid loads will be sectionalized to prevent any undesired back-feed onto utility lines. The full-time operators of the hospital's existing CHP and steam will be trained to provide on-site supervision of the fully automated microgrid controller, with additional oversight from a contractor's 24-hr remote operations center.

9. Timeframe for the completion of the feasibility study

The study is expected to be completed in 12-months.



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

The Implementation Team plans to use models and tools developed, supported and/or recommended by NREL to assess, analyze, and optimize combustion-based generation, renewable energy and energy efficiency technologies for the NTAM technologies and applications. Our methods can be applied on a global, regional, local, or project basis.

Using lessons learned during our work on the Woodbridge Microgrid Study, we evaluate design options for both off-grid and grid-connected power systems for remote, stand-alone, and distributed generation applications using HOMER Pro. HOMER Pro is a computer model that simplifies the task of evaluating design options for both off-grid and grid-connected power systems for remote, stand-alone, and distributed generation (DG) applications. HOMER Pro's optimization and sensitivity analysis algorithms allow the user to evaluate the economic and technical feasibility of a large number of technology options and to account for uncertainty in technology costs, energy resource availability, and other variables.

The HOMER Hybrid Optimization Modeling Software is used for designing and analyzing hybrid power systems, which contain a mix of conventional generators, cogeneration, wind turbines, solar photovoltaics, hydropower, batteries, fuel cells, hydropower, biomass and other inputs. The tool can analyze either grid tied or standalone systems and can also perform greenhouse gas calculations for the measures being considered. HOMER allows out team to input an hourly power consumption profile and match renewable energy generation to the required load. We analyze micro-grid potential, peak renewables penetration, ratio of renewable sources to total energy, and grid stability, particularly for medium to large scale projects. Additionally, HOMER contains a powerful optimizing function that is useful in determining the cost of various energy project scenarios. This functionality allows for minimization of cost and optimization of scenarios based on various factors (e.g., CO2 minimization). To meet the renewable energy industry's system analysis and optimization needs, NREL started developing HOMER in 1993. NREL retains ownership of the licensed software, and retains the right to use HOMER on government projects. In addition, users will always be able to download version 2.68 Beta free of charge from HOMER Energy. [1]

Our team of Certified Energy Managers, Professional Engineers and Microgrid Specialists have developed proprietary specialized modeling to compliment HOMER Pro's capabilities to accommodate real-time challenges and innovative application techniques.

11. The requested funding amount.

In recognition of the resources required, time to collect detailed information and to cultivate public and private partners and stakeholders, NTAM is requesting $150,000 to adequately fund necessary technical planning and analysis.

12. Any cost share by the Lead Local Agency or any of the stakeholder partners.

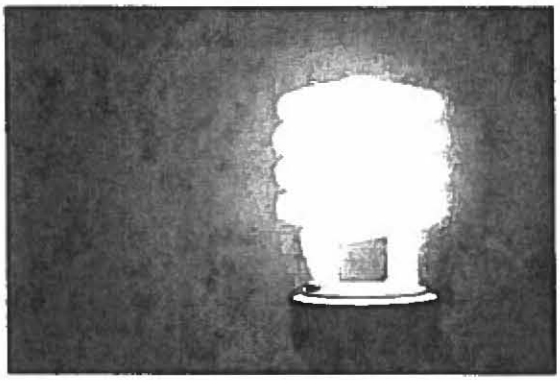
Neptune has invested significant money and resources to provide intra-connection capabilities to the Township and School's critical facilities. The Township is prepared to consider assistance and cost share with in-kind hourly administrative and public safety resources.

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.

To help navigate the process and technical requirements, Neptune Township has selected a team of professional consultants and specialists lead by TB Technologies, LLC, an energy consulting firm with a documented track record of success assisting Municipalities, Counties, Authorities and Commissions throughout the State with the development of energy procurement cooperatives, efficiency planning and redevelopment project implementation. Our Partners and sub-contractors, Microgrid Architect, Greener by Design, GI Energy and CHA bring unparalleled experience with microgrid development in New Jersey.

Executive Summary

TB Tech provides Energy Consulting on both the supply side and the demand side of the meter. Our Certified Energy Manager (CEM), and Facility Specialists, have extensive experience and expertise in all aspects of energy management, including energy efficiency analysis, energy master planning, procurement of energy, alternative energy sources, REC/SREC management and building commissioning.



TB Tech's Energy Management Services uses methods and protocols proven by experience and our history of renewable energy, efficiency, contracting and design projects and assignments. The strength of having our firm and related professional groups working together as one produces seamless, effective solutions that maximize functionality, life cycle costs, and efficiency.

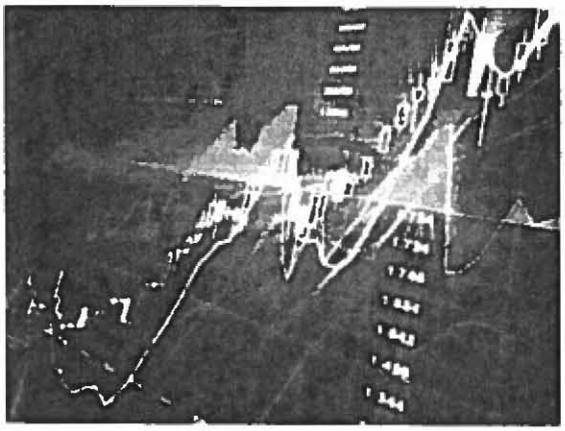
TB Tech's approach can complement your existing energy management efforts or initiate an energy management program to take full advantage of utility deregulation. The energy management services offered by TB Tech, which can be selected as necessary, based upon your unique requirements include:

- SREC and REC Management
- Measurement and Verification
- Energy Master Planning
- Energy Efficiency
- Energy Procurement
- Renewable Energy Feasibility
- Building Commissioning/Retro-Commissioning
- Sustainable Design
- Greenhouse Gas Inventories
- Review and Verification of Greenhouse Gas Emissions Data
- Corporate Strategies for Greenhouse Gas Data Management
- Modeling and Measurement Programs
- Cost Benefit Analysis of Greenhouse Gas Reduction Strategies
- Project Financing Assistance & Utility Rebate Analysis
- Project Management & Administration

Deregulation of the energy industry offers new opportunities to manage costs and incentives to improve facility reliability. These opportunities create new challenges for facility managers and others with the responsibility for procuring energy and managing the sources and uses of that energy.

As a firm that recognizes the impact of greenhouse gas emissions on the environment and the need for sustainable design in new and existing facilities, TB Tech offers solutions that help navigate the changing emission and compliance markets for maximizing SREC and REC values and minimizing market exposure risk.

We recognize the volatility of energy costs and their impact on the private and public sectors, as well as the desire to evaluate sources of renewable energy, while moving to a "carbon neutral" state. Our professional staff has extensive experience and expertise in all aspects of energy management, climate strategies, and sustainable planning.

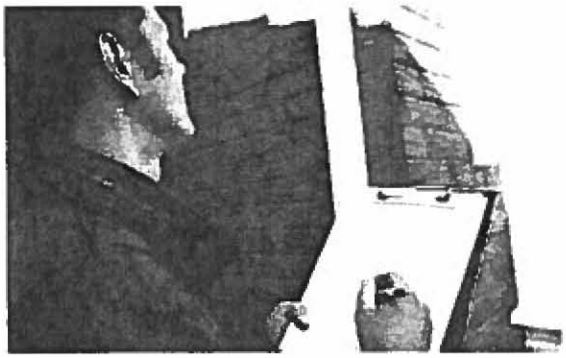


With TB Tech as part of your team, you can concentrate on your business, while we concentrate on your energy management needs.

Energy Efficiency Auditing

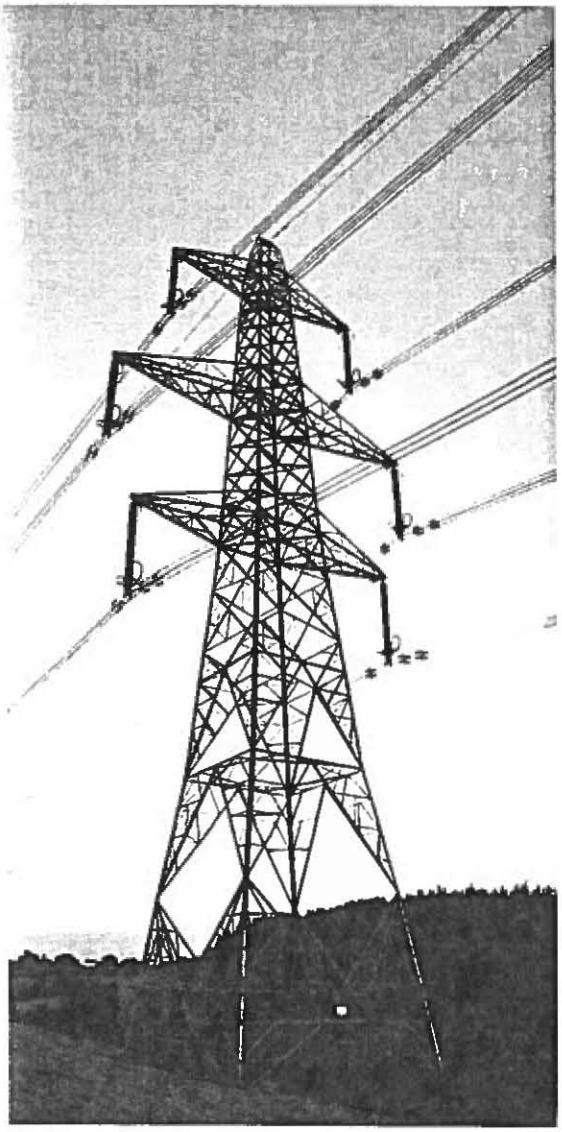
The most effective way to improve facility infrastructure and lower utility costs is to invest in energy efficiency technologies. Energy efficiency also helps to reduce maintenance costs and provides significant environmental benefits that can be valuable as emission reduction credits.

Energy efficiency is defined as using advanced, state-of-the-art technologies to provide better building environments with less energy. It also means getting the most productivity from every unit of energy, delivering solutions that are environmentally-responsible, creating reliable business operating conditions, and ultimately lowering an end-user's total utility costs.



TB Tech provides energy efficiency audit services for a variety of building types and industries. Along with the audit services, staff members are experienced in evaluating existing equipment and building systems and recommending energy efficient alternatives. Not only is our staff experienced in auditing and analyzing existing equipment and systems, we are also intimately familiar with a variety of rebate and incentive programs available to the building owner.

On lighting alone, American consumers and businesses spend some $21 billion annually and could cut their costs substantially with energy-efficient lamps and fixtures while improving the environment. Installing efficient lighting in businesses would reduce carbon dioxide emissions by 140 million tons each year.



TB Tech energy efficiency analysis services create a win-win solution on multiple fronts for our clientele. It can save businesses money, increase employee comfort, and protect the environment.

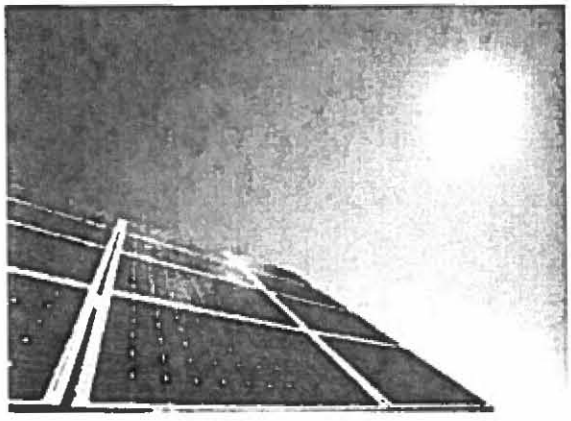
Renewable Energy Consulting

With the continued rise of energy costs in the U.S., New Jersey is leading the nation in driving the market for renewable energy applications, including solar, wind, and biomass technologies. Our state is doing this by subsidizing project costs via the NJBPU's Clean Energy Program (www.njcep.com). This program not only includes financial incentives to reduce the upfront capital costs of some renewable systems, but also has established renewable energy portfolio standards with a solar electric set aside that established a renewable energy certificate trading system for facilities that install solar electric systems.

TB Tech has multiple clients that have embarked on large-scale renewable energy projects including the installation of a fuel cell to power multiple buildings on a college campus, digester gas from a solid waste utility that is used to power the plant's operation, and approximately 300 Mega-watts of solar projects that were made possible by the Clean Energy Program.

TB Tech has experience with renewable energy, dating back to the 2005 when solar technology was emerging in the US. While advances in renewable energy have been remarkable, TB Tech offer the following renewable energy consulting services:

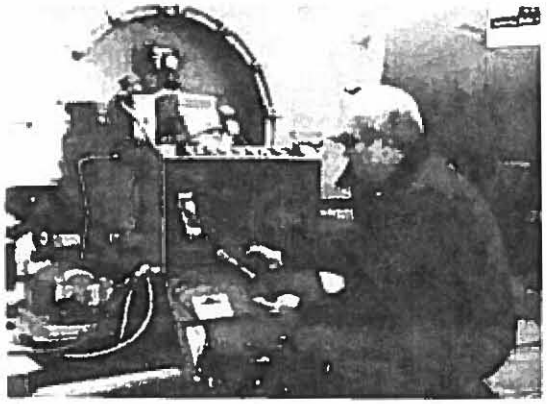
- Renewable Energy Feasibility Study
- Prepare RFQ and/or RFP for the implementation renewable energy system
- Review proposals and recommend to the client the energy provider(s) who has the resources necessary to implement the renewable energy strategy
- Renewable energy systems operation and maintenance management and oversight
- Provide design/build project services for renewable energy



TB Tech can assist in making an initial determination as to whether a renewable energy project is economically, technically, and practically viable for your facility.

Building Commissioning

TB Tech's Commissioning Services provide building owners with an assurance that what they pay for is exactly what they are getting. As a registered member of the Building Commissioning Association, our Certified Commissioning Agents work to ensure that our clients receive an unbiased, objective view of the building system's installations, operation, and performance. Our commissioning process will deliver an assurance that the mechanical systems have been installed according to the contract documents and operate within the energy efficient performance guidelines set out in the Owners Project Requirements and the Basis of Design.



TB Tech begins by working with our clients and the project design professionals early, reviewing design submissions, investigating sustainable and energy alternatives, and cultivating a cooperative project environment that works to deliver a fully operational building on time, and on budget.

During the construction project phase, our commissioning professionals will lead project commissioning meetings, review equipment specifications, and project drawings, making sure the initial Owner Project Requirements are implemented fully. Our professional staff will work with each trade to tailor Installation Verification and Operational Performance forms, and witness equipment start up and performance while validating building automation system performance. Our commissioning process also includes building and life safety back-up system simulations that help to ensure a safe, comfortable, and productive environment

2726 Woodley Pl. NW
Washington, DC 20008

(202) 797-8820
Shalom@MicrogridArchitect.com

Shalom Flank, Ph.D.

STRENGTHS & SKILLS

Incisive analysis of complex problems to reveal simple and concrete next steps: Exercise leadership through identifying the key decisions, variables, or metrics that will determine success or failure.

- Designed dozens of microgrids for Pareto, Urban Ingenuity, and Anbaric, from single-day charrettes to year-long modeling analysis, using commercial and custom-built software tools.
- Used structured project financing models to crystallize project value – secured term-sheets for multiple $10-$100 million microgrids for multiple clients.
- As a consultant, developed new commercialization strategy for leading concentrating-solar company to reduce reliance on large-scale utility contracts (which almost saved the company).
- In almost every setting, giving a clear sense of how to move forward, even after wide-ranging discussion. At DARPA, developed on-line action-item tool (back when the Internet was new).

Patient with Process: Diligent in working innovative projects through bureaucracies

- For Urban Ingenuity, served as Microgrid Architect for design, financing, implementation (soon!), to serve >3 million sf of new development with at least $40 million investment
- For Pareto, negotiated innovative structure for $350 million Power Purchase Agreement, from initial proposal through MOU, term sheet, final contract language, and contract execution.
- Completed multiple microgrid patents, including formulating company-wide intellectual property strategy and working with counsel for patent drafting, patent issue, and IP licensing.
- Executed three complete project cycles at DARPA, including concept development, program approval, contracting, and implementation with over $10 million funding each.

Building stakeholder consensus around new technologies: Skilled in managing group process when facing unfamiliar technologies and organizational change.

- At Pareto, negotiated across many departments of two large investor-owned utilities to achieve interconnection approvals for large microgrids (10 MW and 28 MW).
- At DARPA, helped drive Air Force acceptance of a new technical approach for tracking enemy vehicles (terrain-based Bayesian propagation) in a calcified field with strong vested interests.

Bringing non-technical audiences inside the core implications of new technologies: Eliminating complexity so people can see what's at stake, without getting bogged down in the technology.

- Microgrid evangelist at conferences, on-line (e.g. youtu.be/Oz_aH3H7UA0); frequent guest lecturer at universities (e.g. Harvard, Princeton, GW, Georgetown) and local community groups
- Raised by a professor of education – good teaching and clear explanation come naturally

Evaluating new technologies: Sniffing out the best new ideas, assessing their value and readiness for prime time, avoiding the quicksand of too-complex or almost-ready approaches.

- Selected new microgrid interconnection technology, brought forward through design / approvals
- Performed comprehensive post-acquisition evaluation of defense R&D company's intellectual property portfolio, shaping future investment and IP protection decisions.
- Reviewed and evaluated thousands of R&D proposals for DARPA, NIST, and NSF.

Proud not to specialize: Bridging technical disciplines to integrate and optimize complex systems, taking advantage of broad experience in many areas.

- Pick up new technologies quickly, at sufficient depth for project management, investment decisions, contract negotiations, improving on others' innovations, filing patents, etc.
- Diverse practical implementations, from power electronics for microgrid applications, to LED packaging and thermal management, to information visualization for knowledge management.

PROFESSIONAL EXPERIENCE

Microgrid Architect *2004 – present*
Urban Ingenuity
Pareto Energy
Anbaric Microgrid

Distributed Energy Financial Group *2004 – 2005*
Associate and Sector Analyst (Prime Movers)

Haft, Harrison & Wolfson LLC *2002 – 2003*
Director, Renewable Energy Group

Global Works Consulting (sole proprietorship) *1999 – 2005*
Technology Commercialization Consultant

Defense Advanced Research Projects Agency (DARPA) *1994 - 1998*
Program Manager

Monterey Institute of International Studies *1993 – 1994*
Visiting Scientist, Center for Nonproliferation Studies

Kennedy School of Government, Harvard University *1992 – 1993*
Post-Doctoral Fellow, Center for Science & International Affairs

Education

Ph.D. Massachusetts Institute of Technology *1993*
Political Science / Science, Technology & Public Policy

S.M., Massachusetts Institute of Technology *1991*
Nuclear Engineering

B.A., Cornell University *1987*
Physics

COMMUNITY SERVICE

- CHP and Microgrid advisory committees, IEEE and US Green Building Council, 2005 – current
- Business reviewer for National Science Foundation, alternative energy technologies, and for Advanced Technology Program, National Institute of Standards and Technology, 2002 – current
- Host committee member, EcoDistrict Summit, 2014; Sustainable DC, Energy Working Group, 2011
- D
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Distributed Generation and MicroGrid Development

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 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".

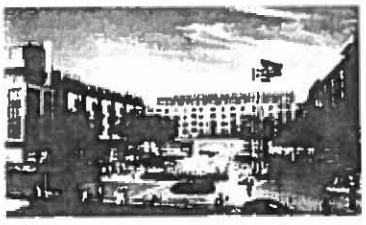
This comprehensive experience, combined with ongoing work with a host of federal, state and not for profit entities developing MicroGrids throughout the United States makes GbD unique among other firms. Our background in energy, environment, regulatory and utility work in the United States is unmatched.

Select Energy DG and MicroGrid Case Studies

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.



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

amongst the other more standard functions of the MicroGrid.

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.

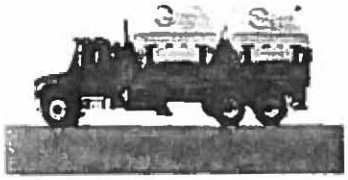
ROCKY MOUNTAIN INSTITUTE

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

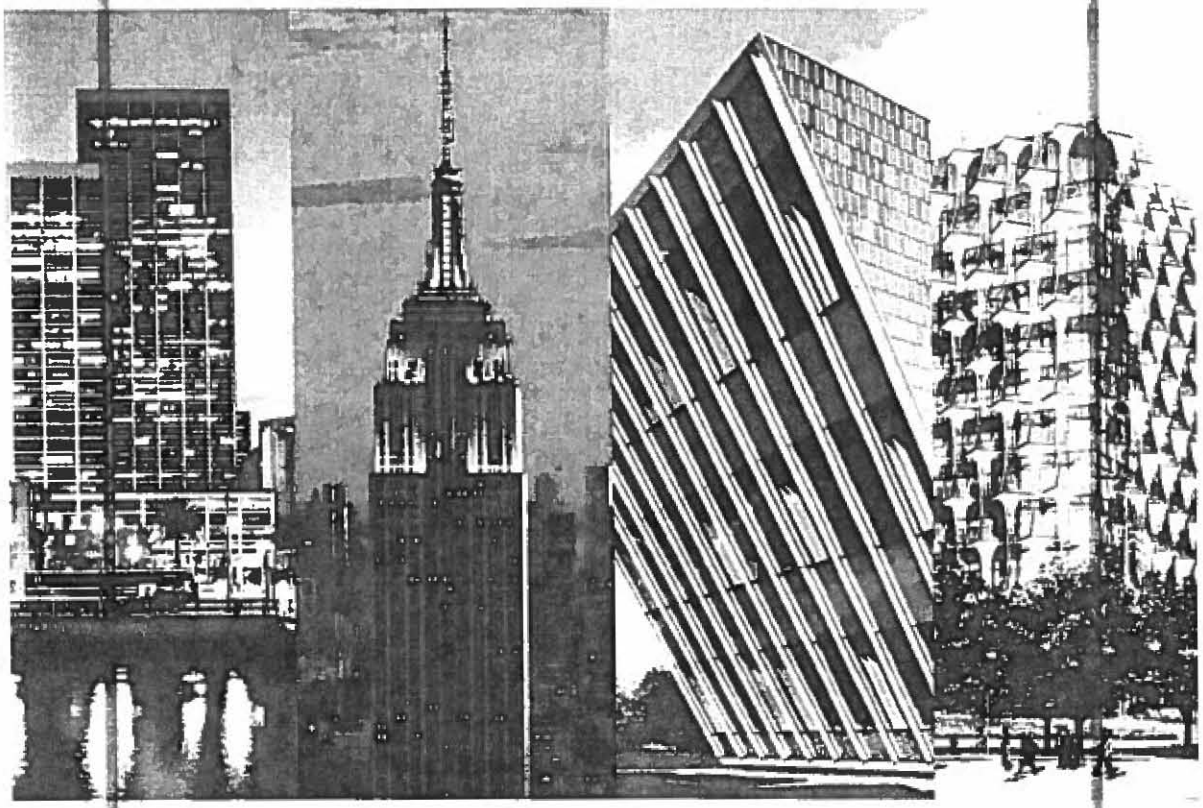
- GbD is providing a full slate of regulatory and business development consulting to Mobile Fueling Solutions (MFS).
- In addition to serving locally based public and private fleet customers, MFS's Virtual Pipeline© uniquely allows compressed natural gas stations to serve geographically dispersed industrial, 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.

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.

gi energy

Providing Sustainable Energy



- Energy Master Planning
- Engineering & Design
- Financial Structuring
- Construction & Installation
- Energy Data Analytics
- Operations & Maintenance

www.gienergy.us.com

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

Vito D. Gadaleta, RMC, QPA
Business Administrator
Economic Development Director
25 Neptune Boulevard
Neptune, NJ 07753

Dear Mr. Gadaleta:

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

Dr. Michael Brantley, Mayor
Nicholas Williams, Deputy Mayor
Robert Lane, Jr.
Kevin McMillan, Police Commissioner
Carol J. Rizzo

Neptune Township - NJ

Where Community, Business & Tourism Prosper

Vito D. Gadaleta, R.M.C., Q.P.A.
Business Administrator
Richard J. Cuttrell, R.M.C.
Township Clerk
Michael J. Bascom, C.M.F.O., C.T.C.
Chief Financial Officer
Police Director

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

May 1, 2017

RE: Town Center MG Grant Application

To Whom It May Concern,

As requested, Neptune 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 – TB Technologies LLC $40,000
Sub-Consultant – CHA $30,000
Sub-Consultant – GI Energy $30,000
Sub-Consultant – Microgrid Architect $30,000
Sub-Consultant – Greener by Design $20,000
Total Request - $150,000

Sincerely,

Vito D. Gadaleta, RMC, QPA, NJCEM
Business Administrator

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.

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[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
TOWNSHIP OF NEPTUNE

THIS MEMORANDUM OF UNDERSTANDING ("MOU"), is made this _____ day of _____, 2017, by and between **The TOWNSHIP OF NEPTUNE** ("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 $150,000, 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

Township of Neptune
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: Township of Neptune

_____ 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: _____