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

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 THE TOWNSHIP OF WOODBRIDGE MIDDLESEX COUNTY FOR PHASE I FEASIBILITY STUDY	)	ORDER
	)	DOCKET NO. QO17060641

Party of Record:

Jeffrey Mayerowitz, Township of Woodbridge, Middlesex County

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 Township of Woodbridge submitted an application to the Board.

The Woodbridge Town Center Advanced Microgrid (WAM or Project) was submitted by the Township of Woodbridge. The Project core partners include the Township of Woodbridge the Woodbridge School District, Woodbridge Housing Authority and a number of private sector companies. The Project critical facilities include The Town Hall/Police building, Fire Department building, Stern Tower Senior Living, Adams Tower Senior Living, Finn Tower Senior Living, Pump Station, Ross Street Elementary School, Mawbey Street Elementary School, Woodbridge Middle School and several private sector businesses. Based on the list of partners and proposed critical facilities there are two FEMA category IV designated facilities (the Town Hall and Fire Department) and seven FEMA category III facilities can provide shelter in an emergency. The estimated total annual electricity usage of all 13 buildings in the proposed Project is 9,024,022 kWh and the estimated annual natural gas usage is 202,011. The FEMA category III and IV facilities that have a combined energy usage per square foot of approximately 128,473 Btu's per square foot.

There are no existing DER facilities in the proposed Project buildings. The Project will evaluate new power capacity which may include fuel cells, solar and dispatchable generation such as combined heat and power ("CHP") and other new electric infrastructure to allow the proposed

Project to operate during normal and emergency conditions. The Project proposes to use Hybrid optimization of multiple energy resources ("HOMER") Pro microgrid software to model the proposed Project as well as the Rutgers' Center for Energy, Economics and Environmental Policy ("CEEEP") Cost/Benefit model. The estimated timeframe to complete the feasibility study is 12 months. PSE&G is the electric utility and Elizabethtown Gas is the natural gas utility for the Township of Woodbridge. Both PSE&G and Elizabethtown Gas provided 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 The Township of Woodbridge and **AUTHORIZES** the President of the Board to sign and 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 THE TOWNSHIP OF WOODBRIDGE FOR
PHASE I FEASIBILITY STUDY

SERVICE LIST

Woodbridge Township
Jeffrey Mayerowitz
1 Main Street
Woodbridge, NJ 07095
Jeffrey.ayerowitz@twp.woodbridge.nj.us

Andrew Kuntz, DAG
Division of Law
124 Halsey Street
Post Office Box 45029
Newark, NJ 07101-45029
andrew.kuntz@law.njoag.gov

Board of Public Utilities
44 South Clinton Avenue, 3rd Floor, Suite 314
Post Office Box 350
Trenton, NJ 08625-0350

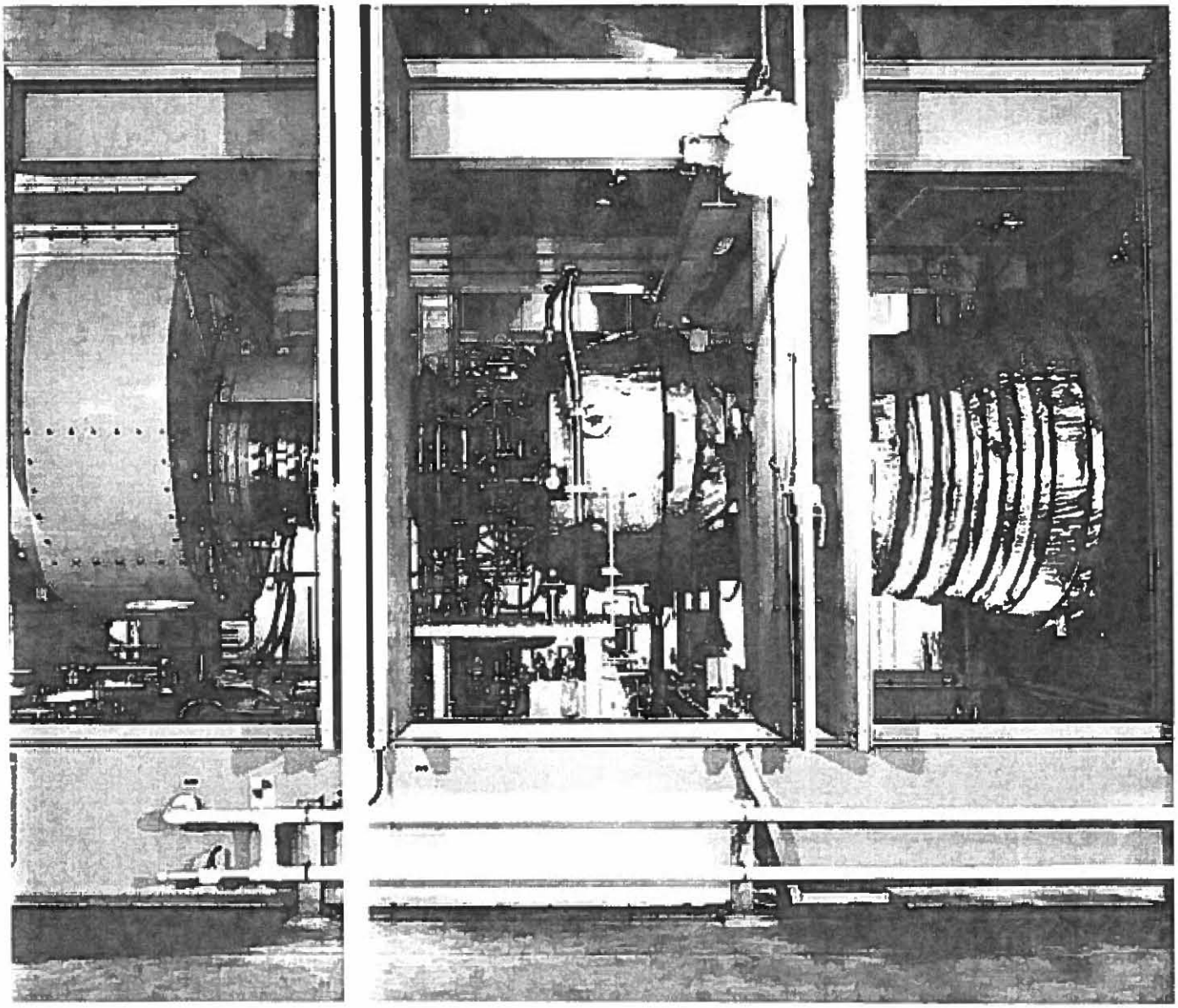
Irene Kim Asbury, Esq.
Secretary of the Board
Office of the Secretary
Irene.asbury@bpu.nj.gov

Michael Winka
Michael.winka@bpu.nj.gov

Marisa Slaten, Director
Economic Development & Energy Policy
marisa.slaten@bpu.nj.gov

Thomas Walker, Director
Division of Energy
Thomas.walker@bpu.nj.gov

James A. Boyd, Jr.
Counsel's Office
james.boyd@bpu.nj.gov



Woodbridge Town Center Advanced Microgrid (WAM)

March 27, 2017

Prepared for:
Jeffrey Mayerowitz
Township of Woodbridge
1 Main Street
Woodbridge, NJ 07095

CHA
design/construction solutions

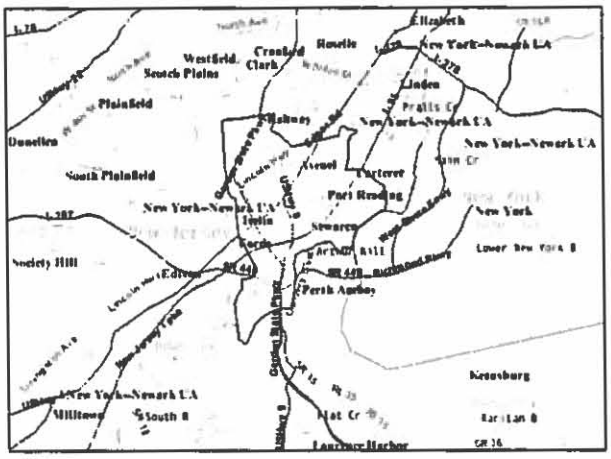
Woodbridge Town Center Advanced Microgrid (WAM)

Program Technical Requirements

1. **Project Name**
   Woodbridge Town Center Advanced Microgrid (WAM)

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).**

Woodbridge New Jersey is located in the heart of the transportation Network that helps to make our state one of the most vital economic engines in the US. The home to over 100,000 people that swells to multiples of that during the day as people come to work, shop and go to school here in town.



In addition to being home to some of the largest corporations in our State, Woodbridge also houses the busiest train station in New Jersey in Metropark. The town's vital transportation network moves millions of people in and around our city by bus, train and car. Woodbridge Mall, the Raritan Center, NJ Transit Coast Line stop, hotels, industry and critical infrastructure all lie within Woodbridge's town boarders.

These assets, combined with a large population, a large business community and the fact that Woodbridge is a vulnerable Coastal Community all point to the critical need for a distributed generation system that is robust and capable of being able to help operate during times of critical need.

Woodbridge has been the leader in the state when it comes to its efforts on sustainability and energy conservation. **Woodbridge was the Sustainable Jersey Town of the Year for 7 of the last 8 years.** As a result of this community wide engagement effort, Woodbridge has not only built a broad consensus toward sustainability investments but created an unparalleled momentum. To serve this purpose, Woodbridge has engaged in the auditing of all of its facilities, has implemented numerous demand side reduction measures and has worked collaboratively with many stakeholders including its school board and others to install solar and other distributed generation and demand reduction measures.

CHA

On December 11, 2015, Woodbridge was awarded the Gardinier Environmental Fund grant through Sustainable Jersey's Small Grants program. Sustainable Jersey grants are intended to help local governments make progress toward a sustainable future, while the Gardinier Environmental Fund focuses on projects related to energy conservation, efficiency, and renewable energy. This study identifies areas in the town that might be appropriate for distributed generation in the event of a storm or major outage.

Woodbridge is near completion of the Garnier study examining the potential development of three advanced microgrid clusters that would allow Woodbridge to operate critical functions and provide necessary support for the town and surrounding area. Working with the host of stakeholders including police, fire, Public Works and dozens of members of the private community, Woodbridge has developed a robust initial plan for a microgrid in its downtown train station area.

GARDINIER ENVIRONMENTAL FUND

$30,000 Small Grant Recipients

Year	Grantee	County	Project
2015	Woodbridge Township	Middlesex	Woodbridge Township Microgrid Study

Through these efforts, the following cluster has been identified as highly critical due to its vital role in providing critical services during disruptive weather events as well as the mitigation of risk to its vulnerable residents that includes several elderly housing facilities. As the assessment of this advance microgrid advances, additional facilities will likely be added to serve other mission critical loads and to build economic sustainability into the economics of the microgrid.

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Currently Identified Critical Stakeholders/Facilities:

1. Town Hall/Police
2. Fire Department
3. Stern Towers Senior Living
4. Adams Tower Senior Living
5. Finn Towers Senior Living
6. Pump Station
7. Ross Street Elementary School
8. Mawbey Street Elementary School
9. Woodbridge Middle School
10. The Medicine Shoppe Pharmacy
11. Knot Just Bagels
12. Reo Diner Restaurant
13. Gas Station

The area for the Woodbridge Town Center Advanced Microgrid (WAM) stretches approximately 1.25 miles from the farthest points, Mawbey Street Elementary School and the Pump Station, with at least nine of the sites are within a ½ mile radius. Via existing public rights of way, the cluster covers a distance of approximately 1.5 miles end to end.

The information below includes facility addresses, contacts, use category, FEMA Criticality Category Classification, hours of operation, approximate annual electric and thermal loads, approximate square footage, and whether or not any energy efficiency and/or energy conservations measures were implemented. The cluster includes two FEMA Category IV buildings (Town Hall and Woodbridge Fire Department), seven Category III (Senior Living and Schools), and four Category II buildings to support the surrounding population and emergency services, totaling in thirteen buildings. As it stands now, the total project loads are approximately 9,024,02 kWh and 202,011 therms over 396,871 square feet.

While the listed facilities most certainly meet the requirements of a Town Center Microgrid, the boundaries of the proposed Woodbridge Microgrid captures the main business district of the Town. Within the boundaries of the WAM there are numerous other businesses that would prove valuable to the community should they ultimately be served by WAM. These businesses include convenience stores, pharmacies, gas stations, etc. As part of the grant effort we would seek to add as much adjacent commercial load as possible to enhance the community value vector and economic sustainability.

Woodbridge is seeking this clean energy grant money to help further the work that has already been supported for this vital infrastructure plan. Working with our utilities, PSE&G and Elizabethtown Gas, Woodbridge has developed the support of all of the stakeholders that will be necessary to propel this project through implementation.

We are asking your support for our application so we can continue to move forward on all the efforts that have been put into making sure that New Jersey's 5th largest city is prepared for emergencies or power outages. It is important to note that Woodbridge is centrally located to a very densely populated area of the State and as such the opportunity to expand this microgrid to serve adjacent critical loads in other municipal jurisdictions, such as Edison Township and to provide benefit to a broader community during crisis cannot be overlooked and value should not be underestimated.

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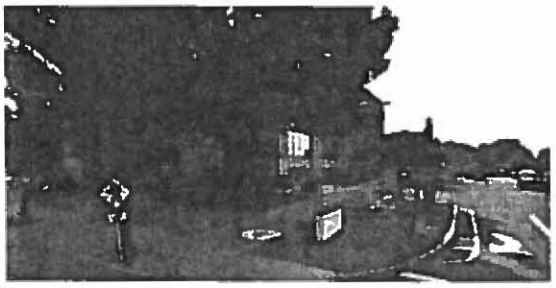
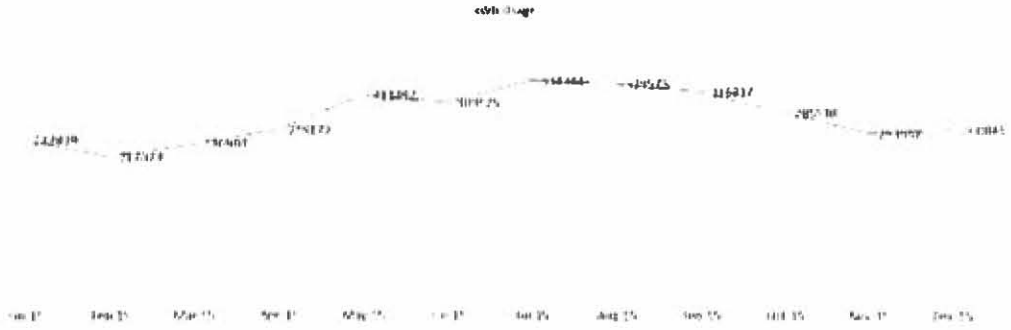
Town Hall/Police	
Address: 1 Main St, Woodbridge Township, NJ 07095	
Facility Type: Municipal Building	FEMA Category: Risk Category IV

Contact Information: Brian Burke	
Brian.Burke@twp.woodbridge.nj.us	732-675-4619 ext. 2042

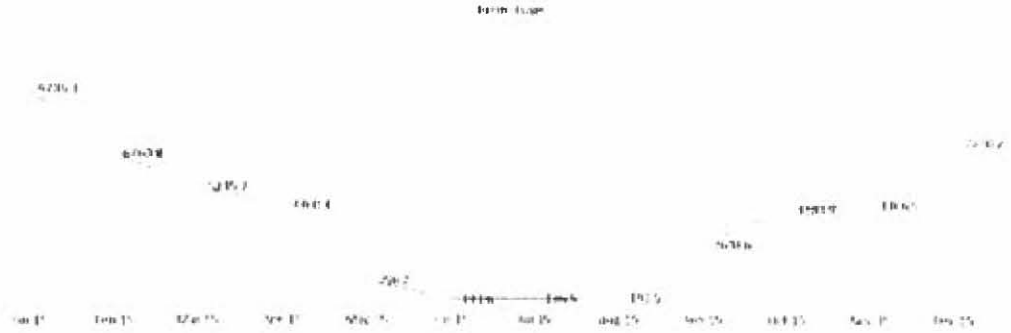
Hours of Operation: 24/7	Total Sq Footage: 93,700
Electric Load: 3,349,046 kWh	Gas Load: 46,001 Therms
Energy Efficiency/Energy Conservation Measures: Yes	



Town Hall



Town Hall



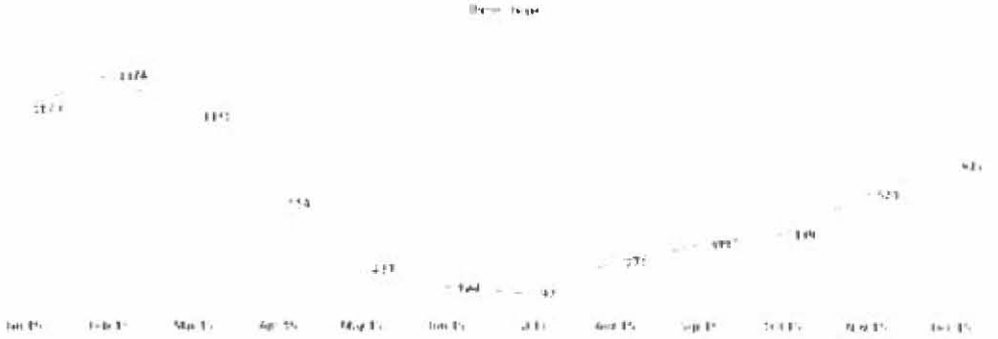
Woodbridge Fire Department	
Address: 418 School St, Woodbridge, NJ 07095	
Facility Type: Fire	FEMA Category: Risk Category IV

Contact Information: Chief Patrick Kenney	
Patrick.kenny@twp.woodbridge.nj.us	732-602-7361

Hours of Operation: 24/7	Total Sq Footage: 1,600
Electric Load: 83,712 kWh	Gas Load: 7,335 Therms
Energy Efficiency/Energy Conservation Measures: No	

Fire Department

Fire Department



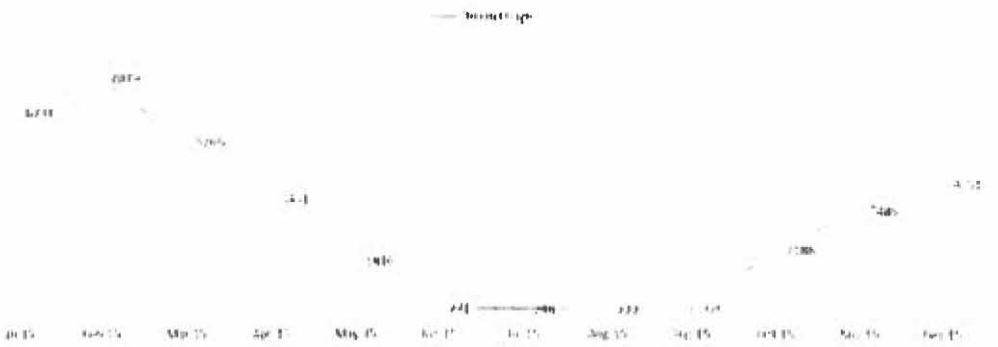
Stern Towers	
Address: 55 Brook Street, Woodbridge, NJ 07095	
Facility Type: Senior Living	FEMA Category: Risk Category III

Contact Information: Lawrence Stecker	
ls@woodbridgehousingauthority.org	732-726-1006

Hours of Operation: 24/7	Total Sq Footage: 43,725
Electric Load: 330,080 kWh	Gas Load: 37,068 Therms
Energy Efficiency/Energy Conservation Measures: No	

Stern Towers

Stern Towers



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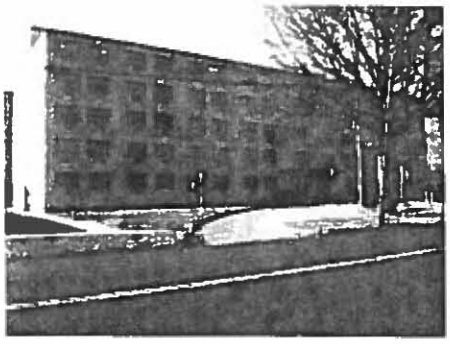
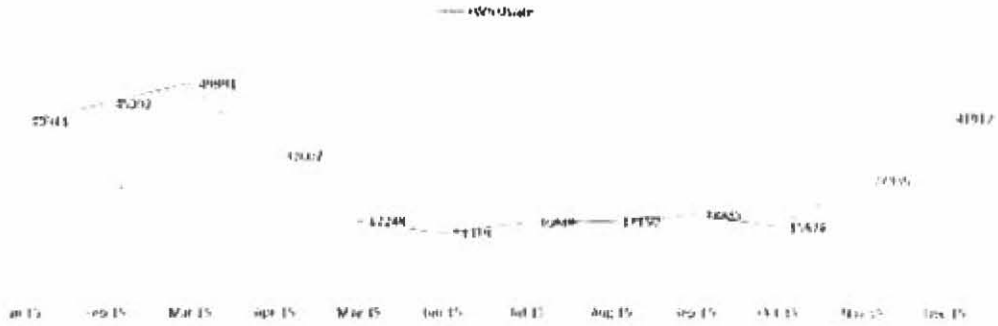
Adams Towers	
Address: 555 Rahway Ave, Woodbridge, NJ 07095	
Facility Type: Senior Living	FEMA Category: Risk Category III

Contact Information: Lawrence Stecker	
ls@woodbridgehousingauthority.org	732-726-1006

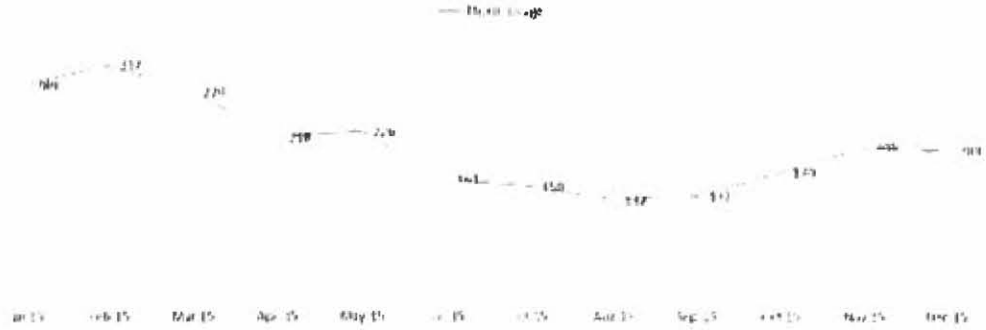
Hours of Operation: 24/7	Total Sq Footage: 52,110
Electric Load: 337, 806 kWh	Gas Load: 2,484 Therms
Energy Efficiency/Energy Conservation Measures: No	



Adams Tower Senior Living



Adams Tower Senior Living

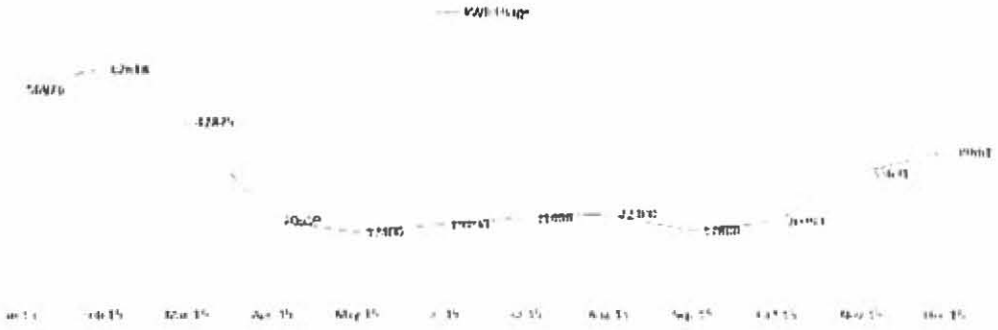


Finn Towers	
Address: 19 Martin Terrace, Woodbridge, NJ 07095	
Facility Type: Senior Living	FEMA Category: Risk Category III

Contact Information: Lawrence Stecker	
ls@woodbridgehousingauthority.org	732-726-1006

Hours of Operation: 24/7	Total Sq Footage: 35,000
Electric Load: 380,173 kWh	Gas Load: 3,601 Therms
Energy Efficiency/Energy Conservation Measures: No	

Finn Towers Senior Living

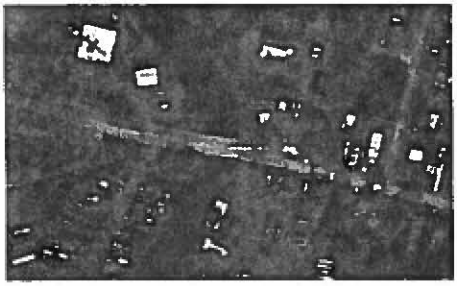


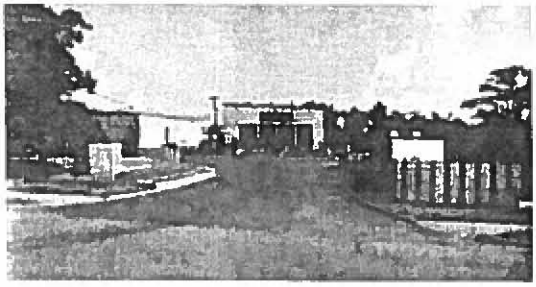
Finn Towers Senior Living

Pump Station	
Address: 201 Woodbridge Ave, Sewaren, NJ 07077	
Facility Type: Pump Station	FEMA Category: Risk Category III

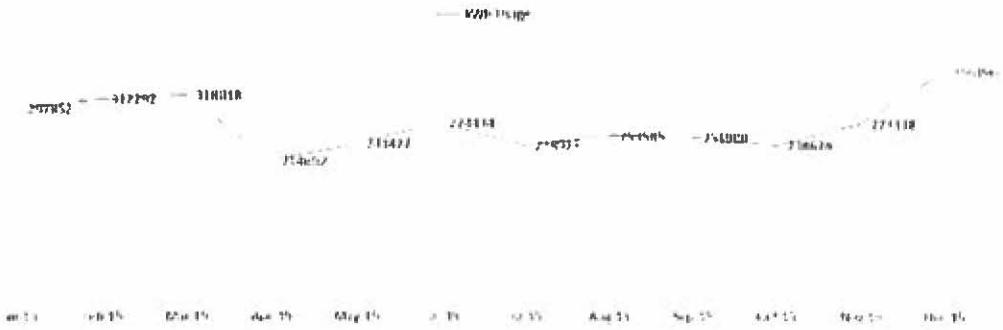
Contact Information: Brian Burke	
Brian.Burke@twp.woodbridge.nj.us	Brian.Burke@twp.woodbridge.nj.us

Hours of Operation: 24/7	Total Sq Footage: 2,270
Electric Load: 3,271,291 kWh	Gas Load: 42 Therms
Energy Efficiency/Energy Conservation Measures: Yes	

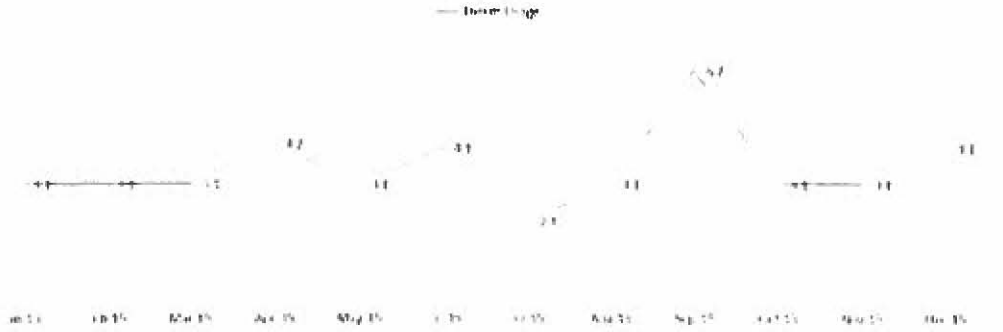




Pump Station



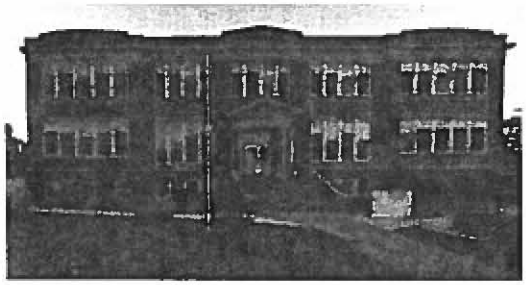
Pump Station



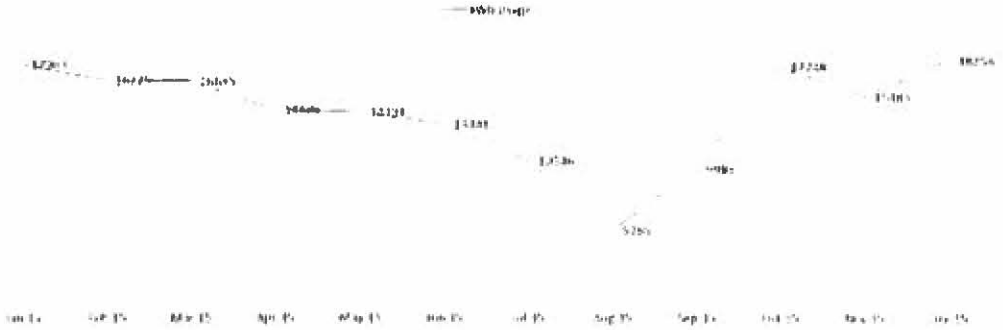
Ross Street Elementary School	
Address: 110 Ross St, Woodbridge, NJ 07095	
Facility Type: School/Shelter	FEMA Category: Risk Category III

Contact Information: Brian Burke	
Brian.Burke@twp.woodbridge.nj.us	Brian.Burke@twp.woodbridge.nj.us

Hours of Operation: 8AM–4:30PM, Closed Weekend	Total Sq Footage: 47,511
Electric Load: 170,785 kWh	Gas Load: 13,613.1 Therms
Energy Efficiency/Energy Conservation Measures: No	



Ross Street Elementry School

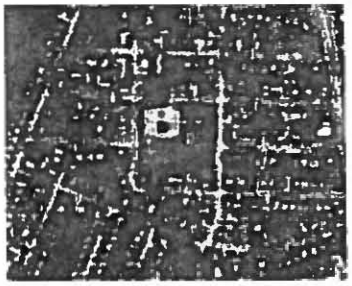


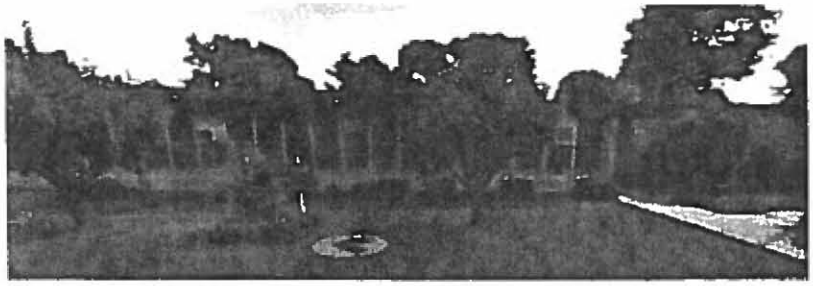
Ross Street Elementary School

Mawbey Street Elementary School	
Address: 275 Mawbey St, Woodbridge, NJ 07095	
Facility Type: School/Shelter	FEMA Category: Risk Category III

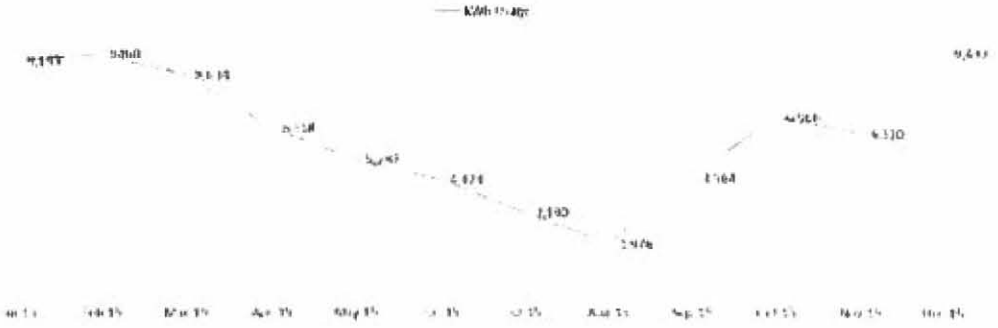
Contact Information: Brian Burke	
Brian.Burke@twp.woodbridge.nj.us	Brian.Burke@twp.woodbridge.nj.us

Hours of Operation: 8AM–4:30PM, Closed Weekend	Total Sq Footage: 27,967
Electric Load: 76,071 kWh	Gas Load: 10,700 Therms
Energy Efficiency/Energy Conservation Measures: No	

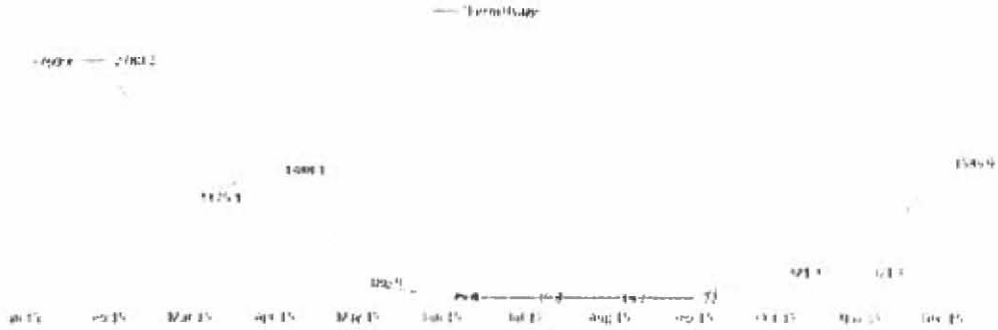




Mawbey Street Elementary School



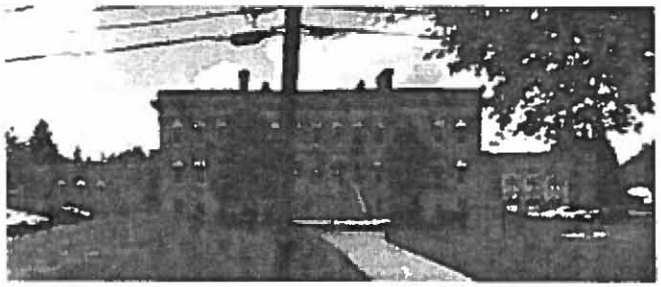
Mawbey Street Elementary School



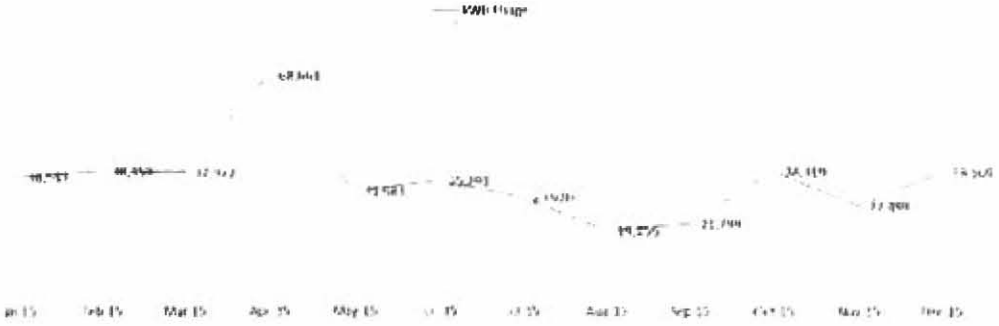
Woodbridge Middle School	
Address: 525 Barron Ave, Woodbridge, NJ 07095	
Facility Type: School/Shelter	FEMA Category: Risk Category III

Contact Information: Brian Burke	
Brian.Burke@twp.woodbridge.nj.us	Brian.Burke@twp.woodbridge.nj.us

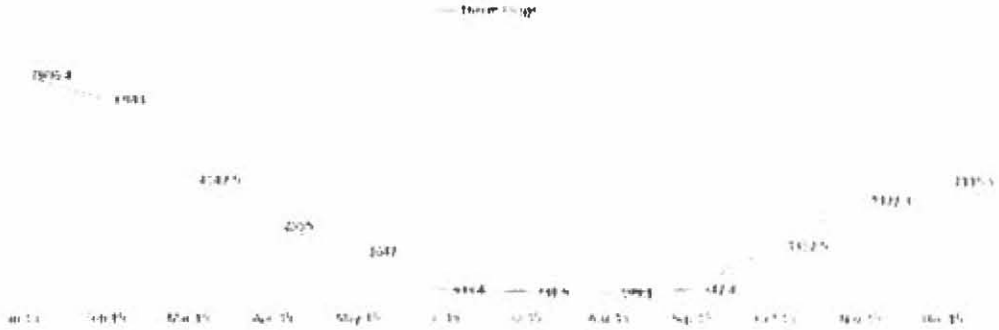
Hours of Operation: 8AM–4:30PM, Closed Weekend	Total Sq Footage: 82,988
Electric Load: 424,020 kWh	Gas Load: 33,560 Therms
Energy Efficiency/Energy Conservation Measures: No	



Woodbridge Middle School



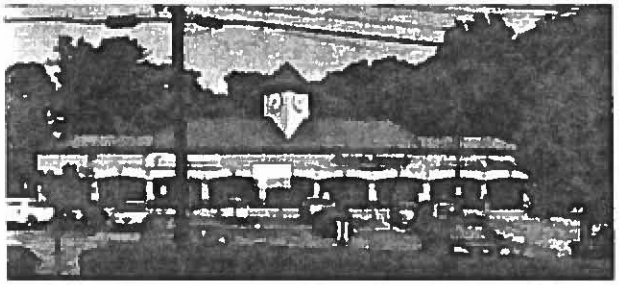
Woodbridge Middle School



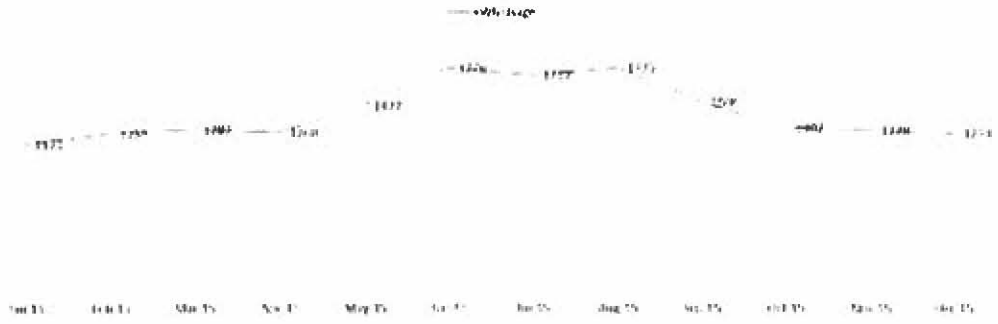
The Medicine Shoppe Pharmacy	
Address: 458 Amboy Ave #2, Woodbridge, NJ 07095	
Facility Type: Pharmacy	FEMA Category: Risk Category II

Contact Information: Amy Joswick	
(732) 636-0011	chlone01@aol.com

Hours of Operation: 9AM-6PM, Closed Sunday	Total Sq Footage: 1,000
Electric Load: 17,058	Gas Load: 254 Therms
Energy Efficiency/Energy Conservation Measures: No	



The Medicine Shoppe Pharmacy



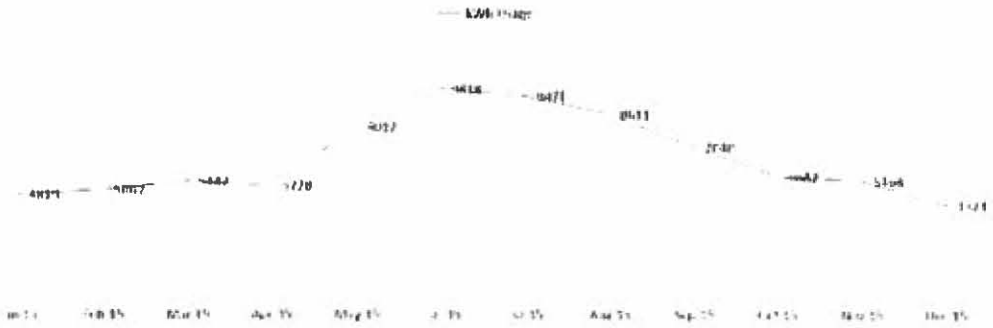
The Medicine Shoppe Pharmacy

Knot Just Bagels	
Address: 10 Main St J, Woodbridge, NJ 07095	
Facility Type: Food Service	FEMA Category: Risk Category II

Contact Information: Sharon McAuliffe	
(732) 750-1999	kjbwoodbridge@gmail

Hours of Operation: 5AM-3PM	Total Sq Footage: 1,500
Electric Load: 78,967 kWh	Gas Load: 6,609 Therms
Energy Efficiency/Energy Conservation Measures: No	

Knot Just Bagels

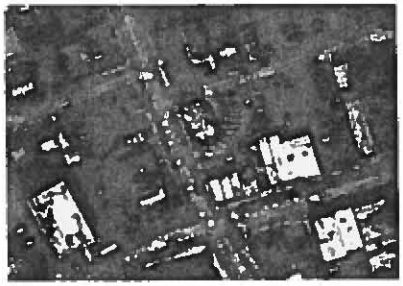


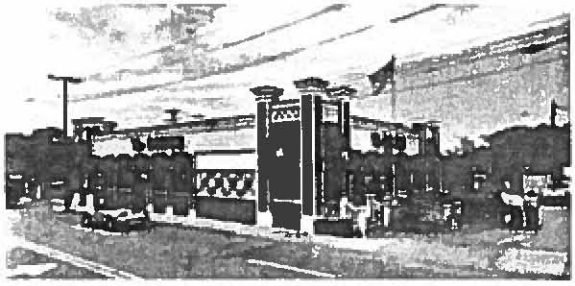
Knot Just Bagels

Reo Diner Restaurant	
Address: 392 Amboy Ave, Woodbridge, NJ 07095	
Facility Type: Food Service	FEMA Category: Risk Category II

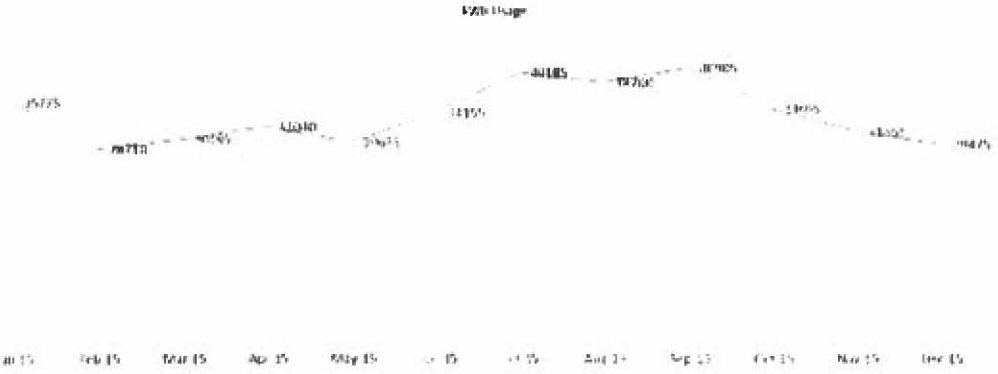
Contact Information: Irene Kokodis	
(732) 634-9200	reodiner392@gmail.com

Hours of Operation: 24/7	Total Sq Footage: 6,500
Electric Load: 405,855 kWh	Gas Load: 40,742 Therms
Energy Efficiency/Energy Conservation Measures: No	

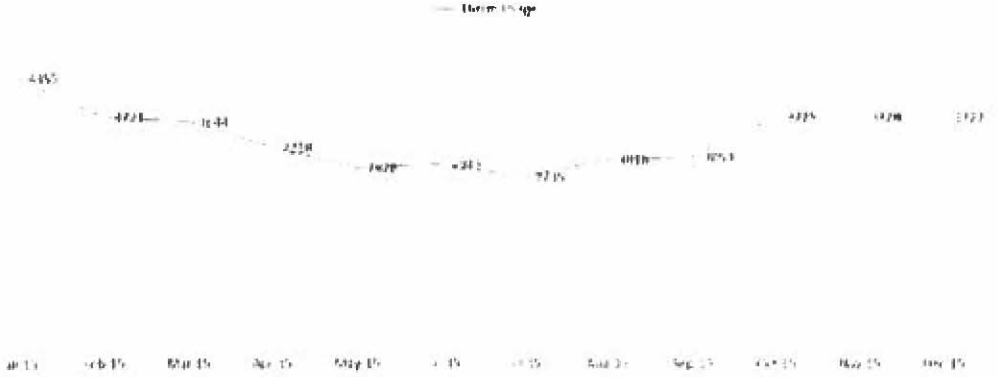




Reo Diner Restaurant



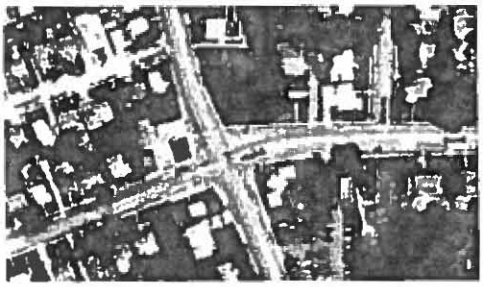
Reo Diner Restaurant

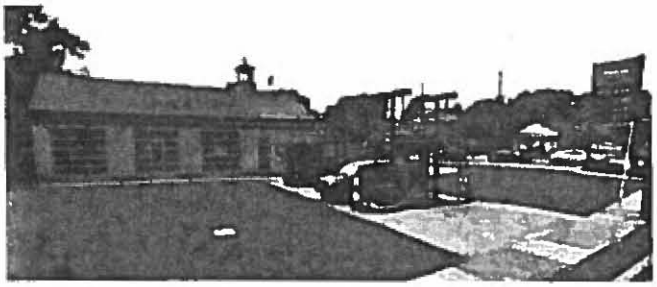


Gas Station	
Address: Green Street and Amboy Ave, Woodbridge, NJ 07095	
Facility Type: Gas Station	FEMA Category: Risk Category II

Contact Information:	

Hours of Operation:	Total Sq Footage: Estimated 1,000
Electric Load: Estimated 100,560 kWh	Gas Load:
Energy Efficiency/Energy Conservation Measures: No	





Gas Station

3. **If the applicant is not a Town Center identified in the NJIT Report, documentation indicating that it satisfies the screening criteria set forth in the NJIT Report is required. Criteria in the NJIT Report were based on a cluster of critical facilities and their building energy usage that included the following ranking:**
   i. **Criticality based on the FEMA Category Classification of Facilities.**
   ii. **Total electric and thermal loads based on Btu's per square foot.**
   iii. **A TC DER Microgrid should have at least two (2) Category III or IV facilities within 0.5 miles and a facility with an energy usage of approximately 90 M Btus per square foot.**

While this load cluster in Woodbridge was not listed in the NJIT Report, Woodbridge is located in an affected county, Middlesex County. The included information proves that the meets the WAM meets the threshold requirements of the program. The WAM has several critical facilities including two FEMA Category IV buildings (Town Hall and Woodbridge Fire Department), seven Category III (Senior Living and Schools), and four Category II buildings to support the population, totaling in thirteen buildings. This totals to approximately 9,024,022 kWh and 202,011 therms over 396,871 square feet, which converts to 128,473 total btu's per square foot.

Woodbridge Town Hall as a Category IV building will act as an anchor for the microgrid due to the location of the police department and as the operational center for the town. It has an electrical load of 3,349,046 kWh and 46,001 Therms gas load over 93,700 square feet, which calculates to 171 M Btus per square foot. The Woodbridge Fire Department, another Category IV facility, is within 0.5 mile radius along with six Category III facilities comprised of three public housing facilities and three schools.

With an area as vibrant as Woodbridge, additional facilities may be added later on to provide a diverse and robust cluster of assets, while also increasing efficiencies and economies of scale.

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.**

Woodbridge Township, PSE&G, The Medicine Shoppe, Knot Just Bagels, Local gas station, and possibly additional partners if needed. Woodbridge has an existing with the Woodbridge Fire Department and the Woodbridge School System and is in good relationship with the private entities. Given the investments that have already been made by the Township to develop community wide consensus, this grant will enable the stakeholders to memorialize this consensus in a WAM MOU that will set fort all relevant economic and reliability terms and conditions. We believe that there will be no significant procurement issues in this microgrid.

5. **A general description of the technology to be developed and the general location within the TC DER Microgrid. This should include a description of the proposed connections (electric, gas and/or thermal) of the critical facilities and the DER technologies. This should also include a location of the electrical connections to the EDC's facilities/equipment and a description of the type of system the TC DER would be interconnecting into (radial or network).**

Project team members with CHA as lead investigator, along with its subcontractors, Greener by Design and GI Energy, will evaluate the implementation of multiple technologies for use within the WAM. CHA would be the lead performing all the engineering services. GI Energy will support this effort from both an economic analysis and constructability standpoint. Finally, Greener by Design will help with

community outreach and various regulatory and permitting requirements. As the team confirms the members of the district and develops more detail on the load profile, the most commercially-viable technologies will be evaluated, including fuel cells, battery energy storage systems, solar photovoltaic generators, and internal combustion engine based combined-heat and power (CHP) systems. These systems will require electric, gas and thermal connections to the critical facilities in Woodbridge as well as the local EDC and GDC.

Depending on the final configuration of the system the generators on the microgrid will either be distributed and sized to the individual loads of each critical facility or the microgrid will configured as a district energy system with a central generating facility and connections to critical loads. During normal grid-parallel operation a district-energy microgrid would supply some or all of the required energy to the participating sites, and potentially distribute excess electricity to the EDC. Thermal energy would be distributed to clusters of buildings sharing the thermal output of microgrid generators (such as CHP). During islanded operation of the district energy system, thermal and electric energy will continue to be generated and distributed to the participating sites. Electric distribution between sites may be achieved through the use of existing distribution assets in partnership with the EDC, or through newly installed non-utility owned distribution.

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

The project team has outlined a number of critical facilities to be included in the Woodbridge microgrid. Our goal for this feasibility study will be to include as many potential facilities within the town center as possible in the microgrid that both enhance resilience while remaining economically viable. Once the list of facilities is finalized, the team will proceed to evaluate electric and thermal loads for each of the locations, which will inform the overall microgrid size and configuration. Further, we will explore interconnection and distribution options, including the potential for a new district energy system as well as the use of EDC infrastructure to connect facilities. However, given the variability of the number of critical facilities included in the microgrid, the final microgrid size and configuration, as well as their dispersed location across Woodbridge's town center, the overall total cost for the project cannot yet be estimated.

The consulting partners will explore and analyze potential financing vehicles and ownership structures including but not limited to single ownership, joint ownership, third party ownership, power purchase agreements, leases, ESCO contracts, and other financing tools. It is expected that a public-private partnership (PPP) will be required due to the infrastructure nature of this project and broad mix of stakeholders. Through the PPP, aspects of the ownership, operations, and maintenance of the project may be handled by either public or private partners. Upon the completion of the analysis, each technically and economically feasible option will be presented to the stakeholders along with various public-private options for ownership and long-term operations.

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

The primary benefits of a microgrid are reliability, redundancy, fuel flexibility, energy efficiency, a cleaner environmentally, locally and regionally, reductions of energy transmission loss, and improved grid security. Woodbridge serves several communities in the area with a population over 100,000, which its town hall as the town center. All of the surrounding communities would benefit from the examples stated above as well as neighboring towns and communities. Additionally, the Woodbridge microgrid would be able to provide economic benefits by participating in ancillary markets such as demand response, frequency modulation and peak shaving. By participating in these markets as well as introducing private investment, we expect that WAM will be able to be configured in such a way as to provide a return on investment (whether public or private) while still providing the needed reliability to the members and the expected value to the community. By incorporating renewable technology and by contributing to the Societal Benefit Charge the proposed project is consistent with the use of the SBC as set forth in N.J.S.A. 48:3-60(a)(3) and furthers objectives of the Department of Environmental Protection and Board of Public Utilities.

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.**

A true microgrid will need to include a communications system that safely and efficiently operates microgrid assets while also interfacing safely and harmoniously with the EDC's distribution assets and network management systems. The project envisions deploying technology that provides real-time control of the microgrid assets via a software control platform that will allow the EDC to capture maximum benefit from the microgrid resource while also allowing the microgrid to function efficiently and reliably as designed. This control platform will be designed to allow the EDC to "see" the status of the microgrid through their Network Operations Center (NOC). This platform could also allow the EDC to control certain aspects of the microgrid, such as when and how the microgrid transitions between grid-parallel and grid-isolated modes.

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

The feasibility study will be completed within 12 months of funding award.

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

The WAM will use consider the use of all practical tools and software including but not limited to HOMER PRO, Rutgers' Center for Energy, Economics and Environmental Policy cost/benefit analysis (CBA) model, GbD Microgrid Toolkit, and other proprietary tools. HOMER Pro Microgrid software, which specializes in Microgrid design and allows for the simulation modeling, map making, analysis, and more. Both CHA and GI Energy have experience using HOMER Pro and will use their own proprietary tools in addition to any relevant tools such as Rutgers' Center for Energy, Economics and Environmental Policy cost/benefit analysis (CBA) model and GbD Microgrid Toolkit.

11. **The requested funding amount.**

WAM anticipates to use $150,000 to complete this study.

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

Woodbridge is willing to contribute services in kind and no cost share has been determined at this time. Further cost share will be explored as financial vehicles and ownership structures are agreed upon.

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.**

Please see the attached information.

Industry & Energy Group

CHA at a Glance
Founded in 1952
40 offices globally
1,100 personnel
Design Firm of the Year
Licensed all 50 states & Canada

ENR
ENGINEERING NEWS-RECORD
TOP FIRM
#59 OF TOP 500
DESIGN FIRMS
#36 OF TOP 100
PURE DESIGNERS
#10 OF TOP 20
MANUFACTURING

Markets
Aviation
Facilities
Industrial / Environmental
Manufacturing & Energy
Sports
Transportation
Utility Infrastructure
Water

Disciplines
Civil
Electrical
Environmental
Landscape Architecture
Mechanical
Planning
Sports Architecture
Structural
Survey

Contact Information
*Gregory S. Corso, PE**
Senior Vice President
Industry & Energy Group Executive
III Winners Circle
Albany, New York 12205
p. 518.453.8222
e. gcorso@chacompanies.com
**NY*

Since 1952, CHA has successfully completed tens of thousands of projects by offering engineering solutions, project management expertise, and client services that are second to none. CHA is a diversified, full-service engineering firm in both market and service delivery. We are nationally recognized for providing innovative approaches to planning and design in the built environment. Our approach goes beyond delivering projects on time and budget; we embrace our clients' goals and become lifelong advocates of their visions.

For over six decades, our clients have recognized the value that CHA brings by providing a full complement of technical services "under one roof". This allows CHA to:

- Reduce project delivery costs through value engineering and efficient project management
- Reduce change orders during construction
- Drive project schedules from the initial concept design through construction and project acceptance

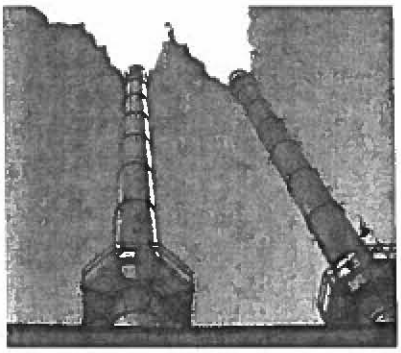
Our services are tied together by a common thread, in that we provide that innovative approach to all problem solving. Harnessing the energy of innovative design solutions is central to our philosophy.

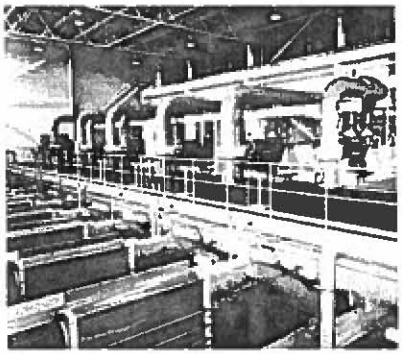
The advantages CHA's Industry & Energy Group offer include:

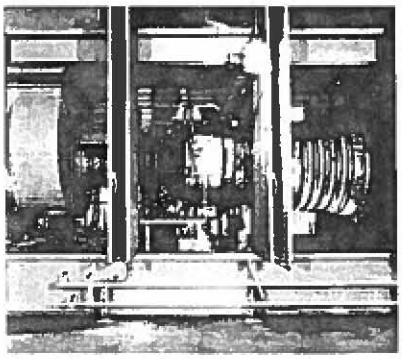
- Extensive district energy, gas and electric transmission & distribution experience.
- Deep experience in industrial energy assessment, benchmarking, load management, on-site generation, renewable energy, and energy performance contracting.
- Energy project outreach & stakeholder engagement professionals.
- Seasoned team of high voltage and natural gas engineers, including many former utility employees.
- Extensive industrial process, utilities, and building energy experience.
- Extensive industrial plant planning, design, design-build, and operation experience.
- Extensive experience in power and thermal generation and distribution planning, design, design-build, and operations.
- Experience throughout the project development and construction cycle.
- Seasoned project managers trained to put our clients' needs first and who have a track record of providing total quality services.
- Practical experience coordinating with relevant state agencies including, but not limited to DOT, ACOE, DEC, EPA.
- Decades of experience working with State energy organizations (ex: NYPA, NYSERDA, Massachusetts DCAMM, NJBPU, ComEd, etc.)

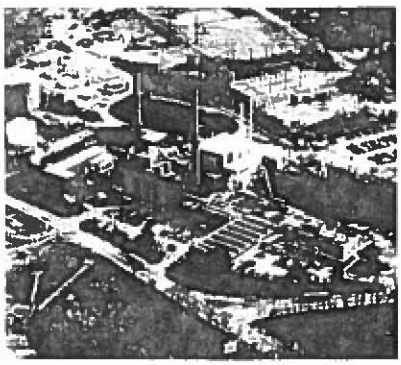
CHA

District Energy









CHA has and can provide a comprehensive approach to district energy systems, from small to large. We understand these systems are critical and must be maintainable and operable with redundant, fail-safe backups.

From master planning, designing comprehensive heat and cooling systems, possibly involving an electrical microgrid, to permitting, we will partner with you to get the project on-line efficiently and fully.

Our teams undertake projects at central plants:

- Heating - CHP, trigen, boilers, and process steam systems
- Cooling - Chillers, cooling towers, thermal storage, and piping systems
- Power - Utility interface, substations, load management, and protective systems

We can provide services for distribution systems:

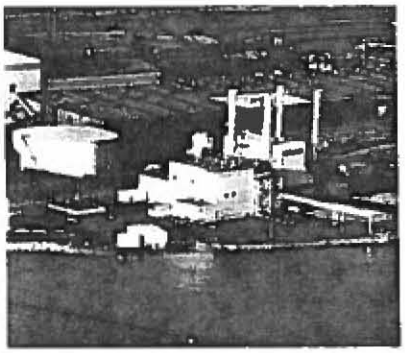
- GIS mapping
- Steam or chilled water pipeline design, stress analysis, and network modeling
- Power distribution ductwork design, circuit analysis, and modeling

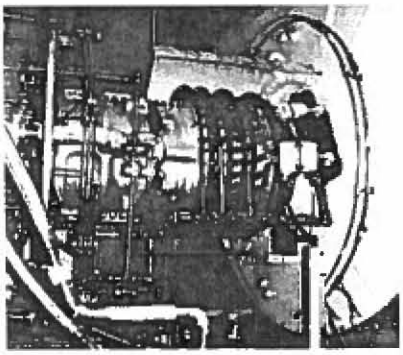
Using the following advanced software, we can: perform heat and fluid modeling; analyze stresses to pipes, structural steel and concrete; analyze and monitor electrical systems; create 3D models; and, perform risk and hazard analyses.

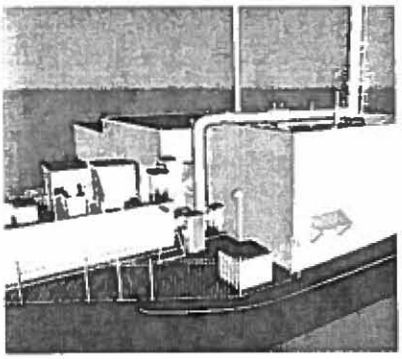
- Recipro
- GT Pro
- Thermoflex
- Pipe 2000
- Caesar II
- Navisworks
- SAP2000
- LPile
- SKM
- Easypower
- @RISK

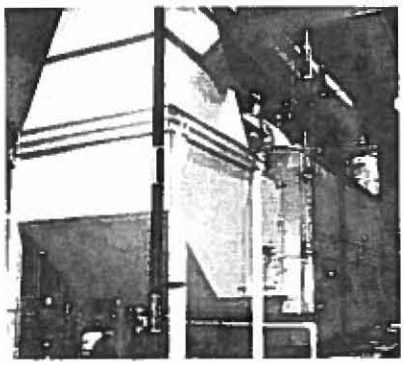
CHA

Power & Thermal Generation









CHA engineers, project managers, design and support staff are experienced in a wide range of power & thermal generation projects including cogeneration, combined-cycle, boilers, chillers, renewable energy, district energy and electric / gas interconnection projects. Our involvement spans the lifecycle of a plant, from concept development and engineering to support permitting, through final design, construction and startup support. Post-operational support includes plant upgrades and modifications.

From feasibility studies to complete planning and design for gas turbine, steam turbine, reciprocating engine, and/or gas, biomass and coal-fired boiler plants, chiller plants, high-voltage substations and more, CHA meets or exceeds our clients' goals. CHA also provides solar PV study and design; geothermal system design; biomass, biogas, and landfill gas; wind farm engineering and construction services; and hydroelectric projects.

Services

- Cycle design and project design development
- Detail-design engineering and 2D / 3D design systems
- Due-diligence, peer-review, and reverse engineering
- Environmental permit and project approval assistance
- Equipment / construction specifications and contract documents
- Front-end engineering design (FEED) and project development assistance
- Owner's engineer, lender's engineer, independent engineer
- Plant & equipment performance test procedures / implementation
- Plant / equipment upgrade, modification and retrofit design
- Plant, equipment, and system training
- Project management, scheduling and cost estimating / control
- Screening, conceptual, and feasibility studies and economic analysis
- Site evaluation studies, real estate support and site research
- Commissioning management
- Construction observation services

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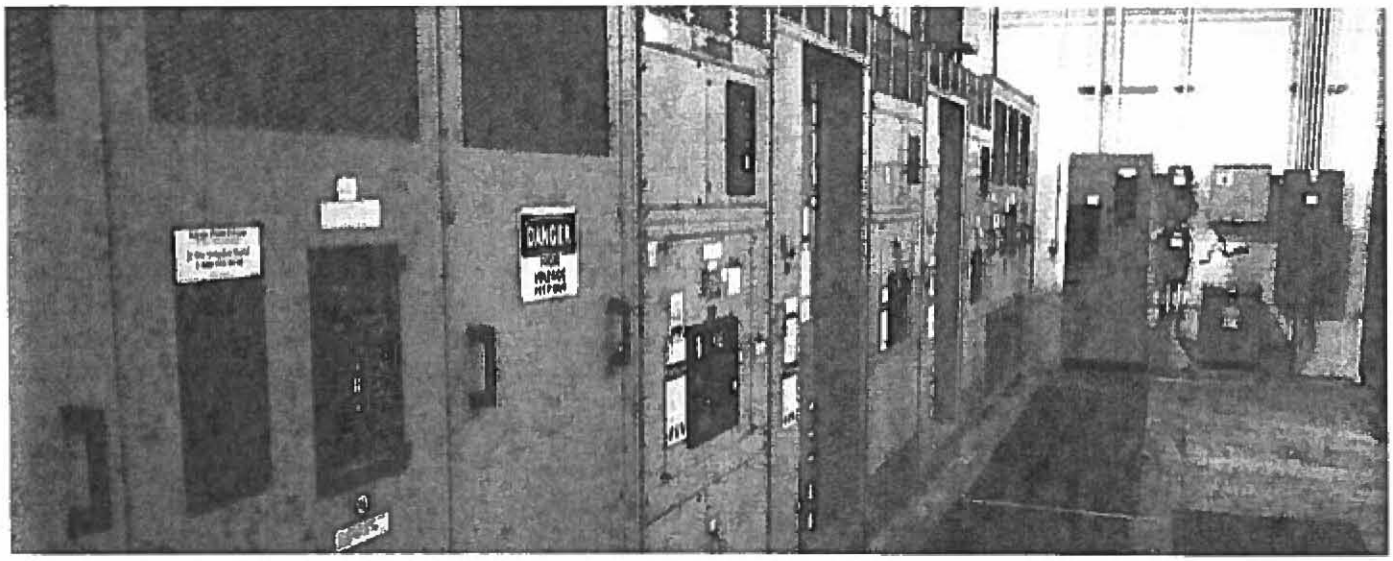

Microgrid Project

Orlando Utility Commission

CHA was competitively selected by the Orlando Utilities Commission (OUC) to continue its' forward-thinking and improvement on its service delivery focus, by implementation of a standalone, fully functioning microgrid demonstration project. This project will serve all the energy needs of the Lake Highland Water Plant, a local, off site water production well and the historic Lake Ivanhoe Building with a combined average load demand of approximately 1,500 kW. Key defined features of the microgrid include:

- Provide primary, high level of reliability for Lake Highland Water Plant, water well, and proposed data center at the Ivanhoe building, and controls/management system with utility grid as back-up.
- Provide for redundancy in design.
- Provide capability for a phased build-out of microgrid.
- Include alternative energy generation and storage technologies, including combined heat and power, large scale battery storage and solar PV with interoperability as part of an integrated system.
- Provide for test loading, load isolation, and alternative operational conditions to demonstrate the various technologies for clients.
- Provide potential research and educational outreach opportunities.

Technologies considered for implementation as part of the microgrid include:

- Energy Generation, including Combined Heat & Power (CHP)
- Reciprocating Internal Combustion Engines
- Microturbines
- Fuel Cells
- PV Solar
- Energy storage
- Large scale battery storage
- Thermal storage

Project approach and delivery process is to be phased and includes:

- Concept development with various options and configurations to be modeled and analyzed to provide viable alternative solutions.
- Selection of a subset of the concept solutions to be pursued to schematic systems engineering with probable construction and operating cost estimates.
- Final selection for complete design, construction and commissioning of the microgrid.

CHA

NY Prize Community Microgrid Feasibility Assessments

Bette & Cring

CHA, with our design/build partner, have secured three (3) microgrid feasibility assessments awarded under the competitive NY Prize, which is a first-in-the nation $40 million competition to help communities create microgrids which are standalone energy systems that can operate independently in the event of a power outage. NY Prize is a competition based structure to develop microgrids that help communities reduce costs, promote clean energy, and build reliability and resiliency into the electric grid. NY Prize is a part of a statewide endeavor to modernize New York State's electric grid, spurring innovation and community partnerships with utilities, local governments, and private sector. The mission is to enable the technological, operational, and business models that will help communities reduce costs, promote clean energy, and build reliability and resiliency into the grid. The initial awards for a stage 1 feasibility assessment generally include the following tasks:

- Identify site constraints and opportunities
- Preliminary assessment of the technical design and system configuration (resource options, appraisal and selection)
- Commercial and financial feasibility assessment
- Preliminary commercial terms/contractual relationships between project participants (project organization and operational control)
- Project value proposition to stakeholders
- Legal/environmental suitability and financial viability
- Environmental
- Net project benefits analysis
- Preliminary project design, management and operations plan, budget and schedule

CHA is the technical lead for microgrid feasibility assessments for this cities of Albany, Troy, and Auburn. Additional to that, CHA has been assisting two other NY Prize feasibility assessments for the cities of Ithaca and Ballston Spa. Upon completion of the Phase 1 Feasibility Assessments, the projects will be entered into a stage 2 competition for detailed design and investment grade cost estimating.

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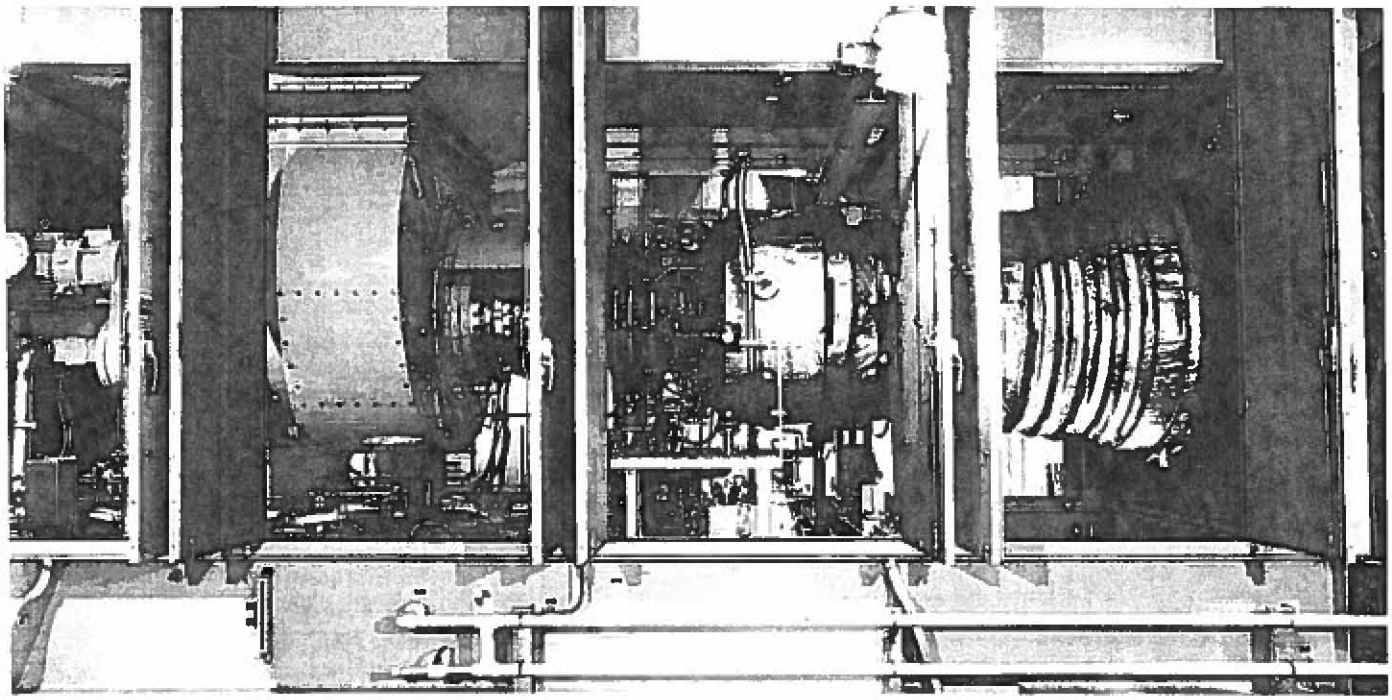


Combined Heat & Power

Cornell University

This LEED Gold rated (office addition) project involved the construction of a combined heat and power generation plant based on two dual-fuel Solar Turbines Titan 130 15 MW gas turbine generators and two Rentech heat recovery steam generators (HRSGs) with supplementary firing. The combined heat and power plant supplies the Cornell University campus with electricity and heating steam. CHA provided the following services:

- Conceptual design and project definition engineering including project cost estimate and comprehensive schedule.
- Specification, selection, and technical coordination for all major equipment including the gas turbine generators and HRSGs.
- Civil/structural, mechanical, electrical, building services, instrumentation and control systems design and engineering for the complete combined heat and power plant.
- Civil, structural, and architectural design for the 160ft by 90ft and 66ft high plant building.
- Specification and technical coordination for a new enclosed coal conveyor system to replace an existing open conveyor located above the new plant building.
- Design and commissioning of the chilled water piping, equipment and controls. The chilled water includes process cooling, inlet chilling, and space cooling. The cooling system was designed to be fully operational for negative, expected, and exceptionally high differential pressure conditions.
- The chilled water lines are 8-inch HDPE service feeds tied-in at the CWP3.
- Design of the control system architecture and automatic control scheme for the complete facility and technical coord nation with the control system integrator for the implementation of the new control system.

This project has received multiple awards including the following:

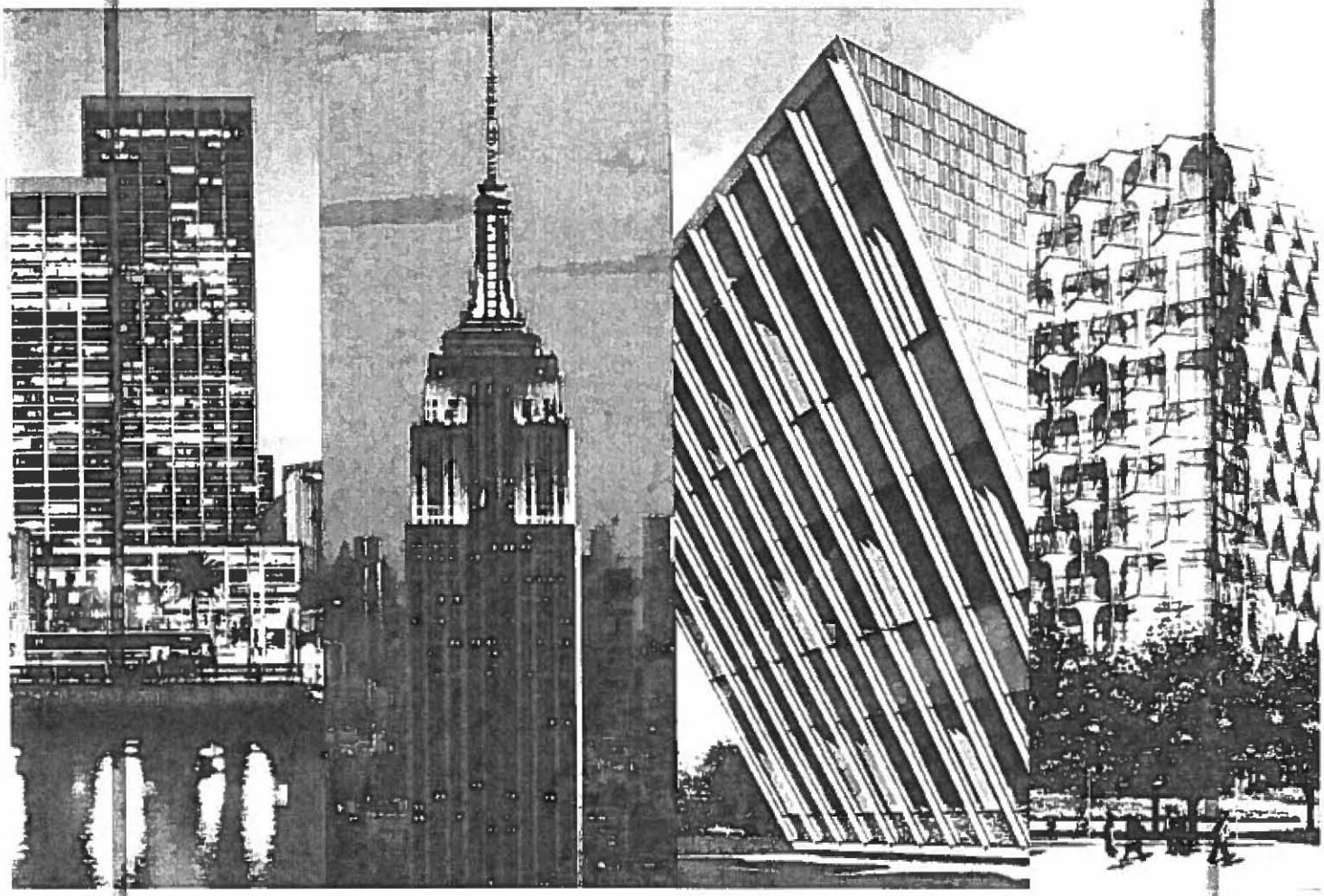
- ***Environmental Protection Agency (EPA) Energy Star Rating***
- ***Combined Cycle Journal (CCJ) Pacesetter Plant Award***
- ***International District Energy Association (IDEA) Global District Energy Climate Award***

The University project team, led by Tim Peer, was recognized with a Facilities Services Keystone Award. This was awarded for demonstrating the University Skills for Success and consistent demonstration the Facilities Services values. The Keystone Award exemplifies excellence in service to the organization and consistently providing quality output in work activities. This award is the highest honor and is awarded to an individual or team that exemplifies excellence and many of qualities in their work.

CHA

gi energy

Providing Sustainable Energy

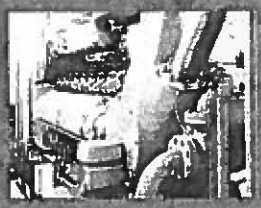


- Energy Master Planning
- Engineering & Design
- Financial Structuring
- Construction & Installation
- Energy Data Analytics
- Operations & Maintenance

www.gienergyus.com

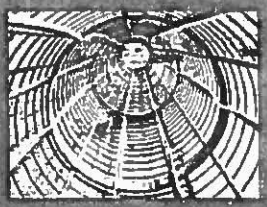
GI Energy is a leading developer of on-site energy and microgrids. GIE tailors long-term, sustainable and efficient energy solutions for your current and future needs.

Our energy technology expertise



Combined Heat & Power (CHP)

CHP uses natural gas to provide e ectricity, chilled water and steam. GIE installed the largest CHP system in a New York commerical building.

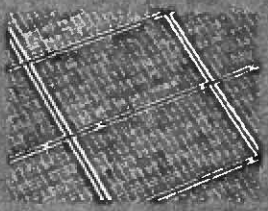


Geothermal and Energy Foundations

Ground source heat pumps use the earth to provide highly efficient heating and cooling. GIE pioneered Energy Pi'es in 2001 with Skanska and is working on America's largest project to date.

Energy Storage

GIE works with partners like Tesla and NEC to provide affordable and scalable energy storage systems.



Solar

GIE integrates solar with other technologies, for example in America's first net-zero energy retail store.

Data Integration, Automation and Controls

Integrating big data maximizes efficiencies through real-time monitoring and optimization. GIE works with leading innovators to customize controls and data analyt cs solutions.

Fuel Cells

Fuel Cells convert chemical energy into electricity. GIE pioneered America's first ever state Microgrid in Hartford, CT, using fuel cells to protect critical community infrastructure.

Our Clients include

WINTRUST Chicago

THE UNIVERSITY OF CHICAGO

Go gle

UBS

EMPIRE STATE REALTY TRUST

Cypress College

Trinity Health

CBRE GLOBAL

Dignity Health

LENNAR

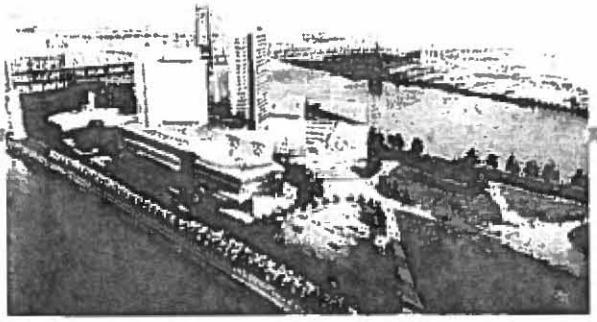
JLL

Walgreens

Why choose GI Energy

1. Focus on financial as well as energy efficiency
2. Independent experts: vendor and technology neutral
3. Full service provider, from scoping to long-term O&M
4. GI Energy warrants the output of its on-site solutions
5. Intimate knowledge of utility markets and tariffs

Case Studies



Cornell Tech
New York, NY

CORNELL TECH

Ground Source Heat Pump geothermal energy system for campus' first academic building, The Bloomberg Center

New Cornell University applied tech campus on Roosevelt Island, NYC

GSHP system provides majority of heating and cooling load. Originally designed to support The Bloomberg Center to be one of the largest Net Zero buildings in the USA

GIE provided engineering, procurement & construction (EPC)

Hunters Point
San Francisco, CA

LENNAR

Eco-District: Utilities Design, Construction, Ownership, Operations & Management

Ground-breaking eco-district design: mixed-use development, integrating sustainable energy generation with smart technology systems

GIE leading team of experts, responsible for sustainable energy, water systems, telecomms & waste management. Partners include Edison Energy, AlfaTech, Tesla & Bloom Energy

GIE arranged third-party financing, and is providing EPC services

Walgreens

Walgreens

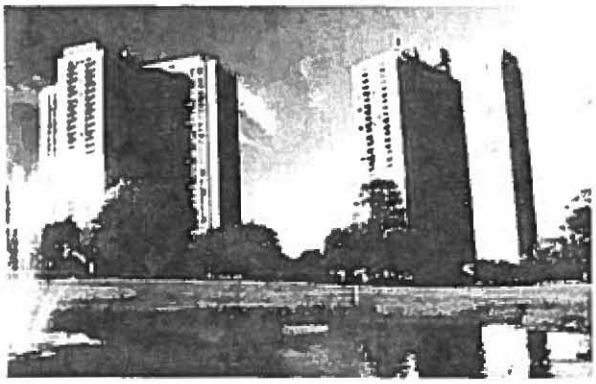
Evanston, IL

Walgreens debut Net-Zero Energy store

Integrated GSHP system with natural ventilation, daylighting, solar PV and wind turbines

First 100% CO_2 refrigeration integrated with geothermal in USA

Amongst many other awards, has won: LEED Platinum, Green Chill Platinum, USGBC Emerald Award, Excellence in Engineering ASHRAE Award



North Shore Towers

Long Island, NY

4.5 MW Reciprocating Engine CHP System

Grid-Isolated 1,844 unit residential community, continuous operation critical for vulnerable residents

GIE provided full EPC for project

GIE recognized management's priority was resident safety, and was awarded contract due to superior engineering ensuring no power outages during installation

GI Energy Projects with LEED certification include

US Embassy, 9 Elms, London, UK (Platinum)

TransAmerica Pyramid Center, San Francisco, CA (Platinum)

Walgreens, Evanston, IL (Platinum)

Cornell Tech, Roosevelt Island, NY*

Hunters Point, San Francisco, CA*

Empire State Building, New York City, NY (Gold)

Federal Center South, Seattle, WA (Gold)

Trevor Day School, New York City, NY (Gold)

One Market Plaza, San Francisco, CA (Gold)

University of Chicago, Chicago, IL (Silver)

One Penn Plaza, New York City, NY

North Shore Towers, New York City, NY

Gateway Plaza, White Plains, NY

College of the Canyons, Santa Clarita, CA

*In progress, designed with Platinum LEED certification as key objective

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GI Energy

Energy Independence, Security & Savings

Microgrid Development Reference – Hartford, CT

February 2017

Contents

The Challenge

Older Technologies Are Less Reliable

Issues Around Grid Reliability

Major power interruptions caused by storms

Essential local facilities not operational for lengthy periods

Emergency readiness is hindered

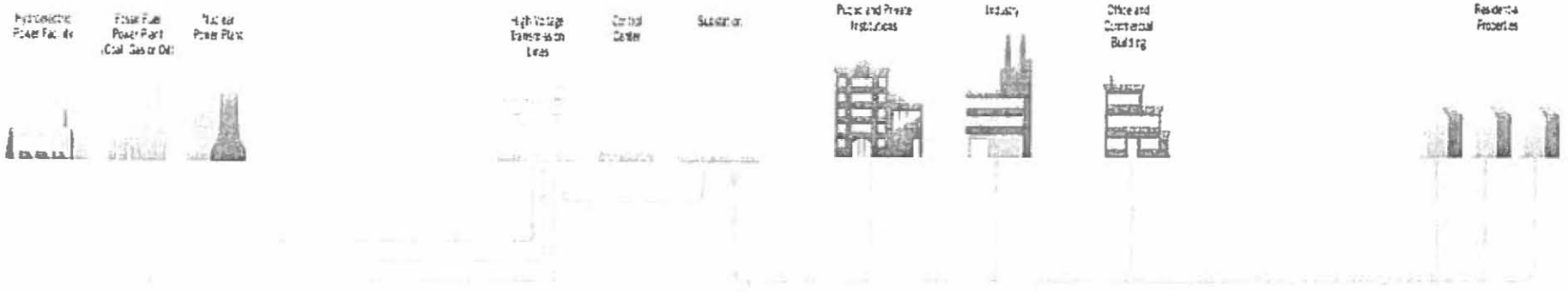
Increased regulatory pressure to increase resiliency

DVIDSHUB. Flickr.com

- Today's energy infrastructure is vulnerable to interruption by storms and other disasters. As mentioned in the Two Storms Final Report (State of CT, 2012) in 2011 a nor'easter and hurricane Irene resulted in over 800,000 outages each and took between 9-12 days to restore power. A Category 3 hurricane may black out the entire State of Connecticut, some areas for over a month.

- A more resilient energy system will be better able to power our homes, businesses, and economy in the face of increasingly prevalent extreme weather events.

The Traditional Power Grid:

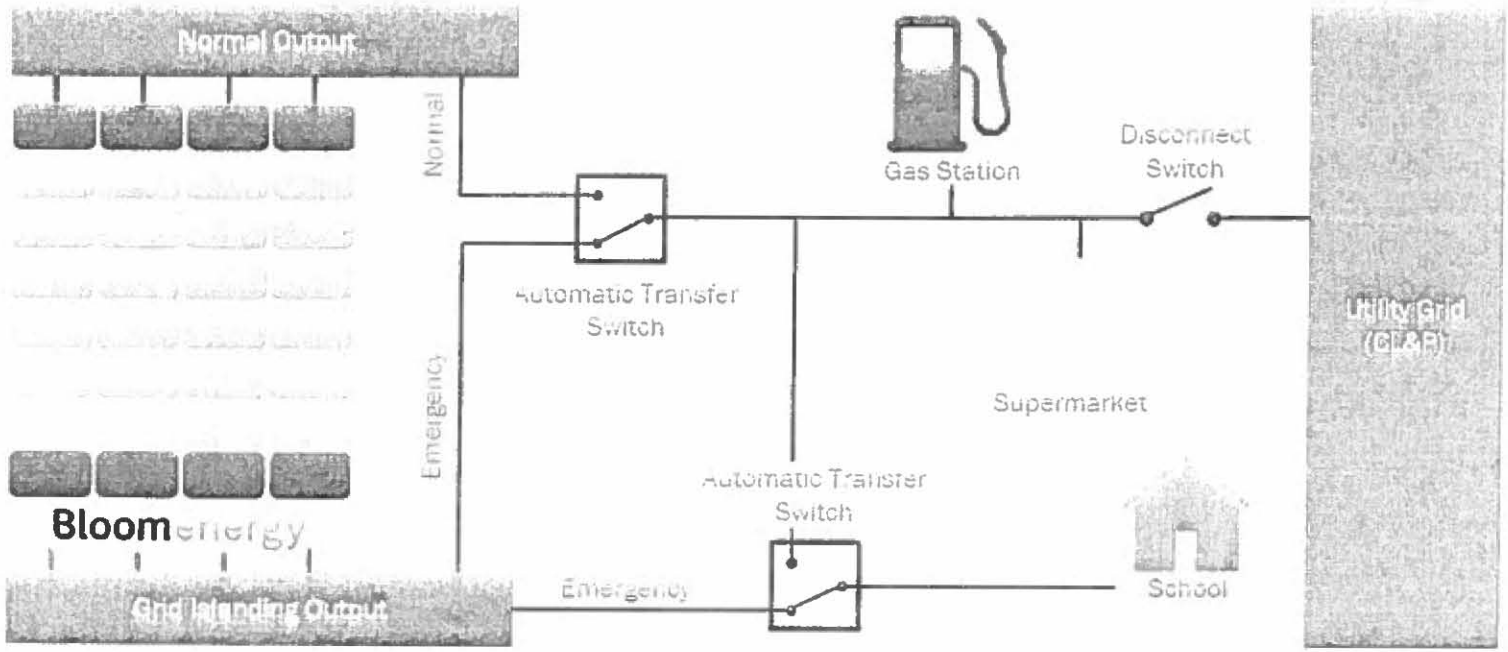


Solution: Microgrids

New Technology Enables New Solutions

Microgrids are just that - the grid in miniature. It is a group of interconnected critical loads and local on-site generation that act as a unit. A microgrid can operate in parallel with the grid when it is operating, or it can operate completely independently during island mode. This is due to advancements in control and automation and new policies that enable cost-effective use of the generators 24/7/365.

- Takeaway: microgrids enable cheaper, cleaner and more resilient local infrastructure that improves emergency response



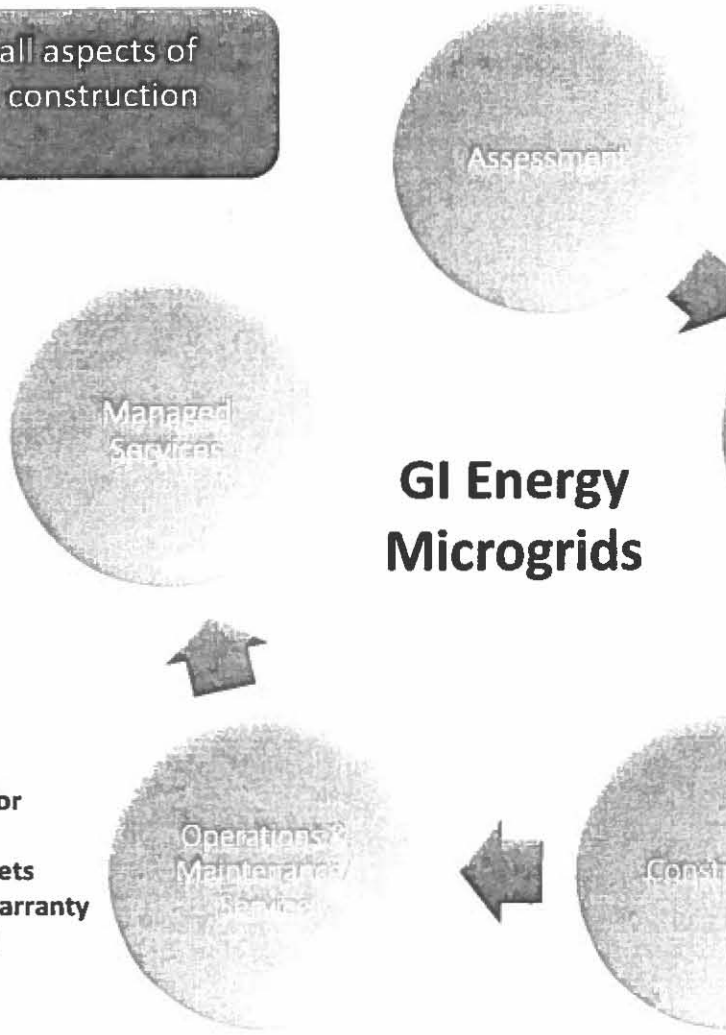
Example Microgrid Diagram

Credit: Antonio Matta, City Architect, Hartford, CT

Microgrid Development Process

Delivering Microgrids for Clients

GIE is responsible for all aspects of project development, construction and operation.



- **Energy modelling** and incentive & utility tariff analysis enable production of technical and financial reports
- **Financing** options (Secure DEEP grants)
- **Specialist subcontractors** sourced as appropriate

- **Design of optimal on-site energy generation mix**
- **All engineering services**
- Equipment lifecycle analysis
- **Management of interaction with utilities**

- **Full EPC Solutions**
- Oversee **interconnection to existing utilities**
- Equipment procurement
- **All permitting arranged** before **Commissioning of asset**

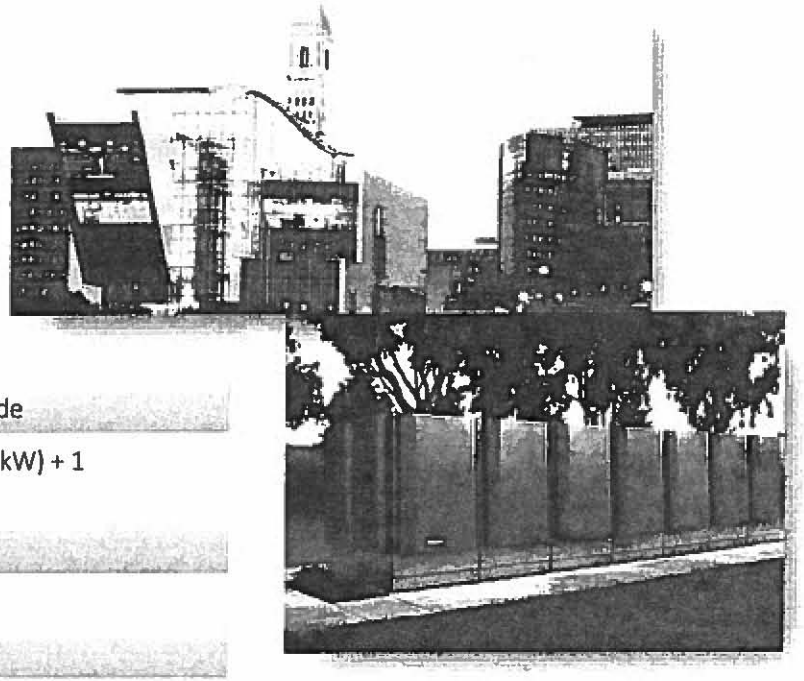
- Provide **on-site training for maintenance staff**
- **Operations of energy assets**
- Parts procurement and **warranty management** as required

- Continuous optimization
- Performance tracking and **utility analysis**
- Fuel sourcing & procurement

GI Microgrid Development in Connecticut

Case Study - Parkville

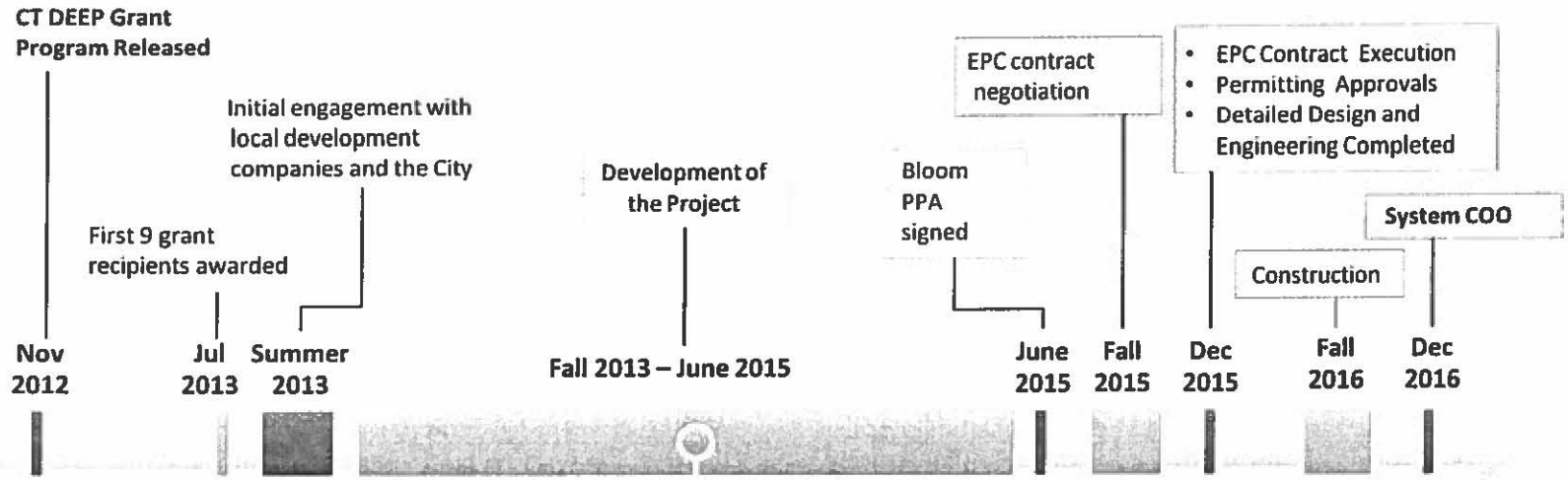
- **Microgrid will provide uninterrupted power for school, gas station, and grocery store during grid outages**
- First microgrid project in CT
- 800 kW Bloom Energy fuel cell microgrid for Parkville section of Hartford
- Funding includes $2.1M grant from State of Connecticut secured by GIE, Virtual Net Metering, and RECs



Size	800 kW grid parallel / 600 kW microgrid-mode
Power Generation Technology	Bloom Energy Servers (4 ES5 fuel cells x 200 kW) + 1 Uninterruptable Power Module (UPM)
Microgrid Equipment	Switchgear and Cabling
Microgrid Owner	Eversource
Bloom Server Owner	Bloom Energy / Constellation
Design & Development	GI Energy
Utilities	Eversource / Connecticut Natural Gas
Interconnection	Parallel grid Connection + Critical Load (microgrid mode)
Customers	Parkville Elementary School, Senior Center, Library – Dwight Branch, C-Town Supermarket

Project Timeline and Milestones

Case Study - Parkville



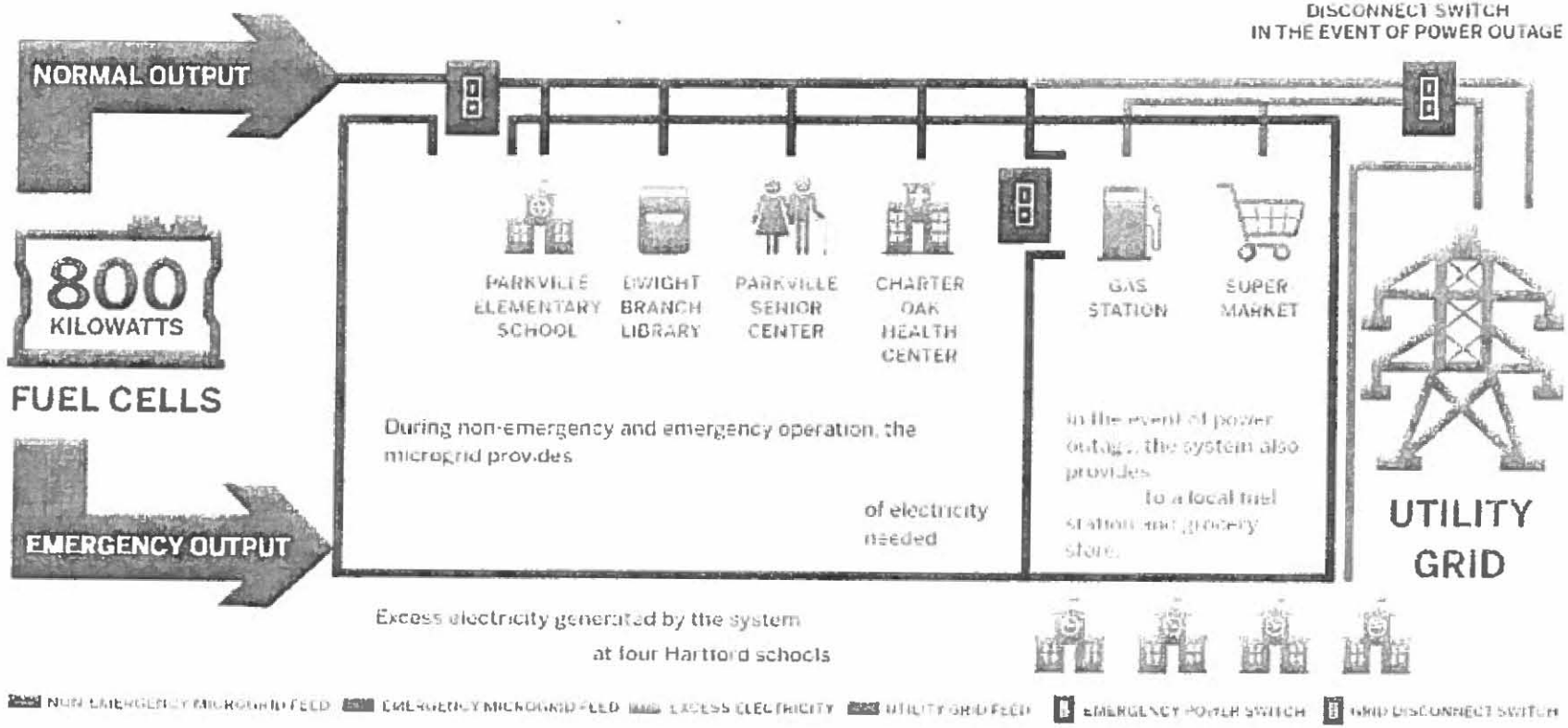
Graphic Credit: Matta, Hartford CT

Key Development Activities

- **Selection of generator technology**: Initially CHP but lack of onsite heat load led to use of a Bloom fuel cell
- **CT LREC bid submission and award:** Bidding strategy required to ensure you are "picked up" while protecting project economics
- **Virtual Net Metering:** Site load under normal conditions @ 20% of fuel cell output required a structure to export excess energy that is only used by the MicroGrid during grid outages
- **Securing Eversource engagement and sign-off**: New model for all parties requiring a collaborative effort
- **Ensure adequate pipeline gas pressure:** Dedicated high pressure gas line for Bloom fuel cell provides extra reliability but greater upfront cost

How a Microgrid Works

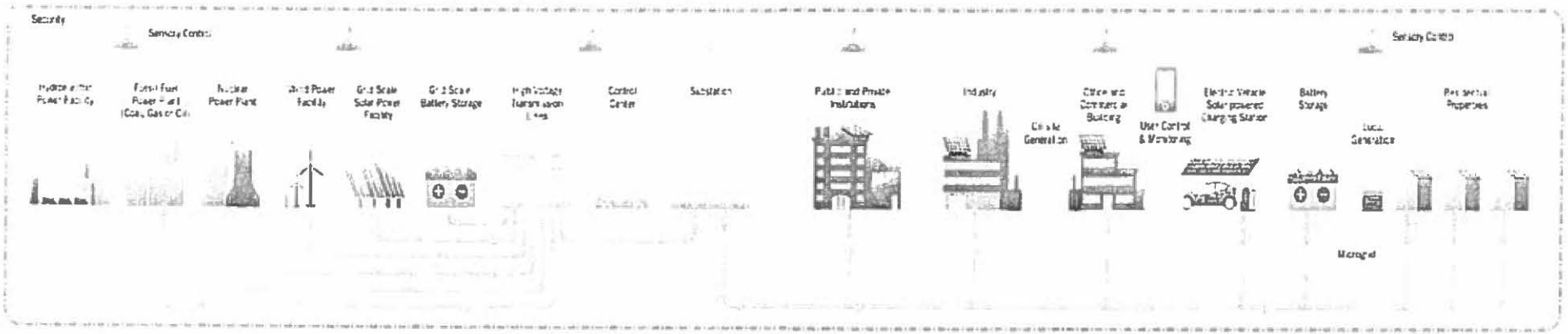
Case Study - Parkville



Graphic Credit: Constellation Energy

Takeaways & Next Steps

- Today's energy infrastructure is vulnerable to interruption by storms and other disasters.
- Municipalities need to take advantage of new technologies that increase resilience and enhance emergency response
- GI Energy has successfully secured incentives for two Connecticut municipalities. Further we supported the development of the Parkville microgrid through completion



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Thank you for your time

If we can offer you any further information, please don't hesitate to contact us:

Paul Kuehn
Director of Business Development
pkuehn@gienergyus.com
Tel: (646) 786-1259

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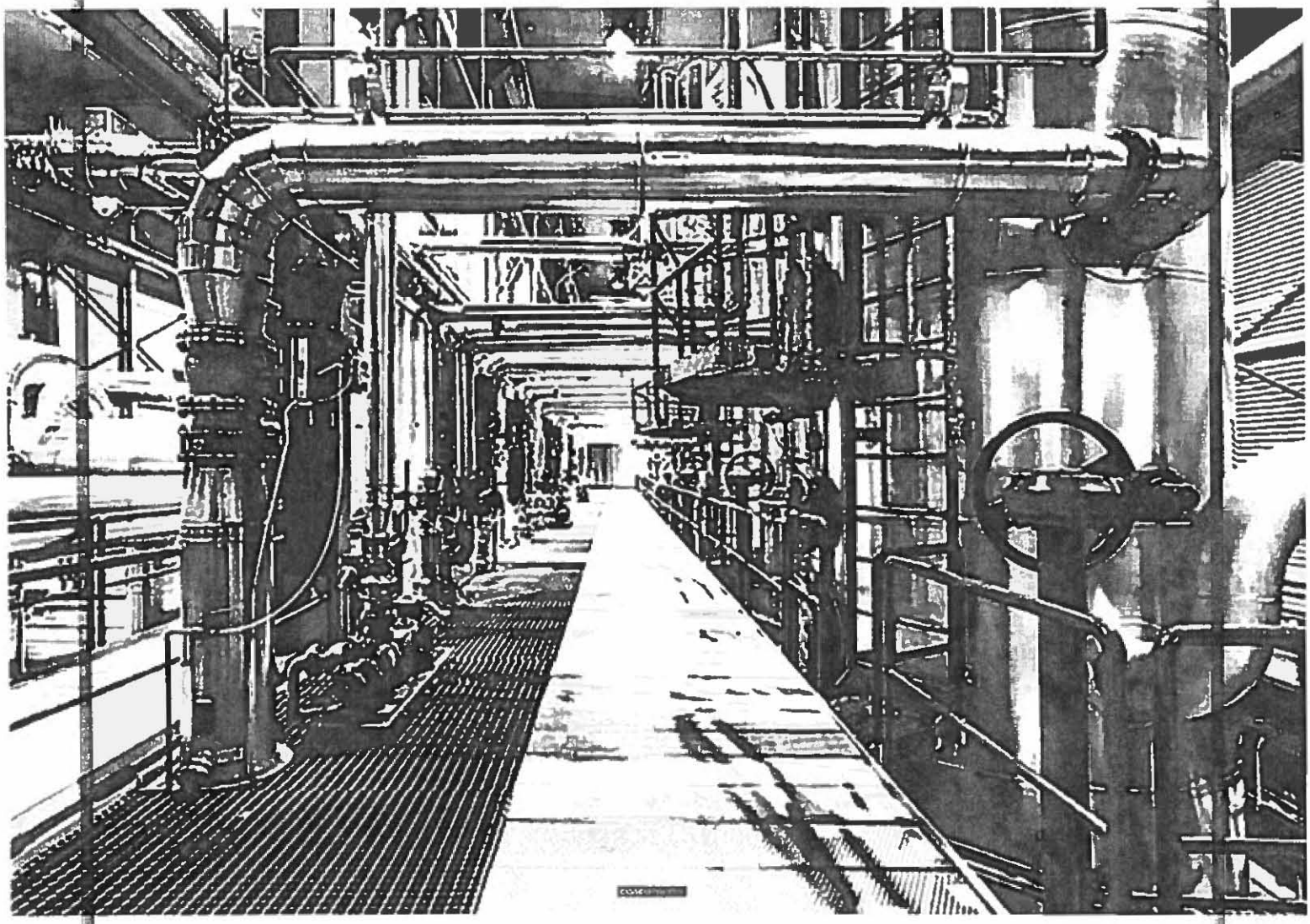
Providing Sustainable Energy



Operations & Maintenance
Maximizing Value

www.gienergyus.com

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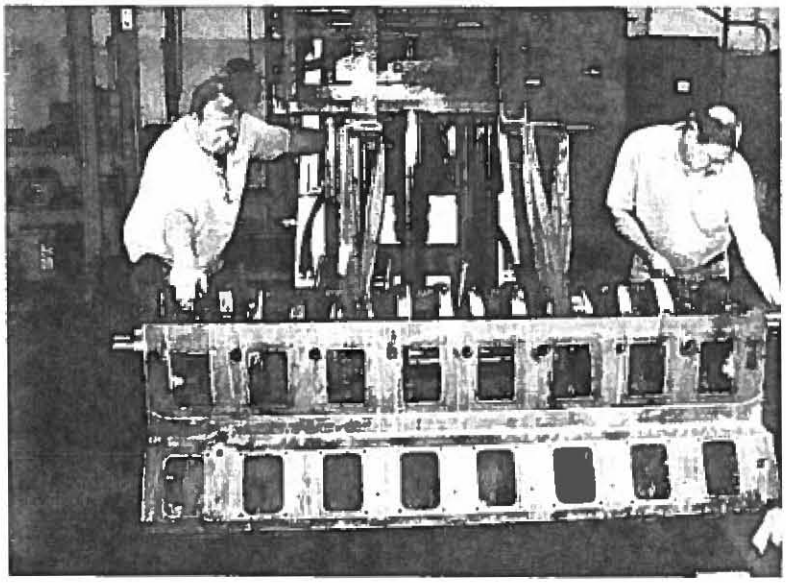
GIE is a leading provider of on-site energy and microgrids, with expertise in cogeneration plants, geothermal systems, fuel cells, renewables and energy storage.

GIE's Operations & Maintenance division has a history of optimizing the financial and environmental efficiency of on-site energy assets.

Operations & Maintenance

- Diagnostic expertise to correct design and construction issues with inherited projects
- Retro-commissioning of existing systems
- Review of plant operations to maintain proper service scheduling and failure prevention
- Warranty support and coordination for maintenance and repairs
- Spare parts inventory program
- Factory trained technicians
- On-site training for client personnel
- Equipment upgrade expertise



GIE maintains and operates over 25 natural gas-fired cogeneration and DER plants, producing more than 50 megawatts of power, to ensure they are working to full capacity.

Our clients include

- Bear Valley Electric Service
- Cornell Tech
- Environmental Strategy Consultants, Inc.
- Hoag Hospital
- One Market Plaza, San Francisco
- Santa Margarita Water District
- Star Milling Company
- Transamerica Pyramid
- North Orange Community College District
- City of Oxnard
- Desert Valley Hospital
- Dignity Health
- Golden Era Productions
- MillerCoors Brewery
- Riverside County
- San Gabriel Valley Medical Center
- Santa Clarita Community College District
- West Coast Electric Service

Managed Services

Our team tracks real-time electrical and thermal production data to ensure maximum efficiency is achieved through energy data analytics.

- Savings and ROI calculations provided through ongoing financial operations reporting
- Vital parameters monitored for emergency notification and response
- Analyze and maximize utility tariff structures
- Forecasts needs, and assists in procurement of natural gas and electrical commodities
- Prompt diagnostics reduces plant down-time

Case Studies

1301 Avenue of the Americas, New York, NY

Cogen. system installed (2008) and designed to reduce peak demand by providing 30% of peak connected load and 20% of thermal energy in the form of high pressure steam while operating at efficiencies above 60%. GIE provide management services including:

- Tracking monthly energy savings and system expenses
- Projecting annual budgeting
- Finding additional revenues such as Performance Credits or Demand Response
- Providing data to satisfy emissions standards

Transamerica Pyramid, San Francisco, CA

GIE designed and installed a cogen. plant, commissioned in 2009, to provide 50% of this 702,000 sq ft retail and commercial office building's electric and thermal energy.

- Maintained and serviced since 2009, runs at 70% efficiency
- Plant runs on a 24/5 schedule
- Timely engine overhauls ensures seamless energy production and removes need for most unscheduled down-time

St. Bernardine Medical Center, San Bernardino, CA

GIE identified deficiencies with the exhaust and fuel systems of this inherited cogen. plant and completed retrofits and upgrades, maximising ROI, and successfully re-commissioning it in 2013.

- Reduced engine oil consumption by 95% by reducing exhaust system back-pressure by 75%
- Lowered gas consumption by 5% and increased overall plant efficiency by 10%
- Reduced wear rate on engine components means lower maintenance costs
- Won a multi-year service and maintenance contract, securing 342 bed acute care hospital from outage and high energy costs
- Emission levels meet Air District quotients

Southwest Justice Center, Murrieta, CA

GIE were called in to identify system damage, and engineering and construction flaws in this poorly designed and implemented plant.

- Produced competitive repair and plant redesign proposal, $200k lower than rival bids, to enable plant to be successfully commissioned
- Secured additional incentive savings from gas utility company
- Awarded long-term service and maintenance contract
- Plant now runs at 95% reliability, saving SJC $1.45m annually via combined electrical demand decrease and related cost reductions

Ensure you get the most value from your system.
Contact us now to discuss the Operations & Maintenance, and Managed Services that we can provide for you.

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Amir Yanni

Construction Project Manager

ayanni@gienergyus.com

Office: (646) 786-1258

Mobile: (630) 864-8993

SUMMARY

Mr. Yanni is Senior Vice President of Construction and Project Management of GI Energy, New York, NY, where he oversees the engineering and construction activity of all Energy and CHP projects that are developed by GI Energy. In his current capacity, Mr. Yanni completed the construction and commissioning of the largest CHP project in a commercial office building in NYC area, a 6.2 MW combined heat and power that provide the building with 60% of its peak electrical demand and 30% of it thermal energy demand.

Mr. Yanni also was instrumental in completing the first synchronous interconnect CHP system in Consolidated Edison of New York history, located in Midtown Manhattan. The 1.6 MW system provide a Class "A" Commercial Office Building with 80% of its electric power and 65% of its Thermal energy requirement in addition to completing over 20 MW of CHP Systems design studies for various commercial building throughout midtown Manhattan.

RELEVANT WORK EXPERIENCE

GI Energy, New York, NY — *August 2007-Present*

Senior Vice President, Construction and Project Management

- North Shore Towers, Floral Park, NY – 8 MW CHP System Construction and Commissioning. Role: Construction Manager
- Gateway Plaza, White Plain, NY -2 MW CHP System Construction and Commissioning. Role: Construction Manager
- One Penn Plaza , NY, NY- 6.2 MW CHP system Construction and Commissioning. Role: Construction/Project Manager
- Transamerica, SF, CA - 1.5MW CHP system construction and commissioning. Role: Construction/Project Manager

Northern Power Systems, Long Island City, New York — *August 2004 – August 2007*

Senior Project Manager

- 717 5th Avenue, New York, NY – 1.6 MW CHP System Construction and Commissioning. Role: Construction Manager
- Waste Water Treatment Plant, Bayridge, NY – 2 MW CHP System Construction and Commissioning. Role: Construction Manager
- Transamerica Building, San Francisco, CA – 1.5 MW CHP System Construction and Commissioning. Role: Construction Manager

Real Energy, Woodland Hill, CA — *August 2002-August 2004*

General Manager of Project Management

- Confidential Commercial Office Building, New Jersey – 2 MW CHP System Construction and Commissioning. Role: Construction Manager

KeySpan Energy Solutions, Melville, New York — *October 1996 – April 2002*

General Manager of Project Management

- Albert Einstein Hospital, Bronx, NY – 7 MW CHP System Construction and Commissioning. Role: Construction Manager
- Honeywell Farm, Jamaica, NY – 2 MW CHP System Construction and Commissioning. Role: Construction Manager
- Mutual Redevelopment 23rd Street, New York, NY – 4.2 MW CHP System Construction and Commissioning. Role: Construction Manager
- University of Connecticut, Hartford, CT – 23 MW CHP System Construction and Commissioning. Role: Construction Manager

H.O. Penn, Holtsville, New York — *July 1980 – October 1996*

Sales Engineer

- 11 West 42nd Street, New York, NY – 7 MW CHP System Construction and Commissioning. Role: Construction Manager
- Watch Tower, Brooklyn, NY – 3 MW CHP System Construction and Commissioning. Role: Construction Manager

EDUCATION

Cairo University, Cairo, Egypt
-Bachelor of Science, Mechanical Engineering

PROFESSIONAL ACCREDITATIONS

Cogeneration Technology, University of Wisconsin
Utility Energy Services, University of Wisconsin
Project Management, George Washington University

David Yanni

Project Manager

Dyanni@gienergyus.com
Office: (646) 786-1259
Mobile: (646) 831-0291

SUMMARY

Mr. Yanni is the corporate head of development and strategy for GI Energy's North American operation. He leads GI Energy's business development activities out of the New York office. His responsibilities include overseeing sales and marketing, customer relationship management and long-term strategic planning. He also leads strategic partnership initiatives and manages new opportunities in the Northeast corridor, including Pennsylvania, New Jersey, New York, Connecticut and Massachusetts. Additionally, he works on energy-related regulatory and policy issues for the company, contributing to GI Energy's goal of better utility standards and comprehensive regulatory support for distributed generation. Prior to working for Endurant Energy (GI Energy's predecessor), Mr. Yanni has experience in the property management, hospitality, retail and entertainment industries. He holds a Bachelor of Science in Film and Communications from Emerson College. He has been a member of the Northeast Clean Heat and Power Initiative's (NECHPI) executive committee since 2010 and was recently elected chairman of the organization.

RELEVANT WORK EXPERIENCE

GI Energy, New York, NY — *June 2008-Present*

Vice President, Strategy and Business Development (Previously Analyst and Director of Business Development)

- Bloomberg LP, New York, NY
  - In development of a 3 MW CHP plant
- Time Warner Center, New York, NY
  - Developed feasibility study and preliminary engineering for a 4 MW CHP plant
- Confidential Bank Client, Connecticut
  - Managed incentive research and feasibility study for multiple energy saving measures at a large data center, such as solar PV, CHP, and demand reduction measures
- Philadelphia Navy Yard, Philadelphia, PA
  - Authored the initial energy master plan on behalf of the Philadelphia Industrial Development Corporation for the 800 acre campus which was being converted from military use to residential and commercial use and would include its own discrete utility system
- Hudson Yards, New York, NY
  - Developed preliminary master plan in conjunction with Related Management
- Conducted Feasibility studies for the following sites:
  - 330 Madison Avenue, New York, NY – 2 MW CHP plant
  - 888 7th Avenue, New York, NY – 2 MW CHP plant
  - 909 3rd Avenue, New York, NY – 2 MW CHP plant
  - 1290 6th Avenue, New York, NY – 5 MW CHP plant
  - 1285 6th Avenue, New York, NY – 4.5 MW CHP plant
  - 2 Park Ave New York, NY – 2 MW CHP plant

EDUCATION

Emerson College, Boston, MA
-Bachelor of the Arts, Film Studies and Communication

PROFESSIONAL AFFILIATIONS

Chairman, Northeast Clean Heat and Power Initiative (NECHPI)
Member, United States Combined Heat and Power Association (USCHPA)

gi energy

Peter Falcier

NYSERDA and Con Edison Liaison and Development Manager

pfalcier@gienergyus.com
Office: (646) 786-1256

SUMMARY

Mr. Falcier manages GI Energy's distributed generation (DG) project development process from the energy & financial modeling stages, through state and federal incentives, and ultimately into Measurement & Verification and commercial operations. In his nearly seven-year tenure, he has gained expertise in DG tariff & billing analysis, conducted more than 20 New York State Energy Research & Development Authority (NYSERDA)-approved detailed CHP feasibility studies for the most prominent NYC real estate groups, and helped author DG legislation for the state of CT. M has presented on CHP to the New York chapters of the US Green Building Council (USGBC) and American Institute of Architects (AIA). Increasingly, he is involved in the data interface and performance management of GI Energy's DG systems.

Pete joined GI Energy after graduating from the Columbia University School of International & Public Affairs (SIPA), where he received a Master of International Affairs in Energy Management & Policy. He was a co-author of a report for the New York City Economic Development Corporation (NYC EDC) on the viability of CHP in meeting New York City's peak power demand—a report that helped establish a goal of 800 megawatts (MW) of DG in Mayor Bloomberg's PlaNYC 2030, New York's long-term sustainability master plan. Prior to graduate school, Pete served as an environmental planner for the Berkshire Regional Planning Commission in Massachusetts, focusing on wind farm development and smart growth. He holds a Bachelor degree in Physics from Middlebury College.

RELEVANT WORK EXPERIENCE

GI Energy, New York, NY *June 2007-Present*
Vice President, Development and Analytics

- Project Development: Coordinate pipeline of more than a dozen 2-9 MW combined heat & power projects (CHP) in Class A office towers throughout NYC metro area; direct major capital grant applications, Detailed Energy Analysis reports & Feasibility Studies ranging in value from $200,000 to $13.5 million for state and federal energy agencies, including the US Department of Energy, the New York State Energy Research & Development Authority (NYSERDA) and the Connecticut Public Utilities Regulatory Authority (PURA); assist VP of Construction in engineering/design review & utility interconnection procedure; assist VP of Operations in establishing & maintaining system controls, data acquisition & performance reporting; liaison to Galvin Electricity Initiative for Perfect Power smart grid development in NY
- Project Finance: Modeling of pro forma financial projections—and underlying energy projections, across all three phases of energy (e.g. power, thermal & fuel)—for highly customized CHP deal structures; expertise in utility tariff analysis & modeling (particularly Con Edison in NYC); lead incentive tracking across target territories (NE, NY, NJ); liaison to major Energy Services Cos. (ESCOs) as part of ongoing market & spark spread due diligence.
- Policy & Outreach: Member of Northeast CHP Initiative (NECHPI) Policy Committee and NYC DG Collaborative; selected by former CEO to direct integration with UK parent company Geothermal International Ltd. following December 2011 acquisition; assumed leadership, in partnership with Executive Director of New York Energy Consumers Council (NYECC), of NYSERDA-sponsored New York Clean Distributed Generation Working Group; coordinated presentations to US Green Building Council of New York, CUNY-sponsored District Energy conference, and ASHRAENY Sustainability Committee; outreach to members of press (New York Times, Christian Science Monitor, Newsweek) covering clean technology/sustainable energy; originator and co-manager of content and design of firm's original website.
- Hudson Yards, New York, NY
  - Developed preliminary master plan in conjunction with Related Management
- Conducted Feasibility studies for the following sites:
  - 330 Madison Avenue, New York, NY – 2 MW CHP plant
  - 888 7th Avenue, New York, NY – 2 MW CHP plant
  - 909 3rd Avenue, New York, NY – 2 MW CHP plant
  - 1290 6th Avenue, New York, NY – 5 MW CHP plant
  - 1285 6th Avenue, New York, NY – 4.5 MW CHP plant
  - 2 Park Ave New York, NY – 2 MW CHP plant
- Time Warner Center, New York, NY
  - Developed feasibility study and preliminary engineering for a 4 MW CHP plant

EDUCATION

Columbia University School of International and Public Affairs, New York, NY
-Master of International Affairs, International Energy Management and Policy
Middlebury College, Middlebury, VT
-Bachelor of Arts, Physics; Concentration, French

PROFESSIONAL AFFILIATIONS

Member, Policy Committee, Northeast Clean Heat and Power Initiative (NECHPI)

gi energy

Paul Kuehn

Director of Business Development

pkuehn@gienergyus.com
Office: (646) 786-1259
Mobile: (646) 689-7080

SUMMARY

Mr. Kuehn heads up as a member of GI Energy's business development team out of the New York office. His responsibilities include development of new business and strategic planning for GI's products in eastern U.S. markets. Paul is focused on supporting his clients' growth and technological adoption. With experience in the U.S., U.K. and Germany in solar electric projects, Paul has been involved in several new market launches, as well as over 40 MW of solar project development, finance, construction, operation, and maintenance.

RELEVANT WORK EXPERIENCE

GI Energy, New York, NY — *September 2016-Present*
Director of Business Development

- Developing a project pipeline in the northeastern U.S. Scouts potential project sites, identifies financial opportunities and risks, and works with local partners and property owners to secure contracts.
- Managing project development, vetting, construction management and project hand over
- Conducts due diligence and writes internal investment committee memos for new business and solar projects.
- Facilitates and leads accredited learning sessions for American Institute of Architect courses on energy for firms

Deutsche Eco, *London, Frankfurt & New York* — *March 2010-August 2016*
Founding Managing Director
Recruited to launch new markets in the U.S. and U.K. from scratch as internal startups. Collaborated with partners to achieve lower energy costs and sustainability using solar technology.

- Developed a $40M project pipeline in the northeastern U.S., launching a new project in nearly every state in the region. Scouted potential project sites, identified financial opportunities and risks, and worked with local partners and property owners to secure contracts.
- Negotiated the company's first ever major utility contract with Vermont's largest single solar power facility (6.5 MWp/37 Acres) in the town of Grand Isle.
- Overcame numerous financial, logistical, engineering, and cultural challenges to secure a $2.4M solar-powered carport deal with the Jewish Community Center (JCC) of Greater New Haven.
- Worked with partners to identify an equity investor to secure a £10M (GBP) industrial solar project in the U.K.
- Managed the project development, vetting & contracting new firms via RFP, construction management and project hand over for 25 MWp on schedule and on budget.
- Conducted due diligence and wrote internal investment committee memos for new businesses and solar projects.

Robert Bosch Foundation, *Frankfurt, Germany* — *June 2009-June 2010*
Founding Managing Director
One of 20 outstanding Americans selected out of 400 candidates to participate in distinguished professional development program in Germany. Opportunity included work placements, advanced professional seminars, and German language training.

- Developed and introduced numerous new performance metrics with KFW environmental bank's credit risk and loan officers for their direct lending for energy efficiency in eastern Europe
- Researched U.S. & U.K. market entry for an internal startup of Deutsche Eco and won approval for both U.S. & U.K. investment and the organization's first U.S. operations and solar project.
- Attended dozens of professional seminars over the course of 7 weeks; met daily with nonprofit, business, government, and other leaders from Germany, Poland, and France.

EDUCATION

Rutgers, The State University of New Jersey, New Brunswick, NJ
-Bachelor of Arts, Political Science

New York University, New York, NY
-Master of Administration, Public and Nonprofit Management

Timothy Banach

NYSERDA and Con Edison Liaison Analyst

tbanach@gienergyus.com

Office: (917) 484-8507

Mobile: (347) 640-2743

SUMMARY

Mr. Banach contributes as a key member of GI Energy's analytics team out of the New York office. His responsibilities include constructing accurate energy and financial models studying the feasibility of potential distributed generation projects and authoring technical feasibility reports. He also generates monthly performance reports for operational CHP systems under management by GI Energy. He tracks energy tariffs and constructs tariff engines for various regional utility service territories to accurately understand the tariff impacts associated with developing distributed generation projects. Additionally, he monitors the regional policy landscape as it relates to distributed generation, particularly in New York, Connecticut, and Massachusetts. He holds a Bachelor of Science in Biology from Loyola University in Maryland and a Master of Science in Environmental Policy from Bard College. He currently serves as Executive Director of the Northeast Clean Heat and Power Initiative.

RELEVANT WORK EXPERIENCE

GI Energy, New York, NY — *May 2013-Present*

Senior Analyst

- Constructed tariff models for energy rates in the United Illuminating, Con Edison, Yankee Gas, and Connecticut Light and Power utility territories
- Connecticut Microgrids RFP, Hartford, CT and Woodbridge, CT
  - Conducted preliminary feasibility studies for three different potential microgrid sites in the state of Connecticut
- Gateway Plaza, White Plains, NY
  - Conducted monthly analysis of existing 2 MW CHP plant to determine economic savings and energy offset
- One Penn Plaza, New York, NY
  - Conducted monthly analysis of existing 6.2 MW CHP plant to determine economic savings and energy offset
  - Managed data collection for NYSERDA measurement and verification period
- 717 Fifth Avenue
  - Conducted monthly analysis of existing 1.6 MW CHP plant to determine economic savings and energy offset
- 1301 Avenue of the Americas
  - Conducted monthly analysis of existing 2.2 MW CHP plant to determine economic savings and energy offset
- Long Island Compost
  - Constructed energy and economic modeling for a 6 MW CHP plant

EDUCATION

Bard College, Center for Environmental Policy, Annandale, NY
-Master of Science, Environmental Policy
Loyola College, Baltimore, MD
-Bachelor of Science, Biology; Minor, Chemistry

PROFESSIONAL AFFILIATIONS

Executive Director, Northeast Clean Heat and Power Initiative

Greener by Design

Distributed Generation and MicroGrid Development

Greener by Design[SM] (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.

Greener by Design Select Energy DG and MicroGrid Case Studies

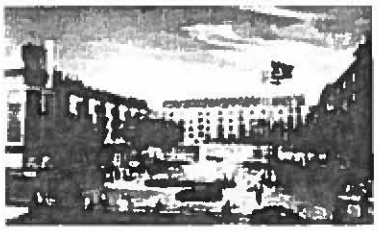
CITY OF HOBOKEN, NJ

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

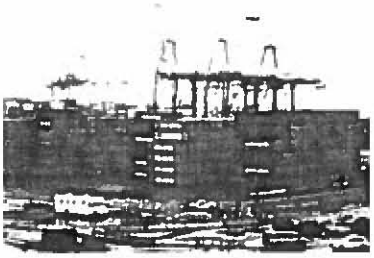
These unique Northeast Corridor projects represent some of the highest profile redevelopment projects in the US looking at using DG and MicroGrid design as part of a comprehensive redevelopment planning effort.



- 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.



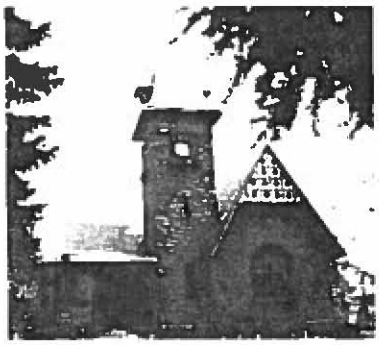
- Worked with US EPA, NJ DEP to complete comprehensive audit of Maher's various consent orders, fines and other enforcement actions related to the operations of the facility.
- Developed Energy and Operations Master Plan aimed at

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, 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.

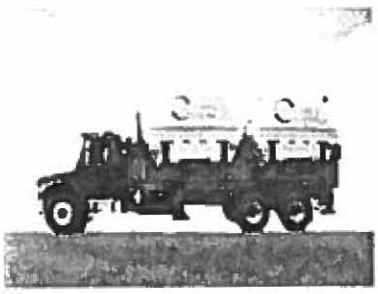
GBD MICROGRID EDUCATION AND SPEAKING

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.

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.

14. An EDC and GDC LOS.

Woodbridge is served by PSE&G and Elizabethtown Gas and both have submitted letters of support for this project. Please see the attached letters of support.

Public Service Electric and Gas Company
80 Park Plaza – T8, Newark, NJ 07102

PSEG

March 21, 2017

Ms. Caroline Ehrlich
Chief of Staff
Woodbridge Township
1 Main Street
Woodbridge, NJ 07095

Dear Ms. Ehrlich:

This correspondence will serve to demonstrate PSE&G's support of your application to the Town Center Distributed Energy Resource Microgrid Feasibility Study Incentive program. PSE&G will work with Woodbridge officials and its consultant to develop and submit your feasibility study, if selected for funding.

PSE&G will support your study in the following ways:

- PSE&G will provide building load data for all buildings included in your microgrid feasibility study, contingent on receiving approval from the owners of each of the buildings to release its load data to the community or its consultant.
- PSE&G will provide technical support to Woodbridge's consultant in the development of your feasibility study. Release of any confidential or proprietary technical information will require the execution of a Non-Disclosure Agreement between all parties.

Mr. Frank Lucchesi will be the primary point of contact for PSE&G to coordinate our efforts with your team. Please feel free to reach out to me at 856-778-6705 if you have any technical questions.

Sincerely,

Michael Henry
Distribution Business Team Leader

Irene Asbury, Secretary
Board of Public Utilities
44 South Clinton Avenue, 9th Floor
P.O. Box 350
Trenton, New Jersey 08625-0350

Re: Woodbridge Township TC DER Microgrid Feasibility Study Application

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 ("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 has required as part of the application process for the Program, that the applicants obtain a letter of support specifically for the feasibility study from the electric distribution company and gas distribution company in which service territory the proposed microgrid project will be located.

In satisfaction of this requirement, please accept this letter from Pivotal Utility Holdings Inc. d/b/a Elizabethtown Gas Company ("Elizabethtown Gas") in regards to Woodbridge Township's ("Applicant") TC DER Microgrid Feasibility Study Application ("Application"). Elizabethtown Gas agrees to provide all reasonable and relevant information regarding Elizabethtown Gas's distribution and interconnection infrastructure, which exists and is available, to the Applicant that is necessary for the Applicant to complete a microgrid feasibility study. Elizabethtown Gas will provide gas service in accordance with the terms and conditions of its tariff, which may be modified from time to time as approved by the BPU.

Elizabethtown Gas looks forward to working with the Applicant and the Board throughout this application process.

Respectfully submitted,

Gary Marmo
Director,
New Business Development
520 Green Lane.
Union, NJ 07083

For more information, please contact:

Paul C. N. Van Gelder, PE* PP CEM
Vice President
6 Campus Drive
Parsippany, New Jersey 07054
p. (973) 538-2120, ext. 231
m. (201) 213-8341
e. pvangelder@chacompanies.com

CHA
design/construction solutions

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

Jeffrey Mayerowitz
Township of Woodbridge
1 Main Street
Woodbridge, NJ 07095

Dear Mr. Mayerowitz:

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

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

April 27, 2017

RE: Town Center MG Grant Application

To Whom It May Concern,

Woodbridge is pleased to submit the requested general description of the overall cost information for the NJBPU Town Center DER Microgrid Grant Program.

The following is the Best and Final Offer for our proposal along with the breakdown for lead and sub-contractors:

Lead Investigator – CHA $75,000
Sub-Consultant – GI Energy $50,000
Sub-Consultant – Greener by Design $25,000
Total Request - $150,000

Additionally, at this point we cannot estimate fees to be paid to EDC/GDC, largely because the size and type of services to be used to unknown. However, we are in communications with PSEG and Elizabethtown Gas and are pleased to work with them on this project.

Sincerely,

Jeff Mayerowtiz

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
TOWNSHIP OF WOODBRIDGE

THIS MEMORANDUM OF UNDERSTANDING ("MOU"), is made this _____ day of _____, 2017, by and between **The TOWNSHIP OF WOODBRIDGE** ("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 Woodbridge
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 Woodbridge

_____ By: _____

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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: _____