

GENERAL ENERGY CORP.

LEADERS IN ENGERY EFFICIENT DESIGN



General Energy
Corporation

Engineers | Planners | Constructors

33 years of Excellence in Engineering

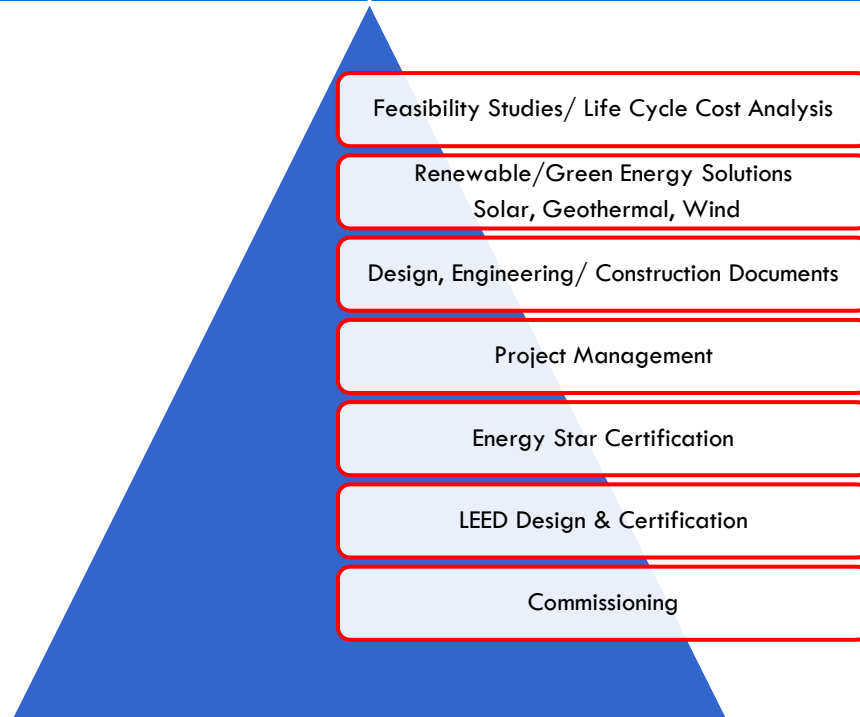
About Us



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- **General Energy Corp. (GEC)** serving the commercial, industrial and institutional clients for three decades providing energy efficient and sustainable designs
- Our mission is to provide outstanding quality engineering services by means of innovation and continuous improvements
- Knowledge, trust, and integrity are our values
- Initiative, team work, planning, and execution are our strengths
- Complete customer satisfaction is our goal

Engineering Services



Energy Services

- Develop a vision and operational plan to reduce energy usage
- Establish short term and long term energy goals
- Perform comprehensive energy efficiency assessment of your facility
- Identify all the energy savings opportunities and perform cost/benefit analysis of each opportunity
- Present our findings in a precise manner based upon factual data
- Assist in selection and implementation of projects
- Set-up, train, and facilitate energy cost reduction team
- Maximize your return on investment

LEED Design Services

- Mechanical, electrical, and plumbing system design to maximize LEED Points for Energy and Atmosphere, Indoor Air Quality, Water Conservation, and Innovations
- Special Systems Design such as:
 - Geothermal heat pumps including ground loop design and/or hybrid system design
 - Demand control ventilation, and displacement ventilation
 - Daylighting and digital lighting controls
 - Gray water system, and water treatment system
 - Solar thermal heating
 - Solar photovoltaic electric power generation
 - Combined Heat and Power - Cogeneration
- Building energy simulation model using DOE 2.1E software for the following purpose:
 - Optimizing building energy performance during design stage
 - Providing documentation for LEED rating which will include energy cost savings for various energy efficiency measures incorporated in building systems design
- Fundamental and enhanced commissioning for LEED credit
- LEED documentation for all the credits applied for

Industrial Systems Optimization

- **GEC** is an approved services provider, and Trade Ally for **ComEd's and NICOR's** incentive programs for the industrial facilities in their service area
- Some of the highlights of the **ComEd's** Smart Ideas for Business program are:
 - Funding of the refrigeration study
 - Funding of the process cooling study
 - Funding compressed air study and air leaks abatement
 - Custom/prescriptive programs
 - Contact GEC outreach representative for more information on ComEd's incentive programs
- **NICOR's** Smart Energy Program
 - Prescriptive programs such as steam traps survey, and boiler tune up
 - Custom programs boiler upgrade, heat recovery, economizer, heating and makeup air upgrades
 - Contact **GEC** outreach representative for more information on ComEd's incentive programs

Technical Assistance Services

- **GEC** is an approved service provider of **ComEd's** Technical Assistance Services (**TAS**) program for large industrial plants
- Some of the highlights of TAS program are:
 - Hospitals – Portion of assessment cost covered by ComEd
 - Laboratories – Portion of assessment cost covered by ComEd
 - Process Efficiency – 50% up to \$15,000 assessment cost covered by ComEd
 - Combined Heat and Power (CHP) – 50% up to \$25,000 study cost covered by ComEd
- Contact GEC's Outreach representative for more information about TAS program

LEED Experience



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West Chicago Library, Chicago, Illinois – Certified LEED

Provided MEP design and LEED documentation

EPTI Center, Glenview, Illinois – LEED Platinum

Provided MEP design and LEED documentation

42nd Street McDonald Restaurant, Chicago – LEED Gold

Provided fundamental and advance commissioning, Building energy simulation and Documentation for commissioning, energy and atmosphere, and indoor air quality

Regional Medical Center , Rockford, Illinois – LEED Silver

Provided electrical design

Correctional Facility – X House, Joliet, Illinois – Targeted LEED Silver

MEP/FP design

Awards

- **2013 ASHRAE National-level Technology Award Category 1 Commercial Building** – New for Evelyn Pease Tyner Interpretive Center, Glenview, IL
- **2011 ASHRAE Region VI 1st place Category 1 Commercial Building** – New for Evelyn Pease Tyner Interpretive Center, Glenview, IL
- **2010 Excellence in Engineering, ASHRAE Illinois Chapter** for Evelyn Pease Tyner Interpretive Center, Glenview, IL
- **2005-2006 Technology Award ASHRAE Region VI**, Energy Savings from Boiler & Chiller Upgrades, Conant High School, Hoffman Estates, Illinois
- **2005 Excellence in Engineering Award ASHRAE Chicago**, Energy Savings from Boiler & Chiller Upgrades, Conant High School, Hoffman Estates, Illinois
- **2004 Energy Project of the Year Award AEE Chicago Chapter** for James B. Conant High School, Hoffman Estates, Illinois

Awards

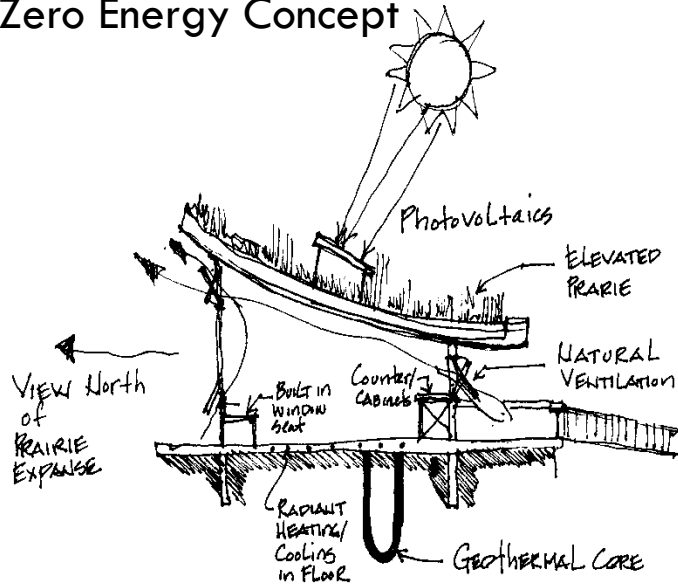
- **2000 ASHRAE Illinois Chapter “Excellence in Engineering Award”** for Schaumburg High School Life Safety Mechanical Work, Schaumburg, Illinois
- **1992 Thomas H. Madigan Special Merit Award** Madden Mental Health Center Hot Water Heater Replacement, Hines, Illinois
- **1991 ASHRAE Illinois Chapter “Energy Design Award”** for Energy Conservation Retrofit of Lighting System site wide, Argonne National Laboratory, Argonne, Illinois

Why Green Energy

Evelyn Pease Tyner Interpretative Center Glenview, IL -2007

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Zero Energy Concept



Long term solution to Reduce & Stabilize Energy Cost

Long term Reliability & Low Maintenance Costs

Rebates & Tax Credits

Increase Property Value



Solar - Photovoltaic

Roof Top PV Solar
Plants

Commercial,
Warehouse,
Industrial Facilities

PPA, Lease
Financing

Utility Grid
Connection



Solar Thermal

Roof Solar
Panels

Energy Efficient

Pool Water
Heating

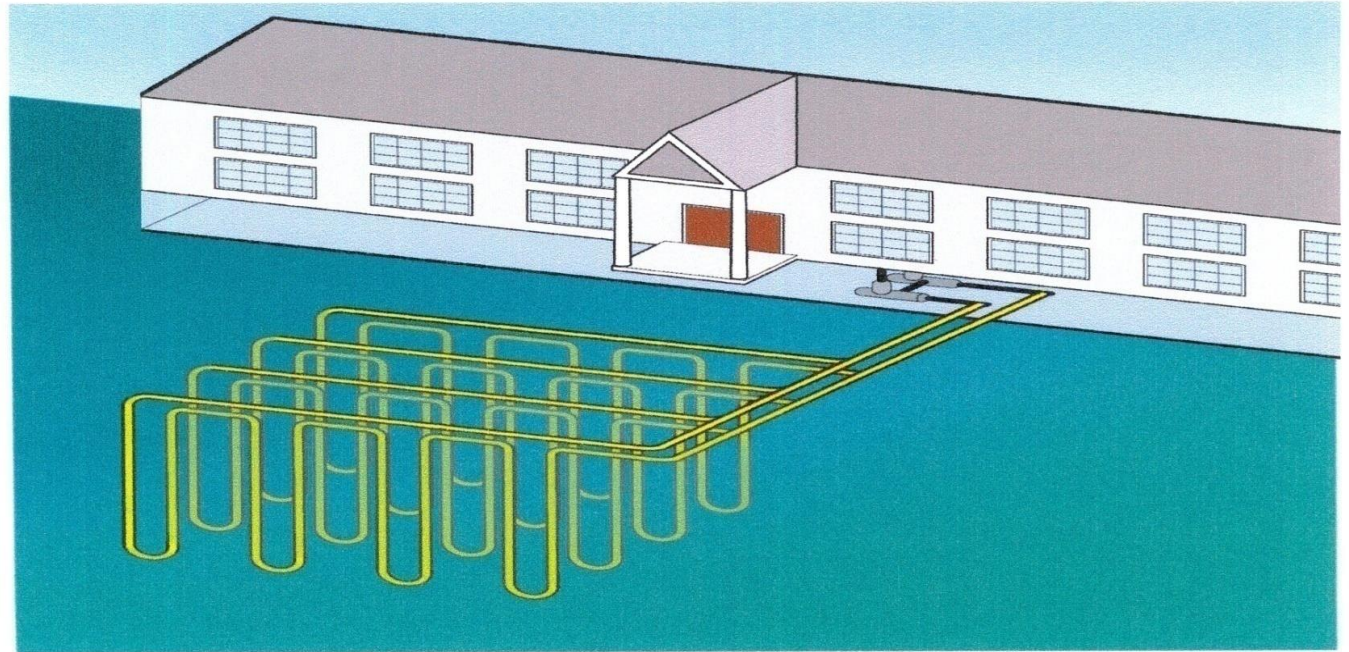


Geothermal

Ground Loop
Wells

Connection to
Building Systems

Heating &
Cooling by
Geothermal
Means



Wind Power



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Project
Development

Site Selection

Feasibility Study

Engineering

Implementation

Monitoring





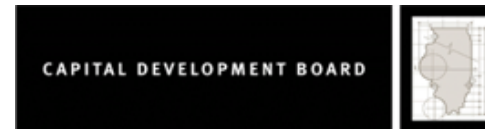
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Client Portfolio

Selected Clients



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Energy Solutions



Alcatel-Lucent

www.generalenergycorp.com

Illinois ~ Ohio ~ Indiana ~ Michigan ~ Pennsylvania

Selected Clients



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University of Chicago

Energy Efficiency Improvements

University of Chicago - Hyde Park Campus, Chicago, Illinois

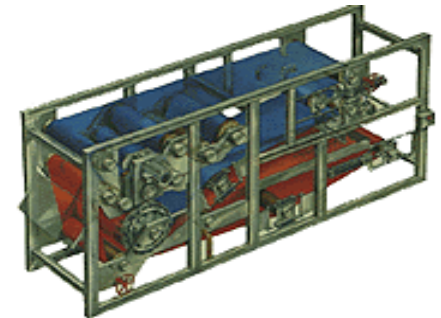
General Energy Corporation has been involved in the implementation program since 1985 thru 1997 for more than 25 building facilities at the Hyde Park campus. These buildings include gymnasiums, field houses, research labs, libraries, lecture halls and auditoriums.

- Bartlett Gymnasium
- Regenstein Library
- Harper Library
- Burton Judson
- Broadview Hall
- Center Continuing Education
- Hutchinson Hall
- Performed studies to assess mechanical, electrical and plumbing (MEP) systems for 7 dormitory buildings with approximate total of 970,500 sf. ft.

Argonne National Lab.

For more than twenty extraordinary, productive years, since 1986 General Energy Corporation has collaborated on more than forty projects including:

- ZGS Cooling Water System Modification – 3000TR Chilled Water System
- Cogeneration – Combined Heat and Power Feasibility Study
- Process Chiller Replacement
- Buildings 223 Fan Coil Upgrade
- Central HVAC system VAV System for Building 203
- Site wide study of Lighting System
- Site wide study of Energy Management and Controls
- Replacement of Laboratory Hoods Exhaust Systems
- Energy Modeling and Energy Efficiency Assessments of fifteen buildings



Evelyn Pease Tyner Center

“ASHRAE 2012 Technology Award – Commercial Building (New Construction)”



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A Zero Energy Building - Certified LEED Platinum

The Evelyn Pease Tyner Interpretive Center supports activities to further learning and appreciation for the prairie in which it is placed. The design of the center demonstrates how building systems can be symbolic with natural environment through green technologies or sustainable design. General Energy Corp. (GEC) was responsible for design of building's Mechanical, Electrical, Plumbing, and Fire Protection (MEP/FP) systems.

The building has 2/3rd roof as green roof – the elevated prairie. Building orientation takes into account prevailing wind for natural ventilation, and solar sensors for control of lights. The roof is overhang on all the sides to reduce solar load and provide for viewing of exhibits. Use of state-of-the-art building automation system to control the temperature and humidity, and programming the operations. Geothermal heat pumps are used for HVAC systems. Heat recovery system is used to reduce OA heating and cooling load.

Outdoor lighting uses PV panels for power and is controlled by solar sensors. PV arrays are used for renewable energy source on 1/3rd of roof. Solar Bollards are provided to light the walk ways.



Alcatel-Lucent Technologies

GEC's Role: GEC provided architectural/ engineering (A/E) services. Major work included MEP (Mechanical/Electrical/Plumbing/Fire Protection/Building Automation) design and coordination with contractors.

Alcatel-Lucent was consolidating their Lisle, IL facility into the Naperville, IL facility. The project included relocation and construction of 12-electronic laboratory facilities, and a physical fitness center within Alcatel-Lucent Naperville, IL Campus.

GEC has provided MEP design services for the relocation of electronic lab facilities including user areas, and office areas. The projects require investigation of existing facilities, verification of MEP backbone infrastructure within the building, and design of new MEP systems that fulfill the requirements of the relocated laboratories. Also, all aspects (including architectural) of a large fitness center was designed by GEC within one of the facilities. The project was part of a multi-year consolidation effort.



Alcatel·Lucent

UIC School of Medicine

GEC's Role: GEC was responsible for the electrical design of a University of Illinois School of Medicine Teaching Facility.

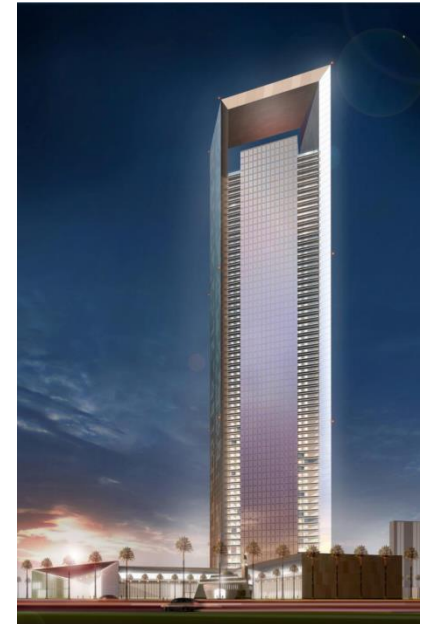
The scope of work included the design of electric power, lighting, and fire alarm system for the Rockford School of Medicine Parkview Campus of University of Illinois Chicago. The scope included 60,000 square feet of new construction and 22,000 square feet of remodeled area. GEC's scope included basic engineering services, consisting of schematic design, design development, construction documents, and building phases. The construction phase services include review of vendor submittals, RFI resolutions, and field visit with punch list recommendations. The facility will be striving to attain a LEED GOLD Certification for design and construction.



Abu Dhabi National Oil Co

GEC's Role: Mechanical Design of all aspects of HVAC, Plumbing, Fire Protection of a 67 story high rise building in Abu Dhabi, United Arab Emirates.

GEC was part of a team to design and construct a new corporate center 67 story office high rise building for the Abu Dhabi National Oil Co. GEC's role is the design of a complete HVAC system based on ASHRAE standards and LEED sustainable best practices, and smoke removal system. The mechanical design also included a central chilled water system with equipment rooms at several levels. The Plumbing System (Water Supply, Drainage, and Irrigation) included domestic water supply, drainage, (black water and gray water) including gray water recycling. A fire protection system design including all aspects of fire protection (risers, large water retention fire protection tanks, distributed sprinkler heads are part of GEC's scope. Also, a state of the art sophisticated Building Management System based on BACNET Protocol is being provided for control and monitoring of the complete MEP Systems of the high rise headquarters complex.



Implementation of Energy Efficiency Projects Federal Mogul, Skokie, IL



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GEC Role: *Developed, engineered and implemented and funded through Performance Based On-Bill Funding with cash flow neutral on utility energy bills.*

Federal Mogul's entire 750,000 sq. ft. plant was converted to LEDs. The light levels were vastly improved in key manufacturing areas to 50 FC. (3) 100 ton Cooling Towers were replaced with a more efficient variable speed system. There were (126) compressed air leaks identified and repaired resulting in lower compressed air system usage.

Total Annual Savings: 3,545,873 kWh

Implementation of Energy Efficiency Projects Dr. Pepper Plant, North Lake, IL



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GEC Role: *Developed, engineered and implemented and funded through Performance Based On-Bill Funding with cash flow neutral on utility energy bills.*

The Northlake Dr. Pepper Plant is an 800,000-sq. ft. plant. The plant used T8 and metal halide light fixtures for interior and exterior lighting. The whole plant's interior and exterior lighting were converted to LEDs. The compressed air system was optimized to reduce air usage – (150) air leaks were identified and repaired; (10) air-operated vibrators were converted to electric; Air-Leader Master Controller was installed on all the compressors to run them more efficiently.

Annual energy Savings: 2,993,362 kWh

Turnkey Implemented LED Projects

LED projects developed, obtained incentives under utility incentive program, implemented and commissioned in 2016/17:

Dean Foods - Huntley, Illinois: Replaced facility's exterior existing (72) 400W Metal Halide Fixtures with (72) 100W LED fixtures. The exterior foot-candles were raised by 25FC.

Annual Energy Savings 129,654 kWh

Aurora Specialty Textile Group (ASTG) – Yorkville, IL: Replaced entire facility's exterior, interior (office and plant) light fixtures with LEDs. The existing fixtures in the plant were (295) 1000W Metal Halides replaced with (295) 200W LED Hi-bay Fixtures. The offices (135) 2x4 T12 and T8 fixtures were replaced with (135) 2x4 52W LED Panels. The (67) exterior 400W and 1000W Metal Halide Fixtures were replaced with (67) 100W LED Fixtures. ASTG realized tremendous energy and maintenance savings along with a great payback and incentive from ComEd. *Annual Energy Savings 1,666,220 kWh*

Turnkey Implemented LED Projects

LED projects developed, obtained incentives under utility incentive program, implemented and commissioned in 2016/17:

Honeywell – Freeport, IL

*Honeywell used 8ft and 4ft T12 fixtures for interior lighting and metal halide fixtures for exterior lighting. The entire 400,000 sq. ft. facility was converted to LEDs resulting in substantial energy savings with a great payback. Light levels were increased by 20FC in the manufacturing areas. **Annual Energy Savings 1,298,222 kWh***

Baker & Taylor – Momence, IL

*The Momence, IL Baker and Taylor Facility is a warehouse storage for books. The light levels were well below 30 FC in the book aisles. The facility had T12 fixtures throughout the plant and metal fixtures in the interior. The entire facility was converted to LEDs and the light levels were increased to 45-50 FC. **Annual Energy Savings 1,507,532 kWh***

Turnkey Implemented LED Projects

LED projects developed, obtained incentives under utility incentive program, implemented and commissioned in 2016/17:

Demco Realty – Skokie, IL: This 120,000 sq.ft. warehouse was converted to LEDs. *Annual Energy Savings 120,000 kWh*

Intren – Union, IL: Intren's 110,000 sq. ft. office, warehouse and exterior facility was converted to LEDs. *Annual Energy Savings 119,991 kWh*

Metro-South Hospital – Blue Island, IL: Metro South is an over 800,000 sq. ft. hospital that was looking to upgrade to LEDs to reduce energy costs. The hospital used T12 lighting for the interior and metal halides in the parking lots. The entire facility was converted to LEDs with Audacy digital controls. The Audacy controls provided scheduling to dim various fixtures during low occupancy which resulted in extra energy savings and incentives from ComEd. *Annual energy Savings 2,654,074 kWh*

Solar Thermal Pool Heating System

Fremd High School



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GEC's Role: Design and construction management of a solar thermal fluid system to provide Energy Efficient Solar Heating of an Olympic sized pool at Fremd High School, Township High School District 211, Palatine, Illinois

Solar panels had to be designed, selected, and properly mounted on the roof. GEC determined the required heating load for the large pool area, so that the pool heating could be segregated from the building boiler systems in a manner that the majority of the heating of the pool would be accomplished by the solar panels, and as such save energy dollars from the standard operation of the boilers to heat the pool. The system is designed to operate year round even in the Chicago area winters. The design of the system also included interconnection with the building automation system so that automatic controls would operate the system, plus also monitor kilowatt hour consumption savings and kilowatt hour totals saving to show energy dollars saved throughout any given time period.



Schaumburg High School

Recipient of “2000 ASHRAE – Excellence in Engineering” Award for Life Safety Mechanical Work

General Energy has been engaged in an ongoing life safety and energy retrofit work with School District 211 five high school facilities since 1996. This project included life safety work at Schaumburg High School.

- Provided 17 air handling units with hot water heating and chilled water cooling coils.
- Provided a HVAC unit with remote condensing unit.
- Chilled water systems with air cooled chillers were provided to serve AHUs in each penthouse.
- Modular natural gas fired hot water boilers were used as a heat source.
- Variable speed drives were installed for the supply & return fans to save energy during winter.
- DDC controls were provided.



AMP-Ohio



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Municipal Facilities

•Comprehensive Energy Efficiency Assessment of Municipal Facilities belonging to the Membership of AMP-Ohio, consists of more than 1.4 million sq. ft.

General Energy Corporation was responsible for conducting field surveys, collect pertinent data, identify energy and water conservation opportunities, perform cost-benefit analysis, and present in a written Energy Audit Report for each building/facility. A partial list of towns in Ohio which participated are as follows:

City of Bowling Green	-	16 Building/Facilities
City of Bryan	-	19 Building/Facilities
Ohio City	-	12 Building/Facilities
Cuyahoga Falls	-	2 Building/Facilities
Painesville	-	2 Building/Facilities
Shelly Materials, Columbus	-	2 Plants/Facilities
Arizona Chemical, Dover	-	1 Plant/Facility
Jackson Water & Wastewater Plants	-	2 Plants/Facilities
Hudson Water Treatment Plant	-	1 Plant/Facility





Thank you

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For More Information Please Email Prem Mehrotra, PremM@generalenergycorp.com