

**SIEMENS**



# Town of Irondequoit

Preliminary Facility Improvement Opportunities

ASHRAE Level 1 Analysis

November 2022

Town of  
**Irondequoit**  
*New York*

# Table of Contents

---

Section 1	
Executive Summary.....	2
Preliminary Analysis.....	3
Proposed Energy Efficiency Measures.....	3
Sustainability Focus.....	12
Detailed Energy Audit .....	13



## Executive Summary

The following report was developed by Siemens to identify, document and present various infrastructure improvement and cost reduction strategies for the Town of Irondequoit. As a leader in Energy Projects and with extensive experience with energy-efficient technologies, Siemens is grateful for the opportunity to do an investigation and evaluation of the potential opportunities that exist for improved utility usage, energy efficiency, and building and systems improvements for Irondequoit.

Siemens has performed an initial assessment of the current systems of operation for the Town and compiled a preliminary list of improvements. We have included a brief description of these opportunities in the Proposed Energy Efficiency Measures section of this proposal. Upon authorization to proceed, Siemens will begin the Detailed Energy Audit and project development activities necessary to deliver a complete final proposal for your consideration. We will continue to meet with you throughout the process to assure that we are meeting your expectations and developing a project that meets your long-term goals.

This analysis meets or exceeds the Level 1 requirements established by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE).

Section  
**2**

## Preliminary Analysis

### General

The Town of Irondequoit has a number of buildings and facilities with a variety of uses. Each site has its' own utility meters / accounts. Some buildings have been fully renovated, some partially renovated and some are still original construction.

## Proposed Energy Efficiency Measures

FIM Group	Facility Improvement Measure	Town Hall	Library	Old DPW	Public Safety	Camps / Parks
Electrical	Lighting Improvements	■		■	■	
Electrical	Convert Remaining Street Lights to LED					
Building Automation	Consolidate Automation Systems	■	■		■	
Building Envelope	Building Envelope Improvements	■	■	■	■	■
Mechanical	Replace Heat Pumps	■				
Miscellaneous	Motor Replacements	■	■		■	
Miscellaneous	Plug Load Controls	■	■		■	
Miscellaneous	High Efficiency Transformers	■	■		■	
Miscellaneous	Water Conservation	■	■		■	■
Miscellaneous	Solar Photovoltaic	■	■	■	■	■

KEY: ■ FIMs to be Included in Project

■ FIMs Requiring Further Investigation

## Lighting Improvements

Areas: Town Hall, Old DPW Garage, Public Safety, Camps & Parks

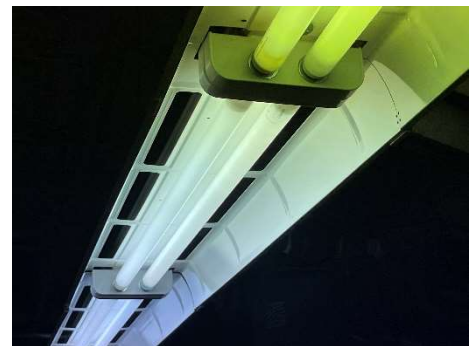
### Benefits:

- *Significantly reduce frequency of burn-outs*
- *Reduced maintenance*
- *Standardized product, less variation in reserve stock*
- *Upgrade infrastructure Town-wide*
- *Energy savings*

### Observations

Most of the building spaces, other than the Library, observed around Town have T8 fluorescent fixtures. This includes a mix of 2x4, 2x2, and 1x4 troffer fixtures along with 2 foot and 4 foot wrap and strip fixtures. A vast majority of these fixtures are lamped with first generation T8 fluorescent lamps and older ballasts, with some areas still having T12 lamps.

It was observed that some of the prismatic lenses on the troffer fixtures are yellowed, cracked, or damaged in some form.



The T8 and T12 linear fluorescent fixtures are supplemented in some areas by plug-in and screw-in compact fluorescent fixtures. There are also some incandescent A-types and R-types remaining as well. These fixture types come in a variety of shapes and sizes, but have common lamps within. These fixtures appear mostly in entryways and other common areas.

The Old DPW Garage building, which is essentially used for storage only, has HID high-bay fixtures and magnetic ballasts.

On the exterior of the buildings, lighting is provided by a mix of LED and HID wall packs and flood lights. Most of the parking and area lighting around the facilities are illuminated by LED area lights. The HID fixtures that remain vary in size/model and range in wattage from 100 to 400 watts. Some fixtures, LED included, were observed to be on during daytime hours. This would indicate a failed photocell.

There are some other fixture and lamp types around the Town, but the fixtures described above comprise a vast majority of the lighting. There are some miscellaneous HID and screw-in A-type fixtures that appear around the Town as well.



There are ceiling mounted occupancy sensors in most areas that have been renovated (primarily the Library), including hallways. Occupancy sensors are scarce in most other areas.



## Description of Opportunity

- Retrofit Linear T8 and T12 Fixtures

### Options Include :

- Re-Lamp fixtures and replace ballasts with new LED drivers with 0-10V dimming
- Re-Lamp fixtures with direct-wired lamps, eliminate ballasts
- Install full-fixture retrofit kits, which eliminates existing ballasts, sockets, etc.



LED Troffer Retrofit Kit

- Retrofit Recessed Cans and Plug-In CFL Fixtures

- Install full-fixture recessed can kits, eliminate individual lamps
- Re-lamp plug-in CFL lamps with LED lamps, eliminate any existing magnetic ballasts
- Re-lamps include all 2-pin, 4-pin and biax lamps



Recessed Can Retrofit

- Replace High-Bay fluorescent Fixtures in the Old DPW Garage with New LED Fixtures

- Replace any remaining outdoor Wall Packs, Flood Lights and Pole-Mount fixtures with LED

- Replace entire fixtures with new LED fixtures
- Eliminate HID magnetic ballast and re-lamp with LED "corn cob" lamps
- Add lighting in parking lots where desired
- In all instances, adhere to "dark sky" compliance

- Replace any miscellaneous incandescent or fluorescent lamps with LED

- Re-Lamp screw-in and plug-in lamps with LED



LED High-Bay Fixture

- Install Occupancy Sensors in Applicable Areas

- Replace older existing occupancy sensors with new sensors equipped with dual-technology
- Install occupancy sensors in areas that currently do not have them, specifically hallways

- Convert remaining streetlights to LED

- Town indicated that 75% - 80% of fixtures have already been converted
- Use LED fixtures previously installed

## Consolidate Automation Systems

Areas: All Buildings

Benefits:

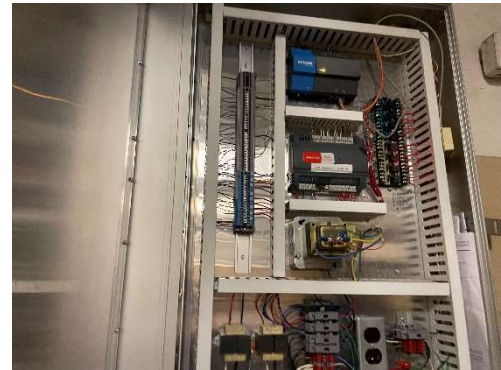
- One service contract
- Standardize on systems / components

### Observations

Town staff indicated that there is a lot of variation in building controls systems between equipment and buildings. This causes difficulty with monitoring and maintaining equipment and automation components, as there are multiple manufacturers / companies required to address a given issue.

### Description of Opportunity

It is proposed to standardize on one automation system across all buildings. This will allow for a single service contract and point of contact for maintenance issues that arise, as well as an opportunity to implement more modern control strategies.



## Building Envelope Upgrades

### Areas: Town-Wide

#### Benefits:

- Tighten the envelope to control the infiltration of unconditioned air into occupied spaces
- Enhance comfort level of occupants
- Energy savings from reduced infiltration and heat loss

#### Observations

Most of the exterior entry doors around the Town are in good condition, though there are some that are in need of replacement of weather-stripping and/or door sweeps, or in need of door replacement.

The same can be said for the overhead doors in buildings such as the DPW Garage.

In a number of areas there are windows in need of window frame/perimeter re-sealing, if not replacement.

There are some noticeable gaps in wall and roof joints between sections of many of the buildings that are in need of re-insulation.

There are other areas around the Town where air infiltration or heat loss generally occurs that would be inspected during the detailed energy audit. These areas include roof-wall interfaces, roof-mounted equipment curbs, pipe penetrations, entry soffits and skylights.

#### Description of Opportunity

- Install or replace weather-stripping on windows and doors where necessary
- Replace gaskets / seals on overhead doors
- Seal roof-wall intersections where necessary
- Insulate entry soffit overhangs
- Rooftop equipment curb sealing
- Inspect all building penetrations for potential air-barrier improvements



Entry Door Gap



Failed Gasket on Window



Sealing Roof-Wall Gap



## Replace Heat Pumps

### Areas: Town Hall

- *Upgrade infrastructure*
- *Energy savings*

### Observations

A majority of the Town Hall building is heated and cooled with water-sourced heat pumps. Some of these units are 20 years or more old and approaching the end of their useful life.

### Description of Opportunity

It is proposed to replace the existing units in kind. The new units will provide updated building infrastructure while delivering heating and cooling in a more efficient manner.

Given the age of the existing heat pumps, it is difficult to find replacement components, making it difficult to maintain the equipment. Replacing the existing units with new will help to eliminate maintenance issues associated with repairing the older units.

## Optional FIMs for Future Consideration

---

### Electric Motor / Pump Replacements

A number of larger motors were observed to be older and rated at standard efficiency.

Siemens will investigate the electric motors throughout the buildings to determine the possibility of upgrading to premium efficiency. Each motor will be replaced with a unit of the appropriate size. This efficiency improvement will update an aging motor as well as save a significant amount of electrical energy.

One significant area that requires thorough investigation is the age, efficiency, and condition of the pumps and motors operating in the Town's many water pumping stations. The size of these motors would yield the most energy savings if found to need replacement.

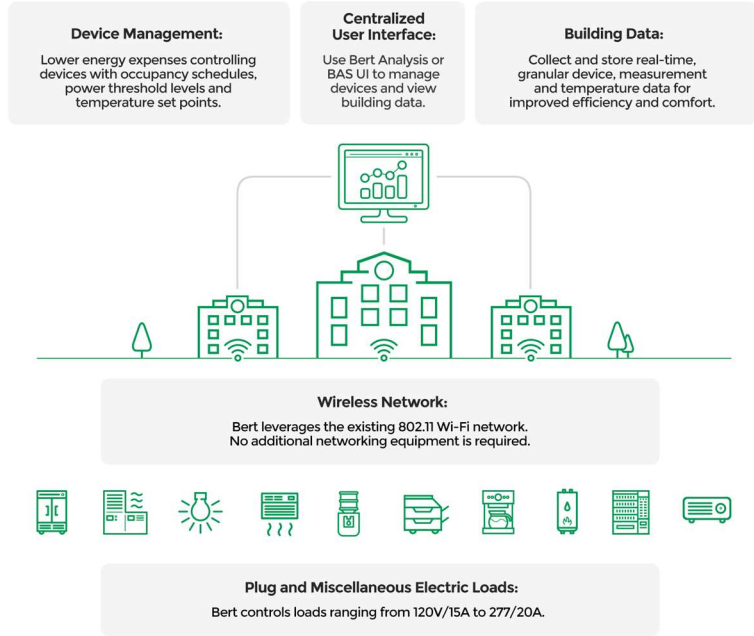


## Plug Load Controllers

Each facility has a significant number of plug-in devices such as coffee makers, printers, copiers, computers, computer charging carts, drinking fountains, etc.

Siemens proposes to install hardware for plug load devices, to measure actual energy use, analyze potential savings, create schedules and control energy use. Approximately 10% of building electric load is plug load and controlling these loads when they are not needed is an excellent means to save energy.

The devices are controlled and configured via wifi, so setup and management are centralized functions that allow the user to change settings with ease.



### High Efficiency Electrical Transformers

There are step-down transformers located in buildings throughout the Town. Electrical transformers are comprised of two major components: a steel core and windings made of aluminum or copper. Transformers are in operation 24 hours a day, year-round, so they are producing energy losses constantly.

- Replace dry-type transformers with new high-efficiency harmonic mitigating transformers to improve system power quality
  - Reduces harmonic related losses
  - Improves system efficiency, performance and reliability
  - Generate less heat, reducing load on cooling equipment

### Water Conservation

Many of the faucets, toilets, and urinals in the buildings are standard flow units.

Faucets, toilets and urinals offer good water saving opportunities because many of these fixtures can be retrofitted to reduce the amount of water consumed per flush (toilets and urinals) or per minute of use (sinks). Reducing domestic water usage will result in a reduction in water use along with fossil fuel energy savings due to more efficient hot water use.

Siemens proposes to retrofit and/or replace domestic plumbing fixtures with modern, high-efficiency fixtures. Siemens will provide a detailed count after the Comprehensive Energy Audit.

### Renewable Energy – Solar Photovoltaic System

Opportunity exists for the implementation of a “Green” energy source such as photovoltaic ground-mounted panels or roof panels. Siemens will investigate the installation of a solar photovoltaic system or multiple systems depending on system-fit. Incentive benefits are in place to reduce the cost of installation on a typical system.

Photovoltaic (PV) panels are the most widely used structures to gather solar energy. The PV panels are commonly attached to the rooftops where maximum sunlight exposure can be reached. Over the recent years, PV panels have seen a steady decrease in cost as higher efficiency PV panels are being developed.



Recent Siemens Installation

The utility providers pass these costs on to commercial consumers, which is an added charge on monthly bills. These charges can be avoided, and additional incentives can be obtained by installing a renewable energy generator, such as solar photovoltaic. Meeting minimum system size requirements will allow for the Town to obtain incentives per kilowatt of system size, and also prevent the ACP charge from the utility provider from appearing on monthly bills.

Section

3

## Sustainability Focus

Siemens is passionate about the environment and stands ready to support the Town of Irondequoit's goals of sustainability and environmental responsibility. This project will conserve our world's resources through, energy conservation, saving fossil fuels and reducing pollution associated with electric generation.



### LEED® Certification

Developed by the U.S. Green Building Council, the LEED (Leadership in Energy and Environmental Design) Green Building Rating System is a voluntary standard for developing high-performance, sustainable buildings in the United States. Siemens can assist you in your pursuit of LEED certification by implementing Facility Improvement Measures that earn credits and satisfy prerequisites necessary for LEED certification. Specifically, we:

- Improve energy efficiency
- Benchmark energy performance through the ENERGY STAR rating system
- Implement measurements, metering and reporting capabilities
- Evaluate and implement renewable energy strategies
- Develop and implement educational and awareness programs
- Provide maintenance and monitoring capabilities





Section  
**4**

## Detailed Energy Audit

The proposed scope of services, assumptions and deliverables are outlined below.

### Project Background

#### Task 1 — Field Work

The team will provide site reconnaissance to review the facilities in sufficient detail to provide concept level design drawings and narratives to develop fixed pricing.

#### Task 2 — Energy Evaluation

Siemens will perform energy savings strategies and conceptual design on the previously mentioned systems to save electric and natural gas utilities. Siemens will perform energy calculations to quantify the actual utility savings that will be realized with the new systems and strategies. These will be compared to the actual utility costs that each space presently consumes.

#### Task 3 — Report

Siemens will document our information into a single report. The report will include the following:

- Executive Summary
- Existing Conditions
- Recommendations of Energy Projects
- Energy Savings
- Appendix
  - Utility Costs
  - Energy Calculations

### Assumptions

- Town of Irondequoit will make available the most up-to-date drawings of the facilities' floor plans and existing lighting, fire alarm, HVAC and compressed air.
- Town of Irondequoit will make available one contact person for each site to answer the engineering team's questions.
- Town of Irondequoit will provide copies of actual electric and natural gas utility bills from the past two (2) years.
- Town of Irondequoit will provide maintenance budgets and direct costs per site specific.

Section

5

**Project Timeline**

	<u>Projected</u>
1. RFP Project.....4-6 Weeks	Dec-2022
› Select ESCO	
2. Execute Letter of Intent (LOI) .....2-3 Weeks	Feb-2023
3. Detailed Energy Audit (DEA).....2-3 Months	May-2023
› Equipment Logging	
› Validate Baseline and Savings	
› Develop Facility Improvement Measures (FIMs)	
› Confirm Design/Project Pricing	
4. Finalize Audit Report and Recommendations .....1-2 Weeks	Jun-2023
› Confirm Technical Acceptance	
5. Project Acceptance .....2-4 Weeks	Jul-2023
› Town Approval ( <i>pending Legal and Financing</i> )	
6. RFP Financing .....3-4 Weeks	Aug-2023
7. Financing Acceptance .....2-3 Weeks	Sep-2023
› Board Approval	
8. Underwrite .....4-6 Weeks	Oct-2023
9. Start Construction..... 1 Week	Dec-2023
10. Complete Installation..... 6-9 Month	Sep-2024