REALTERM
ENERGY

City of Bath, ME

Request for Qualifications

Conversion of community street light system to LED fixtures and from utility-owned to municipally-owned and maintained fixtures on utility-owned poles.

August 10th, 2022

Primary Contact:
Mark Carter
Vice President, Smart Solutions
Pownal, ME 04069
(207) 415-2658
mcarter@realtermenergy.com

TABLE OF CONTENTS

COVER LETTER

Rod Melanson
Director of Sustainability & Environment
rmelanson@cityofbath.com
55 Front Street
Bath, Maine 04530
City of Bath

Dear Mr. Melanson and Members of the Evaluation Team,

RealTerm Energy (RTE) is pleased to submit this response to the Request for Qualifications for LED Streetlighting Conversion Services to the City of Bath. We have assembled a qualified team of professionals experienced in LED streetlight conversions and Smart City solutions to meet the City's project goals.

We encourage the City of Bath to take advantage of RealTerm's extensive and practical experience. With over **300 streetlighting projects** completed across North America, we have **tried, tested, and refined** to overcome many of the obstacles and shortcomings that accompany an LED streetlight conversion. Furthermore, RealTerm Energy is the most experienced streetlight conversion provider in **Maine, with 47 ongoing and completed projects** in this state alone. We have extensive experience working with groups of municipalities in Maine and have completed implementing LED conversion projects in neighboring Towns over the last several years. This allows for project teams to be readily available, thereby enhancing project coordination and efficiency for the City.

Our turnkey service offering for the City's streetlight conversion includes:

- An initial GIS/GPS inventory assessment of your existing streetlight network
- Photometric designs to optimize energy efficiency, minimize costs, and protect public safety
- A comprehensive Investment Grade Audit (IGA)
- Competitive selection and procurement to ensure best value pricing, products, and services
- Installation of new LED fixtures and responsible recycling of old fixtures
- Transfer of all inventory files, data, and warranties
- Customized community outreach services

The RealTerm Energy team appreciates this opportunity to present our proposal and we look forward to the prospect of working with the City of Bath to design and install your new, highly efficient LED streetlighting system.

Angelos Vlasopoulos, Chief Executive Officer
avlasopoulos@realtermenergy.com

1. COMPANY PROFILE & QUALIFICATIONS

1.1. RealTerm Energy Overview

RealTerm Energy is a North American leader in smart technology integrations, specializing in LED Streetlight Conversions, Maintenance Services, Electric Vehicle Charging Stations, and AI HVAC control technology. RealTerm Energy's vision is to connect communities and help benefit the environment through technology.

A U.S. Department of Energy qualified Energy Service Company (ESCO), RealTerm Energy offers turnkey LED lighting upgrades. It is the only company offering a unified suite of smart city solutions for small to mid-sized municipalities and its smart building solution (Brainbox) is the only one of its kind. The company's success is built on a stellar reputation for smooth and timely delivery, a price for performance beyond compare, and a customer-focused mentality offering quality, efficiency, and professionalism every time.

We have to date surveyed, designed and installed over 350,000 streetlights, including over 50,000 smart controls. Our group of back office and field staff members is dedicated exclusively to designing and executing high-quality and cost-effective LED streetlight conversions for municipalities and utilities.

Extensive In-House Expertise

"Several things stand out about RealTerm Energy and our interaction with them. They worked collaboratively with a large and diverse group of municipalities, which demonstrated they could handle projects of varying scope. Regardless of the community size or project they conducted themselves with the same level of professionalism.

They made things easy for all of us. They were extremely responsive from beginning to end and most importantly, they delivered on everything they promised. RealTerm Energy is truly a professional organization."

Dennis Marker
City Manager
City of Caribou, Maine

Realterm Parent Company

Founded in 1991, Realterm is a privately held international on-airport real estate operator and leader in infrastructure and logistics strategies, with installations in North America, Europe, and Asia. Since its inception, Realterm has grown steadily, currently managing over $6.5 + billion in assets.

RealTerm Energy, established in 2013, is the division of Realterm that was created to deliver best-in-class technological, managerial, and financial solutions for efficient energy-related projects to municipalities and public authorities.

World Bank Recognition

In addition, we are particularly proud to have stood out, on a global scale from similar service providers, as noted by the World Bank Group in 2016. RealTerm Energy's "remarkable" partnership in the joint-procurement model developed with LAS and the Association of Municipalities of Ontario has been recognized by the World Bank as being among the most efficient and successful delivery models in the world. The World Bank Group estimates that 20% of global electricity is consumed by lighting and it projects that widespread adoption of LED lighting can reduce that to 7%.

WORLD BANK GROUP

Proud to be recognized by the World Bank.

RealTerm Energy was honored to be chosen by the World Bank to help advance its global initiative of reducing electricity consumption. Post extensive research of various programs and their providers around the globe, the World Bank selected RealTerm Energy due to it being a leader in this field and its highly successful track record. At the outset of 2021, our organization has upgraded over 300 cities and towns to LED across North America, having installed 350,000 luminaires and over 50,000 smart lighting controls.

On the world stage, RTE was invited to speak, on two separate occasions, to World Bank delegates on best practices for a successful LED municipal streetlight conversion. The first, in Washington, D.C., related to Process, Management and Control, and the second, held in Lima, Peru, was related to project finance. RealTerm Energy continues to be called upon as an industry forerunner and provides consulting services for various countries around the globe.

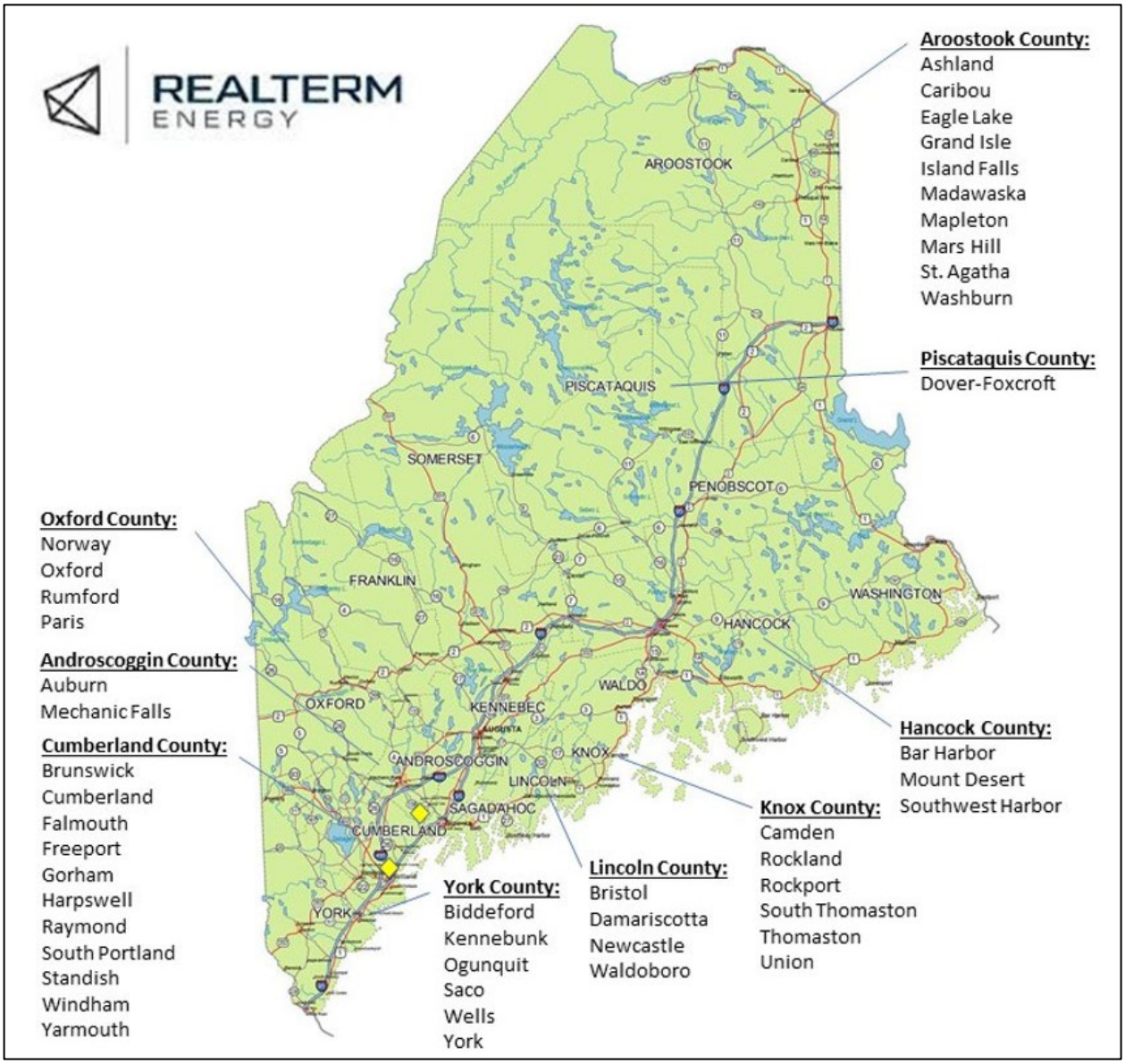
Department of Energy

RealTerm Energy strives to go beyond energy efficiency. As a responsible and forward-thinking company, we are proud to announce that RealTerm has been approved by the DOE to be one of their qualified ESCOs. This allows RealTerm Energy to compete for energy savings performance contracts (ESPCs) with federal agencies, thereby making further progress in reducing energy and operating costs and meeting federal sustainability goals. We can reallocate financing currently being spent on an inefficient and antiquated lighting system and use the savings to transform it into a Smart LED network.

U.S. DEPARTMENT OF ENERGY

1.2. Project Experience Turnkey Conversions in Maine

The following section highlights RealTerm Energy's notable ongoing and completed LED conversion projects in Maine. In Maine alone, we've converted or are in the process of converting over 19,000 lights in 47 municipalities. This allows for project teams to be readily available and provide a hands-on approach, thereby enhancing project coordination and efficiency for the City.



2. KEY PERSONNEL

The LED Street lighting consulting services will be carried out through a fully integrated effort, staffed by experts in their fields with all the necessary skills to deliver the project. This is a very important part of our approach, allowing us to deliver the project on time while meeting all the required standards.

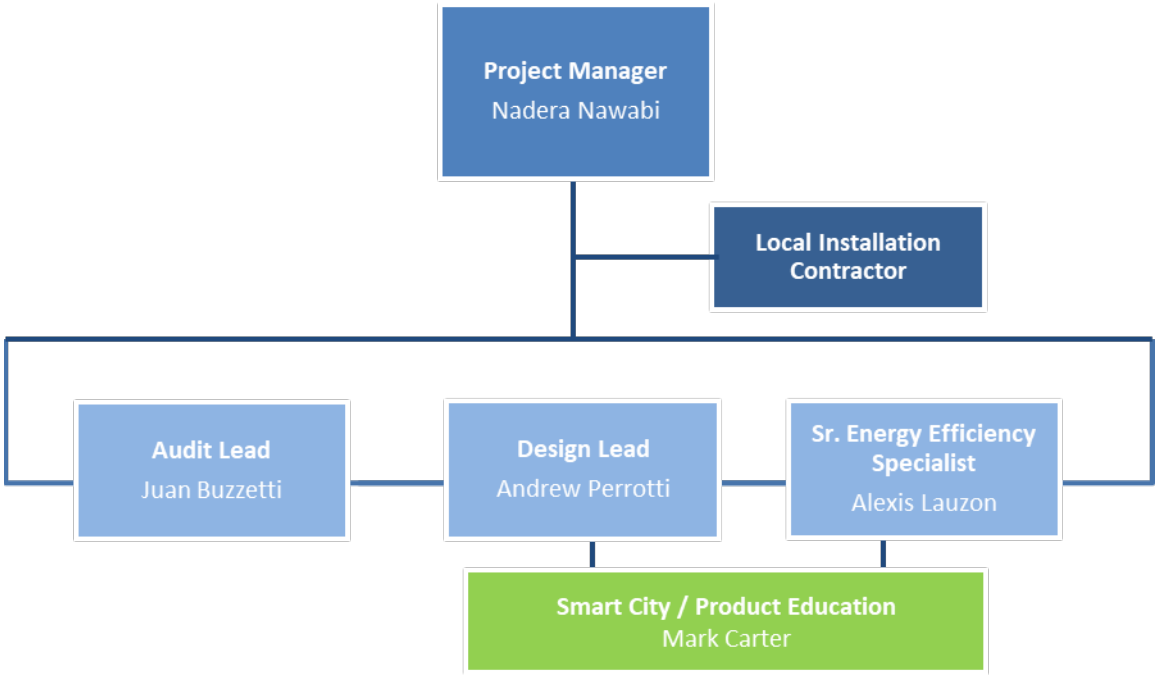
Organization Chart

The project team's organization chart is presented below. **Nadera Nawabi** will lead the project as the single point of contact Project Manager. Nadera is a civil engineer with more than 8 years of experience. As Project Manager for RealTerm Energy she has managed and maintained over 25,000 LED street lights.

Nadera will draw on the skills and expertise of the following team members:

- Andrew Perrotti, Design Lead
- Juan Buzzetti, Audit Lead
- Alexis Lauzon, Sr. Energy Efficiency Specialist
- Mark Carter, Smart City Solutions Consultant
- Local Installer: RealTerm has completed numerous projects in the area working with local installers that are very familiar with CMP's installation requirements.

Please find their CVs on the next page.



Project Role: Project Manager (Single Point of Contact)

Nadera Nawabi

8+ years
of project management experience

Education
B. Eng., Civil Engineering
McGill University
Montreal, Canada
Specialization – Environmental Engineering

ASP Construction Safety Certification
Concordia University
Montreal, Canada

Languages
English, French, Farsi

Project Responsibilities

- Manage the project by keeping municipality updated on the status of its project on a regular basis
- Support all aspects of the project life-cycle to ensure on-time and within budget delivery
- Track installations using Esri (an ArcGIS Platform)

Project Experience in LED Streetlighting Conversions:

- Town of Brunswick, ME [1,118]
- City of Saco, ME [1,425]
- Town of Yarmouth ME, [579]
- Town of Pepperell, MA [410 fixtures]
- City of Haverhill, MA [4,611]
- Town of Hopedale, MA [429]
- Village of East Williston, NY [253]
- Village of Liverpool, NY [308]

Nadera Nawabi, a civil engineer, has more than 8 years of experience in project management, technical reviews as part of quality assurance processes, automation of work processes, data management and the provision of technical support to clients. From her past experience as a project manager for an environmental management solutions organization, Nadera is adept at solving challenges that may arise over the course of a project. She also oversees and documents all aspects of a project's implementation and ensures that the scope and direction of each project remains on schedule.

At RealTerm Energy, Nadera manages all aspects of a project life cycle for a most successful outcome. She focuses on a project's mandate, determines what is needed to move a project forward and employs her solid organizational skills so that all necessary parties are aligned. Nadera keeps RealTerm Energy's clients informed throughout all phases of a project and her approach ensures that we deliver on-time while striving to carefully respect a project's budget.

As a Project Manager, Nadera will:

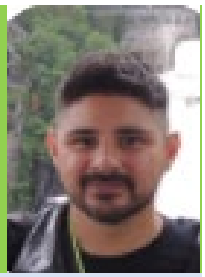
- Manage the overall project schedule and various process tasks amongst all departments
- Update clients on a timely basis regarding the status of their projects
- Manage the procurement functions of a project
- Deal with numerous project facets including project scheduling, contract creation and execution, budgeting

Her past engineering project experience includes Analysis of an Ozone Contactor Tank at the San Andreas Water Treatment Plant in San Francisco, a Water Distribution System Design for Municipalities and Surveying the Campus of McGill University in Montreal. This project involved sketching the geographical design parameters using AutoCAD and documenting all design data.

Project Role: GIS Audit Lead

Juan Buzzetti

10 years
experience as a Geographic Information System (GIS) Specialist



Education:
Master of Science - Geography, Urban and Environmental Studies 2012-2016

Thesis: *Street Network Morphologies. On the Characterization and Quantification of Street Systems. A Case Study in Montréal.*
Concordia University, Montreal, Canada

Bachelor of Arts – Specialisation in Urban Planning
Concordia University, Montreal, Canada

Languages:
English, French, Spanish

Technical Skills:

- ArcGIS Pro, ArcGIS Desktoo, ArcGIS Online, QGIS, Carto, MapBox, AutoCAD, MapInfo;
- Python/Arcpy, SQL, Javascript/Leaflet, HTML/CSS;
- R, SPSS;
- Adobe Illustrator, Adobe Photoshop, Adobe InDesign, Gimp, Inkscape.

Related Project Experience:

- Town of Brunswick, ME [1,118]
- City of Saco, ME [1,425]
- City of Biddeford, ME [2,032 fixtures]
- City of Sudbury, ON [11,032 fixtures]
- City of Brampton, ON [40,000 fixtures]
- City of Orillia, ON [3,245]
- Village of Suffern, NY [556]
- Village of Warwick, NY [516]
- Village of Monroe, NY [509]
- Town of Pepperell MA, [500 fixtures]

Juan is a GIS Specialist and maps municipal LED streetlight systems for RealTerm Energy's clients. He also trains field crews to collect data and uses his GIS expertise to manage databases, analyze data and apply spatial analysis. This allows him to create customized web maps and applications that visualize our lighting solutions.
Juan is proficient in the use of numerous industry-related software including ArcGIS 2 Essential Workflows, Esri, ArcGIS Pro, ArcGIS Online, ArcMap, Google Earth Pro and EQuIS Professional, amongst others.
His various responsibilities as GIS specialist include:

- Performs quality assurance/quality control of collected geospatial data.
- Conducts field surveys
- Creates web maps, operation dashboards, surveys, and configures mobile applications on the ArcGIS platform to support field work;
- Implements scripts for automation of routines using Python/Arcpy;
- Develops and improves existing GIS workflows to streamline work leading to increased output and reduction in errors.

Prior to joining RealTerm Energy, Juan worked at:

- ÉEM Inc. / ÉEM Impact Ltd. Montréal, GIS Analyst, 2015–2019
  - Performs spatial and statistical analyses;
  - Manages and maintains geospatial data ensuring quality assurance;
  - Designs publication-quality maps on environmental impact assessment in Canada and abroad;
  - Provides training and written tutorials on GIS;
  - Automates workflows using ArcGIS Model Builder or Python.2011-2015 Golder Associates, GIS Analyst: Developed GIS automation tools that cut map mass production time.
- Concordia University Montréal, Teaching Assistant for Introduction to GIS and Advanced GIS, 2011–2014

Project Role: Design Lead

Andrew Perrotti

10+ Years in electrical engineering

Education:
Humber College Institute of Technology; (Electrical Engineering Technologies)

DipEng; Graduated with Honours and Coop work experience program

Languages:

English

Project Responsibilities:

- Engineering street light database and customizing it to meet your needs
- Create lighting design according to the RP-8-18 standards
- Ongoing communication with clients regarding photometric designs
- Installation support to subcontractor electrical teams

Relevant Projects:

- Town of Brunswick, ME [1,118]
- City of Saco, ME [1,425]
- City of Orillia, ON [3,245]
- City of Sudbury, ON [11,032 fixtures]
- City of Brampton, ON [40,000 fixtures]
- Village of Liverpool, NY [308]
- Village of Monroe, NY [509]
- Town of Cornwall, NY [499]
- Town of Pepperell, MA [410 fixtures]
- City of Haverhill, MA [4,611]
- Town of Hopedale, MA [429]

Andrew focuses on maximizing long-term energy efficiency for clients, while maintaining a safe and comfortable environment for citizens. He also applies his GIS expertise to manage databases, analyze data and apply spatial analysis, creating customized web maps and applications that visualize our lighting solutions.

His accomplishments at RealTerm Energy include:

- Developing GIS maps utilizing ESRI software.
- Leading the RFQ, product evaluation and selection of appropriate lighting manufacturers for 20+ projects.
- Completing field audits and data reconciliation with utility inventories.

His responsibilities as Lighting Designer in any given project include:

- Completing field audits and data reconciliation with utility inventories.
- Determining the correct fixtures and wattages to ensure that RP-8-18 standards are met wherever possible
- Applying his electrical engineering expertise whenever there are situations that are out of the ordinary.

For over a year, Andrew also worked as a Field Installation Supervisor at RealTerm where he led installation teams and troubleshooted any issues that arose with the Electrical Contractors in any given project. He also provided support to clients installation closeout, and project reconciliation meetings.

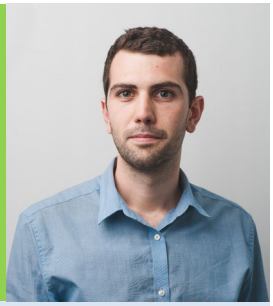
Prior to joining RealTerm Energy, Andrew's professional experience includes:

- E-Lumen International Inc.: As Electrical Engineering Designer he developed electrical designs for residential, commercial, and industrial buildings in AutoCAD;
- Raytheon Company Junior Electrical Engineer.

Project Role: Senior Energy Efficiency Specialist

Alexis Lauzon

6 + years specialization in energy solutions and efficiency



Professional Credentials
Member of the Quebec Order of Engineers (CEP)

Education
Bachelor of Engineering: Bioresource Engineering
McGill University, Montreal, Canada

Languages:
English, French and Mandarin (Basic)

Relevant Projects:

- Caribou et al., ME [3,300 fixtures]
- Windham et al., ME [1300 fixtures]
- Falmouth et al, ME [600 fixtures]
- Town of Wells, ME [500 fixtures]
- Town of Falmouth, ME [579 fixtures]
- City of Brampton, ON [40,000 fixtures]
- City of Guelph, ON [13,500 fixtures]
- City of Barrie, ON [10,622 fixtures]
- City of Oshawa, ON [10,372 fixtures]
- Village of Sea Cliff, NY [496 fixtures]
- Village of Suffern, NY [556]
- Village of Warwick, NY [516]
- Village of Monroe, NY [509]
- City of Brockton, MA [7,269 fixtures]
- Town of Seymour, CT [1,133 fixtures]

Alexis is responsible for evaluating the energy and cost savings of our LED street lighting retrofits, as well as their financial options. Alexis handles communication with municipalities and local distribution companies to coordinate and compile precise energy consumption and billing information.

Alexis's various responsibilities as Energy Efficiency Specialist for LED street light conversion projects across North America include:

- Development of technical and financial calculations for LED conversion projects
- Evaluation of different manufacturers, performance of luminaires, etc.
- Development and evaluation of competitive bid process for installers
- Preparing technical and financial models for calculating project costs and savings potential (energy and operating cost).
- Working on a wide variety of projects formats: RFP, IGA, Proposals & Quotes.
- Gathering and synthesizing costs: soft costs, material costs, labor costs.

Alexis has evaluated more than 100 projects financially and technically and has prepared proposals and audit reports for each of them.

Presently, he holds the position as Director of Operations at RealTerm Energy (RTE) where he also:

- Manages the day-to-day operations of the Estimating and Operations teams.
- Supports the Sales team in researching other markets for new business opportunities and the creation of financial models.
- Proposes innovative ways to enhance energy savings and project returns.

Before joining the RTE team Alexis worked as in intern with various engineering firms such as AECOM, Group Solroc and the Centre for Agricultural Research for the installation of irrigation projects.

Project Role: Smart City Solutions Consultant

Mark Carter

25+ years of automation, enterprise software, embedded semiconductor, and lighting controls experience

Professional Credentials:

United States Army's Engineer Officer Basic Course (EOBC), Fort Leonard, MO

Education:

Bachelor of Science in Chemical Engineering, Concentration in Process Control, from the University of Maine

Languages:

English

Project Responsibilities:

- Coordinate and supervise solution sales approach to identify client's underlying needs and ensure desired goals are met

Relevant Projects Relating to Smart Control Deployments:

- Village of Great Neck, NY [832 fixtures]
- City of South Portland, ME [1,597 fixtures]
- City of Biddeford, ME [2,325 fixtures]
- Town of Wells, ME [500 fixtures]
- Town of Falmouth, ME [579 fixtures]
- City of Brockton, MA [8,761 fixtures]
- Town of Tewksbury, MA [1,711 fixtures]
- City of Auburn, ME [1,253 fixtures]
- Town of Rumford, ME [648 fixtures]
- Town of Norway, ME [270 fixtures]
- Town of Mars Hill, ME [113 fixtures]

Mark is responsible for leading and driving strategy & growth across our Smart Solutions portfolio. He has formidable experience directing sales and operations teams at renowned organizations across the U.S., such as Honeywell International, in the automation controls, enterprise software, embedded semiconductor and lighting controls businesses. Mark takes a solutions-sales approach, prioritizing the identification of the customer's underlying needs.

Mark has twenty-five years' executive-level experience in the controls industry. This experience encompasses industrial automation, building automation and lighting controls. He brings a broad knowledge of device networking and Smart City applications to help clients fulfill their IoT (Internet-of-Things) vision.

He is an excellent communicator with a solution sales approach to identify our clients' underlying needs. A former client of Mark's shared that "he is a great strategic thinker who is able to come up with creative concepts to solve complex problems and meet key business requirements." Mark excels at fostering long-term business development relationships from CEO to end-user and is a thoughtful and innovative member of our management team.

Prior to joining the RealTerm Energy, Mark:

- Held a variety of sales management positions with Honeywell International, Echelon Corporation and CIMCON Lighting.
- Drove growth with sales teams of varying sizes in multiple markets to include automation controls, enterprise software, embedded semiconductor, and lighting controls.
- Developed and operated an international business development consulting firm.
- Graduated from the United States Army's Engineer Officer Basic Course (EOBC), Fort Leonard, MO.

3. REFERENCES

Project Name: Town of Brunswick, ME LED Streetlight Conversion	**Client Contact:** John Eldridge Town Manager jeldridge@brunswickme.org | (207) 725-6659

Project Description:
In 2021, the Town of Brunswick wanted to significantly reduce its energy consumption, maintenance costs, and the environmental impact associated with its network of streetlights.
RealTerm Energy was contracted to manage the turnkey upgrade of 1,079 existing streetlights, composed of cobra head fixtures. Installation of the new LED luminaires was recently completed. This will reduce the Town of Brunswick's streetlight operating costs by approximately 77%, and 70% in energy consumption (kWh) while also improving the Town's overall lighting quality and roadway safety for both vehicle and pedestrian traffic.

Start / End Date:	November 2021 / July 2022
No. of Fixtures:	1,079 fixtures

Project Name: Town of Cumberland, ME LED Streetlight Conversion	**Client Contact:** Bill Shane Town Manager wshane@cumberlandmaine.com | (207) 829-5559 x301

Project Description:
RealTerm Energy won through an RFP and was contracted to manage the turnkey upgrade of 245 existing streetlights, composed of 174 cobra heads and 71 decorative fixtures.
Services provided include GIS auditing and customized lighting design services to ensure safety, resident comfort, and optimized distribution of light for each fixture.
RealTerm Energy also deployed Ubicquia Lighting smart controls for the Town's streetlights to provide a cost effective and modular platform for deploying network and smart city services.
The new LED luminaires will cut Cumberland's streetlight operating costs by approximately 79%, thereby reducing its energy consumption, maintenance costs, and the environmental impact associated with its network of streetlights.

Start / End Date:	October 2020 / July 2021
No. of Fixtures:	245

Project Name: Town of York, ME LED Streetlight Conversion	**Client Contact:** Dean Lessard Public Works Director (207) 363-1010 | dlessard@yorkmaine.org

Project Description:
The Town of York selected RealTerm Energy to manage the turnkey upgrade of 778 existing streetlights, composed of 769 cobra heads and 9 decorative fixtures.
RealTerm Energy provided customized lighting designs, supported the Town in the selection of their new LED light fixtures based on products that best suit their needs, and installed the new technology. Services were also provided to evaluate the acquisition costs from Central Maine Power (CMP). The installation of the streetlights was completed a month ahead of schedule and under budget by 6% thanks to RealTerm Energy's rigorous and effective methods for managing costs.
The new LED fixtures will cut York's streetlight energy consumption by approximately 76%, and significantly reduce its energy consumption, maintenance costs, and the environmental impact.

Start / End Date:	August 2019 / July 2020
No. of Fixtures:	778 fixtures

4. APPROACH AND DELIVERABLES

4.1. Project Management

Our project management approach and extensive experience in LED streetlight conversions ensures your project deliverables will be delivered on time and on budget.

One of RealTerm Energy's experienced project managers will act as the Single Point of Contact (SPOC) to ensure your project's objectives are met. The project manager will plan and organize all resources to complete the project on-time and within budget and manage project activities such as: meetings, planning, evaluation, designing and oversight to ensure work is proceeding in compliance with the project's objectives.

Our experience, derived in over 300 successful projects has enabled our teams to develop workflow, scheduling, logistics and communications protocols that are proven and highly effective in managing streetlight conversions. Each team member realizes the trust that our clients and their constituents place in our ability to deliver an exceptional result – one that is important in areas such as cost savings and increased safety and aesthetics, but also one that is a contributor to lowering greenhouse gas emissions.
To achieve these goals for the City of Bath, we propose the following scope of work and list of deliverables.

Activity/ Deliverables	Scope of Services
GIS Inventory Audit	• Coordinate / manage the overall survey • Review GIS streetlight inventory • Reconcile data • Ensure the design team has all necessary data to develop accurate design plans.
Photometric Design	• Develop lighting design plan following RP-8-18 guidelines while using existing infrastructure, or other standards as agreed upon pre-design • Assist in the selection of the LED manufacturer
Investment Grade Audit Report	• Provide an estimated total project cost and finalize installation scope of work based on the results of the above tasks • Estimate energy and maintenance cost savings • Review and estimate of available incentive/rebates • Provide Key performance indicators (Payback, Cashflows, ROI, NPV, etc.) • Selection of Equipment and Installer(s) • Smart Control Consultation
Procurement Services	• Procurement of Fixtures • Carry out all services related to ordering, delivery, receipt, verification and inspection of all equipment purchases, including inventory control
Installation	• Procurement Services - Installer • Project Management / Construction Administration • Handle permits • Provide Quality control / verification • Removal and disposal of fixtures to appropriate recycling facilities • Ensure streetlight system is functioning
Commissioning	• Process all payments • Process incentive application • Finalize billing change • Transfer final GIS map • Provide commissioning/close out documents to client

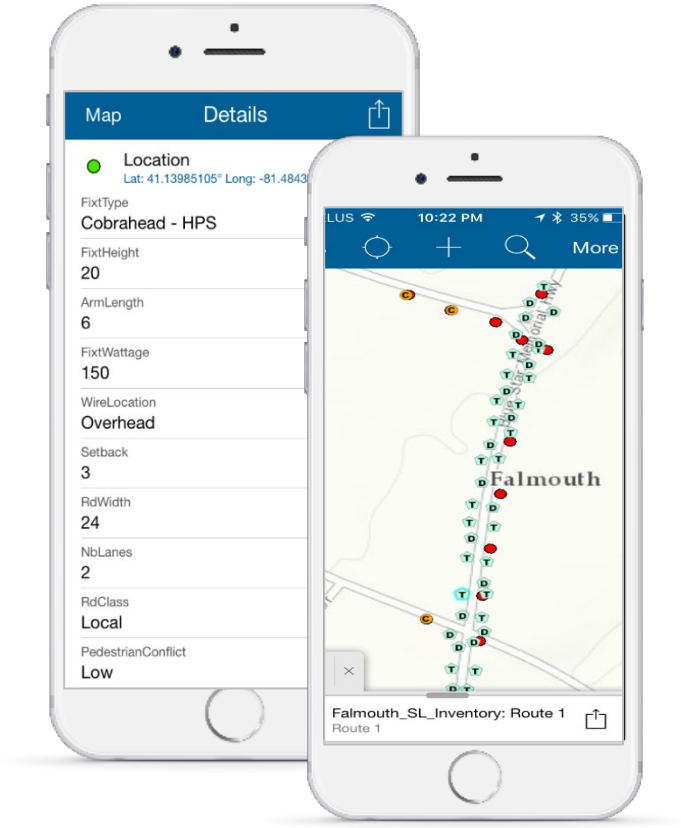
4.2. GIS Audit

At RealTerm Energy, the GIS audit is a foundational component of our approach. Our experienced survey team collects geospatial and descriptive data pertaining to all important streetlight attributes to create a comprehensive picture of your current streetlight network and reveals any gaps and errors that might exist in the inventory data. Using this approach helps the remaining steps in the conversion process run more efficiently.

Our customized Esri application captures and records detailed data from streetlights and their surroundings and enables us to document as many attributes per data point as the City requests, including information about the location, type and existing fixture characteristics.

In addition, our geospatial team takes precise measurements to ensure our lighting design team can specify the appropriate fixture types and wattages. Critical observations include but are not limited to:

- Pole height
- Fixture height
- Road width
- Existing wattage
- Road class
- Fixture type



Some advantages of the streetlight application include:

- Access survey data online
- Export all data to MS-Excel, KML/KMZ, Shapefile or File Geodatabase formats
- Compatible with virtually any smart phone and tablet
- The City's key team members receive online login access, ensuring full transparency of the project from start to finish.
- Post-audit, your staff will be able to identify each light in the system and view its history and attributes.

Click the following link to explore a sample of RealTerm Energy's detailed streetlight survey: ArcGIS Map

4.3. Streetlight Design

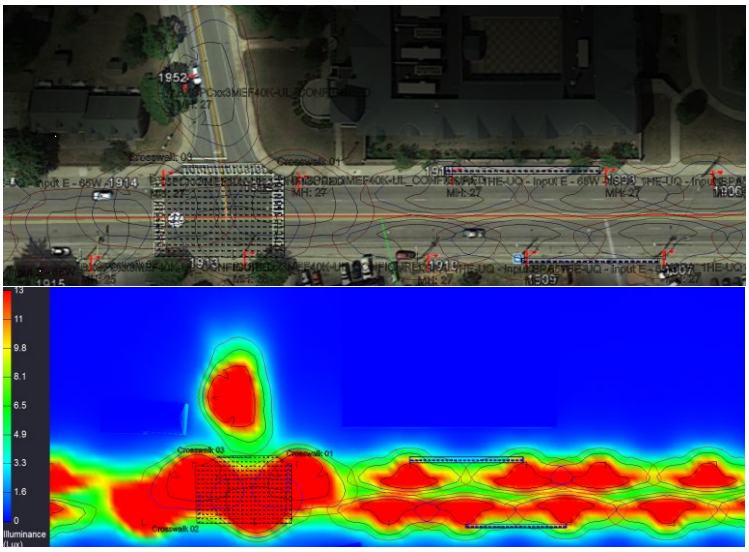
One value-added service that distinguishes RealTerm Energy from others in the industry is its comprehensive photometric design methodology. We look at your conversion project as an opportunity to fix past mistakes and design your streetlight network properly. Instead of just replacing HID lights with their LED equivalents, we actually examine the surrounding area and infrastructure to determine which types and wattages are best suited to each application.

All designs created by our lighting design team have the following advantages:

- Utilize the lighting industry's premier photometric calculation tool, AGi32.
- Follow the RP-8-2018 Roadway Lighting recommendation produced by the IES (Illuminating Engineering Society). Please note RP-8-18 is the updated version of RFP-8-14 as listed in the RFQ.
- Are based on the City's streetlight and roadway infrastructure, not on algorithms or simple one-for-one replacements as is the general industry practice.
- Maximize energy savings.
- Reduce glare, back-light and up-light and incorporate light trespass and dark sky considerations to avoid light pollution.
- Allow for choice of color temperature (i.e. 4000k, 3000k, 2700k, 2200K or a hybrid approach).

We address unique regional characteristics such as neighborhoods, schools, hospitals, tourist attractions, areas of concern and areas with higher frequencies of accidents and/or vehicle-bicycle-pedestrian conflicts. This includes looking at crash data of the last five years (where available) to identify areas of where light levels and/or spacing may have affected public safety.

3D lighting simulations may be created for any areas of concern. The simulations show the light levels on the road and nearby objects/buildings. Please see link for 3D simulation sample. https://realtermenergy.sharepoint.com/:v:/s/RTEOperations/EUrpAtVL_U9MrGSC2UuKF4oB7hkjTRei-04kUnIB2sGPdw?e=rRiQDZ



"Thanks again for the great work done by RealTerm Energy for the City of Victoria. You and your team have been extremely responsive and tremendously helpful. We can attest that it has been well worth the investment and I would highly recommend that others follow suit to ensure proper lighting levels and maximum energy savings."

Ed Robertson, Assistant Director, Public Works, City of Victoria, BC

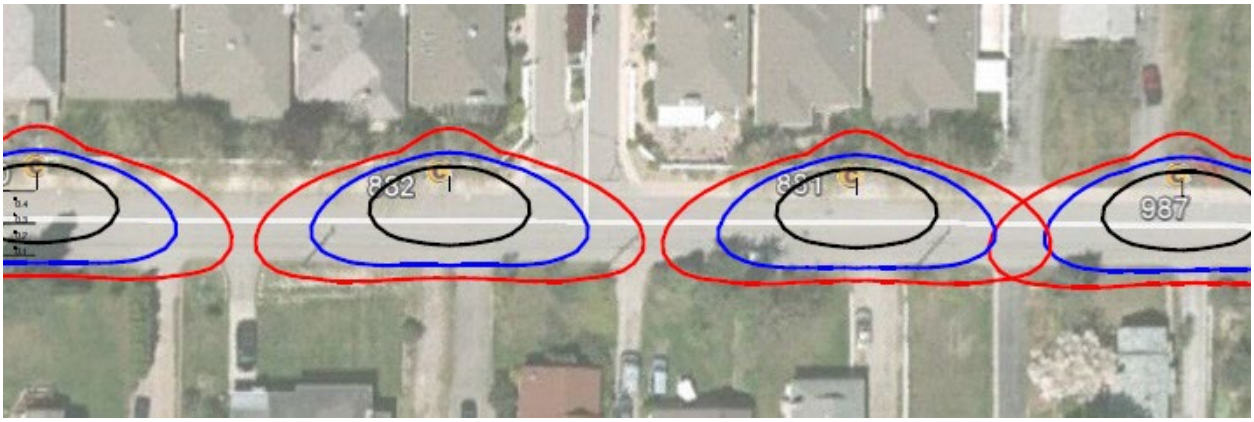
The sample graphic above is a digital rendering of RealTerm Energy's photometric calculations that take into account the GIS inventory survey data and the lighting recommendations for the given street, intersection, sidewalks and pedestrian crosswalks.

Lighting Distribution Patterns

Our meticulous lighting designers work with GIS audit data and manufacturers' technical specifications to ensure even and optimal distribution of light on roadways. Each fixture is available in different types, representing the pattern in which they distribute light around the pole location. Our designers utilize the data on pole location, fixture height, arm length, setback, road width and road classification and then optimize for the fixture type that will allow for the most even distribution of light while maintaining light levels above RP-8-18 guidelines and preventing overlit areas.

The images below demonstrate poor uniformity (on the left) and better uniformity (on the right):

Available fixture types can range in shape from short and wide to long and narrow, depending on pole spacing, proximity of houses and whether or not light must reach the opposite side of the street.



After manufacturer(s) are chosen, our lighting designers obtain the photometric (.IES) files for all types of the chosen fixture model(s). The two images below highlight the difference between the light distribution patterns of Type II (left) and Type IV (right); both fixtures same manufacturer. Using GIS data and overhead satellite imaging, designers can then choose the type or types that create the most uniform distribution of light along each roadway.

Dimming

Properly equipped LED luminaires (with dimmable drivers) have internal dial settings which permit the ability to adjust lumen outputs, typically between 10-90% for a given luminaire with the use of a dimming smart control. Following the selection of the LED manufacturer, the RealTerm design team can explore what options the City has in terms of deploying "pre-dimmed" fixtures in certain locations.

We also ensure each LED fixture is full cut-off to minimize light pollution as recommended by the International Dark Skies Association (IDSA), and we require each fixture to be "controls ready" utilizing the ANSI C136.41 photocell receptacle to provide the City the option of adding smart controls either at the time of installation or in the future.

4.4. Smart City Consultation

We appreciate that the City is considering smart city technology, and we believe a streetlight network provides an excellent base on which to build a platform for consolidating data from the field and distributing information where it is needed. This is above and beyond the many benefits of adding Smart Controls themselves, which includes scheduling control and dimming, automated outage notifications, asset management, and ability to respond to resident concerns.

Some of the many Smart City applications include:

- Road Temperature Sensors – Optimize sand/salt applications and ensure roads are safe for travel.
- Electrical Vehicle Chargers – Address the increasing number of electrical vehicles across the country.
- Public Wi-Fi – Support for local businesses, underserved areas, and in-home learning for school children
- 5G Small Cell – Support for private LTE (CBRS) and/or to monetize densification of 5G by larger cellular carriers.
- Air Quality Sensors – Monitor air quality levels at schools, parks, and areas where vehicle congestion/idling can cause unsafe breathing conditions.
- Sewer/Water Level Sensors – Monitor and alarm for flooding conditions or potential water main breaks.

The number of applications making use of this platform will only grow over time, so the network platform must be able to evolve to the ever-increasing growing data and speed requirements. This capability positions the City to provide additional energy and greenhouse gas reductions, reduced maintenance costs, and a City-wide network for other Smart City applications to enhance the livability for residents and visitors.

While these technologies offer exciting opportunities to the City, challenges will always remain, and our Smart City team will be able to assist you with navigating the features and benefits that would be most useful and cost effective.

4.5. Fixture Selection

An impartial procurement process is a critical part of a successful LED conversion project, particularly with regards to fixture selection. Only through a careful analysis of multiple fixtures can the City of Bath be ensured that the optimum solution is chosen for their project. Our team works with the City to first identify its needs and capacity, and then competitively select equipment and installation services to address those needs.

There are marked differences among luminaries and a fixture that is right for one municipality may not be appropriate for another. Selecting from top tier manufacturers that have incorporated the latest improvements in luminaire technology will ensure that the municipality has the best lighting for years to come.

We produce a detailed evaluation with product recommendations based on a robust set of criteria, including price, failure rate and IP ratings. A sample evaluation summary is illustrated in the table.

Please note that the evaluation criteria and weighting can be customized to fit the needs of the City.

Score Category	Score Weighting	Fixture #1	Fixture #2	Fixture #3	Fixture #4	Fixture #5
Weighted Scenario 1: Photometric Prioritization						
Photometric Score	50	50	43	28.9	39.2	45.6
Cost Score	25	24.7	25	23.1	24.7	24.2
NPV Score	25	21.2	25	19.4	22.5	19.4
Total Score	100	95.9	93	71.4	86.4	89.2
Weighted Scenario 2: Equal Prioritization						
Photometric Score	33.3	33.3	28.6	19.2	26.1	30.4
Cost Score	33.3	32.9	33.3	30.8	23.9	32.2
NPV Score	33.3	28.3	33.3	25.9	30	25.8
Total Score	100	94.5	95.2	75.9	89	88.4
Weighted Scenario 3: Net Present Value Prioritization						
Photometric Score	25	25	21.5	14.4	19.6	22.8
Cost Score	25	49.4	50	46.2	49.4	48.3
NPV Score	50	21.2	25	19.4	22.5	19.4
Total Score	100	95.6	96.5	80	91.5	90.5

4.6. Investment Grade Audit

An Investment Grade Audit (IGA) reveals all when it comes to your project. It is a detailed energy audit that presents the financial benefits generated, energy savings achieved and the return on investment from converting the City's streetlights to LEDs.

At RealTerm Energy, we use our unique advanced methodology and processes to produce an investment grade analysis of your current streetlight system's performance that compares the status quo with the post-conversion LED system.

The IGA is a comprehensive report that can be used as a helpful tool for communicating and summarizing the advantages of the LED conversion to non-expert decision-makers, stakeholders and community members.

Once the materials and installation contractor are selected and the photometric designs are complete, RealTerm Energy produces an IGA Report that provides:

1) A complete analysis of the City's current streetlight infrastructure's performance. This includes both energy consumption and operating costs and is established as the Baseline.
2) A comparison of the projected energy consumption associated with the post-conversion LED system. It uses data from field surveys conducted, confirmed pricing from suppliers and installers, and the specified LEDs following photometric designs.

This report is based on precise, fixture-by-fixture inventory and design, and provides the optimal fixture types, wattages, light distributions, dimming profiles (if applicable) and quantities for approval by the City in preparation for procurement. Should the 1-1 approach be taken, an IGA based on the existing CMP data and the 1-1 LED replacement BOM can be prepared.

4.7. Financing Analysis

A properly structured streetlight conversion will go a long way to alleviating the pressures on the City's finances, while at the same time providing better, safer, and more aesthetically pleasing lighting for your residents, which will help stimulate commercial activity.

RealTerm will analyze finance options available to the City for the LED conversion, specifically self-financing or bonding, tax exempt lease or municipal lease-purchase loans, and energy performance contracts. This will consider typical interest rates, analysis for various typical lengths of term, payback periods and return on investment.

We can provide consultation on the costs and benefits of using each of the following financing options.

- Energy Performance Contract (EPC)
- Design, Upgrade and Transfer (DUT), where the City provides the financing
- Tax Exempt Lease-Purchase Agreement (TELP)
- Smart Infrastructure As A Service (SiAAS), where we can incorporate smart city devices to best meet the City's requirements while using a TELP).

Many of our latest projects have been accomplished using Tax Exempt Lease Purchase (TELP). Because the lenders are exempt from paying federal taxes on their funds, the rates are considerably lower than conventual borrowing rates, and in fact rival municipal bond rates once all of the setup costs are accounted for. This form of financing is a common way for most municipalities to finance fleet vehicles, schools, and other civic infrastructure.

RealTerm Energy can facilitate the introduction to its preferred third-party TELP financer, but it will be the responsibility of the City to complete all administrative tasks in collaboration with the TELP financer.

4.8. Installation

We have ongoing communication with our clients before, during, and after the installation process to minimize disruption to traffic, cyclists, and pedestrians while adhering safety standards and maximizing the efficiency of installation crews.

Installation Oversight

RealTerm's Project Manager will be responsible for all project activities and installers and will outline installation protocols and provide necessary training to the installation teams. This ensures all work is done to the highest standards and is fully documented. Procedures are worked out in advance to ensure safety, guarantee compliance with municipal, state and federal regulations, and establish guidelines for handling exceptions and reporting problems.

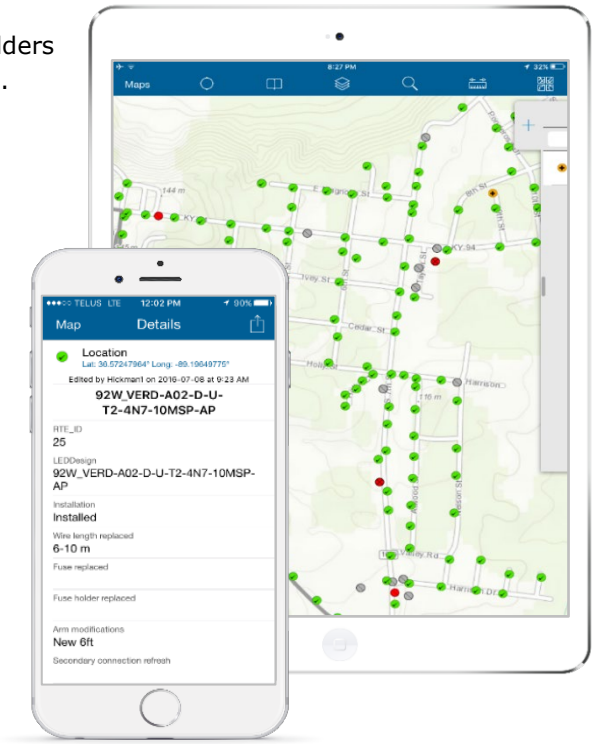
The installation team aims to:

- Minimize disruption to traffic, pedestrians, and residents
- Maximize safety and environmental standards
- Minimize the installation timeline
- Maximize productivity

All installation personnel will use RealTerm Energy's customized GIS streetlight app, which builds on the GIS survey and design data. Use of this app is extremely important as it tells the installation crew which LED luminaire to install at each individual location and confirms what has been installed and removed.

The installation team can also use the app to view and/or record any streetlight infrastructure that requires a return trip for corrective action. The app allows the installation team to build on the data that was captured during the GIS audit phase.

In addition, team members and any municipal stakeholders can review project progress in real-time via a web-map.

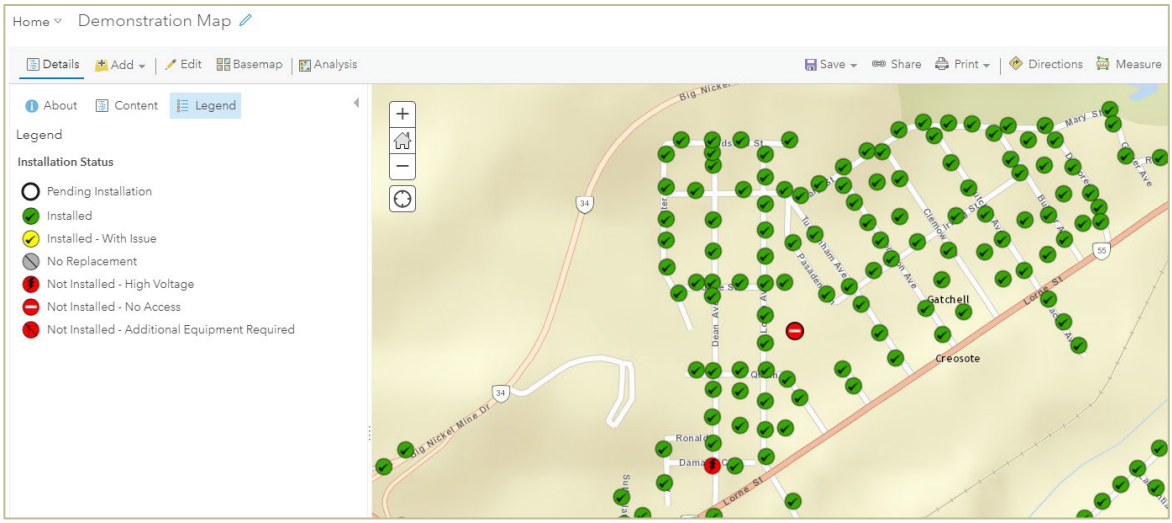


The key aspects of the installation phase include:

- Pre-installation training to installation teams
- Traffic management
- Environmental management
- Progress reporting
- Invoice review and processing
- Change order management
- Utility billing / rate changes
- Incentives and/or rebates application and processing
- Ongoing quality control and spot-checks
- Inventory control
- Continuous data reconciliation
- Post-installation training to City staff

Tracking Individual Teams or Installation Districts

Each fixture can be tracked through the application, both the map and dashboard can be filtered to show the information you are looking for. Each installation team will receive a unique login credential, which allows the software to keep track of who installed each fixture. Below, an example of an installation map used by two installers. Additionally, filters and map icons can be setup to showcase different attributes. For example, each fixture can be assigned to a specific district, so it is easier to visualize the data.



The daily information also allows all parties to monitor the rate of installation of the luminaires by crew, to track their speed and efficiency. This allows advance notice of any requirement to engage more crews if necessary, or to support slower crews to ensure that the job proceeds on schedule.

Safety

RealTerm Energy provides and maintains a safe and healthy work environment, always employing industry best practices in full compliance with legislative requirements. In all our projects, we strive to eliminate any foreseeable hazards to prevent personal injuries/ illness, security losses and damage to property. We ensure that our selected electrical contractor has met the licensing and legislative requirements specific to the state and attends the client's Safety Orientation meeting whenever available. We also conduct a step-by-step safety orientation training module with the contractor before installation begins which is in line with all applicable OSHA standards.

We are proud of our safety record after installing over 300 000 fixtures. To date, none of our workers, contractors, or local citizens have been injured on the job. We will continue to be diligent to maintain this enviable safety performance.

4.9. Construction Administration

Completion of the project commissioning will occur at the end of the installation phase to quickly address any errors, punch list items, or troubleshooting needs.

RealTerm can quickly validate the installation data against the reconciled and approved GIS audit data, allowing our team to identify any locations where the data is inconsistent quickly and accurately. This ensures tremendous precision that establishes a finite subset of the installation locations that require additional review and/or a return trip with an installation crew.

Upon completion of the contract, RealTerm Energy will transfer an electronic Commissioning Binder to the City. This ensures that you and your team have all complete and necessary information going forward. This will include but is not limited to:

Closing and Contractor letters	Disposal approvals
Luminaire and controller warranties	Lighting designs (if applicable)
All collected metadata on the streetlights and their LED replacements	Final installed mapping (ESRI, KMZ and Excel Spreadsheet Format)
Insurance	Emergency contact details of our key staff
Final incentive and/or rebate application documentation	Billing change confirmation from the utility

As part of the project's closeout phase, RealTerm Energy is prepared to train the City's relevant staff in all aspects of routine operation, maintenance, and safety.

4.10. Municipality Acquisition Support

RealTerm Energy supports local ownership. When municipalities gain control of their streetlight assets, they reduce energy and O&M costs, improve operating efficiency, and take advantage of new emerging "smart" technologies.

RealTerm Energy can assist the City in the purchase and acquisition of its streetlights from Central Maine Power (CMP). We have worked with more than 35 municipalities that are in CMP's service territory, so we are well versed in the process.

RealTerm Energy's acquisition services include the following:

- Guidance in determining the steps required for the acquisition process
- Assessment of cutover costs
- Facilitation in transfer of ownership

The following describes the steps involved in acquiring your streetlights from CMP.

1. Once the City is ready to move forward with the acquisition, they need to submit the Notice of Intent and request the new Net Book Value.

2. CMP will prepare the Customer-Owned Street Light Agreement, prepare the Net Book Value detail to send to the City.

3. The City will sign, scan, and return the Agreement to its CMP Account Manager.

4. CMP will prepare the invoice and send the City the instructions for where to send the payment.

5. When the payment is received, the City will own the fixtures.

6. CMP will send the attached documents back with the applicable signatures along with a workflow spreadsheet. This spreadsheet needs to be completed and returned in a designated timeframe as the replacements begin.

We aware the City has already initiated this process mainly steps 1 and 2 and a buyback (NBV) figure of $65,672 has been provided.

4.11. Rebates and Incentives

Incentives provide municipalities with a way to reduce the overall costs of their streetlight conversion without sacrificing the scope or quality of service.

Once designs have been confirmed by the City, our team processes and submits any necessary paperwork on the City's behalf to secure all available incentives, grants and/or rebates relating to the LED conversion project. Receipt of incentives is always dependant on Efficiency Maine approval, as well as the availability of funding.

As a Qualified Partner of Efficiency Maine, RealTerm Energy is very familiar with its incentive structure and process for exterior lighting and will ensure the City receives the maximum available incentives. Please note, you can search for RealTerm in the database under ESCO for provider type at this website https://www.efficiencymaine.com/at-work/qualified-partners/.

RealTerm Energy's extensive experience with incentive programs across North America has resulted in over $13 million in incentives for our clients.

4.12. Workmanship Warranty

RealTerm Energy requires all installation subcontractors to warrant all workmanship completed within the demarcation point for a period of one (1) year following the completion date of the installation. All outages related to workmanship issues will be fixed for no additional cost during the Workmanship Warranty period.

Material including fixtures, photocells and smart controls are normally covered by their manufacturer's ten (10) year warranties. For on-going other maintenance services, RealTerm can manage all the various maintenance components as listed below under a separate contract:

- **Map-based online outage reporting system**
    - Simplifies the reporting, dispatch and repair of any streetlight issues
    - Maintains the accuracy of your GIS database by updating all repair work as performed
    - Creates an outage map for the EC detailing equipment needed for on-site repairs
    - Allows for the complete tracking of repairs throughout the process

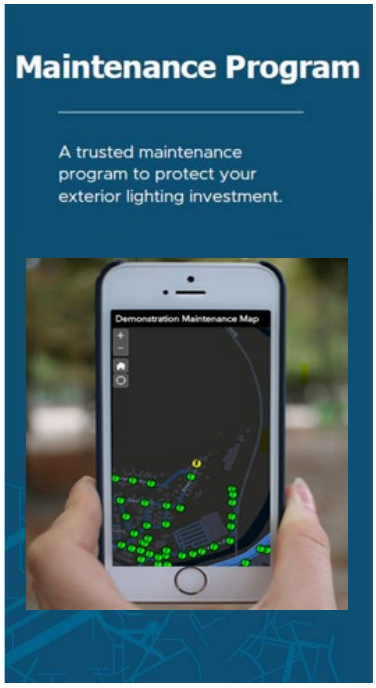
- **RMA (Return Merchandise Authorization) Services**
    - Minimizes any work requirements of municipal staff to prepare, submit, and track RMAs.
    - Completes RMA for any products under warranty and provides the required materials for shipment
    - Supervises and tracks returns until they are completed, and new products returned to the City.

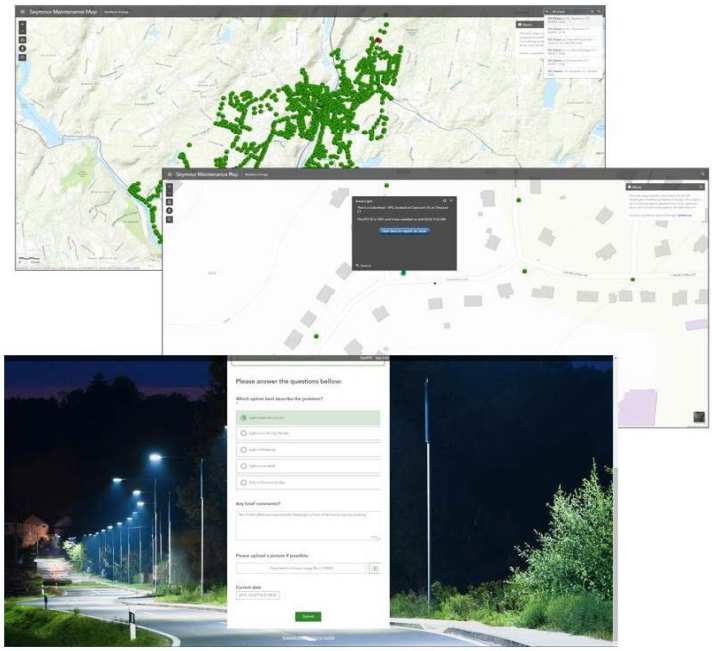
Web-based Maintenance Management System

At all times the City will have access to the Team's web-based maintenance management system for easy access and reporting. During the installation phase of the project, this map and database has already been created and updated as the installation progresses. Our maintenance program builds upon this information, which contains a complete description of each luminaire and control node, its location and all work performed during the installation.
RealTerm Energy uses a map-based online outage reporting system which:

- Simplifies the reporting of any streetlight issues
- Maintains the accuracy of your GIS database
- Creates outage map for EC detailing equipment needed for repairs
- Allows tracking of repairs throughout the process

RealTerm is currently managing a number of ongoing maintenance projects in Maine including for the Towns of Gorham, Falmouth, Cumberland, Oxford, and Mars Hill among others.





5. PROJECT SCHEDULE

RealTerm Energy is committed to delivering projects on budget and on schedule to the complete satisfaction of its clients. Our extensive experience working on LED streetlight conversion and our clear understanding of what is required ensures the project is successful. As stated in the RFQ document, if a notice to proceed is issued in October 2022, we are confident that we can complete the project by end of April 2023. The following schedule provides an estimated time frame for the City.

Stage	Task	Plan Start	Plan End	Action By
Sales				
	Estimated Contract signed	3-Oct-22		RTE/Bath
	Estimated Kickoff Meeting	10-Oct-22		RTE/Bath
GIS				
	Estimated GIS Audit	17-Oct-22	24-Oct-22	RTE
	Estimated GIS QC and Data Processing	25-Oct-22	1-Nov-22	RTE
	Estimated Post Survey Package Sent to Bath	4-Nov-22		RTE
	Estimated Post Survey Questionaire Received Back from Bath	11-Nov-22		Bath
Streetlight Acquisition				
	Estimated Streetlight Acquisition from Utility	11-Nov-22	9-Dec-22	Bath
Selection of Equipment & Labor				
	Estimated Material RFP Launch Date	18-Nov-22		RTE
	Estimated Material RFP Close Date	9-Dec-22		RTE
	Estimated Material RFP Approval Date	16-Dec-22		Bath
	Estimated Installer RFP Launch Date	18-Nov-22		RTE
	Estimated Installer RFP Close Date	9-Dec-22		RTE
Photometric Design				
	Estimated Photometric Designs	21-Dec-22	11-Jan-23	RTE
	Estimated Photometric Design QC	12-Jan-23	19-Jan-23	RTE
IGA				
	Estimated Date IGA Sent to Bath	9-Feb-23		RTE
	Estimated IGA approval by Bath	23-Feb-23		Bath
Procurement				
	Estimated Procurement of fixtures and installation services	27-Feb-23	27-Mar-23	RTE
Installation				
	Estimated Installation of fixtures	3-Apr-23	19-Apr-23	RTE
	Estimated Installation End Date and Deficiency Clean Up	20-Apr-23	27-Apr-23	RTE
Commissioning				
	Estimated Billing Change to Utility Submitted Date	4-May-23	11-May-23	RTE
	Estimated Billing Change Approved by Utility Date	11-May-23	8-Jun-23	Central Maine Power
Project Close-Out				
	Estimated Close-out documents / Commissioning e-Binder	27-Apr-23	4-May-23	RTE

** Please note, all dates are estimates and may vary.

6. ESTIMATED PROJECT COST

6.1. Notes and Clarifications on Project Cost

The project cost is presented with two scenarios, the first being "Basic LED Upgrade" and the second is "Recommended LED Upgrade", both are described below.

The Basic LED Upgrade Scenario includes the replacement of the 21 Granville Tops with LED Retrofit kits (keeping the existing fixture housing), the rest of the inventory would be replaced with new LED luminaires. The installation budget would be based on head change and fuse kit (as per CMP requirement) supply and installation only. No other installation allowances would be included. This would be the most basic (minimal) and lower cost option to proceed with the LED upgrade.

The Recommended LED Upgrade Scenario includes the replacement of all fixtures with new LED luminaires (no retrofit kits used). Furthermore, the installation budget also includes allowances for: rewiring (25%), bracket replacement (1%), third-party quality control and a decorative site assessment (to review tenon requirements/mounting considerations), in addition to the fuse kit supply and installation. This would follow the recommended option to also upgrade certain components of the supporting lighting infrastructure as part of the LED conversion.

Additional Notes and Assumptions:

1. This Proposal includes the projected acquisition cost from CMP. The acquisition cost is provided solely for analysis purposes and is not included in RealTerm Energy's total project cost.
2. Before upgrade, the maintenance cost is included in the electricity cost. After the acquisition of the lighting system, the City will be responsible for the maintenance cost of the new LED lighting system. Post-upgrade LED maintenance is estimated at $12.00/luminaire/year. Estimated LED maintenance cost includes only the warranty maintenance cost of the luminaires and photocells/Smart Controls.
3. LED Technology Specified: Smart ready LED Fixtures: 7-PIN, Dimmable Drivers. Luminaire and Control Warranty: 10 years. Retrofit Kit warranty (basic option only): 7 years.
4. Total project cost does not include modification of fixture mounting, relocation of fixture, the replacement of the fixtures near high tension located in the restricted zone, upgrades to supporting infrastructure (unless otherwise listed), traffic controls/police details, any potential connection or disconnect fees by the utility and any applicable tax.
5. Energy escalation rate (annual): 3% and a maintenance escalation rate (annual): 2%.
6. Smart Controls Option includes hardware and installation, central management and connectivity fees for the first year. Smart controls option is presented for both the basic and recommended scenario.
7. Incentive calculated is based on Efficiency Maine's incentive at 0.30$/kWh saved in the first year, only for lights on municipal-owned poles, as per Efficiency Maine requirements (applied as an estimate to the full decorative inventory). Final incentive is subject to Efficiency Maine approval and availability of funds.

The Project cost is subject to change based on Audit, Photometric Design, and Feasibility Study (IGA) results including but not limited to Manufacturer and Electrical Contractor selection. All prices are based on indicative material and labor prices for the Central Maine Power service territory. Note that the basic and recommended options are provided for budgetary purposes. RealTerm Energy can work with the City of Bath on an open-book basis to define the final scope of work through an IGA report. Final structure of an open-book agreement to be reviewed and discussed at the contract negotiation stage.

6.2. Basic LED Upgrade Scenario

General Scope of Work & Project Cost

Quantity of Cobraheads:	600
Quantity of Decoratives/Floods:	46
Total Quantity of Fixtures:	**646**

Item	Estimated Total
LED Lighting Upgrade Project Cost:	**$ 197,019**
Incentives:	$ 9,312
Net Project Cost:	**$ 187,707**
Utility Acquisition Cost:	$ 65,672
Total Project Cost + Acquisition:	**$ 253,379**

Streetlight Inventory

Baseline Fixture Type	Sample LED Replacement	Quantity
Cobrahead Inventory		
Sodium Cut off 50W	20W_3000K LED Replacement 2890 approx. lumens	108
Sodium Open 70W	25W_3000K LED Replacement 3250 approx. lumens	1
Sodium Cut Off 70W	25W_3000K LED Replacement 3250 approx. lumens	168
Sodium Cut Off 100W	35W_3000K LED Replacement 4600 approx. lumens	14
Sodium Cut Off 150W	60W_3000K LED Replacement 7700 approx. lumens	8
Sodium Cut Off 250W	81W_3000K LED Replacement 10950 approx. lumens	1
Sodium Enclosed 50W	20W_3000K LED Replacement 2890 approx. lumens	160
Sodium Enclosed 70W	25W_3000K LED Replacement 3250 approx. lumens	87
Sodium Enclosed 100W	35W_3000K LED Replacement 4600 approx. lumens	19
Sodium Enclosed 150W	60W_3000K LED Replacement 7700 approx. lumens	22
Sodium Enclosed 250W	81W_3000K LED Replacement 10950 approx. lumens	7
Sodium Enclosed 400W	135W_3000K LED Replacement 17350 approx. lumens	1
Mercury Enclosed 400W	135W_3000K LED Replacement 17350 approx. lumens	4
SubTotal (Cobrahead)		**600**
Decorative/Flood Inventory		
Sodium Flood 250W	99W_3000K LED Floodlight 15010 approx. lumens	5
Sodium Flood 400W	129W_3000K LED Floodlight 19540 approx. lumens	9
Metal Halide Flood 175W	60W_3000K LED Floodlight 7500 approx. lumens	2
Sodium Special Granville Simple 70W	30W LED Retrofit Kit	1
Sodium Special Granville Simple 100W	40W LED Retrofit Kit	1
Halide Special Granville Simple 100W	40W LED Retrofit Kit	19
Sodium Special Hallbrook 70W	27W_3000K LED Teardrop Style 3500 approx. lumens	2
Halide Special Hallbrook 100W	38W_3000K LED Teardrop Style 4600 approx. lumens	1
Sodium Special Esplanade 150W	51W_3000K LED Teardrop Style 6000 approx. lumens	6
SubTotal (Decorative/Flood)		**46**
Total		**646**

Energy and Cost Savings

Parameter (Annual):	Before Upgrade	Post Upgrade	Savings	Savings (%)
Energy Consumption (kWh)	284,802	81,119	203,683	72%
Utility Cost	$ 115,439	$ 10,910	$ 104,530	91%
Maintenance Cost	$ -	$ 7,908	-$ 7,908	N/A
Total Street Lights Expenditures	**$ 115,439**	**$ 18,818**	**$ 96,622**	**84%**
Average Cost per Fixture	$ 179	$ 29	$ 150	84%

Payback and Net Project Savings

Project Payback:	**2.6 years**
20 Year Net Project Savings:	**$ 2,354,943**

Smart Controls Option

Quantity of Fixtures:	646
Net Adder for Smart Controls:	$ 74,722
Total Project Cost (Smart Controls):	**$ 271,741**
Incentives:	$ 9,312
Utility Acquisition Cost:	$ 65,672
Total Project Cost (Smart Controls) + Acquisition:	**$ 328,101**
Project Payback (Smart Controls):	3.3 years

6.3. Recommended LED Upgrade Scenario

General Scope of Work & Project Cost

Quantity of Cobraheads:	600
Quantity of Decoratives/Floods:	46
Total Quantity of Fixtures:	**646**

Item	Estimated Total
LED Lighting Upgrade Project Cost:	**$ 221,435**
Incentives:	$ 9,319
Net Project Cost:	**$ 212,116**
Utility Acquisition Cost:	$ 65,672
Total Project Cost + Acquisition:	**$ 277,788**

Streetlight Inventory

Baseline Fixture Type	Sample LED Replacement	Quantity
Cobrahead Inventory		
Sodium Cut off 50W	20W_3000K LED Replacement 2890 approx. lumens	108
Sodium Open 70W	25W_3000K LED Replacement 3250 approx. lumens	1
Sodium Cut Off 70W	25W_3000K LED Replacement 3250 approx. lumens	168
Sodium Cut Off 100W	35W_3000K LED Replacement 4600 approx. lumens	14
Sodium Cut Off 150W	60W_3000K LED Replacement 7700 approx. lumens	8
Sodium Cut Off 250W	81W_3000K LED Replacement 10950 approx. lumens	1
Sodium Enclosed 50W	20W_3000K LED Replacement 2890 approx. lumens	160
Sodium Enclosed 70W	25W_3000K LED Replacement 3250 approx. lumens	87
Sodium Enclosed 100W	35W_3000K LED Replacement 4600 approx. lumens	19
Sodium Enclosed 150W	60W_3000K LED Replacement 7700 approx. lumens	22
Sodium Enclosed 250W	81W_3000K LED Replacement 10950 approx. lumens	7
Sodium Enclosed 400W	135W_3000K LED Replacement 17350 approx. lumens	1
Mercury Enclosed 400W	135W_3000K LED Replacement 17350 approx. lumens	4
SubTotal (Cobrahead)		**600**
Decorative/Flood Inventory		
Sodium Flood 250W	99W_3000K LED Floodlight 15010 approx. lumens	5
Sodium Flood 400W	129W_3000K LED Floodlight 19540 approx. lumens	9
Metal Halide Flood 175W	60W_3000K LED Floodlight 7500 approx. lumens	2
Sodium Special Granville Simple 70W	24W_3000K LED Acorn Style 3600 approx. lumens	1
Sodium Special Granville Simple 100W	40W_3000K LED Acorn Style 5900 approx. lumens	1
Halide Special Granville Simple 100W	40W_3000K LED Acorn Style 5900 approx. lumens	19
Sodium Special Hallbrook 70W	27W_3000K LED Teardrop Style 3500 approx. lumens	2
Halide Special Hallbrook 100W	38W_3000K LED Teardrop Style 4600 approx. lumens	1
Sodium Special Esplanade 150W	51W_3000K LED Teardrop Style 6000 approx. lumens	6
SubTotal (Decorative/Flood)		**46**
Total		**646**

Energy and Cost Savings

Parameter (Annual):	Before Upgrade	Post Upgrade	Savings	Savings (%)
Energy Consumption (kWh)	284,802	81,093	203,709	72%
Utility Cost	$ 115,439	$ 10,906	$ 104,533	91%
Maintenance Cost	$ -	$ 7,908	-$ 7,908	N/A
Total Street Lights Expenditures	**$ 115,439**	**$ 18,814**	**$ 96,625**	**84%**
Average Cost per Fixture	$ 179	$ 29	$ 150	84%

Payback and Net Project Savings

Project Payback:	**2.8 years**
20 Year Net Project Savings:	**$ 2,329,615**

Smart Controls Option

Quantity of Fixtures:	646
Net Adder for Smart Controls:	$ 74,015
Total Project Cost (Smart Controls):	**$ 295,450**
Incentives:	$ 9,319
Utility Acquisition Cost:	$ 65,672
Total Project Cost (Smart Controls) + Acquisition:	**$ 351,803**
Project Payback (Smart Controls):	3.6 years