



Town of Fort Erie

Energy Conservation  
and Demand  
Management Plan

2019 - 2024

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# SECTION I - Introduction

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## Introduction

This report represents the Town of Fort Erie’s Energy Conservation and Demand Management Plan (CDM) for 2019-2024.

The report is a strategic plan which provides the basis for the Town to move forward on identifying and implementing improvements to our facilities and operations. The goal of reducing energy consumption and mitigating the environmental effects associated with energy usage.

The plan will assist the Town of Fort Erie in meeting its legislative requirements under the Green Energy Act (2009), which came into effect on January 1, 2012. Under the new regulation, public agencies are required to report annually on energy use and greenhouse gas (GHG) emissions, develop and implement energy management plans and report on the results.

A number of progressive and attainable goals are identified within the plan aimed at improving the environmental performance of the Town of Fort Erie over a 5-year term.

Each year, the municipality incurs over \$1.2 million in utility costs throughout our facilities and operations. Previous and future studies focusing on the management of utility expenditures are in the best financial interest of the Town of Fort Erie.



# SECTION II – Understanding and Context

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## Vision and Goals

Although energy conservation isn't specifically identified in the Town's 2019-2022 Corporate Strategic Plan, senior staff and members of Council have been supportive of numerous energy initiatives.

## The Green Energy Act (2009)

On January 1, 2012 the Green Energy Act (GEA) came into effect. Under the act, public agencies were required to report annually on their energy use and GHG emissions beginning on July 1, 2013. In addition to reporting total energy consumed and GHG emissions, municipalities report on GHG intensity (per square foot) and energy intensity (per square foot), by facility and by operation type. "Operation type" includes;

- Administrative offices
- Public libraries
- Cultural and recreation facilities
- Ambulance stations and facilities
- Fire stations and facilities
- Police stations and facilities
- Storage facilities
- Water and sewage treatment/pumping
- Parking garages

Starting July 1, 2014, public agencies were required to develop and implement 5-year energy conservation and demand management plans. Plans included;

- Goals and objectives for conserving energy, reducing energy and managing energy demand
- Proposed measures and the associated costs and savings estimates
- Timeframes associated with the energy conservation and demand management measures
- Confirmation that the plan has been approved by the Town's senior management (Council)

# SECTION III – Current State, Baseline & Opportunity

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## Energy Opportunity Assessment

Staff has undertaken an energy opportunity assessment to confirm the current state of operations, develop an energy consumption, demand and greenhouse gas baseline, and identify and quantify opportunities for improved performance for Town facilities.

The energy opportunity assessment comprised of a brief evaluation of utility consumption history, a walk-through of each Town-owned facility. Energy conservation measures (ECMs) have been identified and evaluated for possible application at each Town facility to reduce energy consumption.

## Portfolio Description

The Town has a diverse inventory of buildings, the following portfolio description provides context for the energy opportunity assessment and is consistent with the GEA reporting requirements:

### Administrative Offices

#### **Town Hall**

1 Municipal Centre Drive, Fort Erie

The Fort Erie Town Hall was constructed in 1995 in order to provide to the Town with greater administrative space. The 3-floor facility consists primarily of office and meeting space. The space within the building is conditioned by a boiler/chilled water system which is controlled by a Building Automation System (BAS).

### Public Libraries

#### **Centennial Branch**

136 Gilmore Road, Fort Erie

The centennial library was originally constructed in 1967, with an addition in 1979. The single floor structure is home to the Libraries administrative staff and is the largest circulation site as well. The facility also includes 2 community rooms which are used extensively throughout the year. The space is conditioned by 3 rooftop HVAC units.

#### **Crystal Ridge Branch**

89 Ridge Road South, Ridgeway

This branch of the Libraries opened in 1988. The main floor houses public space and a community room. The site also has a large, unfinished basement which is used as storage for excess materials. The facility is conditioned by 2 rooftop HVAC units.

#### **Stevensville Branch**

2508 Stevensville Road, Stevensville

A renovation to the Stevensville Memorial Hall in 2001 made room for the smallest branch of the Libraries. The space is conditioned by a single rooftop HVAC unit.

## **Cultural and Recreation Facilities**

#### **Crystal Ridge Arena**

109 Ridge Road South, Ridgeway

The seasonal, single-pad arena was constructed in 1974. The building has been extensively renovated, most recently in 1999, when dressing rooms and lobby space were expanded. Space is heated by an indirect HV system and radiant unit heaters.

#### **Leisureplex Arena**

3 Municipal Centre Drive, Fort Erie

The Leisureplex opened to the public in 1996. The building consists of 2 ice surfaces, one which operates year round, and a second which operates with ice for 9 months and hosts dry floor activities for the other 3 months of the year. The building boasts a large, bright atrium, an arcade, concession stand, pub and a sports shop. The facility is also home to numerous tenants. The space is conditioned by multiple rooftop HVAC units and radiant unit heaters controlled by a central BAS.

#### **Lion's Community Hall**

3 Municipal Centre Drive, Fort Erie

The community hall is situated within the Leisureplex arena; however, many of its events are hosted independent of arena operations. The 500 seat hall includes a full service kitchen, bar, separate meeting room and generous washrooms. The space is conditioned by 2 rooftop HVAC units.

#### **Stevensville Community Hall**

2508 Stevensville Road, Stevensville

Rebuilt in 1981 following a fire to the original structure, the site was further renovated in 2001 to include the Stevensville Branch of the public library system. The community hall can host events of up to 150 people. It includes a full service kitchen, bar and washrooms. The space is conditioned by a rooftop HVAC system.

### **Central Station Community Hall**

444 Central Avenue, Fort Erie

The new community hall within the Central Fire Station opened in 2013. The community hall and training room have a combined capacity of 100 people. The hall includes a full service kitchen, bar and washrooms. The community hall operates independent from the fire response services. The space is conditioned by indirect heat, split HVAC systems.

### **Railroad Museum**

411 Central Avenue, Fort Erie

The railroad museum site includes 2 former railway stations and one locomotive. The GTR B1 Station was originally constructed in 1873 and was moved to the current site in 1982. The Ridgeway Station was built circa 1900 and moved to the current site in 1975. The seasonal site operates daily from Victoria Day through to Labour Day annually.

### **Historical Museum**

402 Ridge Road North, Ridgeway

The limestone structure was originally constructed in 1874 and operated as Bertie Town Hall for almost 100 years. The building eventually became a museum in 1976 and was designated as a building of architectural and historical interest in 1988. The site still operates as a year round museum and also is the main office site for the 3 full-time museum staff. Additionally several part-time staff and numerous volunteers work at the site throughout the year. The space is conditioned by a rooftop HVAC unit.

## **Fire Stations and Facilities**

### **Fire Station #3**

1015 Dominion Road, Fort Erie

The privately owned 2 floor fire station was constructed in 1955. The Town leases the majority of the site for fire response equipment. The site houses up to 5 response vehicles and one additional wash bay. The second floor includes a training room, kitchen and private office space. The space is conditioned by 3 rooftop HVAC units and gas fired unit heaters in the truck bays.

#### **Fire Station #4**

398 Ridge Road North, Ridgeway

Originally constructed in 1955, the 2 floor building has served as a fire station for Ridgeway/Bertie Township for over 60 years. Housing 4 fire response vehicles, the station also has two cold storage bays in the rear of the site and a training room, kitchen and bar on the second floor. The space is conditioned by a furnace and radiant unit heaters in the truck bays.

#### **Fire Station #5**

2654 Stevensville Road, Stevensville

The station was originally constructed in 1955, then renovated and expanded in 2002. The one story structure houses up to 4 response trucks, and also has a small meeting room with commercial kitchen facilities. The space is conditioned by a furnace with split AC and radiant unit heaters in the truck bays.

#### **Fire Station #6**

271 Ridgeway Road, Crystal Beach

This small, single story structure was built in 1965. The building contains enough space for up to 4 fire response vehicles and includes a small training room, washrooms and a kitchen. The space is heated by a boiler through convector and radiant unit heaters in the truck bays.

#### **Fire Training Centre**

525 Industrial Drive, Fort Erie

The fire training tower was constructed in the 1980's. The classroom is capable of hosting training session of up to 24 people. A small addition in 2011 added updated washrooms and serving space to the classroom portion of the site. The space is conditioned by furnace and split AC system.

### **Central Fire Station**

444 Central Avenue, Fort Erie

Opening in 2013, the new fire station amalgamated the operations of 2 existing stations (#1 and #2) under one roof. The site includes truck bays for up to 8 pieces of equipment and training facilities. As well, the Fire Department administrative offices are housed here along with an independent community hall. The space is conditioned by indirect heat, split HVAC systems.

## **Storage Facilities**

### **Public Works Facility**

1818 Petit Road, Fort Erie

The John L. Gibson Centre public works building was constructed in 1993. The facility hosts the Town's public works operations, including; roads and drainage services, water/wastewater services, parks and cemetery services and fleet services. The building contains administrative offices, staff facilities, vehicle storage and repair and general storage space. The space is conditioned by 5 rooftop HVAC and gas fired unit heaters.

## **Summary of Current Energy Consumption**

Energy consumption baselines have been established in conformance with the GEA using historical data. All Town facilities have been grouped by type for reporting purposes and energy consumption profiles for each facility type have been developed; these include:

Administrative Buildings

Public Libraries

Cultural and Recreation Facilities

Fire Stations and Facilities

Storage Facilities

Additional details, including energy usage and GHG emissions, by facility, are included in Appendix A.

Figure 1 - Historical Electricity Usage (kWh)

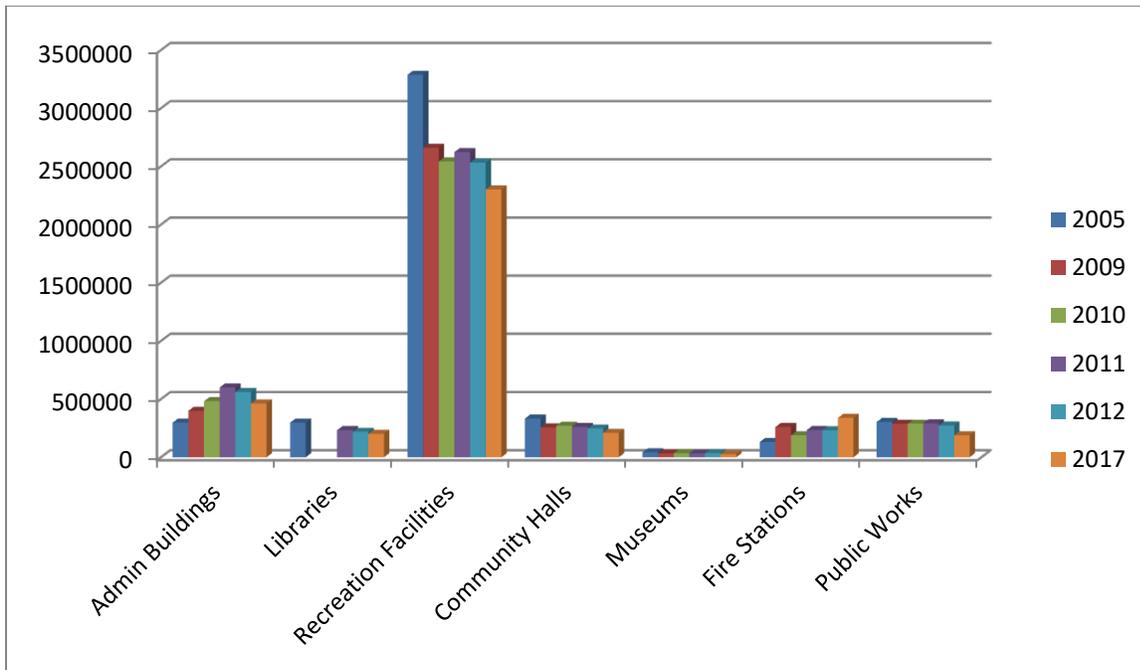


Figure 2 - Historical Gas Usage (Cubic Metres)

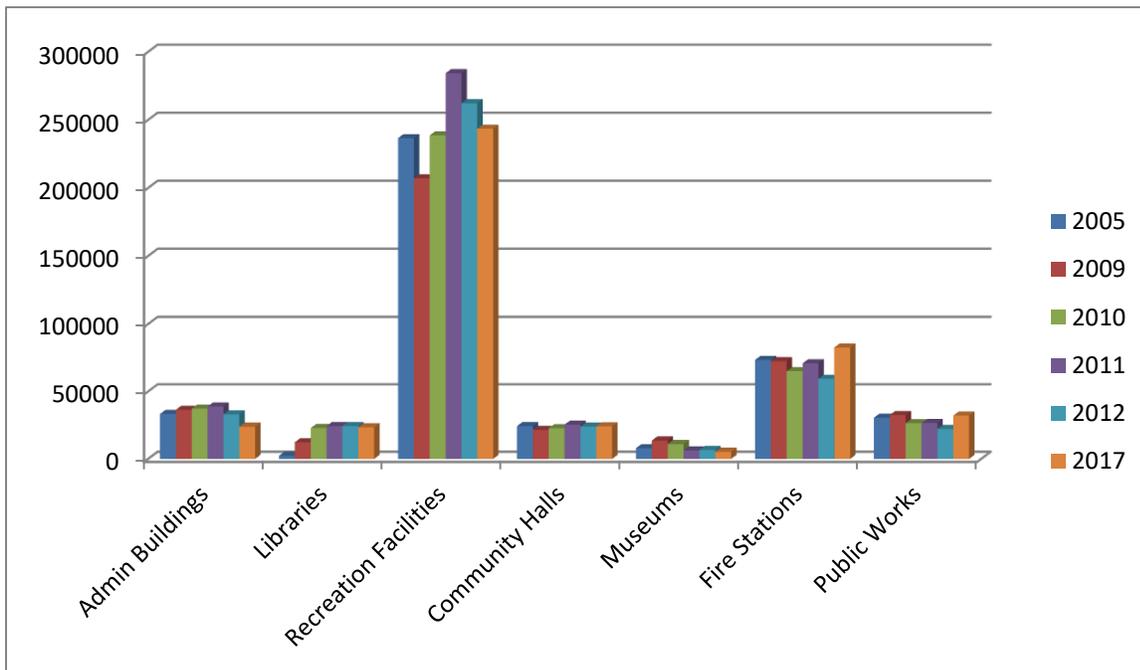


Figure 3 - Utility Distribution Across Fire Stations (2017 data)

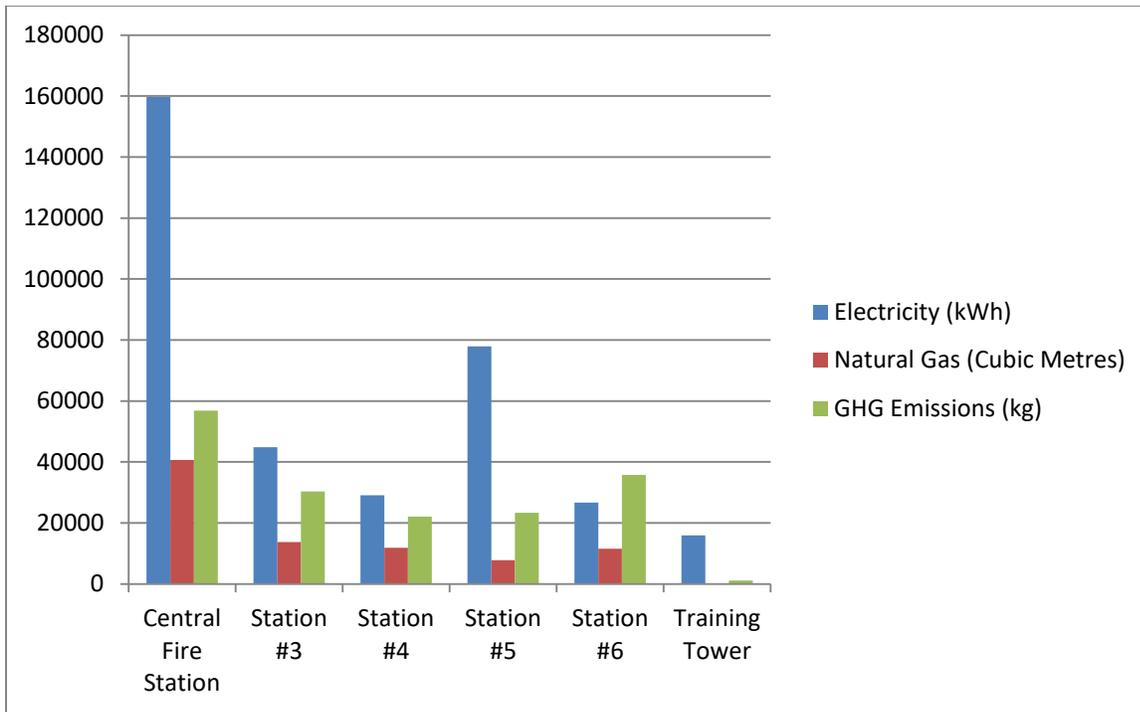
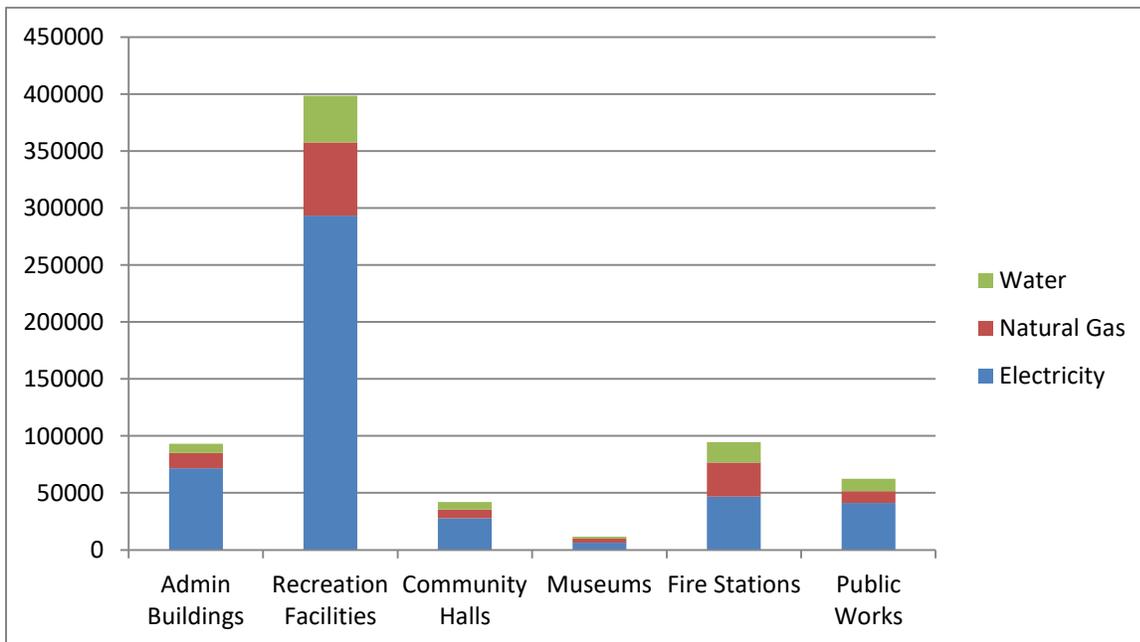


Figure 4 - 2017 Utility Costs by Operation Type



## **Trends in Energy Consumption**

Utility consumption varies based on many factors; facility usage, ambient temperature, human behavior, mechanical maintenance and upgrades, most of which can be mitigated through conservation efforts. Since forming in 2005, the Facilities Management division has been to analyzing and benchmarking utility consumption, initiating capital renewal programs aimed at improving energy efficiency and formalizing maintenance programs to optimize equipment operation. These efforts have led to electricity consumption reductions roughly equal to the annual utility rate increases. Natural gas rates have remained quite stable for the past 10 years requiring more modest conservation efforts to balance budget potential increases. The value of these past efforts continues to be realized today, however, the future of the utility markets is far more uncertain.

## **Summary of Current Technical Practices**

The Town of Fort Erie currently employs a number of routine technical practices which enhance energy conservation measures. The following list outlines a few guidelines staff uses when maintaining or upgrading our facilities.

### **Building Envelope**

- Current facilities are regularly inspected an air gaps sealed to reduce air loss.
- Building roofs are inspected, visually or with a thermal scan, prior to replacement. Any deficiencies are addressed during replacement, including; replacing damaged insulation or addition of insulation to improve heat retention/reflection.

### **Building Automation Systems**

- Existing BAS have been maintained and/or upgraded to ensure the optimal operation of the facility.
- New or replacement equipment is integrated into the existing BAS where applicable.

### **HVAC Replacement**

- Specification for replacement units include; energy star rating, R-410A refrigerant, variable speed drive motors (when applicable) and economizers.

### **Appliances and Office Equipment**

- Only energy star appliances and equipment are purchased (when available).
- All monitors and screens have been replaced with energy star LCD/LED/Plasma where applicable.

## Lighting

→ Replacement of all fixtures considers upgrades to the most efficient models suitable for the application.

→ The most efficient lamps are sourced for each fixture when replacing.

→ 98% of the facility light fixtures have been upgraded to LED.

→ Available OPA programs are applied for prior to all lighting upgrades.

→ Lighting controls are being analyzed and integrated during all lighting replacements. This method can often derive more energy savings than the actual fixture replacement.

## Heated Water

→ On-demand water heaters have been implemented in several applications and are considered during all replacements.

→ Replacement boilers are specified as high efficiency, modulating, direct vent models.

## Summary of Energy Conservation Measures

A walk-through assessment was completed at each of the facilities listed in the portfolio. A number of common and categorized energy conservation measures have been identified through these walk-throughs. The following table indicates what measures have been identified for each facility.

	Exterior lighting upgrade	Interior lighting upgrade	Interior lighting controls	Heated water upgrade	HVAC upgrades	Staff/Tenant Education
Town Hall	x				x	x
Centennial Library	x	x	x	x		x
Crystal Ridge Library	x	x				x
Stevensville Library				x		x
Crystal Ridge Arena						x
Leisureplex Arena	x		x			x
Lion's Banquet Hall	x				x	x
Stevensville Hall			x	x		x
Central Station Hall						x
Railroad Museum			x			x
Historical Museum	x			x	x	x
Fire Station #3			x	x	x	x

Fire Station #4						X
Fire Station #5			X		X	X
Fire Station #6			X	X	X	X
Training Tower	X					X
Central Station						X
Public Works Facility			X			X

## Previous Energy Initiatives

As a result of previous energy assessments, numerous energy initiatives have improved the efficiency of Town facilities. Since 2008, the Town of Fort Erie has received over \$130,000.00 in grants and incentives from the Ontario Power Authority (OPA). This grant funding was possible only with investments of almost \$450,000.00 towards energy efficiency projects including; lighting upgrades, HVAC replacements and equipment recommissioning. This combined investment of \$580,000.00 in Town facilities is earning an estimated electrical savings of over \$97,000.00 annually. Many other initiatives have also improved the overall efficiency of our facilities, including; roof insulation replacements, installation of several on-demand water heaters, window filming, motor rebuilds and lighting controls. Further savings have also been realized through the elimination on non-necessary utility accounts and invoice monitoring.

The Town has also completed a complete upgrade of all streetlighting to LED. This conversion was completed in 2016 at a cost of just under \$2.2 million. Annual energy savings of almost \$200,000 will provide a return on this investment over the lifespan of the new fixtures.

## SECTION IV – Action Plan

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The focus of the CDM is on short term, feasible actions that are achievable with minimal budgetary impact, timelines and responsibilities will be address during implementation phase. Actions that require funding will be considered as part of future budget processes. In addition, a 5-year facility action plan is presented at the end of this section with a distinct focus on energy conservation.

### Goals

The following list summarizes objectives that have been identified as a priority in attaining our goal of becoming a more environmentally responsible community partner. Where possible, estimated annual savings have been included.

- Mechanical system re-commissioning to ensure optimal performance of systems.
- Mechanical upgrades to reduce energy consumption.
- Maximizing external funding opportunities related to energy improvements.

## 5-Year Facility Action Plan

1. Renewable Energy Generation – Investigation and implementation into various renewable energy opportunities will be explored. Roof capacity limitations will ultimately determine the energy production capabilities of the system and lifespan of the array.
2. Re-commissioning of Mechanical Systems – Mechanical systems should be re-commissioned or upgraded every 15 to 20 years.
3. Mechanical Unit Upgrades – various mechanical systems will be upgraded through future capital projects. The capital forecast lists several upgrades to equipment at Town Hall, the Leisureplex, Fire stations and the Gibson Centre.
4. Lighting Upgrades – Numerous lighting upgrades have been undertaken over the past 5 years with the assistance of external funding opportunities. Further upgrades will be conducted as technology improves and fixtures age.
5. Whole Building Improvements – The 2020 capital program includes funding for a new fire station in Ridgeway Crystal Beach. This new station will improve all aspects of building efficiency from the existing stations. Roof replacements at the Leisureplex will also improve the building envelope and heat retention.
6. Demand Management – Investigate opportunities to participate in demand management programs for a possible fit within our operations. Annual savings will be based on the surplus demand that can be shaved during peak call times and the current electricity rates.

# SECTION V – Implementation

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## Oversight

A multidisciplinary staff-based steering committee was established to oversee the development of this plan. It is recommended that this committee continue to meet on an annual basis to continue to manage the development and execution of the action plans. This committee is comprised of representatives from:

Infrastructure Services

Corporate Services

Fire Services

Museum Services

Library Services

## Renewal Cycle and Reporting

This is the first version of the CDM, it is recommended that the GEA portion of the plan be updated annually to comply with reporting requirements. The CDM has to be update on or before July 1<sup>st</sup>, of every fifth anniversary or as required by the GEA. Facilities Management will continue to provide updated reports as required by the Green Energy Act, posting each on the municipal website for public availability.

## Monitoring and Measurement

As the 5-year CDM is implemented, accurate accounting of energy demand and consumption will be required to sustainably satisfy the annual GEA reporting requirements. In addition, monitoring and measuring consumption will allow the Town to communicate successes to stakeholders.

## Resource Implications

The actions in the plan are staggered for implementation over a 5-year timeframe. They have been developed to mirror the capital budget forecast of the various Town departments to ensure an allocation of funding for each action is identified. Facilities Management will administer the actions of the plan in collaboration with staff from various other Town departments.

# APPENDIX A – 2016 Summary of Energy Usage and GHG Emissions

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<b>Operatin Name</b>	<b>Operation Type</b>	<b>Bldg Size (sq. metre)</b>	<b>Electricity (KWh)</b>	<b>Natural Gas (cubic metres)</b>	<b>Greenhouse Gas (Kg)</b>	<b>Energy Intensity eKWh/Sq. ft)</b>
Crystal Ridge Arena	Indoor ice rinks	2,601	339,761	34,987	78,225	25.42
Crystal Ridge Branch	Public libraries	519	57,727	8,847	18,778	27.16
Fire Station #3	Fire stations	1,115	45,600	11,777	23,887	14.23
Fire Training Centre	Fire stations	113	17,551	594	1,747	19.62
Fort Erie Town Hall	Administrative	4,246	482,375	21,401	57,609	15.53
Gibson Centre Public Works Facility	Storage facilities	2,123	185,424	32,037	67,161	23.01
Stevensville Memorial Community Hall	Community centre	883	67,080	6,138	13,989	13.92
Centennial Branch	Public libraries	1,317	132,637	12,779	28,875	18.94
Central Fire Station	Fire stations	1,239	159,480	34,094	70,128	39.13
Fire Station #4	Fire stations	418	28,758	8,229	16,580	25.83
Fire Station #5	Fire stations	710	82,349	7,627	17,347	21.38
Fire Station #6	Fire stations	511	27,410	11,685	23,066	27.56
Historical Museum	Cultural facilities	441	21,698	4,991	10,207	15.75
Leisureplex Arena	Indoor ice rinks	11,892	2,074,452	193,309	439,218	32.26
Railroad Museum	Cultural facilities	171	10,056	618	1,526	9.03
	<b>Totals</b>	<b>28,299</b>	<b>3,732,358</b>	<b>389,113</b>	<b>868,345</b>	