THE CITY OF WINDSOR

CORPORATE ENERGY MANAGEMENT PLAN 2014 - 2018

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City of Windsor
Energy Initiatives Unit
Asset Planning Division

City of Windsor

Corporate
Energy Management Plan
2014 - 2018

Prepared for the City of Windsor

June 9, 2014

Prepared by:

City of Windsor

Energy Initiatives Unit

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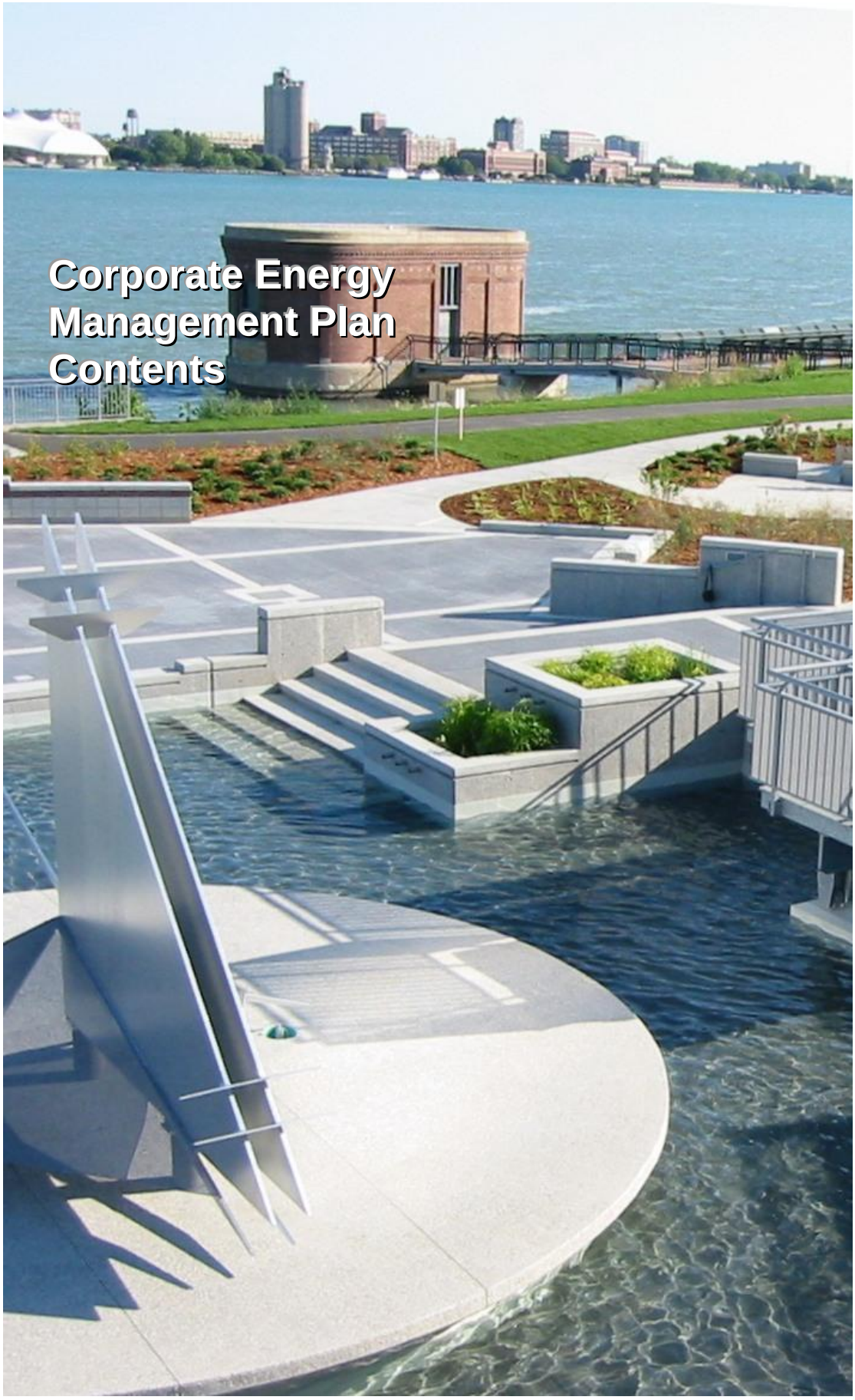

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Section 0
Acronyms, Abbreviations & Definitions

Acronyms and Abbreviations:

BAS – Building Automation System
BEPI – Building Energy Performance
CHP – Combined Heat and Power
CSA – Canadian Standards Association
eCO_2 – Carbon Dioxide Equivalent
ekWh – Equivalent kilowatt-hour
EMIS – Energy Management Information System
EMP – Energy Management Plan
FIT – Feed-In-Tariff
GA – Global Adjustment
GHG – Greenhouse Gas
HOEP – Hourly Ontario Electricity Price
HPS – High Pressure Sodium
HVAC – Heating, Ventilation and Air Conditioning
IESO – Independent Electricity System Operator
kWh – Kilowatt-hour
LDC – Local Distribution Company
LED – Light-Emitting Diode
m^3 – Cubic meters
ML – Million liters
MWh – Megawatt-hour
NHL – National Hockey League
OHL – Ontario Hockey League
OPA – Ontario Power Authority
PSUI – Process and Systems Upgrade Initiative
PV – Photovoltaic
RFQ – Request for Quotes
TSSA - Technical Standards and Safety Authority
VFD – Variable Frequency Drive
WFCU – Windsor Family Credit Union Centre
WIATC – Windsor International Aquatic and Family Centre

Section 1
Executive Summary

1.0 Executive Summary

1.1 Introduction

This Energy Management Plan (EMP) is prepared in compliance with Ontario Regulation 397/11 of the Green Energy Act 2009.

Energy conservation and the strategic management of energy usage are critical steps in contributing to reducing the effects of Greenhouse Gas emissions on the environment, ensuring a reliable energy supply and securing a sustainable community.

The Corporate Energy Management Plan contained herein supports both the Community Strategic Plan and the Corporate Strategic Action Plan, Environment Pillar – "Our Environment Clean and Efficient". It is also aligned with the Municipal Environmental Master Plan, Goal D – "Use Resources Efficiently: To increase resource efficiency, conserve water and energy and reduce waste".

The purpose of the EMP is to create a flexible living document that sets goals, strategies and initiatives to reduce energy consumption and greenhouse gas emissions.

While Ontario Regulation 397/11 requires the EMP to be updated at the end of the five-year period (2014 – 2018), Administration will be providing City Council with annual updates commencing July 2015.

1.2 Key Energy Successes

A. Energy Efficiency Improvements

The implementation of recommendations resulting from initiating energy audits and studies will generate the following savings / reductions throughout 2014 – 2015:

- Annual projected electricity savings – 4.2 million kWh or 5.3% based on 2013 consumption
- Annual projected electricity cost savings – $509,000 or 4.6% based on 2013 electricity costs
- Annual projected natural gas savings – 144,000 cubic meters
- Annual projected natural gas cost savings – $26,600
- Annual GHG emissions reduction – 1,220 tonnes

B. Combined Heat and Power (Embedded Generation)

The installation of a cogeneration plant at the WFCU Centre could produce sufficient electricity to reduce the need for power from the provincial grid by approximately 6.9 million kWh annually which represents 86% of 2013 consumption. In addition, the system will generate the equivalent energy of 600,000 cubic meters of natural gas or 68% of the facility's current thermal needs.

C. Streetlights Conversion to LED

Converting the City's over 23,500 street lights from HPS to LED lamps will reduce electricity consumption by over 5 million kWh or 6.5% of the corporation's annual electricity usage while saving over $1 million in utility

costs. In addition annual streetlight maintenance costs will be reduced by over $900,000 as the lamp recycling program will increase from once every five years to once in fifteen years.

D. Energy Awareness and Education Campaign

Stressing the importance of staff participation in energy related efficiency measures, whether it's the installation of a new technology or simply turning off office lights and computers, cannot be overstated. Studies have shown that engaging staff working within a facility (as occupant or operational staff) where an education awareness campaign was implemented, coupled with the implementation of energy efficient technologies, resulted in energy savings as high as 15%.

The Corporation will be rolling out a phased approach to an energy awareness and education campaign beginning the second half of 2014. Administration is anticipating a 1.5% decrease of overall energy consumption over the next eighteen months, with expectations to expand the programs as deemed appropriate.

E. Renewable Energy

The City began its renewable energy program in 2011 with the installation of three solar thermal water heating systems at the following outdoor pools - Mic Mac, Remington Park, and Lions (Lanspeary), saving approximately 35% of natural gas consumed during the summer months.

Currently a 350 kW photovoltaic array is being built on the roof of the Windsor International Aquatic and Training Center. When completed in the Fall of 2014 the system will generate approximately 500,000 kWh of electricity annually for the next 20 years, under contract with the Ontario Power Authority, earning the City a yearly average income of $250,000.

Recently the City successfully completed the initial vetting process for the installation of three additional PV systems under OPA Contract FIT 3.0. Should these contracts be awarded and approved by City Council the combined installed capacity would exceed 1.2 MW with an electricity output of approximately 1.7 million kWh and an income of $560,000 annually.

F. Future Opportunities

The Energy Management Plan is a living document and will continue to evolve throughout and beyond the 2014 – 2018 timeframe. Surveys indicate most Ontarians have concerns about the cost of energy whether its personal home or business use. The City has an opportunity to lead by example to conserve and use energy wisely through the implementation of new technologies in concert with educational efforts to create an overall culture of energy conservation, both at home and in the workplace.

It is estimated that future energy efficiency measures identified in the current plan will benefit the City by an additional 4.3 million kWh of electricity, and 240,000 cubic meters of natural gas reductions, representing $494,000 in cost savings.

G. Consumption Reduction and Price Volatility

The ongoing evolution of the Energy Management Plan demonstrates the City has and will continue to employ strategies that will both reduce consumption and generate cost savings. However, there is a caveat that must be recognized, which is the risk of volatile energy price increases, in particular electricity. This risk which is unpredictable can negate all or part of the financial benefit resulting from energy consumption reductions. In

other words while the City is experiencing a decrease in consumption, a corresponding decrease in costs is not a certainty and will ultimately be a function of price volatility. This caution has been substantiated by the electricity consumption reduction of 2.6 million kWh experienced during the period 2011 to 2013 while realizing an electricity cost increase of $940,000. Without this electricity consumption reduction of 2.6 million kWh, however, the City would have experienced an additional increase in cost of approximately $360,000 based on 2013 prices.

Implementing the above identified measures, which are projected to reduce consumption by approximately 16 million kWh by 2015, may not result in the anticipated $2.2 million in savings particularly if electricity prices continue to trend at 8-10% annual increase as projected by the Province. On a go forward basis it may be more practical to describe cost savings in terms of cost avoidance.

H. Energy Data Management

To efficiently manage energy use requires effective monitoring systems that provide accurate real time feedback. An energy monitoring and management information software integrated with various existing and future BAS and sub-metering systems, will optimize the management of energy resources.

To achieve this objective Energy Initiatives / Asset Planning will be working with Information Technology and Parks & Facilities Departments to explore the best solution for an enterprise wide integration of systems and energy management software.

I. Greenhouse Gas Emission Reduction

The City's efforts to achieve both energy and cost savings also result in another equally important outcome – reducing City's carbon footprint by reducing GHG emissions. Identifying carbon dioxide (CO_2) emissions reduction by translating abstract measurements into everyday terms can be a helpful reference. By implementing measures contained in the EMP, GHG emissions can be reduced by approximately 4300 tonnes which are equivalent to the following:

- Taking 905 vehicles off the road, or
- Driving 10.2 million vehicle miles, or
- Electricity annual usage of 591 homes, or
- Carbon sequestered effect of 110,256 tree seedlings grown for 10 years.

Section 2
Corporate Energy Management Plan

2.0 Corporate Energy Management Plan

2.1 Introduction

The Ontario Provincial Government has committed to assist the broader public sector to better understand and manage their energy consumption. As part of this commitment, Ontario Regulation 397/11 under the Green Energy Act 2009 requires public agencies, municipalities, municipal service boards, school boards, universities, colleges, and hospitals to:

a) Report on energy consumption and greenhouse gas annually beginning July 1st, 2013 (commencing with 2011 energy data).
b) Develop and implement Energy Management Plans starting July 1st, 2014.

Ontario Regulation 397/11 focuses on the need to understand how and when buildings and facilities use energy. By adopting this regulation the Administration will be better able to discover opportunities for improving efficiency, decrease consumption and ultimately generate cost savings / cost avoidance opportunities.

Managing the corporation's $15 million annual utility costs requires clear strategies for our technical systems, operational staff and occupants. Having an energy management plan helps to identify goals and systematically works to achieve them.

The outline below is the framework for the Corporation's Energy Management Plan (EMP) which provides a simple systematic approach that will enable administration to better understand our current energy use, and what influences consumption as well as the opportunities available to reduce that use. It is intended to be a road map for the period 2014 – 2018; whereby best practice energy management will be incorporated to deliver energy savings in an effective and flexible manner.

2.2 Corporate Vision

The City of Windsor will continue to reduce energy consumption and mitigate costs through the wise use of energy. This will involve a collaborative effort to increase conservation awareness and better understanding of energy management within the Corporation.

2.3 Goals and Objectives

In order to safeguard the success of the strategic direction of the Energy Management Plan, there are a number of goals and objectives that align with its development and implementation. The goals and objectives identified below will act as a guide and provide a common focus and direction for the Plan:

- Achieve a 10% reduction in overall energy consumption over the five-year (2014 – 2018) timeframe of the EMP.
- Improve financial accountability achieved through savings and cost avoidance that will lead to both direct and indirect annual corporate savings.
- Develop a broad-based corporate awareness and commitment.
- Become a leader in energy conservation and demand management among municipalities in Ontario.

- Integrate information systems and coordinate corporate programs to support energy related actions.
- Improve energy efficiency and environmental performance.

2.4 Energy Management Plan Context

The City of Windsor currently spends approximately $15 million annually in utility costs (electricity, natural gas, district heating and cooling, and water) based on 2013 data, and operates over 200 buildings of a variety of sizes, encompassing approximately 3 million square feet of space. With an ongoing commitment of time and dedicated resources for the implementation of the outlined management plan, administration believes that a significant amount of energy savings can be realized immediately and into the future of the five-year (2014 – 2018) plan.

Energy Management Plans can be developed by a variety of different approaches. For example:

a) Building by Building Assessment – This plan would identify saving opportunities in all buildings with the development of a prioritized list from the most to the least in consumption and cost reduction.
b) Payback Period – This plan would be driven by an optimized payback approach which will identify energy measures within a building with an associated estimated payback period. These measures can be prioritized from the most favourable in payback years to the least.
c) Goal Specific – This plan is driven by establishing improvement targets as a percentage of the energy usage or a percentage reduction of average enterprise wide energy intensity.

The energy management plan being developed herein is primarily a hybrid of “a” and “b” identified above, with a focus on the payback period as a means of prioritizing the measures to be implemented.

2.5 Energy Management Plan Components

The Energy Management Plan outlined in this report consists of the following components:

Historical Energy Consumption and Cost

This section of the report establishes the historical 2010 – 2013 energy use for electricity, natural gas, district energy and water. This data will be used as the benchmark to evaluate future actions, monitor results and set future targets.

Energy Saving Measures

This section of the report outlines energy consumption reduction opportunities through a wide variety of technical, behavioral, and organizational measures that will be implemented throughout the timeframe of the five- year plan 2014 – 2018. In addition, past energy reduction measures that were implemented in the years 2010 –2012 are identified.

Renewable Energy

This section of the report outlines renewable energy opportunities, such as roof mounted photovoltaic systems on City owned buildings.

Energy Management Plan Implementation

This section of the report summarizes the prioritization of the various energy efficiency measures being considered for implementation.

Monitoring and Evaluation

This section of the report recommends metering systems and energy management information software that provides analytical data that assists with decision making, identifying anomalies, optimizing daily operations, and evaluating achievements related to energy reduction targets.

Section 3
Energy Consumption and Cost

3.0 Energy Consumption and Cost

3.1 Historical Consumption and Cost Data 2010 – 2013

Energy management starts with understanding how and when energy is currently used. The scope of this report is limited to energy use of electricity, natural gas, water, and district heating and cooling.

Table 1 below identifies the annual consumption and corresponding costs for the period 2010 – 2013. The following sub-sections describe the energy and water consumption over this four year period.

Table 1 – Annual Energy Consumption & Cost 2010 – 2013

Utility	2010 Consumption	2010 Costs	2011 Consumption	2011 Costs	2012 Consumption	2012 Costs	2013 Consumption	2013 Costs
Electricity [kWh]	81,159,900	$9,215,300	83,428,700	$10,630,400	80,811,300	$10,387,900	80,875,500	$11,570,000
Natural Gas [m^3]	3,661,500 *	$1,138,200	4,353,200	$1,508,700	4,126,500	$1,133,200	4,918,800	$1,283,000
Water [m^3]	1,098,100	$1,597,300	753,100	$1,537,000	638,800	$1,292,300	499,500	$1,310,300
District Energy ** [MWh]	9,430	$273,700	9,120	$290,600	7,689	$240,900	15,500	$479,200
Total Annual Costs		$12,224,500		$13,966,700		$13,054,300		$14,642,500

* 2010 natural gas consumption is based on 11 months of data
** Combined chilled and hot water

3.1.1 Average Annual Cost 2010 – 2013 by Utility Type

To know where we are going we need to understand where we have been. Below is an analysis of the City's average consumption and cost experience over the period 2010 – 2013.

Figure 3.1 demonstrates the average annual costs by utility type over a four year period. Electricity is by far the largest cost driver and represents 78% of the City's average annual energy expenditure. The cost of electricity (commodity price plus global adjustment) has increased on average 10% a year during the period 2010 – 2013. While the corporation continues to make significant enterprise wide improvements in terms of energy consumption reduction, price volatility represents a budget risk that is both uncontrollable and unpredictable.

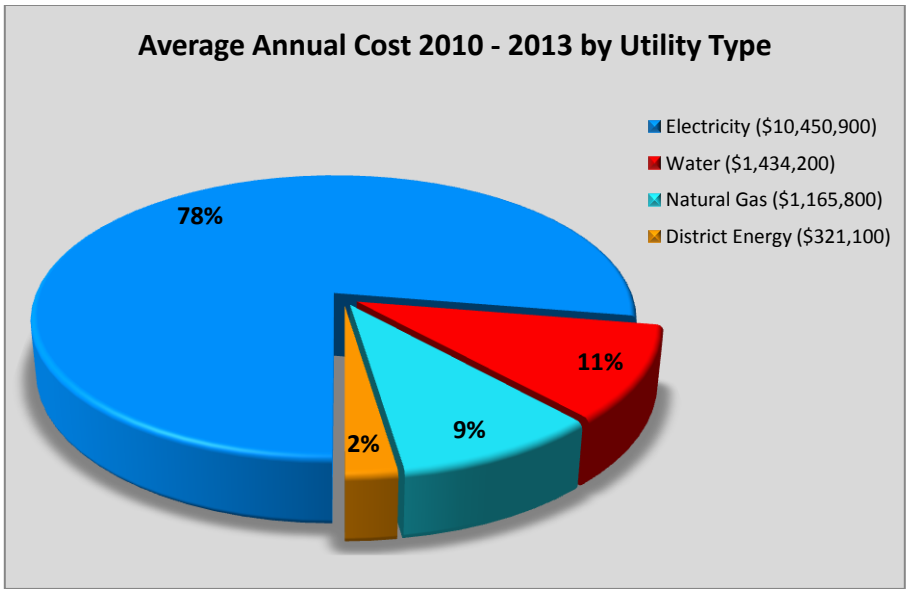

Figure 3.1 – Average Annual Cost Breakdown By Utility Type 2010 – 2013

The 2014 corporate utility budget is approximately $15.1 million. Given this significant expense it makes sense to develop business processes that integrates energy management into the municipal organizational structure. Success in managing energy simply equates to minimizing energy costs and reducing the associated environmental impacts. Therefore having business processes to plan, monitor and control energy use should be a corporate municipal service. The intent of this municipal energy management plan is to develop a roadmap to achieve this objective.

3.1.2 Consumption 2010 – 2013 by Utility Type

The graphs below depict the utility consumption by type for the period 2010 – 2013 (2013 does not include the Windsor International Aquatic and Training Centre utility data).

Electricity consumption as demonstrated in Figure 3.2 below has been relatively stable with a 3.1% decrease since 2011. This reduction can be explained in part due to the energy efficiency programs which were implemented beginning in 2010. While consumption decreased by 2.6 million kWh or 3.1%, electricity costs actually increased by $940,000 or 9%.

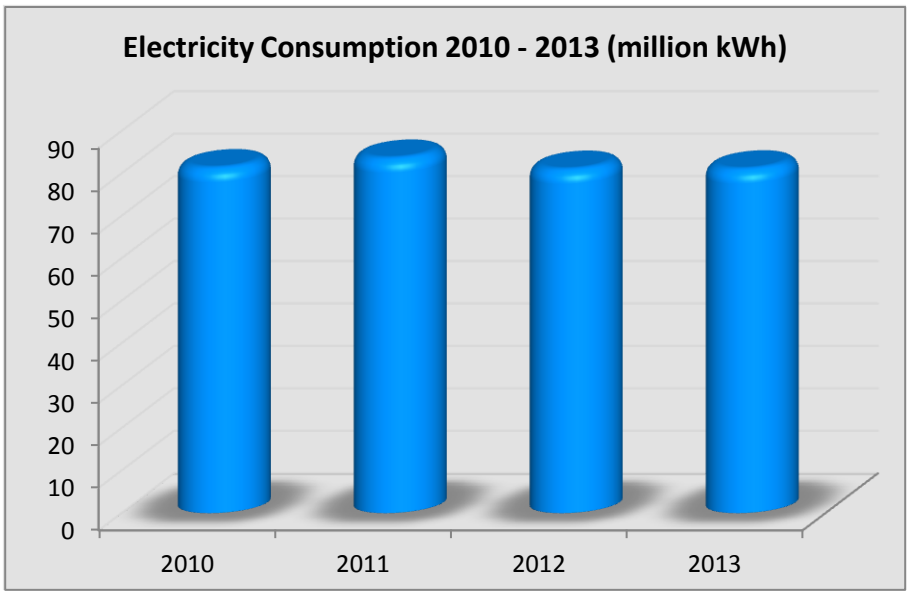

Figure 3.2 – City of Windsor Electricity Usage

Natural gas consumption has also been relatively stable with the exception of 2013, where colder winter and spring temperatures were on average 4 °C per month lower than 2012. This resulted in a 19.2% increase in consumption. Commodity prices have been trending lower mainly as a result of significant shale gas well-drilling creating record high storage capacity. While there continues to be significant natural gas discoveries, commodity prices began to increase in the second quarter of 2013 mainly as a result of the closing of the Ontario coal-fired power plants which are being replaced with natural gas cogeneration production.

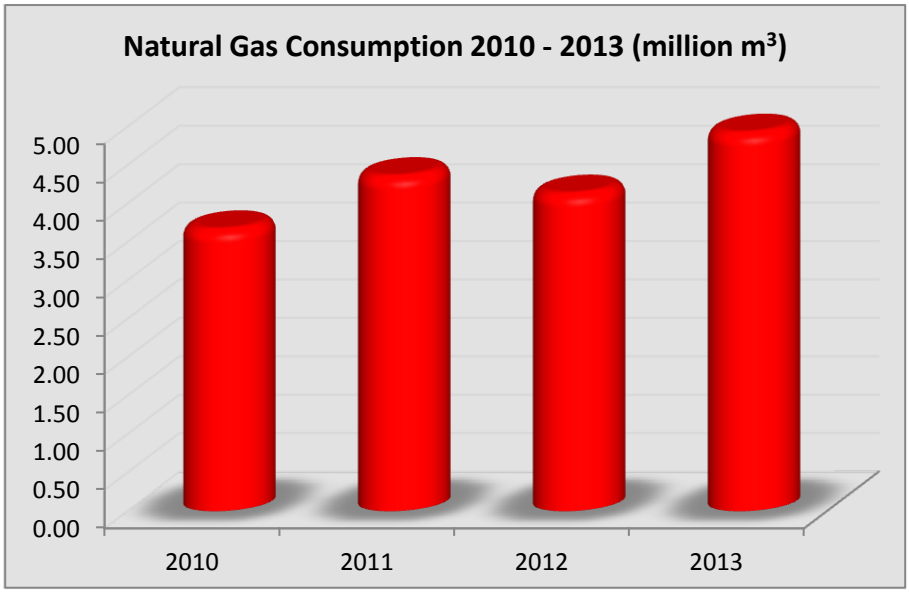

Figure 3.3 – City of Windsor Natural Gas Usage

Water consumption has decreased from approximately 1.1 million cubic meters in 2010 to less than 500,000 cubic meters in 2013. This reduction in usage is mainly attributed to the following factors:

- Lou Romano water reclamation plant in June 2011 implemented a new system that reduces the need for potable water used in the waste water filtration treatment process by approximately 448,000 cubic meters.
- The closure of malfunctioning reflecting ponds at City Hall Square has saved 55,000 cubic meters annually.
- In 2011 – 2012 the arenas implemented a new water reclamation process, lowering potable water consumption by a combined 41,000 cubic meters.

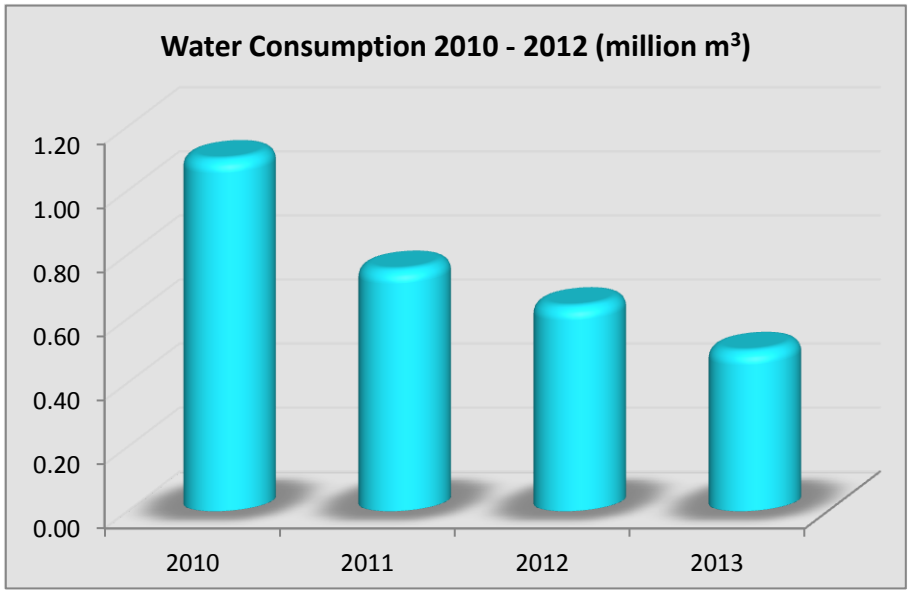

Figure 3.4 – City of Windsor Water Usage

District Energy consumption, which is the utilization of a central source (Caesars Windsor Casino plant) of chilled water for cooling and hot water for heating, continues to be relatively flat. Consumption data for the Art Gallery of Windsor was added in 2013. The City currently has six facilities that are serviced by District Energy.

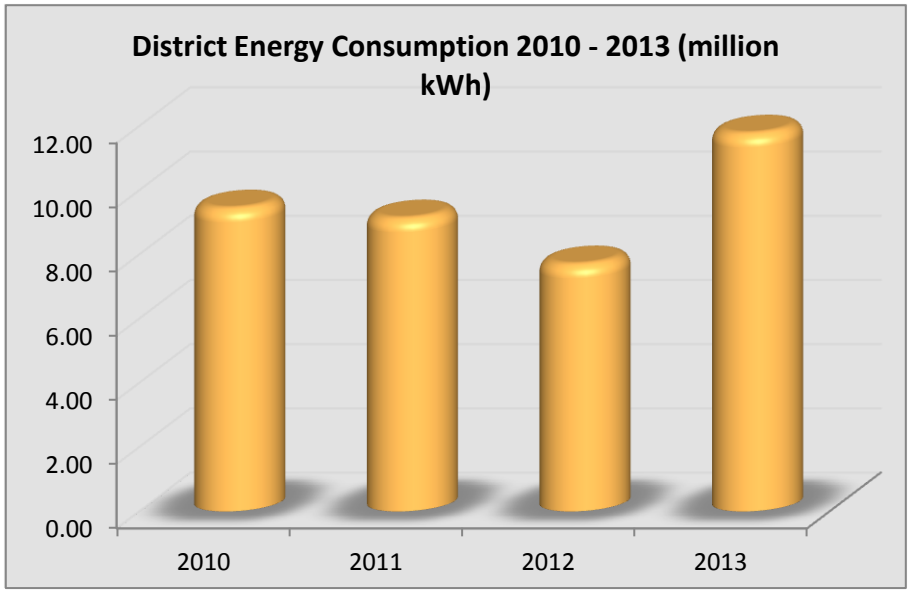

Figure 3.5 – City of Windsor District Energy Usage

In addition to the data provided above, Appendices A and B provide consumption data for the City's buildings as prescribed by Ontario Regulation 397/11 for the years 2011 and 2012.

3.2 Electricity Consumption by Sector

Electricity is by far the corporation's largest cost driver representing more than 79% (2013) of the total annual utility expenditures. The following chart display the 2013 electricity usage by the various municipal service sectors.

The two water treatment plants, pumping stations, arenas, street and traffic lights, account for 71% of the annual electricity consumed. Accordingly, a significant number of energy initiatives are being planned and implemented for these larger users.

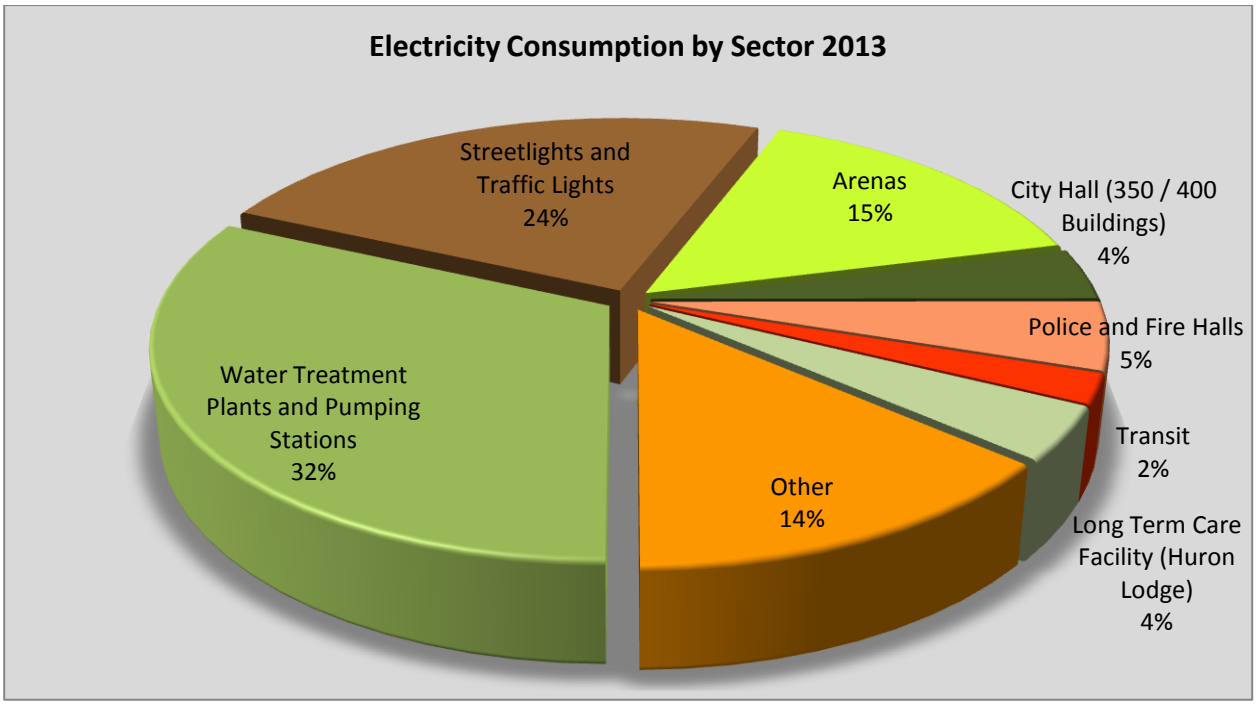

Figure 3.6 – Electricity Consumption by Sector 2013

3.3 Effects of Electricity Price Volatility

The effective commodity price of electricity per kilowatt-hour is comprised of two parts; the wholesale price or the Hourly Ontario Energy Price (HOEP) and the Global Adjustment (GA).

The Hourly Ontario Energy Price is the hourly price that is charged to local distribution companies (LDCs). HOEP becomes the basis of the commodity charges in the retail electricity market if customers receive their electricity from their LDC. The HOEP rate has recently experienced significant volatility. For example the average price in November 2013 was $.01493 per kWh increasing to $ .06144 in January 2014 and settling at $.03229 in April 2014. These unpredictable price swings have an impact on municipal energy budgets which are often set 3-4 months in advance of any budget year.

The GA represents a "true-up" of the province wide utility cost and accounts for the difference between the market price (HOEP) and the rates paid to regulated and contracted generators as well as for the cost of conservation and demand management programs. The GA is set monthly by the Independent Electricity System Operator (IESO) and similar to HOEP demonstrates significant price volatility. For example the GA in November 2013 was $.06228 per kWh, decreasing to $.03626 in January 2014 with a further dramatic decrease to negative $(0.00965) in April 2014.

Figure 3.7 below identifies the average monthly electricity price (HOEP plus GA) from January 2011 to March 2014. The trend line demonstrates an annualized price increase of approximately 10%. A further analysis indicates an average price of $.07041 in 2011 increasing to $.09625 by the end of March 2014. This represents a 36.6% price increase during this time period.

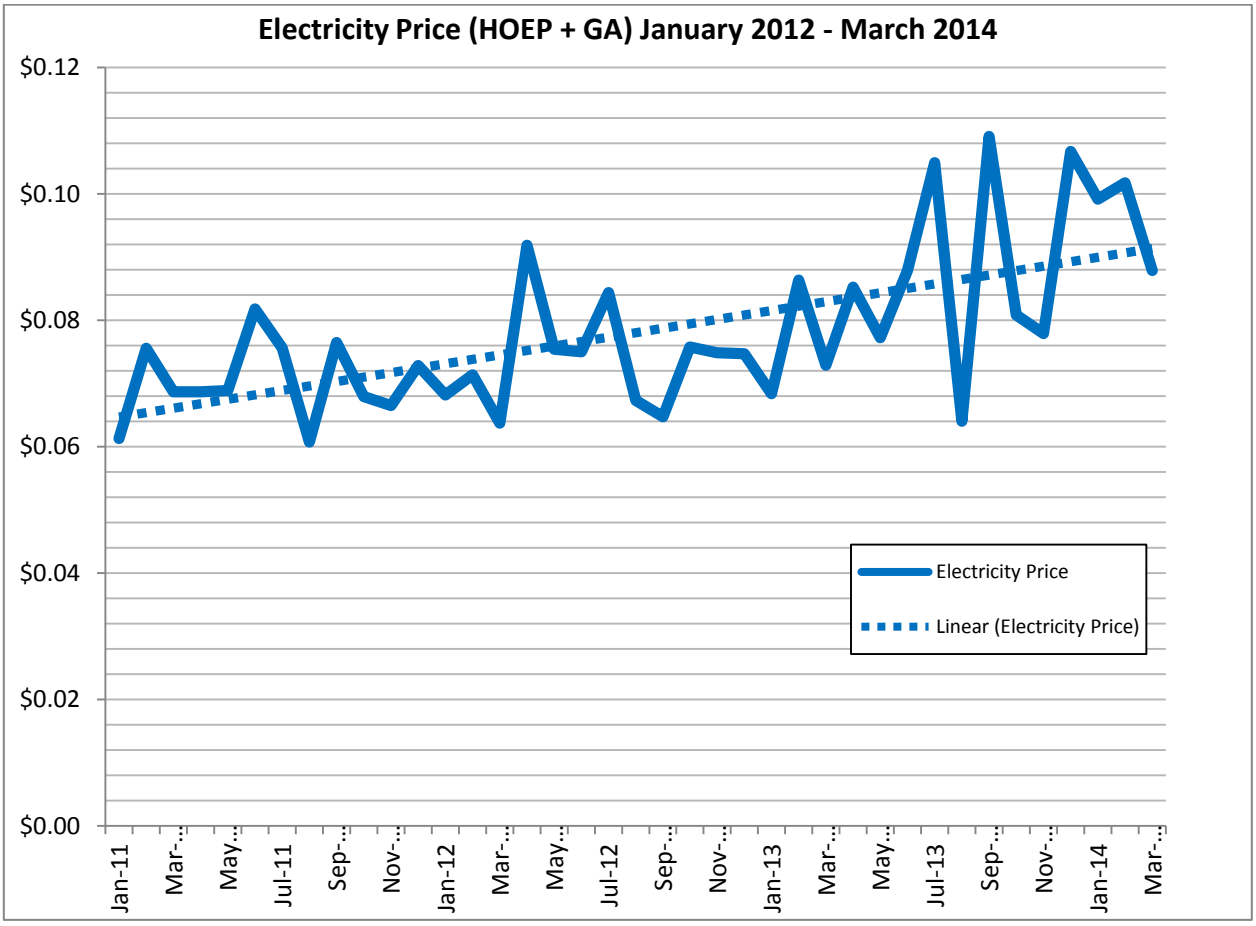

Figure 3.7 – Ontario Electricity Price January 2012 - March 2014

Figure 3.8 below identifies the annual electricity consumption for the years 2011 – 2013 against the total annual City of Windsor's electricity cost for the same period. While consumption has decreased by 2.6 million kWh corresponding costs has increased by $940,000.

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To further illustrate price volatility, if the commodity price remained relatively unchanged from 2011 to 2013 the City's electricity costs (Figure 3.8) would have decreased by approximately $330,000 in 2013.

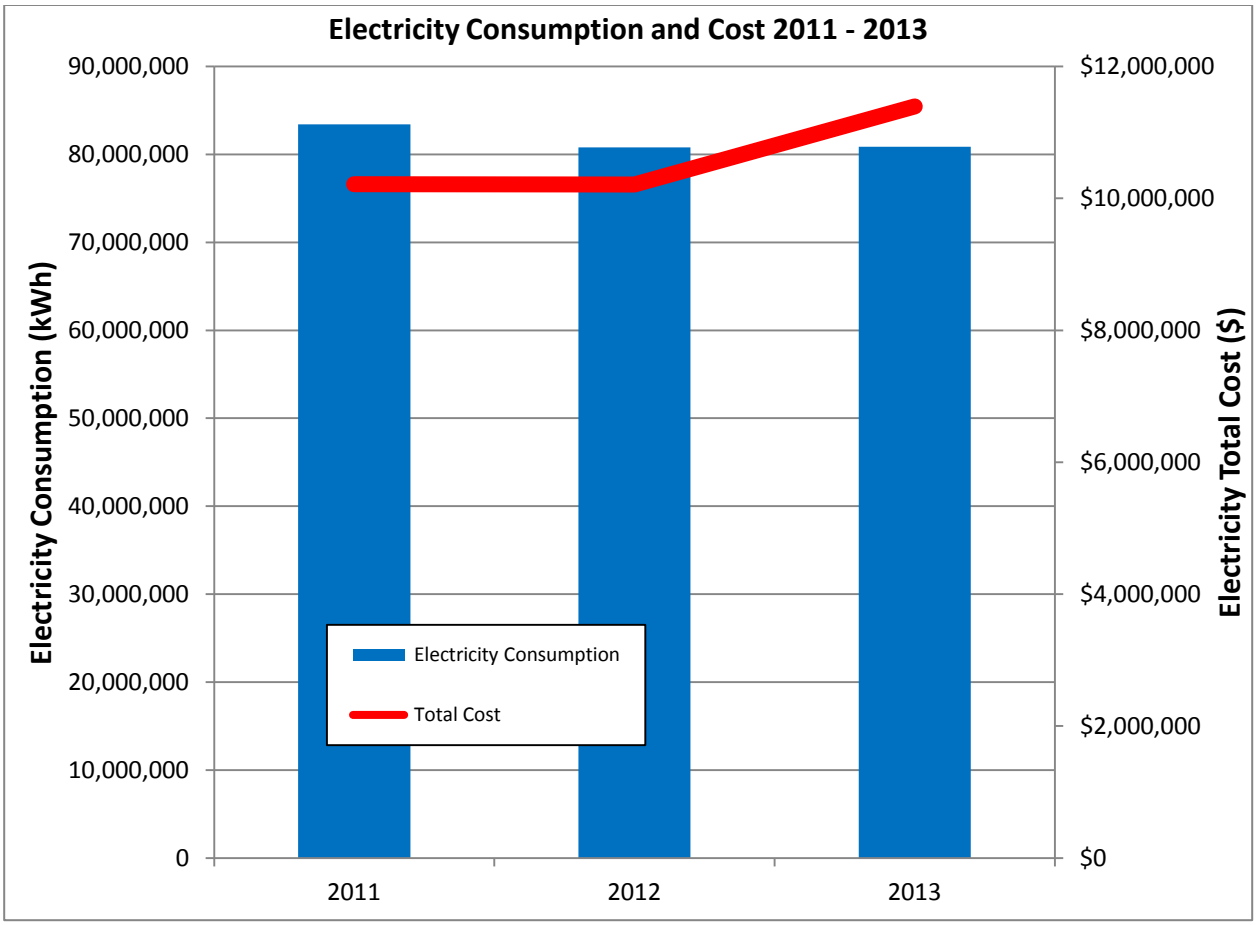


Figure 3.8 – Electricity Consumption and Cost 2011 – 2013

Section 4
Energy Savings Measures

4.0 Energy Savings Measures

4.1 Introduction

Energy Savings Measures are actions that are taken to save energy and to help achieve the goals and objectives of the City. They constitute the bulk of the Energy Management Plan (EMP) implementation.

There are three basic types of energy saving measures:

a) Technical Measures: e.g. install occupancy sensors, variable frequency drives (VFD), and improvements in lighting and HVAC systems.
b) Behavioural Measures: e.g. develop and implement an employee awareness and education program.
c) Organizational Measures: e.g. develop a policy requiring that all new buildings be designed to LEED Gold standard, and new equipment purchases be Energy Star rated.

This Plan will identify:

- Previous measures
- Current measures
- Proposed measures
- Cost and savings associated with each measure (cost savings identified below are based on the year when the energy audit or study was completed)

4.2 Previous Energy Reduction Measures

4.2.1 Corporate Wide Energy Efficiency and Retrofit Program

The City of Windsor owns and operates over 200 buildings and facilities. In 2008 / 2009 a comprehensive energy audit was undertaken by MCW Custom Energy Solutions Ltd., incorporating 157 sites or approximately 78% of our building portfolio. Throughout 2010 – 2012 energy reduction measures were implemented across a broad spectrum of building types. Energy reduction measures included the following: Lighting retrofit and redesign, mechanical modifications, controls including building automation systems upgrades and re-commissioning, water, building envelope and renewables.

Since implementation began in January 2010, MCW completed $2,370,300 in energy and water saving measures, which was offset by $449,130 received through various utility, provincial and federal incentive programs. These incentives represent 19% of the total construction costs leaving a municipal net total expenditure of $1,921,170.

Energy Reduction Measures Implementation Cost 2010 – 2012

Implementation of the various energy reduction measures (see Appendices C and D) in 2010 – 2012 had a net municipal cost of $1,921,170 as demonstrated in Figure 4.1 below. These measures have produced annual

savings of $247,100 and represent 12.9% of the net municipal implementation costs resulting in a simple payback period of 7.8 years. The annual eCO_2 (GHG) emissions reduction totals 1,127 tonnes.

Figure 4.1 below identifies the total cost of the energy reduction measures implemented in 2010 – 2012.

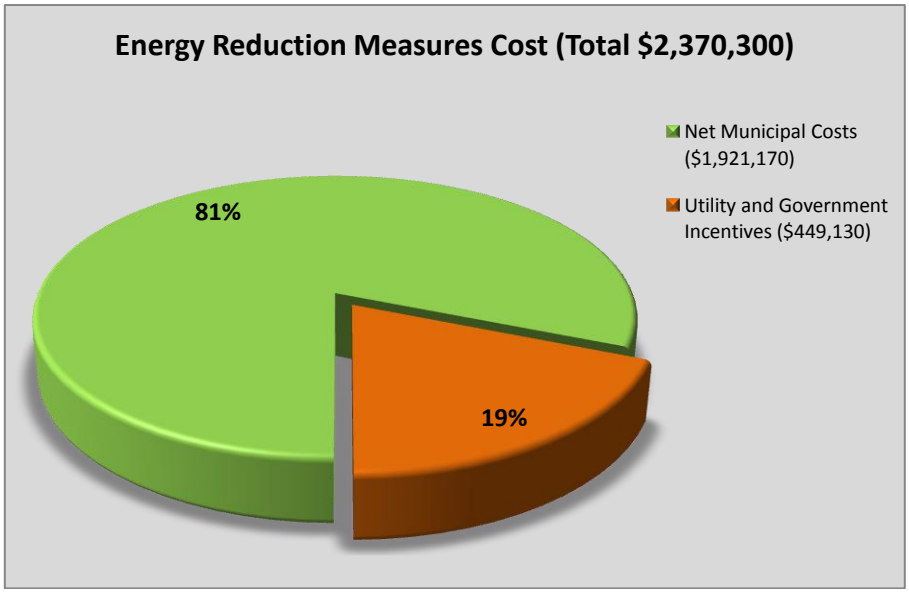


Figure 4.1 – Energy Reduction Measures Cost

Figure 4.2 below identifies the annual cost savings by utility type associated with the implemented energy reduction measures 2010 – 2012.

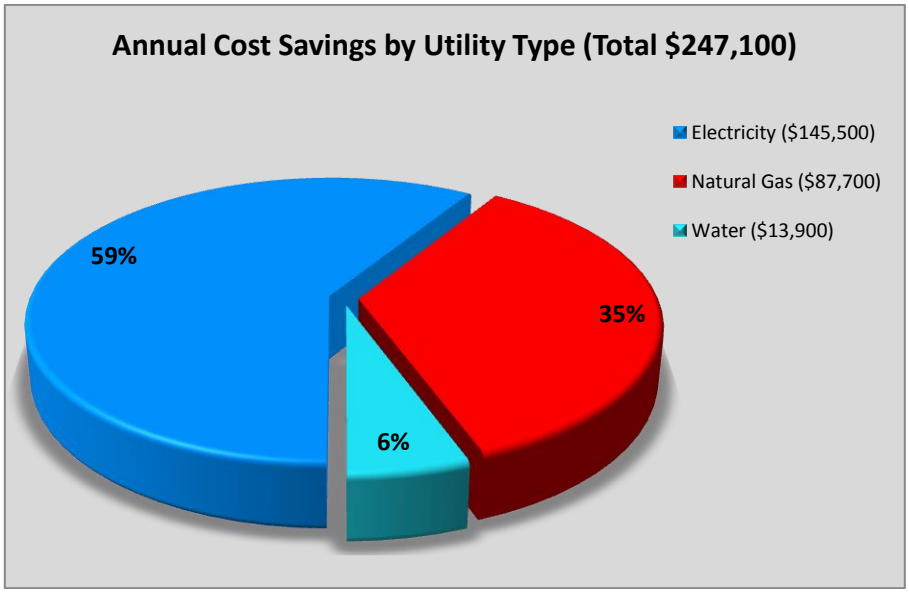


Figure 4.2 – Annual Cost Savings by Utility Type

Implementation of energy reduction measures produced a decrease in consumption as indicated in Table 2 below:

Table 2 – Utility Consumption Savings

Electricity	1,767,600 kWh	2.01% *
Gas	316,600 m^3	7.44%*
Water	13,900 m^3	1.59%*

* Percentages are based on the average consumption for the period 2010 – 2012

A more detailed description of the energy reduction measures implemented in 2010 – 2012 can be found in Appendices C and D.

- Appendix C – identifies "As Built Program by Measure"
- Appendix D – identifies "As Built Program by Building"

4.2.2 City Wide Traffic Signal Lights Conversion to LED

In 2004 the City began a lighting project to convert traffic signal lights to LED lighting technology. Over the past ten years an incremental phased approach based on available funding was implemented with the final intersections to be completed in the Spring of 2014.

Traffic lights consumed approximately 2.8 million kWh annually in 2004; Figure 4.3 below graphically depicts the electricity consumption reduction to approximately 700,000 kWh over the past ten years.

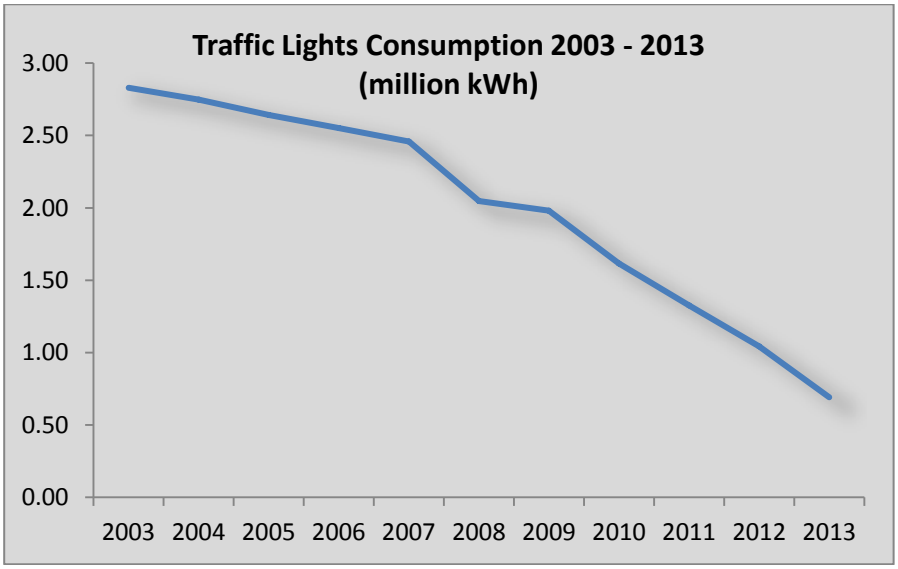


Figure 4.3 – Traffic Signal Lights Consumption Reduction

4.3 Current Conservation Demand Management Measures

4.3.1 Technical Measures – Energy Audits

Technological energy efficiency measures can be identified by conducting energy audits. Energy audits are an important tool in helping to identify conservation and demand management measures, particularly when

undertaking a systematic examination of the major energy consuming systems (heating, cooling, processing equipment, lighting, etc.). Different levels of energy audits, from a basic facility walk-through to a detailed system level analysis e.g. detailed engineering studies, have been and will continue to be implemented by the City.

The intent of an energy audit typically is twofold:

- To report on the feasibility of energy management opportunities that would permanently reduce utility costs and/or reduce the production of greenhouse gas emissions.
- To identify equipment that should be replaced or modified because it is nearing the end of its service life.

The following audits have either been recently completed, are currently underway, or planned in the future.

A. WFCU Center

An energy audit of the WFCU Centre was undertaken by MCW Custom Energy Solutions Ltd. in October 2013.

A.1 – Building Description

Address	8787 McHugh Street
Total Floor Area (ft^2)	302,000
Storey Above Grade	3
Storey Below Grade	1
Year Opened	2008

The WFCU Center is a multipurpose recreation and entertainment complex with a variety of uses. Opened in 2008, the main bowl houses a NHL size arena with approximately 6500 seats and 35 luxury suites. In addition there are concession areas, dressing rooms, training facilities and retail shops. The main bowl is open for scheduled events such as OHL Windsor Spitfires games, concerts and conventions.

The community bowl area includes three NHL sized ice pads, dressing rooms, two community gyms, meeting rooms, a banquet hall, concession areas, and the administrative offices. The community bowl area is open to the public 24 hours a day, but its core operating hours are 7 a.m. to 11 p.m.

A.2 – Utility Overview

The WFCU Centre is one of the largest energy users within the City's building inventory. In 2013 the facility consumed 7,937,677 kWh of electricity, 884,692 cubic meters of natural gas and 25,947 cubic meters of water for a combined annual expenditure of $1,165,236. The energy intensity or Building Energy Performance Index (BEPI) for the WFCU Centre is 57.2 ekWh/ft^2, which is the average for a facility of this type and size.

The slight variations in the natural gas consumption (Figure A.2) are the result of the different weather conditions experienced during the four year period. The decrease in water consumption in 2013 (Figure A.3) is the result of implementing a new water reclamation process.

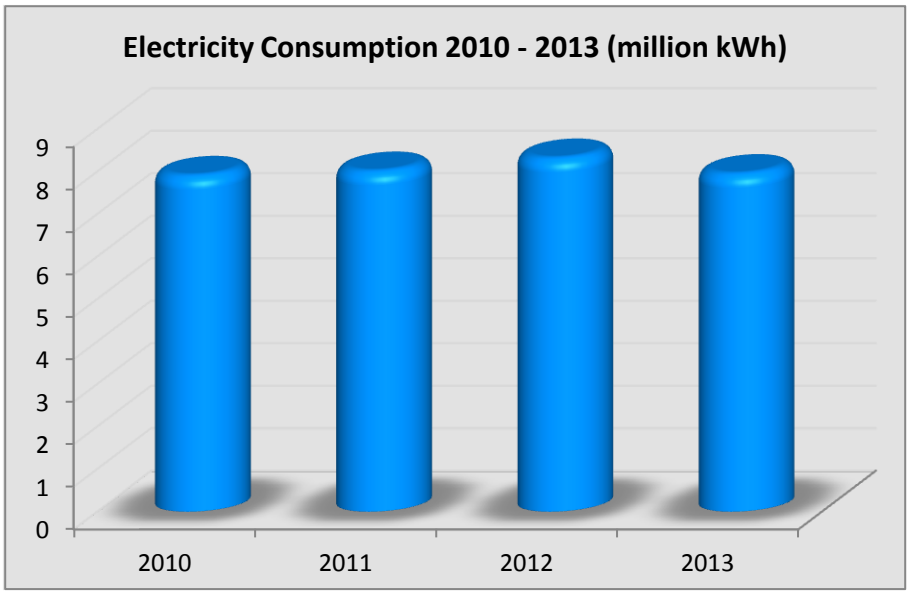


Figure A.1 – WFCU Centre Electricity Usage

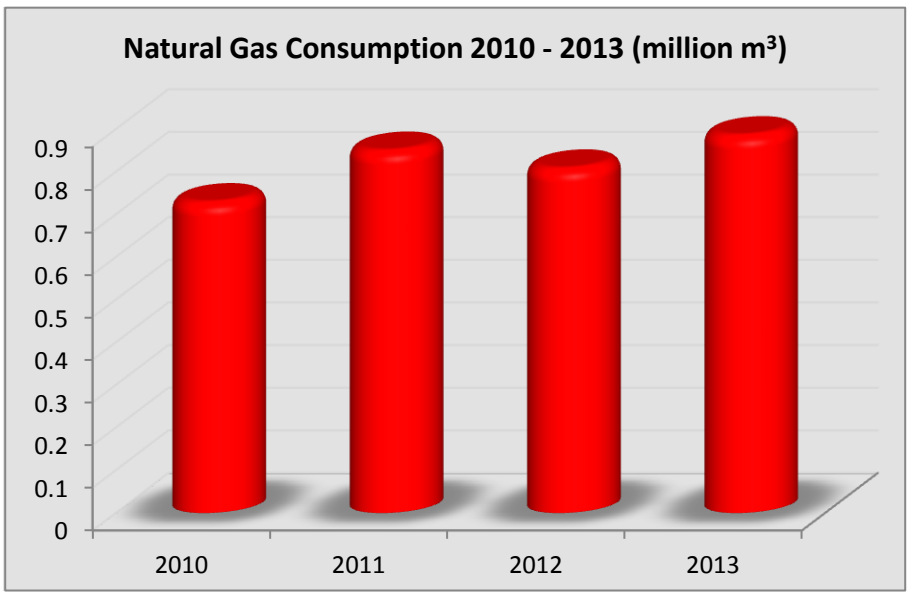


Figure A.2 – WFCU Centre Natural Gas Usage

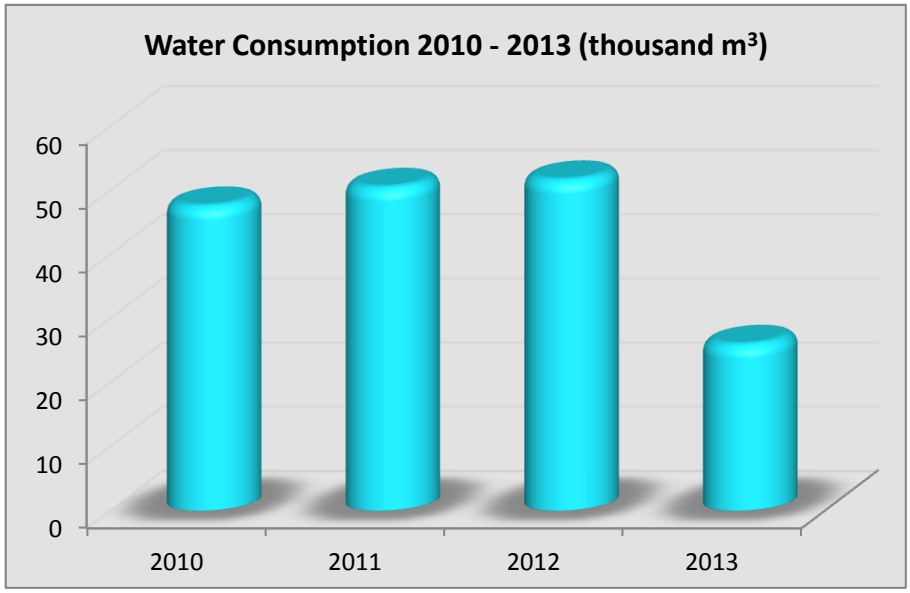


Figure A.3 – WFCU Centre Water Usage

Table 3 below provides a summary of the recommended energy retrofit program for the WFCU Center.

Table 3 – WFCU Energy Efficiency Measures Program Summary

BUILDING / MEASURE	SAVINGS						INCENTIVES		
WFCU Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVA]	Annual Electricity Demand [kW/kVA]	Natural Gas [m³]	eCO_2 [tonnes]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback [years]
LIGHTING RETROFIT & REDESIGN	**26,359**	**230,618**	**59**	**646**	**-**	**41**	**24,819**	**317,152**	12.0
Lighting Retrofits & Redesign	17,885	152,462	43.5	479	-	27	17,418	174,207	9.7
Interior LED Lighting	4,635	37,242	13.4	147.3	-	7	5,356	124,564	26.9
Lighting Controls	3,042	33,910	-	-	-	6	1,695	3,319	1.1
Exterior LED Lighting	797	7,004	1.6	19.2	-	1	350	15,062	18.9
MECHANICAL MODIFICATIONS	**61,813**	**357,231**	**-**	**-**	**159,194**	**367**	**52,010**	**257,750**	**4.2**
Ice Plant Controls DDC Installation	22,425	250,000	-	-	-	45	25,000	95,560	4.3
Ice Plant Heat Recovery: DHW	3,417	-3,676	-	-	20,035	37	2,004	67,456	19.7
Ice Plant Heat Recovery: Snow Melt	27,488	16,337	-	-	139,159	268	15,550	44,593	1.6
Variable Flow Pumping	8,483	94,570	-	-	-	17	9,457	50,141	5.9
BUILDING AUTOMATION CONTROLS	**2,729**	**20,000**	**-**	**-**	**5,000**	**13**	**1,500**	**6,720**	**2.5**
Building Controls Re-commissioning	2,729	20,000	-	-	5,000	13	1,500	6,720	2.5
BUILDING ENVELOPE UPGRADES	**856**	**-**	**-**	**-**	**4,580**	**9**	**458**	**13,941**	**16.3**
Building Envelope Sealing	856	-	-	-	4,580	9	458	13,941	16.3

Based on consultation with WFCU management and operational staff, Table 3.1 below identifies the priority measures to be implemented in 2014 – 2015. The balance of the energy reduction measures identified in Table 3 will be prioritized for the period 2016 – 2018.

Table 3.1 – WFCU Energy Efficiency Prioritized Measures

Building Measure	Total Savings [$]	Electrical Savings [kWh]	Natural Gas Savings [m^3]	Total Measure Cost w/Incentive	Simple Payback [years]
Lighting Retrofit & Re-design	$17,885	152,462		$174,207	9.7
Lighting Controls	$3,042	33,910		$3,319	1.1
Ice Plant Controls DDC	$22,425	250,000		$95,560	4.3
Ice Plant Heat Recovery: Ice Melt	$27,488	16,337	139,159	$44,593	1.6
Variable Flow Pump	$8,483	94,570		$50,141	5.9
Building Controls Re-commissioning	$2,729	20,000	5,000	$6,720	2.5

Implementing the measures identified in Table 3.1 above represents the following savings and consumption reductions:

- Annual savings - $82,052
- Electricity savings – 567,279 kWh or 7.1% reduction based on 2013 data.
- Natural Gas savings – 144,169 cubic meters or 16.3% reduction based on 2013 data.
- Annual eCO_2 (GHG) emissions reduction – 376 tonnes.

The net municipal cost of implementing the measures is $374,540 with a simple payback period of 4.5 years.

B. Forest Glade Arena

An energy audit of Forest Glade Arena was undertaken by I.B. Storey Inc. in September 2013.

B.1 – Building Description

Address	3205 Forest Glade Drive
Total Floor Area (ft^2)	62,000
Storey Above Grade	1
Year Opened	1975 / 1990

The Forest Glade Arena is a multi-use facility with two ice surfaces, kitchen facilities and auditorium. The complex was constructed in 1975 with the second ice surface and auditorium added in 1990.

B.2 – Utility Overview

Based on the energy efficiency opportunities available with the ammonia refrigeration system a detailed engineering study was commissioned with a specific focus on the facility's ice plant. The ammonia refrigeration system was chosen for the study as it consumes a significant portion of electricity. The plant refrigeration system, including fans, pumps, and compressors consumes 38% of the facility annual electricity usage and accounts for 56% of the peak demand load as identified in the Figures B.1 and B.2 below.

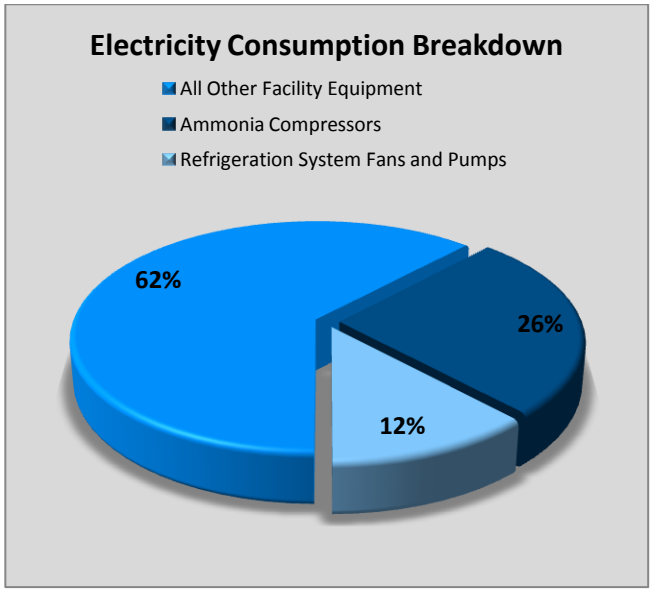


Figure B.1 – Forest Glade Arena Electricity Consumption Analysis

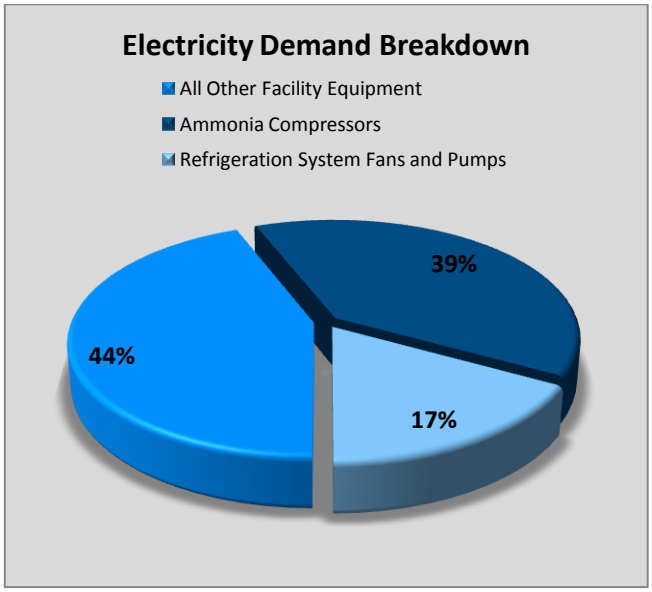


Figure B.2 – Forest Glade Arena Electricity Demand Analysis

In 2013 the facility consumed 1,346,416 kWh for an annual cost of $162,449. The energy intensity or BEPI of 21.71 kWh/ft^2 is better than average for a facility of this type and can be partially attributed to the previous energy audit undertaken in 2008 and implemented in 2010 – 2011. Figure B.3 below identifies electricity consumption for the period 2010 – 2013.

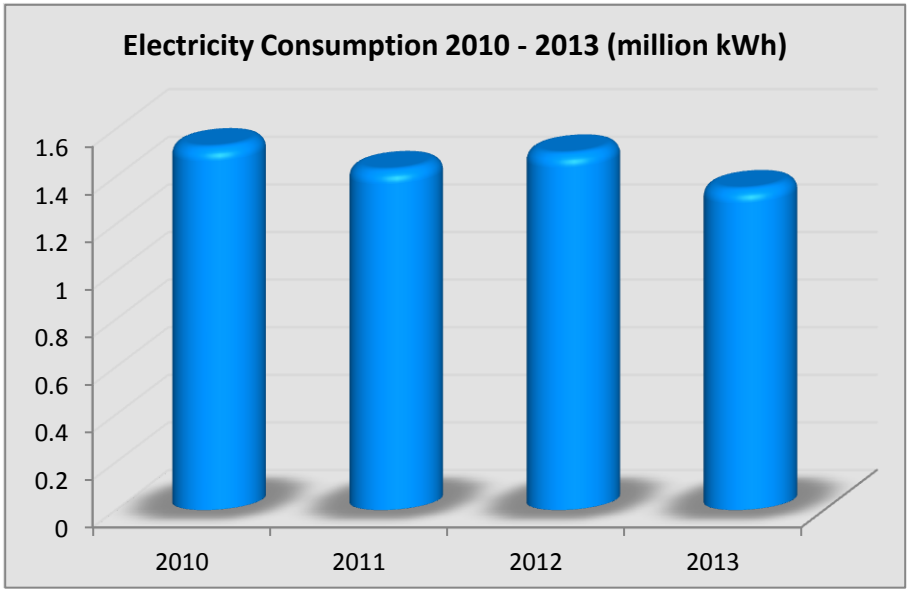


Figure B.3 – Forest Glade Arena Electrical Usage

Table 4 below provides a summary of the recommended energy retrofit program for the refrigeration plant at the Forest Glade Arena.

Table 4 – Forest Glade Arena Energy Efficiency Measures Program Summary

Forest Glade Arena	ANNUAL SAVINGS			ANNUAL COST SAVINGS		PROJECT COST [$]	SIMPLE PAYBACK [years]
Measure	Electric [kWh]	Demand [kW]	eCO_2 [tonnes]	Electric [$]	Maintenance [$]		
Floating Head Pressure Control	31,230	0	7	3,723	0	29,032	7.8
Floating Head Pressure Control with New Condenser	108,888	139	24	12,979	0	105,940	8.2
Shell and Tube Chiller Replacement	52,903	0	12	6,306	0	184,269	29.2
Control System Upgrades	59,931	0	13	7,144	0	41,312	5.8
Evaporative Condenser Replacement	42,995	139	9	5,125	0	95,370	18.6
Reciprocating to Screw Compressors	0	0	0	0	11,232	106,848	9.5

Based on consultations with arena management and operational staff regarding the identified energy efficiency measures and the calculated energy savings, the measures identified as “Floating Head Pressure Control with New Condenser” and “Control System Upgrades” are recommended for implementation in 2014 – 2015. The balance of the energy reduction measures will be prioritized for the period 2016 – 2018.

Implementing the recommended prioritized measures identified in Table 4.1 below will result in the following savings and consumption reduction:

- Annual savings – $20,123 or 12.4% of 2013 electricity costs
- Electricity savings – 168,819 kWh or 12.5% reduction based on 2013 consumption

- Annual eCO_2 (GHG) emissions reduction – 37 tonnes

The net municipal cost of the measures will be $130,307 (including eligible incentives) with a simple payback period of 6.5 years.

Table 4.1 – Forest Glade Arena Energy Efficiency Prioritized Measures

Forest Glade Arena	ANNUAL SAVINGS			ANNUAL COST SAVINGS		PROJECT COST [$]	SIMPLE PAYBACK [years]
Measure	Electric [kWh]	Demand [kW]	eCO_2 [tonnes]	Electric [$]	Maintenance [$]		
Floating Head Pressure Control with New Condenser	108,888	139	24	12,979	0	105,940	8.2
Control System Upgrades	59,931	0	13	7,144	0	41,312	5.8

C. South Windsor Arena

An energy audit of South Windsor Arena was undertaken by I.B. Storey Inc. in September 2013.

C.1 – Building Description

Address	2555 Pulford Street
Total Floor Area (ft^2)	81,600
Storey Above Grade	1
Year Opened	1968 / 1995

The South Windsor Arena is a multi-use facility with two ice surfaces, kitchen facility and auditorium. The complex was constructed in 1968 with the second ice surface and auditorium added in 1995.

C.2 – Utility Overview

Based on the energy efficiency opportunities available with the ammonia refrigeration system a detailed engineering study was commissioned with a specific focus on the facility's refrigeration plant. The ammonia refrigeration system was chosen for the study as it consumes a significant portion of electricity. The plant refrigeration system, including fans, pumps, and compressors consumes 50% of the annual electricity usage and accounts for 56% of the peak demand load as identified in Figure C.1 and C.2 below.

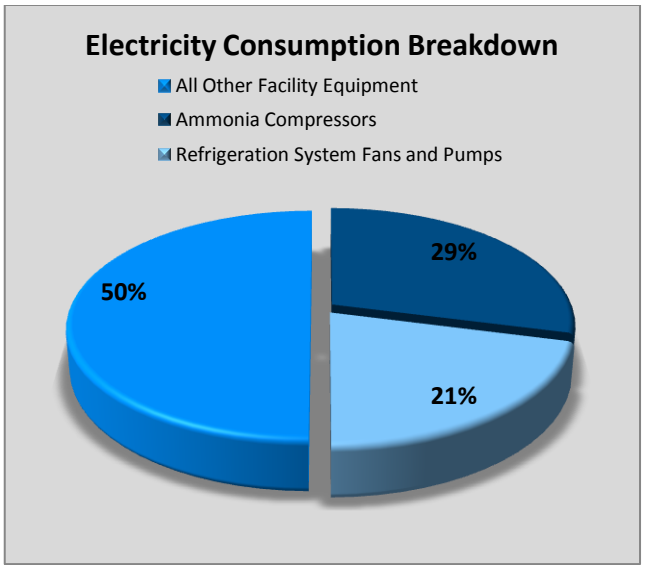


Figure C.1 – South Windsor Arena Electricity Consumption Analysis

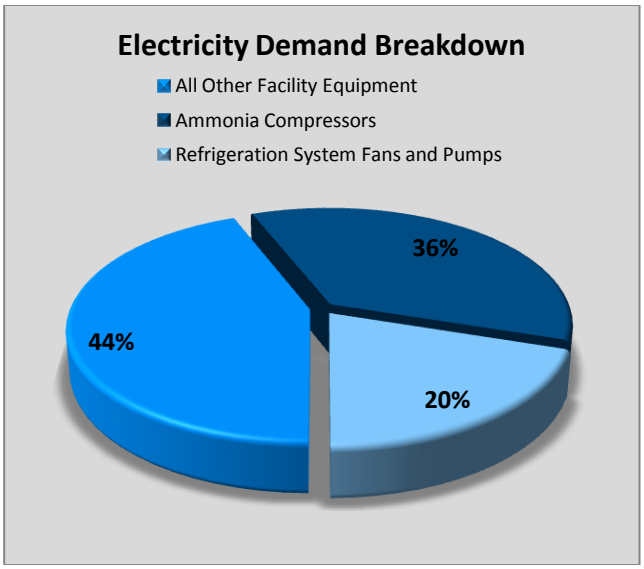


Figure C.2 – South Windsor Arena Electricity Demand Analysis

In 2013 the facility consumed 1,337,407 kWh with an annual cost of $156,756. The energy intensity or BEPI at 16.39 kWh/ft^2 is better than average for a facility of this type and can be partially attributed to the previous energy audit undertaken in 2008 and implemented in 2010 – 2011. Figure C.3 below identifies electricity consumption for the period 2010 – 2013.

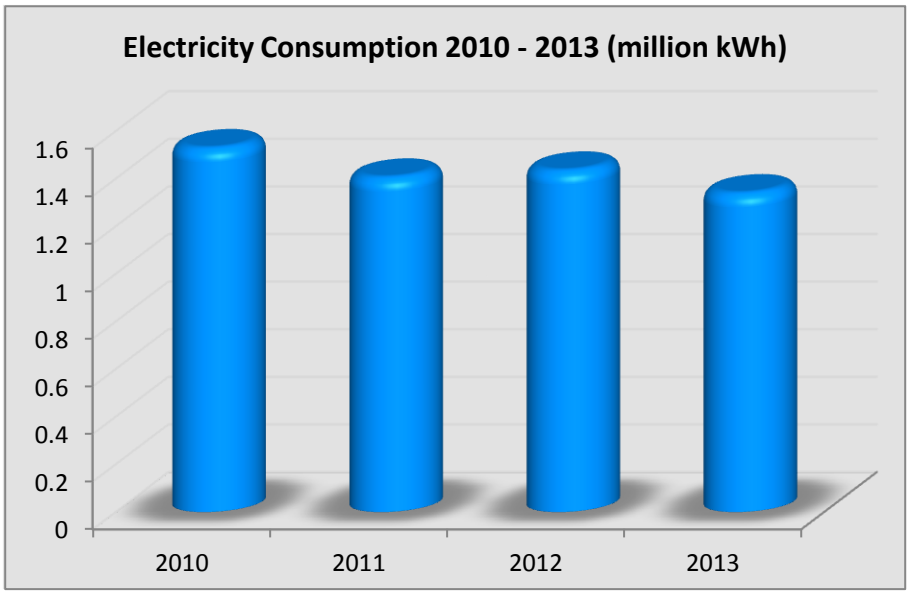


Figure C.3 - South Windsor Arena Electricity Usage

Table 5 below provides a summary of the recommended energy retrofit program for the refrigeration plant at South Windsor Arena.

Table 5 – South Windsor Arena Energy Efficiency Measures Program Summary

South Windsor Arena	ANNUAL SAVINGS			ANNUAL COST SAVINGS		PROJECT COST [$]	SIMPLE PAYBACK [years]
Measure	Electric [kWh]	Demand [kW]	eCO_2 [tonnes]	Electric [$]	Maintenance [$]		
Floating Head Pressure Control	45,855	0	10	5,576	0	29,032	7.8
Floating Head Pressure Control with New Condenser	120,760	139	27	15,539	0	105,940	8.2
Shell and Tube Chiller Replacement	64,185	0	14	7,805	0	184,269	29.2
Control System Upgrades	78,440	0	17	9,538	0	41,312	5.8
Evaporative Condenser Replacement	40,415	139	9	4,914	0	95,370	18.6
Reciprocating to Screw Compressors	0	0	0	0	9,700	106,848	9.5

Based on consultations with arena management and operational staff regarding the identified energy efficiency measures and the calculated energy saving, the measures identified as “Floating Head Pressure Control with New Condenser” and “Control System Upgrades” are recommended for implementation in 2014 – 2015. The balance of the energy reduction measures will be prioritized for the period 2016 – 2018.

Implementing the recommended prioritized measures identified in Table 5.1 below will result in the following savings and consumption reduction:

- Annual savings – $25,078 or 16% of 2013 electricity costs
- Electricity savings – 199,110 kWh or 14.9% reduction based on 2013 consumption
- Annual eCO_2 (GHG) emissions reduction – 44 tonnes

The net municipal cost of the measures will be $130,307 (including eligible incentives) with a simple payback period of 5.2 years.

Table 5.1 – South Windsor Arena Energy Efficiency Prioritized Measures

South Windsor Arena	ANNUAL SAVINGS			ANNUAL COST SAVINGS		PROJECT COST [$]	SIMPLE PAYBACK [years]
Measure	Electric [kWh]	Demand [kW]	eCO_2 [tonnes]	Electric [$]	Maintenance [$]		
Floating Head Pressure Control with New Condenser	120,760	139	27	15,539	0	105,940	8.2
Control System Upgrades	78,440	0	17	9,538	0	41,312	5.8

D. Lanspeary Park Outdoor Rink

An arena refrigeration system audit was undertaken by I.B. Storey Inc. in March 2013.

Address	1250 Langlois Avenue
Total Floor Area (ft^2)	21,925
Storey Above Grade	1
Year Opened	1950

D.1 – Facility Overview

The facility is comprised of a single pad outdoor rink, mechanical room and office originally constructed in 1956 with the plant retrofitted in 2000. The objective of the study was to establish the current condition of refrigeration plant, noting CSA and Technical Standards & Safety Authority (TSSA) compliance related issues. In addition energy efficiency and cost saving opportunities were identified.

D.2 – Utility Overview

In 2013 the facility consumed 203,721 kWh with an annual cost of $28,637. Figure D.1 below identifies electrical consumption for the period 2010 – 2013.

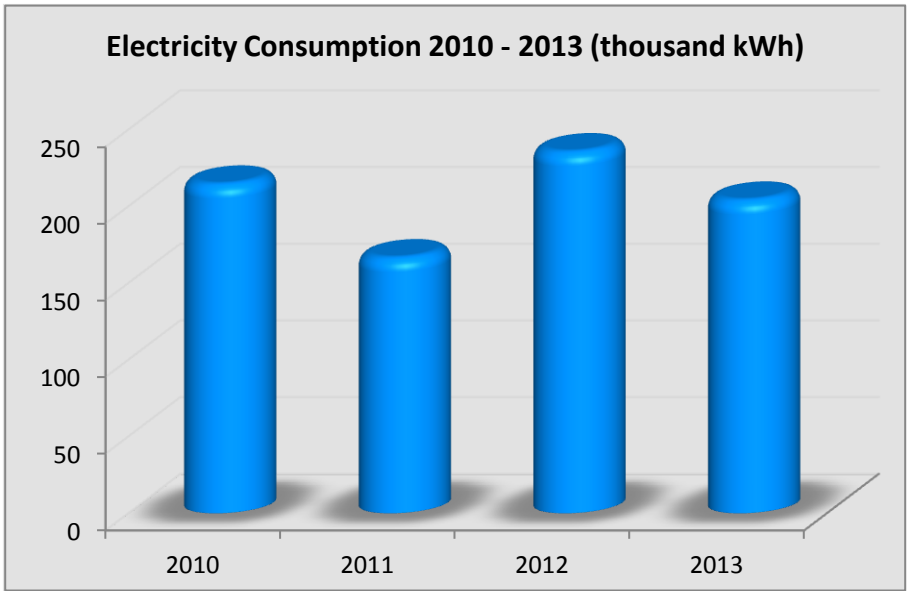


Figure D.1 – Lanspeary Outdoor Rink Electricity Usage

Table 6 below provides a summary of the energy retrofit program for the refrigeration plant at Lanspeary Outdoor Rink.

Table 6 – Lanspeary Arena Energy Efficiency Measures Program Summary

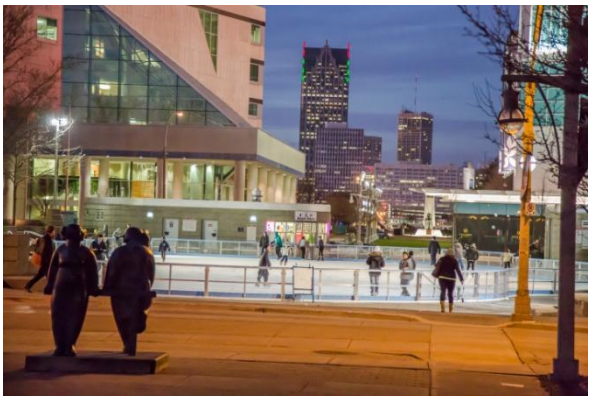
Lanspeary Outdoor Rink	ANNUAL SAVINGS				TOTAL SAVINGS [$]	PROJECT COST [$]	SIMPLE PAYBACK [years]
Measure	Fuel [kWh]	Electric [kWh]	Demand [kW]	eCO_2 [tonnes]			
Reciprocating Compressors to Screw Compressors		8,500		2	4,600	300,000	65.2
Shell and Tube Chiller to Plate and Shell		11,050		2	1,800	30,000	16.7
Floating Head Pressure		34,000		7	2,400	20,000	8.3
Evaporative Condenser to Induced Draft with VFD		21,000	30	5	1,800	60,000	33.3
Slab Sensor to IR Camera		5,100		1	400	12,000	30.0
Upgrade Controls		6,800		1	500	20,000	40.0
Condenser Pump Throttled		7,000		2	500	8,000	16.0
Notched Compressor Belts		10,200		2	700	3000	2.7
Desuperheater for Floodwater Preheat	50,000			9	1,000	20,000	20.0
T5 Fluorescent to LED		2,400	16	1	1,300	25,000	19.2

Based on costs and analysis of the simple payback period which is 34.3 years it was determined to postpone implementation of any of the identified measures. A further review and business case analysis will be undertaken in 2016.

E. Charles Clark Square Outdoor Rink

An arena refrigeration system audit was undertaken by I.B. Storey Inc. in March 2013.

Address	225 Chatham Street
Total Floor Area (ft^2)	12,240
Storey Above Grade	1
Year Opened	2001



E.1 – Facility Overview

The facility is comprised of a single outdoor leisure skating surface, mechanical room and office/concession space constructed in 2000. The objective of the study was to establish the current condition of the refrigeration plant noting CSA and TSSA compliance related issues. In addition energy efficiency and cost saving opportunities were identified.

E.2 Utility Overview

In 2013 the facility consumed 228,626 kWh with an annual cost of $26,636. Figure E.1 below identifies electrical consumption for the period 2010 – 2013.

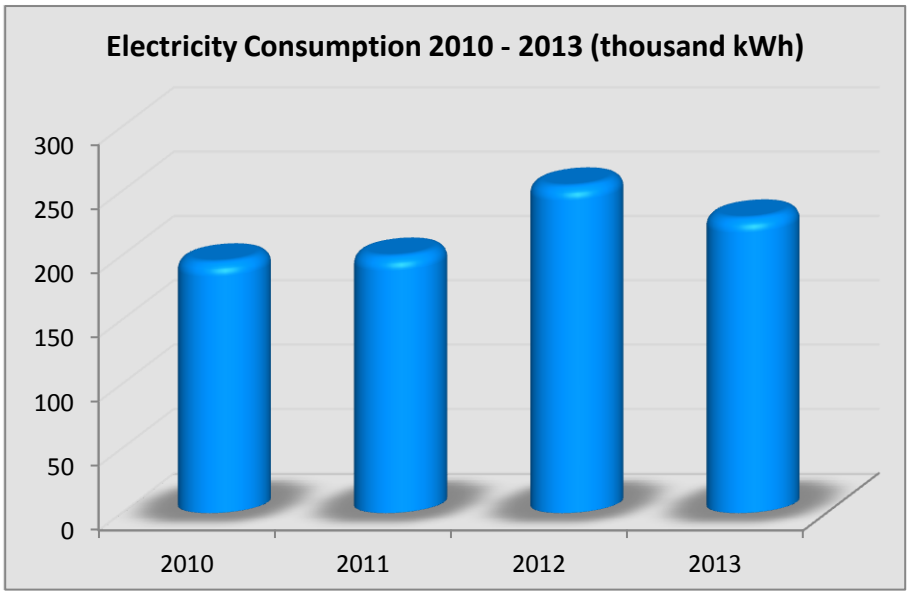


Figure E.1 – Charles Clark Square Outdoor Rink Electricity Usage

Table 7 below provides a summary of the energy retrofit program for the refrigeration plant at Charles Clark Square.

Table 7 – Charles Clark Square Energy Efficiency Measures Program Summary

Charles Clark Square Outdoor Rink	ANNUAL SAVINGS				TOTAL SAVINGS [$]	PROJECT COST [$]	SIMPLE PAYBACK [years]
Measure	Fuel [kWh]	Electric [kWh]	Demand [kW]	eCO_2 [tonnes]			
Reciprocating Compressors to Screw Compressors		15,000		3	3,100	250,000	80.6
Shell and Tube Chiller to Plate and Shell		19,500		4	2,400	30,000	12.5
Floating Head Pressure		60,000		13	4,200	20,000	4.8
Evaporative Condenser to Induced Draft with VFD		21,000	30	5	1,800	60,000	33.3
Slab Sensor to IR Camera		9,000		2	600	12,000	20.0
Upgrade Controls		12,000		3	800	20,000	25.0
Notched Compressor Belts		18,000		4	1,300	3,000	2.3
Desuperheater for Floodwater Preheat	35,000			6	700	20,000	28.6

Based on cost and analysis of the payback period the measures identified as “Floating Heading Pressure” and “Notched Compressor Belts” are recommended for implementation for 2014 – 2015. The balance of the energy reduction measures will be prioritized for the period 2016 – 2018.

Implementing the recommended prioritized measures identified in Table 7.1 below will result in the following savings and consumption reduction:

- Annual savings – $5,500 or 9.2% of 2013 electricity costs
- Electricity savings – 78,000 kWh or 34% reduction based on 2013 consumption
- Annual eCO_2 (GHG) emissions reduction – 17 tonnes

The net municipal cost of the measures will be $23,000 (including eligible incentives) with a simple payback period of 4.2 years.

Table 7.1 – Charles Clark Square Energy Efficiency Prioritized Measures

Charles Clark Square Outdoor Rink	ANNUAL SAVINGS				TOTAL SAVINGS [$]	PROJECT COST [$]	SIMPLE PAYBACK [years]
Measure	Fuel [kWh]	Electric [kWh]	Demand [kW]	eCO_2 [tonnes]			
Floating Head Pressure		60,000		13	4,200	20,000	4.8
Notched Compressor Belts		18,000		4	1,300	3,000	2.3

F. 400 City Hall Administrative Building

An energy audit was conducted by MCW Custom Energy Solutions Ltd. in May 2014.

F.1 – Building Description

Address	400 City Hall Square East
Total Floor Area (ft^2)	264,811
Storey Above Grade	4 plus Mechanical Penthouse
Storey Below Grade	2 (Parking)
Year Opened	2006

400 City Hall Square E. is a four floors office complex occupied by a number of City of Windsor departments as well as employees of the Provincial and Federal Governments. Each office floor is approximately 39,000 square feet in size with the two below grade parking levels occupying 109,256 square feet of space.

F.2 – Utility Overview

The 400 City Hall building is one of six municipal buildings which is heated and cooled by a central district energy plant located at Caesars Windsor Casino. The plant is operated by a private sector third party company that also provides heating and cooling services to other downtown sites.

In 2013 the facility consumed 2,194,827 kWh of electricity, 18,649 cubic meters of natural gas, 2,097 MWH of thermal heating and cooling and 4,786 cubic meters of water. The combined annual utility expenditure is $358,921. The energy intensity or BEPI for 400 City Hall is 25.9 ekWh/ft^2, which is better than average for a facility of this type and size. Figures F.1, F.2, and F.3 below identifies electricity, district heating and cooling, and water consumption for the period 2010 – 2013.

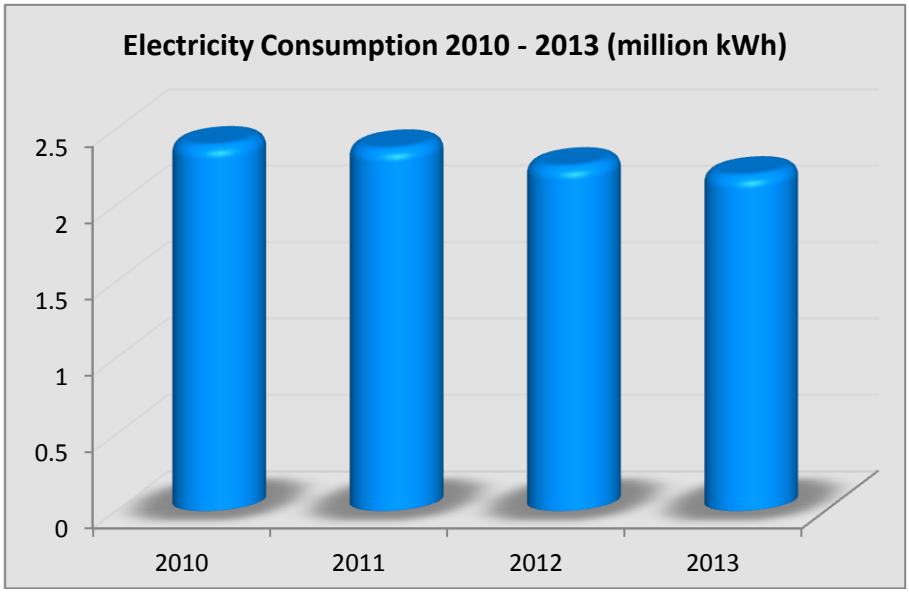


Figure F.1 – 400 City Hall Electricity Usage

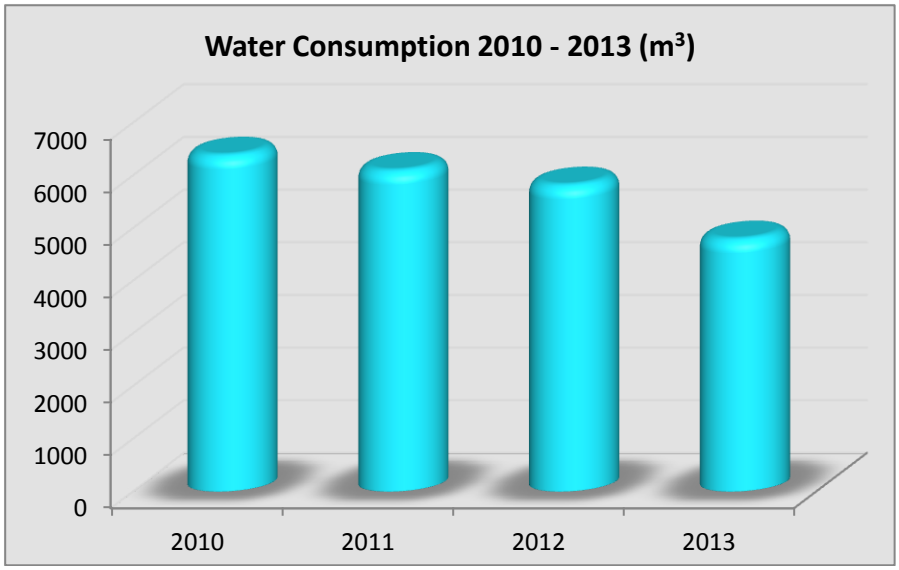


Figure F.2 – 400 City Hall Water Usage

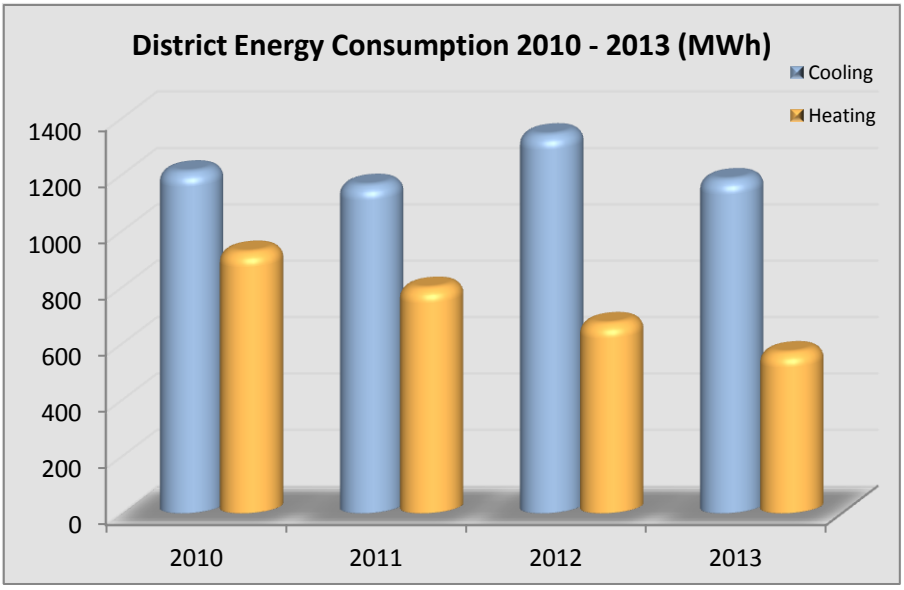


Figure F.3 – 400 City Hall District Heating and Cooling Usage

The City of Windsor is participating in the Canada wide "Town Hall Challenge" campaign. This program compiles good practice design, retrofit and operational metrics for lighting, equipment, HVAC and other building systems to create a model building operating at 20 ekWh/ft^2. Participating in the campaign exhibits a commitment to achieve the target of 20 ekWh/ft^2 by 2015. The City of Windsor currently ranks fifth among reporting "Town Halls".

The energy audit undertaken by MCW Energy Solutions Inc. (July 2014) will identify and recommend specific energy reduction measures. Based on benchmarking results the Town Hall Challenge methodology has tabulated some preliminary targets are described below in Table 8.

Table 8 – 400 City Hall Saving Opportunities

400 City Hall Building	ENERGY SAVINGS	TOTAL SAVINGS
Electricity Consumption	342,000 kWh	$47,840
Electricity Demand	30 kW	$164
District Energy (Heating)	86 MWh	$2,163
District Energy (Cooling)	131 MWh	$5,247

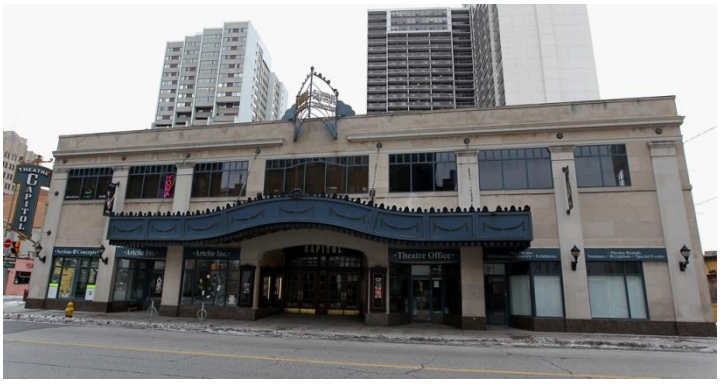
Subject to the energy audit to be undertaken by MCW a prioritized measures program will be implemented in 2014 – 2015.

G. Capitol Theatre

An energy audit for the Capitol Theatre was undertaken by MCW Custom Energy Solutions Ltd. in October 2013.

G.1 – Building Description

Address	121 University Avenue West
Total Floor Area (ft^2)	55,000
Storey Above Grade	2
Storey Below Grade	1
Year Opened	1920



The Capitol Theatre is a performing arts venue acquired by the City of Windsor in 2011 and is now home of the Windsor Symphony Orchestra. The facility was constructed in 1920 and has undergone extensive renovations in the 1990's. The theatre houses three performance auditoriums, several retail spaces, and the administrative offices of the Windsor Symphony Orchestra. The facility is currently undergoing a $1.8 million renovation program.

G.2 – Utility Overview

Electricity consumption data for the period 2011 – 2013 is identified in figure G.1 below. In 2013 the facility consumed 350,649 kWh of electricity, 81,989 cubic meters of natural gas and 1,860 cubic meters of water for a combined annual expenditure of $77,065.

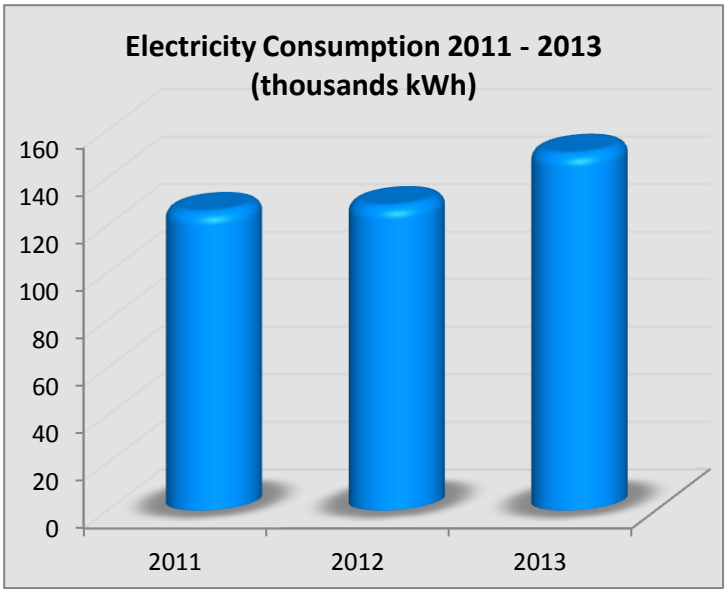


Figure G.1 – Capitol Theatre Electricity Usage

As depicted in Figure G.2 below historical natural gas data was not available prior to 2012.

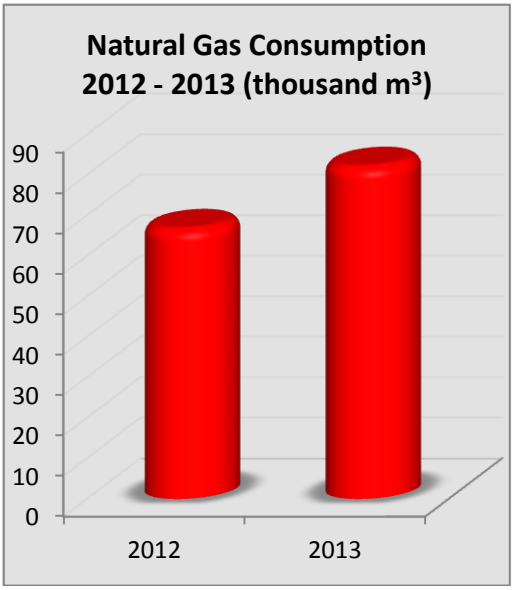


Figure G.2 - Capitol Theatre Natural Gas Usage

Table 9 below provides a summary of the recommended energy retrofit program for the Capitol Theatre.

Table 9 – Capitol Theatre Energy Efficiency Measures Program Summary

Capitol Theatre	SAVINGS						INCENTIVES		
Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Natural Gas [m³]	eCO_2 [tonnes]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback [years]
LIGHTING RETROFIT & REDESIGN	**2,389**	**16,495**	**5**	**63**	**0**	**4**	**64,008**	**61,917**	12.0
Lighting Retrofits & Redesign	596	3,980	1.4	17.1	-	1	10,479	9,907	16.6
Interior LED Lighting	1,292	8,790	2.9	35.4	-	2	51,945	50,766	39.3
Exterior LED Lighting	501	3,725	0.9	10.2	-	1	1584	1,244	2.5
MECHANICAL MODIFICATIONS	**175**				**882**	**2**	**17,116**	**17,028**	**97.3**
Instantaneous DHW Heating	175	-	-	-	882	2	17,116	17,028	97.3
BUILDING AUTOMATION CONTROLS	**3,745**	**30,000**	**-**	**-**	**2,500**	**10**	**1,750**	**7,155**	**1.9**
Programmable Thermostats	1,281	10,000	-	-	1,000	4	600	1,455	1.1
BAS Controller	2,464	20,000	-		1,500	6	1,150	5,700	2.3
BUILDING ENVELOPE UPGRADES	**548**				**2,763**	**5**	**7672**	**7,396**	**13.5**
Building Envelope Sealing	548	-	-	-	2,763	5	7672	7,396	13.5

Table 9.1 below identifies the priority measures to be implemented in 2014 – 2015. The balance of the energy reduction measures identified in Table 9 will be prioritized for the period 2016 – 2018.

Table 9.1 – Capitol Theatre Energy Efficiency Prioritized Measures

Building Measure	Total Savings [$]	Electrical Savings [kWh]	Natural Gas Savings [m^3]	Total Measure Cost w/Incentive	Simple Payback [years]
Programmable Thermostats	$1,281	10,000	1,000	$1,455	1.1
BAS Controller	$2,464	20,000	1,500	$5,700	2.3
Total	**$3,745**	**30,000**	**2,500**	**$7,155**	**1.9**

Implementing the measures identified above represents the following savings and consumption reductions:

- Annual savings – $3,745 or 5.4% of 2013 electricity and natural gas costs
- Electricity savings – 30,000 kWh or 8.6% reduction based on 2013 data
- Natural Gas savings – 2,500 cubic meters or 2.3% reduction based on 2013 data
- Annual eCO_2 (GHG) emissions reduction – 10 tonnes

The net municipal cost of implementing the measures is $7,155 with a simple payback period of 1.9 years.

H. Little River Pollution Control Plant

An energy audit will be undertaken by Stantec Consulting in the summer of 2014.

H.1 – Building Description

Address	9400 Little River Road
Total Floor Area (ft^2)	97,080
Storey Above Grade	1 - 2
Storey Below Grade	1 - 2
Year Opened	1965

H.2 – Utility Overview

The Little River Pollution Control Plant (LRPCP) is third largest energy user within the City building portfolio behind the Lou Romano Water Reclamation Plant and the WFCU Center. In 2013 the plant consumed 5,924,640 kWh of electricity, 11,536 cubic meters of natural gas and 14,706 cubic meters of water for a combined annual expenditure of $747,091. The energy intensity is based on effluent flow and it is 1.32 GJ/ML or 368 kWh/ML of treated water. Figures H.1, H.2, and H.3 below identifies electricity, natural gas, and water consumption for the period 2010 – 2013.

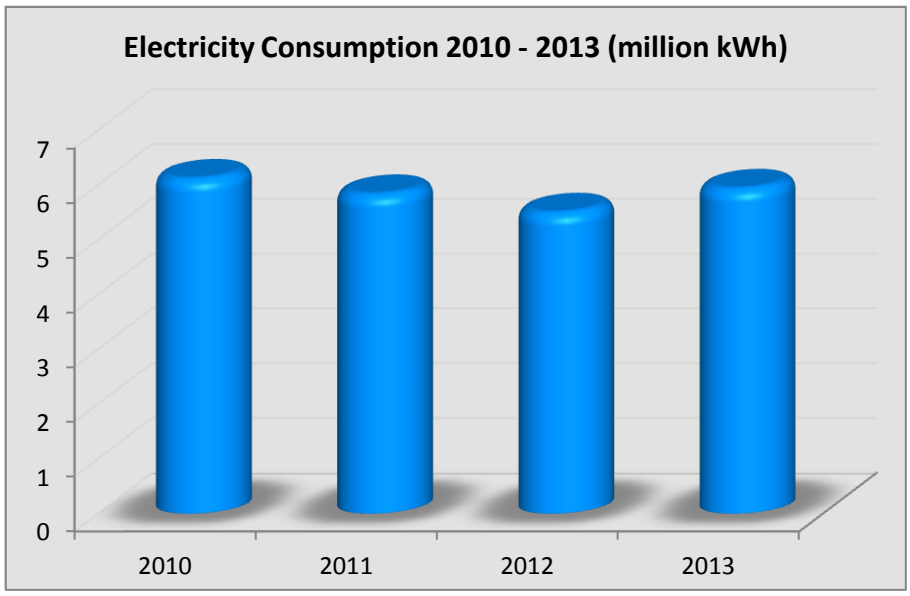


Figure H.1 – LRPCP Electricity Usage

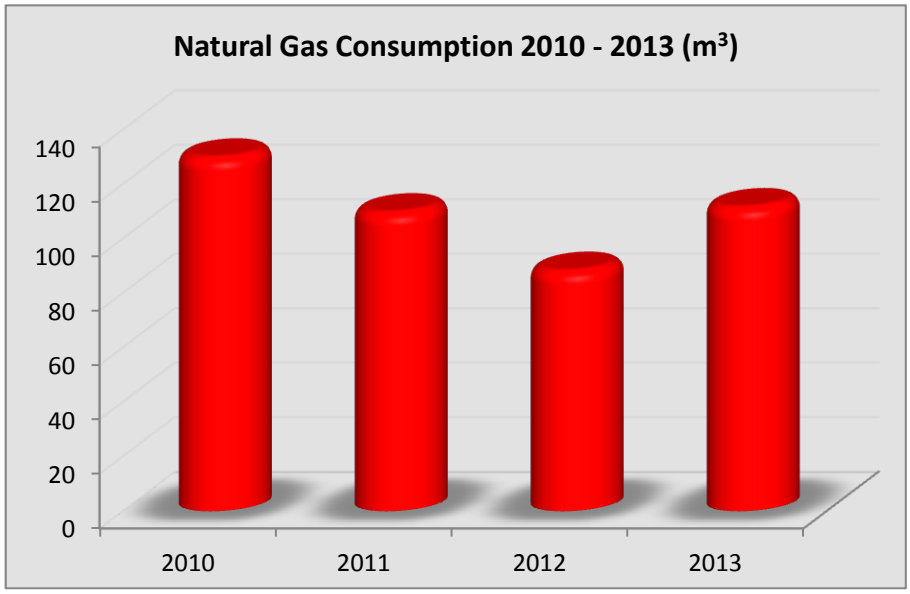


Figure H.2 – LRPCP Natural Gas Usage

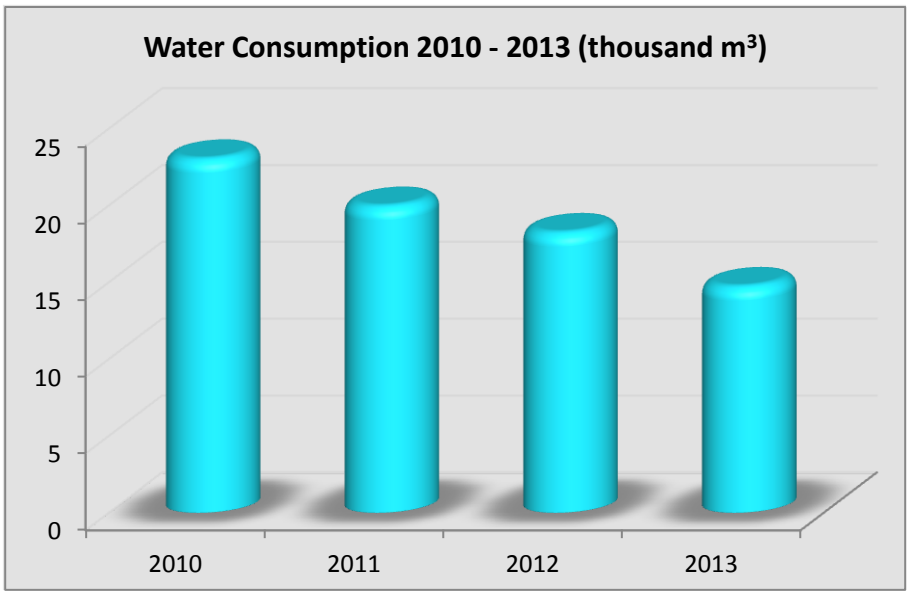


Figure H.3 – LRPCP Water Usage

H.3 – Detailed Engineering Study

As part of the energy audit process a detailed engineering study will be conducted by Stantec Engineering in June 2014. This comprehensive study will investigate the plant's major processing equipment and systems (i.e. pumps, motor, compressors, etc.) to identify energy saving opportunities and to provide support for future capital improvements/decisions. In addition the study will assist with securing major funding incentives and technical expertise through the provincial saveONenergy program.

H.4 – Motor Replacement

Currently, the City is planning to replace two 250 hp motors at LRPCP through the Retrofit program of OPA's saveONenergy initiative. The equipment is in need of replacement due to the system's age, increased maintenance requirements and obsolescence of replacement parts. The City will replace the existing pumps with more energy efficient motors including variable speed drive technologies.

Table 10 below outlines the estimated reduction electricity consumption and the corresponding cost savings.

Table 10 – LRPCP Motor Replacement Program

Existing Motors		**Efficient Motors**		**Estimated Savings**		**Project Cost** [$]	**Simple Payback** [years]
Electricity Demand [kW]	Annual Electricity Consumption [kWh]	Electricity Demand [kW]	Annual Electricity Consumption [kWh]	Demand Savings [kW]	Annual Energy Savings (kWh]		
201.7	1,766,898	158.60	1,389,354	43.1	377,544	669,405	14.3

Installation of the two 250 hp motors represents the following savings and consumption reductions:

- Annual savings – $43,908 or 6.3% of 2013 electricity costs.
- Electricity savings - 377,544 kWh or 6.4% reduction based on 2013 consumption.
- Annual CO_2 (GHG)emission reduction – 83 tonnes

H.5 – Sub-Metering Pilot Project

A sub-metering pilot project will be undertaken at LRPCP in July 2014. Sub-meters are metering devices that monitor electricity, gas, water, steam and other utilities. Electrical sub-meters are installed to monitor systems/equipment i.e. pumps, motors, compressors, lighting, etc. that consume significant amounts of energy. This electricity usage data is typically transmitted every 15 minutes to an energy management software for analysis with the intent of identifying savings opportunities.

Traditionally utility bill analysis uses information that is simply outdated (up to 45 days after usage) and is too aggregated, (bill represents a 28-30 day period, not 15 minute intervals). Sub-metering addresses this information gap, providing real-time granular visibility of energy consumption. This information can be utilized to optimize the facility's operations.

Benefits include:

- Identification of unnecessary equipment running at night, off shift or during weekends.
- Ability to transmit information back to operators and facility managers the same day and provide operators with feedback the next day about implemented changes.
- Comparison and benchmarking of usage across similar facilities and over time.
- Detection of utility bill errors by comparing sub-meter usage with actual utility bill.
- Better management of electricity usage when facility faces demand limits or peak usage pricing from the utility.

Table 11 below outlines the preliminary estimated reduction in electricity consumption and corresponding cost savings.

Table 11 – LRPCP Sub-Metering Program

Building Measure	Total Annual Savings/$	Electrical kWh Savings	Total Measure Cost with Incentive	Simple Payback (years)
6 Sub-meters	$46,520	400,000 kWh	$50,000	1.1

Implementing a sub-metering program at LRPCP represents the following cost savings and consumption reductions:

- Annual savings – 46,520 or 6.7% of 2013 electricity costs
- Electrical savings – 400,000 kWh or 6.8% reduction based on 2013 consumption.
- Annual CO_2 (GHG) emissions reduction – 88 tonnes

The net municipal cost of this program is approximately $50,000 (including eligible incentives) with a simple payback period of 1.1 years.

I. Lou Romano Water Reclamation Plant – High Efficiency Turbo Blowers

I.1 – Building Description

Address	4155 Ojibway Parkway
Total Floor Area (ft^2)	36,845
Storey Above Grade	1 - 2
Storey Below Grade	1 - 2
Year Opened	1969

I.2 – Utility Overview and Project Background

Lou Romano Water Reclamation Plant (LRWRP) is the largest energy user within the City's portfolio of buildings. In 2013 the plant consumed 17,471,484 kWh of electricity, 294,721 cubic meters of natural gas and 150,234 cubic meters of water for a combined annual expenditure of $2,364,824. Figures I.1, I.2, and I.3 below identify electricity, natural gas and water consumption for the period 2010 – 2013.

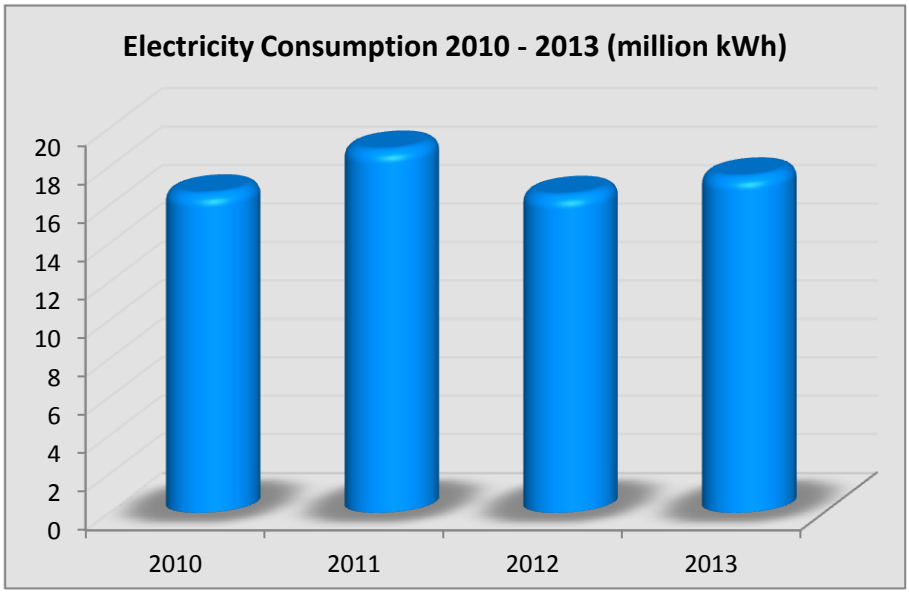


Figure I.1 – LRWRP Electricity Usage

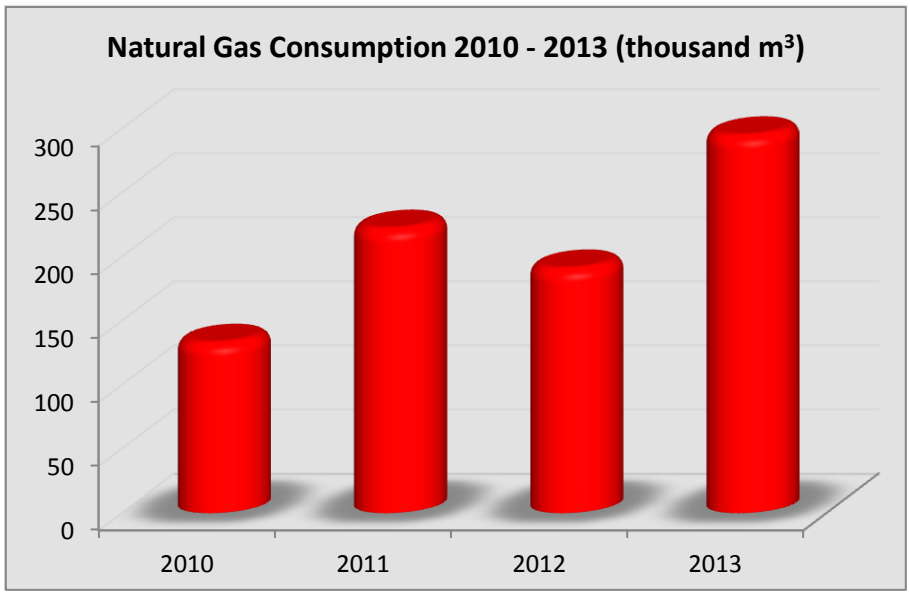


Figure I.2 – LRWRP Natural Gas Usage

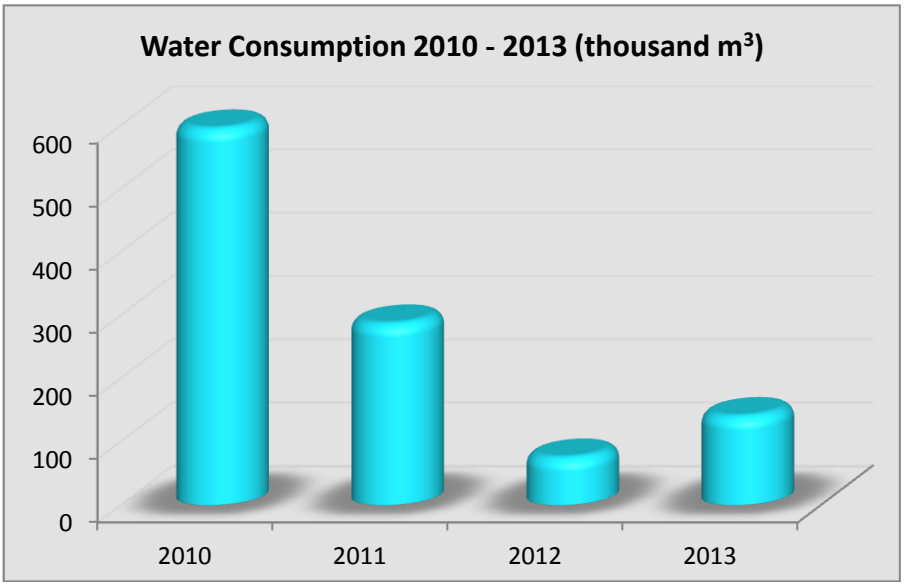


Figure I.3 – LRWRP Water Usage

The City engaged the services of Dillon Consulting Ltd. to conduct a detailed engineering study to evaluate the economics of adding two high efficiency turbo blowers which have demonstrated to generate potential energy savings of approximately 30%. The existing blowers were purchased in 2005 and still have significant amount of remaining life. Each of the existing blowers is equipped with 450 hp motors and in total consume 4.5 million kWh or approximately 27.5% of the annual electricity used at the plant. One of the objectives for replacing the existing blowers is to reduce the requirement of operating two existing blowers during periods of average demand with only one turbo blower, which has a significantly higher capacity range.

Table 12 below outlines the estimated reduction in electricity consumption and the corresponding cost savings data.

Table 12 – LRWRP Turbo Blowers Replacement Program

Building Measure	Total Savings [$]	Electrical Savings [kWh]	Incentive	Total Measure Cost with Incentive	Simple Payback [Years]
Two Turbo Blowers	$ 181,463	1,480,481	$304,725	$ 394,071	2.1

The turbo blower project installation completion date is June 2015.

Installing the two turbo blowers will result in the following savings and consumption reductions:

- Annual savings - $181,463
- Electricity savings – 1,480,481 kWh based on 2012 costs
- Annual eCO_2 (GHG) emission reduction – 327 tonnes

The net municipal cost of this measure will be $394,071 (including eligible incentives) with a simple payback of 2.1 years.

J. Intelligent Electronic Compressor Controller

Intelligent electronics compressor controllers will be installed on approximately 45 air conditioning units on designated City buildings in June 2014. Air conditioning is one of the largest energy consumers in both the residential and industrial sectors. Many existing air conditioning units use old and inefficient technology. Installing electronic control units add state of the art intelligence to air conditioning systems and improve their energy efficiency.

Typically air conditioning systems are usually dimensioned to cope with the extreme cooling demands of the few hottest days of the year. However in most operational conditions this maximum output is not required and the systems are oversized. Running an air conditioning unit until the thermostat switches it off means that the system operates with excess capacity most of the time.

When the cycle starts, the compressor pushes cooling energy into the heat exchanger which acts as an energy storage. At this stage the system works with high efficiency as compressors operate most efficiently when fully loaded. In normal weather conditions the energy storage is soon fully “charged up”, from this point onwards. The compressor provides more cooling than the heat exchanger can take up known as thermodynamic saturation. Running the compressor beyond this stage does not increase the cooling effect any more.

An electric compressor controller is designed to detect thermodynamic saturation and to optimize the compressor accordingly. When over-capacity is detected the controller switches the compressor off and avoids inefficient over cooling.

Table 13 below outlines the estimated reduction in electricity consumption and corresponding cost savings.

Table 13 - Intelligent Electronic Compressor Controller Program

Building Measure	Total Estimated Annual Savings	Estimated Electrical Savings [kWh]	Total Measure Cost with Incentives	Simply Payback [years]
Electronic Compressor Controller – 45 units	$13,720	100,000	$26,000	1.9

Installing electronic control units will result in the following reduction in costs and consumption.

- Annual savings - $13,720
- Electricity savings - 100,000 kWh
- Annual eCO_2 (GHG) emissions reduction – 22 tonnes

The net municipal cost of the measure will be $26,000 (including eligible incentives) with a simple payback period of 1.9 years.

K. Transit Windsor Bus Garage / Administrative Offices

A preliminary engineering study was undertaken by MCW Custom Energy Solutions Ltd. in March 2014.

K.1 – Building Description

Address	3700 E.C. Row, North Service Road
Total Floor Area (ft^2)	132,800
Storey Above Grade	2
Storey Below Grade	0
Year Opened	1978

The Transit Windsor bus garage constructed in 1978 currently houses all city busses and is the primary maintenance and administrative facility for Transit Windsor. The facility is approximately 132,800 square feet and is compartmentalized into four main areas:

- Bus storage
- Maintenance and repair shop
- Bus cleaning and wash area
- Administration office

K.2 – Utility Overview

In 2013 the facility consumed 1,445,437 kWh of electricity, 497,019 cubic meters of natural gas and 6,659 cubic meters of water with an annual utility cost of $289,442. The energy intensity or BEPI is 11.26 kWh/ft^2 for electricity and 35.44 ekWh/ft^2 for natural gas. Figures K.1, K.2, and K.3 below identify electricity, natural gas, and water consumption for the period 2010 – 2013.

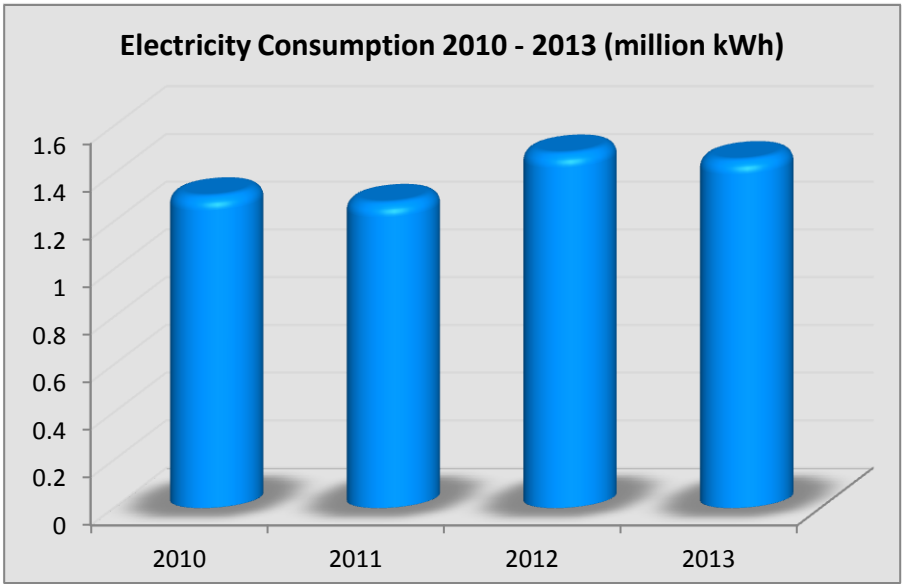


Figure K.1 – Transit Windsor Electricity Usage

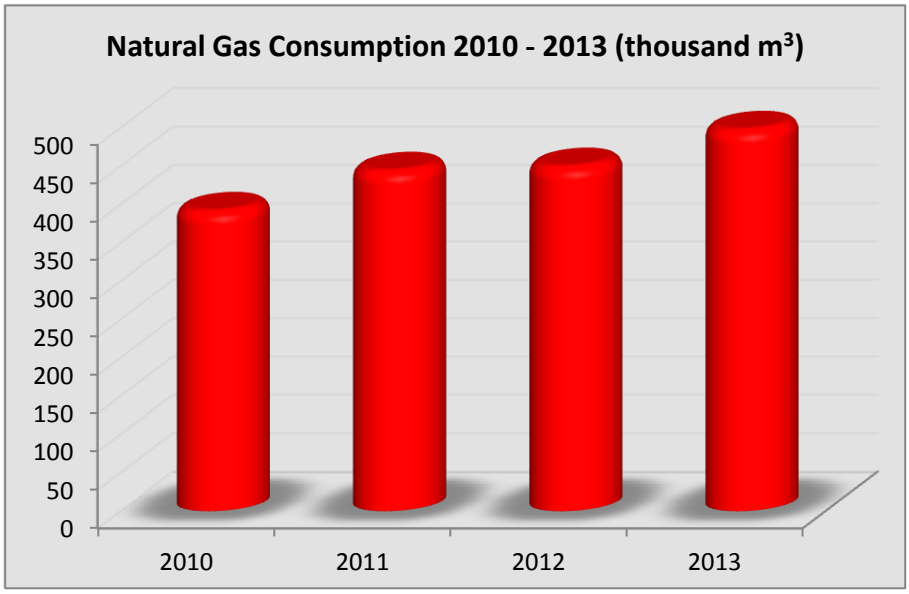


Figure K.2 – Transit Windsor Natural Gas Usage

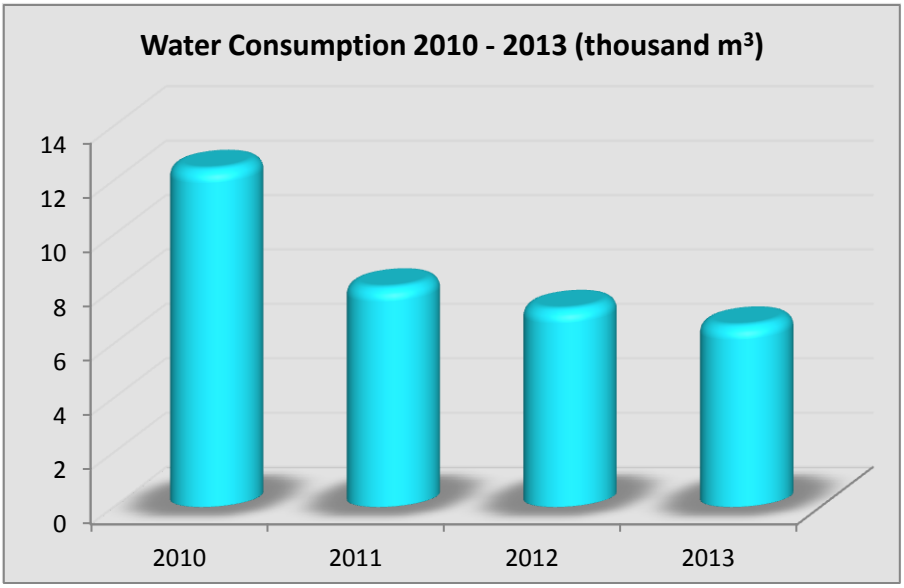


Figure K.3 - Transit Windsor Water Usage

The preliminary engineering study undertaken by MCW Energy Solutions Inc., identified and investigated project opportunities, provided an estimate of energy savings, and associated costs.

Based on the amount of energy savings identified, Administration determined that a detailed engineering study (DES) would be undertaken in order to provide a more comprehensive energy consumption analysis.

Table 14 – Transit Windsor Energy Efficiency Measures

Transit Windsor Measure	Annual Savings [$]	Annual Electricity Savings (kWh]	PROJECT COST [$]	SIMPLE PAYBACK [years]
Make-up Air and Exhaust Fans Replacement NO_x and CO Detection Systems	16,904	120,745	756,966	45

L. Embedded Combined Heat and Power (CHP) Plant at WFCU Center

The City of Windsor is considering the installation of a CHP plant at the WFCU Center. CHP systems also known as Co-generation produce electricity and heat from a single source – natural gas. The electricity generated is utilized for onsite power requirements while the heat produced in the process is recovered for the thermal needs of the facility. The cost of the proposed system is approximately $2 million. The Ontario Power Authority (OPA) will provide subsides of 40% of the capital project costs.

The City recently issued an RFQ and has selected CEM Engineering to undertake a detailed engineering study (DES) in accordance with OPA's saveONenergy PSUI (processed system upgrade initiative).

The purpose of the DES is to evaluate the feasibility of the CHP as a sustainable energy project and to attract financial incentives of approximately $800,000 from the OPA program.

As noted in Section 4, subsection A.2, the WFCU Center in 2013 consumed approximately 8 million kWh of electricity and 885,000 cubic meters of natural gas at a cost of $1,114,000. The cost of an 800 kW CHP system is

approximately $2 million with available incentives of $800,000 results in a net City cost of $1.2 million and a simple payback period of approximately 2.5 years.

Table 15 below outlines the estimated reduction in electricity consumption and corresponding cost savings.

Table 15 – WFCU Centre CHP Program

Building Measure	Total Savings	Electrical Savings [kWh]	Total Measure Cost with Incentives	Simply Payback [years]
CHP system	$477,102 *	6,900,000	$1,200,000	2.5

* Based on 2013 data and net of operating costs after CHP implementation

Implementing a CHP system represents the following savings and consumption reduction:

- Annual savings $477,102
- Electricity savings – 6.9 million kWh or 86% reduction based on 2013 data
- CHP plant will produce the equivalent energy of 600,000 cubic meters or 68% of 2013 natural gas usage

The net municipal cost of implementing CHP system at WFCU is approximately $1.2 million with a simple payback period of 2.5 years.

Below it is a representation of a CHP unit.

M. Embedded CHP Plant at Huron Lodge Long Term Care Facility

The City of Windsor is also considering the installation of a CHP plant at Huron Lodge. An RFP was recently issued and CEM Engineering was selected to undertake a DES. The DES will evaluate the feasibility of a CHP plant as a sustainable energy project to attract financial incentives from the OPA program.

Huron Lodge is a long-term care facility with 224 resident beds. Each floor is 40,000 square feet in size and accommodates approximately 50 resident living quarters, 2 dining areas, 2 serving areas, and a connected pantry. The main kitchen is located on the first floor while the basement contains the laundry facilities.

M.1 – Building Description

Address	1881 Cabana Road
Total Floor Area (ft^2)	176,528
Storey Above Grade	4
Storey Below Grade	1
Year Opened	2006

M.2 – Utility Overview

Huron Lodge is a significant energy user within the city's building inventory and is the second highest consumer of natural gas. In 2013 the facility consumed 3,258,665 kWh of electricity, 564,420 cubic meters of natural gas, and 30,037 cubic meters of water for a combined annual expenditure of $567,291. Figures M.1, M.2, and M.3 below identify electricity, natural gas and water consumption for the period 2010 – 2013.

The energy intensity or BEPI is at 18.5 kWh/ft^2 for electricity and 34 ekWh/ft^2 for natural gas.

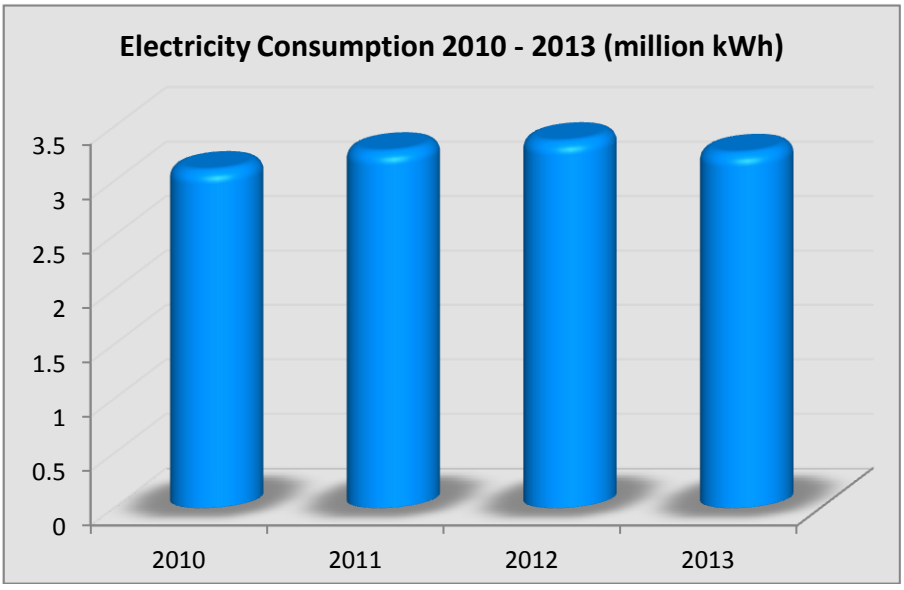


Figure M.1 – Huron Lodge Electricity Usage

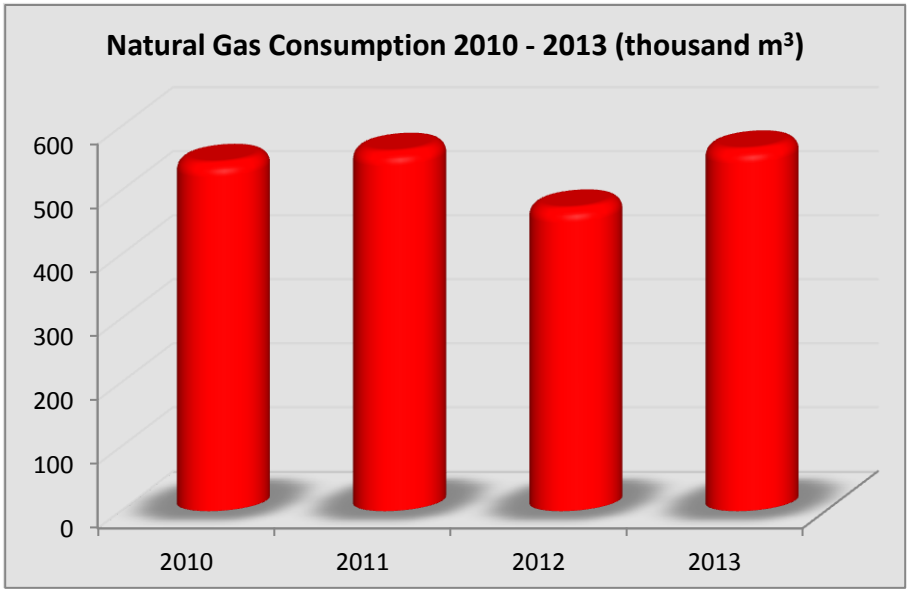


Figure M.2 – Huron Lodge Natural Gas Usage

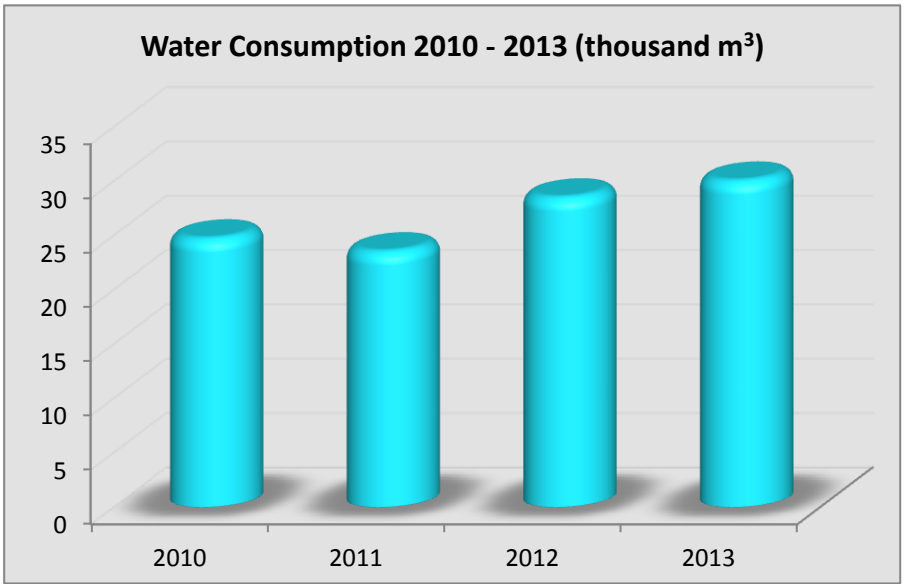


Figure M.3 – Huron Lodge Water Usage

Table 16 below outlines the preliminary estimated reduction in electricity consumption and corresponding cost savings.

Table 16 – Huron Lodge CHP Program

Building Measure	Total Savings	Electrical Savings [kWh]	Total Measure Cost with Incentives	Simply Payback [years]
CHP System	$220,000	2,070,000	$840,000	3.8

Implementing a CHP system represents the following projected savings and consumption reductions:

- Annual savings $220,000
- Electricity savings - 2,070,000 kWh or 65% reduction based on 2013 data

The net municipal cost of implementing a CHP system at Huron Lodge is estimated at $840,000 with a simple payback period of 3.8 years.

N. Huron Lodge Long Term Care Facility Energy Audit

A preliminary energy audit will be undertaken at Huron Lodge by Health Care Energy Leaders – Ontario (HELO) in June 2014. The OPA has partnered with HELO to provide assistance with consumption audits, energy efficiency opportunities, preparation of business case content to help health care administrators with project formulation and execution.

The investigation phase will involve an in depth understanding of the building systems with operational and functional data to be collected to document baseline operation conditions. A complete list of measures will be developed to identify potential energy efficiency opportunities.

While the energy audit is yet to be completed administration is targeting an estimated 8% electricity and 10% natural gas reduction.

Table 17 below outlines a preliminary estimation of electricity and natural gas consumption reduction and corresponding cost savings.

Table 17 – Huron Lodge Energy Efficiency Measures Program

Building Measure	Total Savings	Electrical Savings [kWh]	Natural Gas [m^3]	Total Measure Cost with Incentives	Simply Payback [years]
TBA	$44,445	260,693	56,400	TBA	TBA

O. Municipal Storm and Sanitary Pumping Stations

A review of the energy consumption efficiency of the City's 43 sanitary and storm pumping stations is under consideration. The pump stations consume approximately 2.3 million kWh annually at a cost of $253,000. In addition to the energy consumption a preliminary review has noted some stations experiencing a high inductive load. This means the power factor which ideally should register between 1.0 and 0.9 is too low. If the power factor is below 0.9, the City is paying a premium for the kilowatt (kW) component of the monthly electricity bill. Installation of capacitors and / or installing variable frequency drives (VFD'S) will increase the power factor and reduce costs. Dillon consulting has been engaged to provide a scope of work and associated costs with undertaking this project.

Table 18 below outlines a preliminary estimation of electricity consumption and corresponding cost savings.

Table 18 – Pumping Stations Energy Efficiency Measures Program Summary

Building Measure	Total Savings	Electrical Savings [kWh]	Total Measure Cost with Incentives	Simply Payback [years]
Power Factor correction / VFD's	$23,920	184,000	TBA	TBA

Below it is depicted one of the City's 43 pump stations.

P. Streetlight City Wide LED Conversion

The City is converting its 23,533 existing high pressure sodium (HPS) streetlights to LED lamps. The expected annual electricity savings is approximately 29%, in addition re-lamping will occur every 15 years compared to the current 5 years resulting in reduced maintenance cost of approximately 50%. The expenditure of approximately $14.3 million to convert to LED lamps is projected to save $36.5 million over the expected 15 year life of the LED lamp. Other benefits of conversion to LED streetlights include:

- Major reduction in the City's carbon footprint
- Increased vehicular and pedestrian safety through better visibility, object recognition and colour rendition
- LED fixtures are certified by the International Dark Sky Association (IDA) as dark sky friendly, thus eliminating obtrusive sky glow for street lights
- Assist in satisfying the goals and recommendations outlined in the City's Environmental Master Plan and City's Strategic Community Plan

Table 19 below outlines a summary estimation of electricity consumption reduction and corresponding cost savings.

Table 19 – Streetlights Energy Efficiency Measures Program

STREETLIGHTS	**SAVINGS**					
Measure	**Annual Savings**	**Annual Energy Savings** [kWh]	**Maintenance Cost**	**eCO_2** [tonnes]	**Project Cost with Incentive**	**Simple Payback** [years]
Streetlight conversion to LED lamps	$1,014,000	5.22 million	$913,333	1,160	$13.8 million	7.2

Implementing the city-wide streetlight conversion to LED lamps will result in the following saving and consumption reductions.

- Annual electricity savings - $1,014,000 or 29% of 2013 electricity costs
- Electricity savings 5,220,000 kWh or 29% reduction based on 2013 streetlight consumption
- Annual maintenance cost savings - $913,333 reduction
- Annual eCO_2 (GHG) emissions reduction 1,160 tonnes

The net municipal cost of the measure will be $13.8 million (including eligible incentives) with a simple payback of 7.2 years.

4.4 Behavioural Measures

4.4.1 Energy Awareness and Education Campaign

Introduction

In 2013 the City spent $14.6 million on energy and water consumption. This consumption is equivalent to 140 million kWh and 0.5 million cubic meters of water; sufficient energy to cool and heat 5,000 homes.

Benefits of efficient energy management at municipal facilities include:

- Saves taxpayers money
- Reduces greenhouse gas emissions
- Protects the environment and natural resources; and
- Contributes to the preservation of energy security at national level

To become truly energy-efficient, the City must make basic changes in the way the employees behave, in the technologies adopted and in the internal policies and procedures. No single change can deliver maximum savings. Benefits are maximized when a combination of behavioural, technological, and organizational changes are implemented simultaneously with support from senior management.

While efforts to adopt energy-efficient equipment, maintenance and operational practices can be challenging, it is a much more difficult challenge to establish energy efficiency as a fundamental value. People tend to take energy for granted, and many are unaware of the opportunities they have to reduce energy use. Some may claim to support energy efficiency, but do not commit themselves in changing their behaviour. Increasing people's awareness toward energy use is therefore important to ensure the success of the energy efficiency initiatives and should be part of the energy management plan.

Energy Awareness Campaign Objectives

A well designed Awareness Campaign would support and strengthen the energy conservation objectives of the City. The Awareness Campaign will incorporate the following objectives:

- Increase the employees' understanding of energy efficiency and explain the City's objectives toward energy savings
- Create the link between the individual actions and behaviour of employees and potential energy use and savings
- Motivate the employees to modify their behaviour towards energy consumption
- Improve City's operations and increase employees productivity and morale
- Reduce energy consumption and save money
- Increase City's reputation and serve as a positive model
- Transfer the behaviours learned in the workplace to the home and community

Coupled with an effective energy management plan, an awareness campaign is a non-expensive and relatively easy to implement opportunity for the City to lower consumption and energy costs. Conscientious use of energy would potentially bring significant energy savings in the range of 5-10%. A 5% reduction in energy consumption would equate to approximately 4 million kWh of electricity, 220,000 cubic meters of natural gas, 775 MWh district heating and cooling and 35,000 cubic meters of potable water, resulting in potential annual savings of $750,000.

Design and Implementation

The awareness campaign will be implemented as follows:

- Assembling the Players
  - Obtaining Senior Management commitment
  - Assembling a working "Energy Champions" team
- Establishing Baselines
  - Establishing a baseline of energy consumption
  - Establishing a baseline of energy efficiency awareness (survey/questionnaire)
- Formulating Objectives
  - Supporting the energy saving objectives
  - Establishing awareness and communication objectives
- Developing a Communications Plan
  - Identifying communication tools (dashboard, emails, posters, social media)
  - Confirming target audiences
  - Anticipating challenges
  - Developing messages ("Kill-A-Watt", "Watt's the problem? Turn it off!", "It makes cents to turn it off", "You've got the power to save energy!")

- Implementing the Awareness Campaign (starting April 2014)
  - No / low cost actions (dashboard messages, emails, City Circuit newsletter, social media, stickers)
  - Meetings, brown bag lunches, and seminars
  - Actions requiring some budget (posters, video-messages, calendars and other promotion materials)
- Program Evaluation
- Monitoring and Reporting
- Following Through
  - Reinforcing the message
  - Adapting the approach
  - Sharing success

4.5 Organizational Measures

4.5.1 Introduction

At the organizational level commitment from Council and senior administration will demonstrate leadership and commitment required to ensure the realization of the Energy Management Plan by all of the corporation's energy consumers. City employees play a key role in the efficient use of energy which cannot be overstated and which further underscores the proposition that harnessing administrative and political support will greatly assist in developing a corporate culture of energy conservation.

4.5.2 Background

The Corporation's Energy Initiative unit was approved by Council in 2010 and forms part of the Asset Planning Division. It is comprised of:

- Manager of Energy Initiatives
- Supervisor of Energy Contracts (Temporary full time)
- Energy Support Clerk

The mandate of Corporate Energy Initiatives is as follows:

"To promote and implement cost effective energy efficient products, services and programs that reduce corporate consumption of electricity, natural gas, and water".

City Council has also been supportive by the following actions:

a) Community Strategic Plan

The City of Windsor's Community Strategic Plan was officially adopted by Council in 2007. The Plan offers a strategic road map for the community through community participation and sustainable development. "Our Environment: Clean and Efficient", one of the four pillars of the Plan identifies energy conservation as a community objective.

Our Environment: Clean and Efficient Community Objectives:
Conserve Energy – Be an energy-efficient community

b) Environmental Master Plan

The Environmental Master Plan was developed in 2006 in accordance with the goals and objectives established in the Official Plan and the Corporation's Community Strategic Plan. One of the key objectives of the Environmental Master Plan identifies the need for development and implementation of a corporate energy management plan.

Goals: Use Resources Efficiently
To increase resource efficiency, conserve water and energy and reduce waste.
Objective D: Establish a Corporate Energy Management Plan

4.5.3 Embedded Energy Manager – OPA saveONenergy Process and Systems Initiative

The City of Windsor in cooperation with EnWin Utilities Ltd. hired an Embedded Energy Manager (EEM) in May 2013 through the Ontario Power Authority (OPA) saveONenergy for Business Process and Systems Initiative. This position is 80% funded by the OPA until Dec. 31, 2015 and offers the City the opportunity to employ a full-time dedicated staff to help manage energy related initiatives.

The core function of the EEM is to identify, assess, report and implement energy savings opportunities within the corporation's building/facility portfolio and other related assets.

Duties and responsibilities include the following:

- Report to the Manager of Energy Initiatives or designate
- Review existing reports/data and undertake a primary assessment of City sites with a focus on major energy users to identify savings opportunities and identify operations/systems that will require more detailed analysis
- Provide a database and an energy tracking and monitoring system for each facility/process that captures monthly consumption and electrical load inventory of major equipment.
- Develop and deliver training to City staff on the energy tracking and monitoring system
- Review control systems, operating schedules and maintenance practices at each facility to identify operational savings
- Develop maintenance practices and programs to enhance energy efficiency
- Develop and recommend an energy saving opportunities action plan that includes capital improvement projects as well as operational and maintenance changes
- Co-ordinate the implementation of energy saving projects including planning, and budgeting with service providers
- Assist with development of a corporate wide measurement and verification system
- Implement a employee training and awareness program that promotes energy efficiency initiatives undertaken
- Assist with fostering a sustainable energy management culture within the corporation
- Co-ordinate and assist with site inspections by Utilities and Ontario Power Authority to review projects and related information
- Prepare quarterly reports

The saving targets include implementation of 0.3 MW of peak demand savings and 1.285 MWh in energy savings each year for the period 2013 – 2015. In addition 33% of the prescribed savings target must be achieved without third party incentives.

The EEM program requires quarterly reports and to be filed with the OPA. These reports provide a status update as to the activity levels and savings opportunities resulting from the EEM initiative.

4.5.4 Corporate Energy Champions

The Energy Initiatives unit established a team of corporate operational stakeholders having direct responsibility in the consumption of energy within their respective jurisdictions/workplaces. The team "Corporate Energy Champions" mandate is to ensure the efficient use of energy is a priority within their respective operation and throughout the municipal work place.

The Corporate Energy Champions meet monthly with the following objectives:

- Promote, support and assist with the implementation of a broad range of energy consumption reduction measures as identified in the Energy Management Plan.
- Integrate best practices into daily operations where applicable
- Provide a forum for cross pollination of ideas and energy management strategies that benefit the Corporation
- Assist with the execution of the corporation's energy education and awareness campaign.

Section 5
Renewable Energy

5.0 Renewable Energy

5.1 Windsor International Aquatic and Training Centre – 350 kW Photovoltaic System

5.1.1 Building Description

The Windsor International Aquatic and Training Centre (WIATC) is the City of Windsor's brand new state of the art competitive pool and indoor water park facility. The natatorium is comprised of a 71 meter x 25 meter 10 lane pool featuring two moveable bulkheads that allow for multiple configurations to fit the ideal length for any swim competition or community use. The pool varies from 2 m to 5.2 m in depth and also features a moveable floor which allows for shallower depths and greater accommodation for community programming. The diving well is comprised of a dive tower with five platforms ranging in height from 1 m to 10 m and 2 springboard platforms.

Adventure Bay is a family oriented water theme park and features multiple slides, wave pool, lazy river, water play zone and other water amusement related amenities.

The WIATC is comprised of a natatorium and water amusement park having a building footprint of approximately 116,000 square feet. The mezzanine area occupying administrative offices and public viewing space is 30,000 square feet with the basement encompassing 31,000 square feet. The facility is one of six municipal buildings heated and cooled by District Energy.

Address	401 Pitt Street West
Total Floor Area (ft^2)	176,280
Storey Above Grade	1 (plus mezzanine) 45 ft. ceiling height
Storey Below Grade	1
Year Opened	2013

5.1.2 Utility Overview

The facility partially opened (natatorium) in August 2013 for the International Children's Games and the Adventure Bay water park opened to the public in December 2013. While complete utility profile is not available at the writing of this Plan, an analysis of the first 8 months of operation indicate a monthly consumption trend of approximately 692 MWh of combined heating and cooling. The first quarter of 2014 electricity consumption averaged 573,000 kWh monthly.

5.1.3 350 kW Roof Mounted Photovoltaic System

In September 2013 the City executed a Feed-In-Tariff (FIT) contract with the Ontario Power Authority (OPA) permitting the installation of a PV system of up to 350 kW in size to be located on the roof of the Windsor International Aquatic and Training Centre. Under FIT 2.1, the City will receive a rate of $0.539 per kilowatt hour of electricity generated for a 20 year term.

The system size is 350 kW AC (419.6 kW DC) and is comprised of 1554, 270 W mono-crystalline modules. The installation angle is 20 degrees allowing for approximately 18 inches of clearance below the panels on the high end. Projected energy output is estimated at 501 MWh for the first year and an estimated 9,558 MWh over the 20 year life of the OPA contract. Field losses for wiring are calculated below 2%, soiling losses of 2% in December, 6% in January and February and 2% in March have been added to give a conservative yield projection. Annual solar panel degradation has been factored at 0.75%.

Construction will begin in the spring 2014 with a commercial operation date of February 19, 2015.

5.2 OPA FIT 3.0 Applications

The City has made PV applications for four additional sites under FIT 3.0 and has recently been advised that three facilities have met the completeness and eligibility requirements under OPA FIT rules.

The sites are:

- WFCU Centre – 500 kW
- Transit Windsor / Bus Garage – 500 kW
- Forest Glade Arena – 250 kW

These applications will now move forward to be assessed for connection / distribution availability with an anticipated July 2014 response from OPA.

Section 6
Energy Management Plan Implementation

6.0 Energy Management Plan Implementation

6.1 Objective

The Energy Management Plan identifies a roadmap that provides direction to support the City of Windsor towards achieving its vision, goals and objectives over the life of the five-year plan 2014 – 2018. The Plan is intended to be living document that is flexible, creative yet simple to execute and serves as the fundamental cornerstone for the City's successful energy management. Outcomes will include the development of new policies, procedures, processes and acquiring broader energy management knowledge corporately.

The intent of the EMP is to prepare a document that is going to be used by our municipality to better manage energy use, to reduce energy consumption and to demonstrate leadership in our community.

6.2 Prioritization of Energy Measures

The measurers being developed will not be of equal importance or immediately implemented. It will be necessary to prioritize the measures in order to make an informed decision as to which ones to implement first.

Measures with clearly define costs and savings will be prioritized according to their simple payback period. Other measures that do not have clearly defined costs and savings will be prioritized based on considerations such as importance, ease of implementation, and availability of lead department.

Table 20 below identifies the various energy improvements, programs and initiatives that will be implemented during the period 2014 – 2018. A schedule for completing the prioritized measures will be established with an assignment of the year the measure is anticipated to be operational.

Table 20 – Summary of Prioritized Energy Efficiency Measures 2014 – 2015

Facility / Location	Energy Initiative Description	Projected Completion Date	Net Cost	Annual Savings		GHG Reduction	Simple Payback
				Electricity [kWh]	**Natural Gas** [m^3]	[tonnes]	[years]
Little River Pollution Control Plant	Sewage Pumps Motors Replacement	Summer 2014	$43,908	377,544		83	14.3
400 City Hall Building	Energy Audit	August 2014	TBA	TBA	TBA	TBA	TBA
Multiple Facilities	Intelligent Electronic Compressor Controller	Autumn 2014	$13,720	100,000		22	1.9
WFCU	Lighting Retrofit & Controls, Ice Plant Controls & Heat Recovery, Variable Flow Pumping, and Building Controls	October 2014	$374,540	567,279	144,159	376	4.5
Lou Romano Water Reclamation Plant	Turbo Blowers Installation	February 2015	$181,463	1,480,481		327	2.1
Forest Glade Arena	Floating Head Pressure Control with New Condenser and Control System Upgrades	April 2015	$130,307	168,819		37	6.5
South Windsor Arena	Floating Head Pressure Control with New Condenser and Control System Upgrades	April 2015	$130,308	199,110		44	6.5
Charles Clark Rink	Floating Head Pressure Control and Compressor Belt	2015	$23,000	78,000		18	4.2
Capitol Theatre	Control Upgrades	2015	$7,155	30,000	25,000	7	
Transit Windsor	Detection Systems Replacement	2015	$61,400	100,000		22	TBA
WFCU Centre	Embedded Combined Heat and Power	December 2015	$1,200,00	6,900,000		TBA	2.5
Huron Lodge	Embedded Combined Heat and Power	TBD	840,000	2,070,000		TBA	TBA
Huron Lodge	Building Controls	2016	$30,345	260,693	56,000	79	
Pumping Stations	Efficiency Improvement, VFDs, Power Factor Correction	2016 - 2019	TBA	184,000		56	TBA
Streetlights	Streetlight City Wide LED Conversion	TBD	$14,225,000	5,220,000		1580	
WIATC	350 kW PV System	Early 2015	$1,124,289	501,000			
City Wide	Energy Awareness Campaign	2014 / 2015	TBA	1,300,000	74,000	392	
Little River Pollution Control Plant	Energy Audit	Early 2015	TBA	TBA		TBA	TBA
Little River Pollution Control Plant	Pilot sub-metering project	2015	$50,000	400,000		88	1.1
Lanspeary Ice Rink	Refrigeration Plant Modifications	2016	$515,000	156,000		32	34.3
WFCU	LED Lighting, Mechanical Measures, Building Envelope	2016 - 2018	$282,743	124,120	24,585	81	12.6
Forest Glade Arena	Compressor, Chiller and Condenser Replacement	2016 - 2018	$386,487	95,898		21	17.1
South Windsor Arena	Compressor, Chiller and Condenser Replacement	2016 - 2018	$386,487	104,600		23	17.2
Charles Clark Ice Rink	Refrigeration Plant Modifications	2016 - 2018	$392,000	111,500		23	41.7
Capitol Theatre	Lighting and Mechanical Modifications	2016 - 2018					
Transit Windsor	HVAC Upgrade	2016 - 2018	$756,966	120,745			

Section 7
Monitoring and Evaluation

7.0 Monitoring and Evaluation

7.1 Plan Review and Monitoring

Continuous monitoring, verification and reporting is an integral part of energy management and a necessary tool to track consumption, cost savings / cost avoidance resulting from the implemented projects. Incorporating a monitoring/evaluation process will provide gateways to help better understand how energy consumption might be further reduced.

7.1.1 Monitoring, Verification and Reporting

While Ontario regulation 397/11 requires that municipalities report on the results of their respective plan at the end of the 5 year planning period, Asset Planning/Energy Initiatives division will be providing City Council an annual update commencing in July 2015.

As part of the Plan the various, projects / measures as they become operational will be regularly monitored and reviewed annually to document energy consumption and cost savings. The monitoring process will include updates to the departments affected by the implementation of the projects/measures. By regularly reporting consumption and cost savings and / or avoidance to departments, staff will become aware of the outcomes of their participation in energy management initiatives, resulting in constructive feedback and additional energy saving ideas and opportunities.

The annual report will provide the following information:

- Annual energy consumption with historical comparisons
- A updated description of current, new, and proposed measures contributing to the conservation, energy reduction and managing demand for energy
- A revised forecast of expected results of current and proposed measures
- An update of actual results achieved to-date
- A description of any proposed changes to be made to assist the City in achieving established targets and forecasts

7.2 Energy Data Management

To efficiently manage energy use requires effective monitoring systems that provide accurate feedback, ideally in real time. The ability to analyze useful data will serve to reinforce the concept that energy while a constant is a variable cost. Making individuals accountable and empowering them with the tools to better control energy use is fundamental and stresses the importance of engaging people in the development and execution of an energy management plan.

As previously stated it is important to develop a corporate wide understanding of energy consumption and costs. An essential set of tools to achieve this would involve a comprehensive metering and sub-metering program and an energy management information system.

The ability to analyze in real time requires real time consumption data to be collected by an energy management information system (EMIS). This allows facility staff and energy administrators to react and respond to operational abnormalities, market conditions in terms of peak pricing and other "troubleshooting" matters that often arise within a corporation that has multiple sites and is a large user of energy.

Real time data analysis provides several benefits that include:

- Quick response time to poor operational performance
- Better understanding of larger facilities, i.e. water treatment plants, WFCU Center, 400 City Hall
- Better monitoring and setting of consumption reduction targets
- Assist with budget preparation

The key objective of energy data management is to identify energy efficiency opportunities, reduce consumption, better manage costs and ultimately support a culture of energy conservation. The addition of an EMIS will dramatically improve both analytical capabilities and the ability to identify energy efficiency opportunities.

Currently the City is undertaking a business assessment for an enterprise wide utility management process. Once completed this business process review will lead to a number of recommendations including the integration of an energy management system with current and future BAS and metering systems.

7.3 Building Automation Systems

The Corporation currently has several types of building automation systems (BAS) in a number of its facilities. A BAS represents another tool that assists operational and administrative staff to optimize the day to day management of a facility. The ability to integrate buildings systems that include heating, ventilation, air conditioning (HVAC), lighting, security and energy data management information is essential and provides for a comprehensive enterprise wide energy management program.

This EMP recommends a complete integration of building automation and where prudent installation of new systems, upgrades and required improvements across the corporation's building portfolio.

Section 8
Appendices

Appendix A

City of Windsor 2011 Consumption Data as per Ontario Regulation 397/11

Confirm consecutive 12-month period (month-year to month-year)		01-2011 to 12-2011											
Type of Public Agency (Sector):		Municipal											
Agency Sub-sector		Municipality											
Organization Name		City of Windsor											
						Energy Type and Amount Purchased and Consumed in Natural Units				Total			
Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)	
City Hall	Administrative offices and related facilities, including municipal council chambers	350 City Hall Sq. W	6159	39.89		1184944	168757		140 Giga Joule - chilled water	415397.4799	1.747826826		
400 Building	Administrative offices and related facilities, including municipal council chambers	400 City Hall Sq. E.	14307	39.99		2370476	31590	2869 Giga Joule - steam or hot water	4183 Giga Joule - chilled water	466292.1366	0.970076961		
File Storage	Administrative offices and related facilities, including municipal council chambers	930 Mercer Street	771	39.89		38082	16997			35181.54712	1.021271621		
Transit Windsor	Storage facilities where equipment or vehicles are maintained, repaired or stored	3700 North Service Road	12235	167.54		1276121	443571			940716.989	1.76257148		
Windsor Transit Downtown Bus Terminal	Administrative offices and related facilities, including municipal council chambers	300 Chatham Street W.	910	114.68		321479		720 Giga Joule - steam or hot water	442 Giga Joule - chilled water	73449.65857	2.210171459		
Chatham Street Parking Garage	Parking garages	62 Chatham St. E.	15859	167.54			8361			15807.53235	0.020170998		
Pelissier Parking Garage	Parking garages	426 Pelissier	12783	167.54		276004				22080.32	0.077729359		
Mackenzie Hall	Cultural facilities	3277 Sandwich St.	743	71.8		187408	12289			38226.5552	1.54084245		
Huron Lodge	Administrative offices and related facilities, including municipal council chambers	1881 Cabana Road	16400	167.98		3272733	560552			1321613.386	2.026131605		
City Hall Heating Plant	Administrative offices and related facilities, including municipal council chambers	440 City Hall Square E.	55	167.54		14634				1170.72	0.957861818		
Capitol Theatre	Auditoriums	121 University Ave. W.	2407	67.81		125520	47022			98942.66279	0.935161496		
Bridgeview Library	Public libraries	1295 Campbell Ave.	464	48		88495	7150			20597.58305	1.276165948		
Nicola Budimir Library	Public libraries	1310 Grand Marias Rd. W.	871	92.75		85506	7167			20390.60371	0.668233088		

Confirm consecutive 12-month period (month-year to month-year)		01-2011 to 12-2011											
Type of Public Agency (Sector):		Municipal											
Agency Sub-sector		Municipality											
Organization Name		City of Windsor											
						Energy Type and Amount Purchased and Consumed in Natural Units				Total			
Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)	
Remington Library	Public libraries	2710 Lillian Ave.	185	23.99		21780	2694			6835.749138	0.980975351		
Riverside Library	Public libraries	6305 Wyandotte St. E.	1315	64		204717	23633			61058.54789	1.24804546		
Fountainbleau Library	Public libraries	3030 Rivard Ave.	761	40.01		136727	16074			41328.0984	1.454938817		
Seminole Library	Public libraries	4285 Seminole	380	40.01		33643	11939			25263.63575	1.520791947		
Ouellette (Central) Library	Public libraries	850 Ouellette Ave.	9426	65.99		1109927	115579			307310.938	0.893039438		
DND Facility	Police stations and associated offices and facilities	4007 Sandwich St.	8175	167.98		1041441	97718			268063.5692	0.915948413		
Police Precinct# 2 (Jefferson)	Police stations and associated offices and facilities	2696 Jefferson Ave.	1124	55.98		119729	14430			36860.06761	0.874658541		
Joint Juistice Facility	Police stations and associated offices and facilities	200 Chatham St. E.	30144	167.54		5162372		11229 Giga Joule - steam or hot water	13435 Giga Joule - chilled water	1229611.04	1.124091966		
Roseland Golf and Curling Club	Indoor ice rinks	455 Kennedy Drive	4143	92		883622	102433			264352.3555	1.713764369		
Traffic Engineering	Storage facilities where equipment or vehicles are maintained, repaired or stored	1231 Mercer Ave.	739	167.54		69573	11434			27183.26912	0.930889905		
Public Works	Administrative offices and related facilities, including municipal council chambers	1266 McDougall Ave.	1467	39.89		169435	20273			51883.48117	0.944520095		
Traffic Office/Paint & Sign Shop	Storage facilities where equipment or vehicles are maintained, repaired or stored	1269 Mercer	1458	74.79		110715	11552			30697.7231	0.576511331		
Solid Waste/Recycling Centre	Administrative offices and related facilities, including municipal council chambers	3540 E.C. Row	1013	167.54		169341	20959			53172.93129	1.393404679		

Confirm consecutive 12-month period (month-year to month-year)	01-2011 to 12-2011
Type of Public Agency (Sector):	Municipal
Agency Sub-sector	Municipality
Organization Name	City of Windsor

Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Energy Type and Amount Purchased and Consumed in Natural Units				Total		
						Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)
Crawford Yard	Storage facilities where equipment or vehicles are maintained, repaired or stored	1531 Crawford Ave.	6043	135.63		585117	96986			230173.7102	0.962618825	
Field Engineering	Storage facilities where equipment or vehicles are maintained, repaired or stored	2545 Pillette	891	39.89		81189	25511			54726.9054	1.423491874	
Little River Waste Water Treatment Plant	Facilities related to the treatment of water	9400/9410 Little River Road	3423	167.54	18990.8	5823384	109632			673143.9393	7.349898545	1.32478372
Lou Romano Water Treatment Reclamation Plant	Facilities related to the treatment of water	4155 Ojibway	9019	167.54	65508	18868899	221843			1928934.286	8.472751921	1.16651019
Crawford yard	Administrative offices and related facilities, including municipal council chambers	1531 Crawford Yard	557	39.89		4562	11905			22872.87444	0.847232496	
Fire Hall # 1	Fire stations and associated offices and facilities	815 Goyeau St.	2388	167.54		454325	56641			143433.0039	1.592401449	
Fire Hall # 2	Fire stations and associated offices and facilities	2296 Richmond St.	744	167.54		94832	31171			66519.29422	2.061824812	
Fire Hall # 3	Fire stations and associated offices and facilities	2750 Ouellette Ave.	558	167.54		89325	18313			41769.05225	1.831945125	
Fire Hall # 4	Fire stations and associated offices and facilities	2600 College Ave.	772	167.54		84053	18271			41267.88592	1.297460181	
Fire Hall # 5	Fire stations and associated offices and facilities	1905 Cabana Rd. W.	539	167.54		66952	15257			34201.45614	1.530167013	
Fire Hall # 6	Fire stations and associated offices and facilities	5650 Tecumseh Rd. E.	520	167.54		67408	22459			47854.23179	2.119134885	

Confirm consecutive 12-month period (month-year to month-year)	01-2011 to 12-2011
Type of Public Agency (Sector):	Municipal
Agency Sub-sector	Municipality
Organization Name	City of Windsor

Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Energy Type and Amount Purchased and Consumed in Natural Units				Total		
						Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)
Fire Hall # 9 Fire and Rescue Apparatus	Fire stations and associated offices and facilities	2885 Kew Drive	1035	167.98		92023	33221			70170.35957	1.548133585	
Training and Fire Protection Services	Fire stations and associated offices and facilities	65 Elliot St.	622	39.89		422	9321			17656.29427	0.575788842	
Old Fire Hall # 7	Fire stations and associated offices and facilities	254 Lauzon Rd.	441	167.54		46722	7548			18008.2126	1.036248707	
Adie Knox Community Center	Community centres	1495 Wyandotte St. W.	1161	83.77		7650	9005			17637.09613	0.320474849	
AKO Community Center	Community centres	4271 Alice st.	1329	83.77		71759	10090			24817.14643	0.484857637	
College Community Center	Community centres	3325 College Ave.	1226	83.77		7512	19186			36874.52962	0.620798989	
Edward Community Center	Community centres	1150 Edward St.	1198	0.02		36537	11312			24309.73262	0.471060367	
Forest Glade Community Center	Community centres	3215 Forest Glade Dr.	1082	83.77		38000	22504			45586.67001	0.922183956	
Gino A. Marcus Community Center	Cultural facilities	1168 Drouillard Rd.	3613	83.77		579037	67155			173288.0162	1.288093966	
Malden Park Community Center	Community centres	4200 Malden Road	130	83.77		57844	3705			11632.29304	2.692243846	
Oakwood Community Center	Community centres	2520 Cabana Rd.	1068	83.77		222648	34333			82722.73679	1.98044324	
Ojibway Nature Center	Community centres	5200 Matchette Rd.	362	83.77		82480	13346			31830.70794	2.230789945	
Optimist Community Center	Community centres	1075 Ypres Blvd.	975	83.77		125821	18028			44149.90356	1.172007056	

Confirm consecutive 12-month period (month-year to month-year)	01-2011 to 12-2011
Type of Public Agency (Sector):	Municipal
Agency Sub-sector	Municipality
Organization Name	City of Windsor

Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Energy Type and Amount Purchased and Consumed in Natural Units				Total		
						Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)
Remington Community Center	Community centres	2720 Lillian	278	83.77		7449	7759			15265.29489	1.164301223	
Mic Mac Community Centre	Community centres	1059 Prince Rd.	566	83.77		100864	3761			15179.76815	0.895770777	
Adie Knox Pool and Arena	Indoor recreational facilities	1551 Wyandotte St. W.	4357	104.71		1298474	150122			387702.6265	2.391134753	
A.K.O. Community Pool	Community centres	4270 Alice St.	1328	83.77		74766	40396			82355.04829	1.36649741	
Windsor Water World	Indoor swimming pools	400 Wyandotte St. East	1207	98.73		916496	1721			76573.44907	2.788095327	
Adstoll Arena	Indoor ice rinks	4735 Adstoll	3344	0.02		14458	6856			14118.77871	0.094006986	
Forest Glade Arena	Indoor ice rinks	3205 Forest Glade Dr.	5760	167.54		1412102	75764			256209.624	1.385815597	
South Windsor Arena	Indoor ice rinks	2555 Pullford St.	7580	167.54		1403592	133260			364232.314	1.339242586	
Windsor Arena	Indoor ice rinks	572 McDougall Ave.	6329	167.54		802432	127448			305151.1899	1.226878761	
WFCU Center	Indoor ice rinks	8787 McHugh Drive	29740	167.54		7998451	848713			2244475.793	2.060059952	
Civic Terrace/Festival Plaza	Auditoriums	350 Riverside Dr. E.	380	83.98		164620	5139			22885.53215	2.076974053	
Indoor Tennis Club	Indoor recreational facilities	2 Memorial Drive	2545	104.71		13697				1095.76	0.019374931	
Field House	Administrative offices and related facilities, including municipal council chambers	2365 McDougall Ave.	446	39.99		23784	9059			19029.90999	0.969102556	
Boxing Club	Gyms and indoor courts for playing tennis, basketball or other sports	1899 Grove	469	83.98		13240	8186			16535.87262	0.769425075	
Lakeview Marina	Administrative offices and related facilities, including municipal council chambers	9200 Riverside Dr. E.	371	55.85		74348	1716			9192.155932	0.898401509	

Confirm consecutive 12-month period (month-year to month-year)		01-2011 to 12-2011										
Type of Public Agency (Sector):		Municipal										
Agency Sub-sector		Municipality										
Organization Name		City of Windsor										
						Energy Type and Amount Purchased and Consumed in Natural Units				Total		
Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)
Lanspeary house	Storage facilities where equipment or vehicles are maintained, repaired or stored	1219 Peirre	153	167.54		5492	2469			5107.318063	0.746634902	
Walker Homesite Park	Storage facilities where equipment or vehicles are maintained, repaired or stored	200-1900 Sydney Ave.	213	104.71		64998				5199.84	1.098557746	
Wilson Park	Storage facilities where equipment or vehicles are maintained, repaired or stored	1499 Wyandotte W.	92	0.02		5901				472.08	0.230908696	
Willistead Coach House	Cultural facilities	950 Chilver	929	83.77		35323	19149			39029.45642	0.925515113	
Willistead Manor	Cultural facilities	1899 Niagara St.	929	83.77		123127	40953			87277.00753	2.163744865	
Parks Administration Bld.	Administrative offices and related facilities, including municipal council chambers	2450 McDougall Ave.	1495	39.89		172673	17740			47353.56298	0.869802809	
Parks Yard	Storage facilities where equipment or vehicles are maintained, repaired or stored	2461 McDougall Ave.	3132	39.89		186121	55341			119518.8688	0.889968793	
Windsor Community Museum	Cultural facilities	254 Pitt St.	222	55.85		58318	5035			14184.74695	1.813440991	
Jeanette/Charl Pumping Station	Facilities related to the pumping of water	2331 Charl Ave.	85	167.98	81.18	6756				540.48	0.286136471	0.29960089
Drouillard Pumping Station	Facilities related to the pumping of water	290 Drouillard Road	117	167.98	15.56	12825				1026	0.394615385	2.96722365
Sixth Concession Pump Station	Facilities related to the pumping of water	4177 Ducharme	42	167.54	262.04	23868				1909.44	2.045828571	0.32790719

Confirm consecutive 12-month period (month-year to month-year)	01-2011 to 12-2011
Type of Public Agency (Sector):	Municipal
Agency Sub-sector	Municipality
Organization Name	City of Windsor

Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Energy Type and Amount Purchased and Consumed in Natural Units				Total		
						Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)
Grand Marais Pump Station	Facilities related to the pumping of water	3005 Grand Marais Road	115	167.98	649.2	69857				5588.56	2.186827826	0.38737708
Huron Estates Pumping Station	Facilities related to the pumping of water	2355 Lambton Street	39	167.98	52.14	11650				932	1.075384615	0.80437284
Primord Pumping Station	Facilities related to the pumping of water	9381 Little River Road	44	167.54	174.32	85541				6843.28	6.998809091	1.76656494
Maplewood Pumping Station	Facilities related to the pumping of water	5555 Maplewood Drive	104	167.54	1080.66	162110				12968.8	5.6115	0.54003664
Pontiac Pump Station	Facilities related to the pumping of water	9410 Little River Road	44	167.54	4828.79	161881				12950.48	13.24480909	0.12068688
St. Paul Pumping Station	Facilities related to the pumping of water	7730 Riverside Dr. E.	59	167.54	2383.31	285782				22862.56	17.43754576	0.43167494
East Marsh Pump Station	Facilities related to the pumping of water	10864 Riverside Dr. E.	60	167.98	2693.53	40615				3249.2	2.4369	0.05428341
Riverdale Pump Station	Facilities related to the pumping of water	594 Riverdale Ave.	41	167.54	363.65	41707				3336.56	3.662078049	0.41288382
Brighton Beach Pump Station	Facilities related to the pumping of water	4718 Sandwich St.	28	167.98	117.58	58717				4697.36	7.549328571	1.79776493
Ambassador Pump Station	Facilities related to the pumping of water	1021 Sprucewood	41	167.98	42.82	29111				2328.88	2.556087805	2.44744512
Jefferson Pump Station	Facilities related to the pumping of water	6340 Tecumseh Rd. E.	96	167.98	105.89	27457				2196.56	1.0296375	0.93347058
Wellington Underpass Pump Station	Facilities related to the pumping of water	1385 Wellington	26	167.54	13.48	21326				1706.08	2.952830769	5.69537092
Aspen Lake Pump Station	Facilities related to the pumping of water	1418 Florence	41	167.98	728.47	27956				2236.48	2.454673171	0.13815476
Central Ave. Pump Station	Facilities related to the pumping of water	3601 Grand Marais	115	167.98	100	4089				327.12	0.128003478	0.147204
Devonwood Pump Station	Facilities related to the pumping of water	3867 Acorn Crt.	46	167.98	257.76	6255				500.4	0.489521739	0.08736034
East Banwell Pump Station	Facilities related to the pumping of water	11520 Palmetto St.	58	167.98	42.06	2417				193.36	0.15002069	0.20687589
Florence Pump Station	Facilities related to the pumping of water	574 Florence	40	167.98	100	1356				108.48	0.12204	0.048816

Confirm consecutive 12-month period (month-year to month-year)	01-2011 to 12-2011
Type of Public Agency (Sector):	Municipal
Agency Sub-sector	Municipality
Organization Name	City of Windsor

Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Energy Type and Amount Purchased and Consumed in Natural Units				Total		
						Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)
Ford/Buckingham Pump Station	Facilities related to the pumping of water	5270 Riverside Dr. E.	40	167.98	1158.3	27096				2167.68	2.43864	0.08421445
Ganatchio Pump station	Facilities related to the pumping of water	9855 Wyandotte St. E.	46	167.98	6.33	1251				100.08	0.097904348	0.71146919
Lakeview Pump Station	Facilities related to the pumping of water	11999 Riverside Dr. E.	40	167.98	2984.36	101684				8134.72	9.15156	0.12266027
McKee Pump Station	Facilities related to the pumping of water	4659 Welland	40	167.54	100	2987				238.96	0.26883	0.107532
Peter Pump Station	Facilities related to the pumping of water	3766 Peter St.	42	167.54	463.03	17943				1435.44	1.537971429	0.13950457
Pillette Pump Station	Facilities related to the pumping of water	3499 Pillette	40	167.54	100	13981				1118.48	1.25829	0.503316
Robinet Pump Station	Facilities related to the pumping of water	2901 Robinet	10	167.54	100	1559				124.72	0.56124	0.056124
South Cameron Pump Station	Facilities related to the pumping of water	2255 Alexandra	35	167.54	183.93	10388				831.04	1.06848	0.20332083
Southwood Lakes Pump Station	Facilities related to the pumping of water	720 Lake Trail Dr.	37	167.54	100	25096				2007.68	2.441772973	0.903456
Twin Oaks Pump Station	Facilities related to the pumping of water	7750 Twin Oaks Dr.	37	167.54	100	2801				224.08	0.27252973	0.100836
Walker Farms Pump Station	Facilities related to the pumping of water	3400 Rhodes Dr.	46	167.54	100	29678				2374.24	2.322626087	1.068408
Walker Underpass Pump Station	Facilities related to the pumping of water	2691 Walker Road	35	167.54	34.62	24904				1992.32	2.561554286	2.58967071
Ypres Pump Station	Facilities related to the pumping of water	2170 Ypres Blvd.	38	167.54	681.49	66246				5299.68	6.275936842	0.34994732
Provincial Square Pump Station	Facilities related to the pumping of water	1848 Provincial Road	41	167.54	381.89	10727				858.16	0.941882927	0.10112127
Storage Facility	Storage facilities where equipment or vehicles are maintained, repaired or stored	1356 Tecumseh Rd. W.	288	0.02		16009	4542			9867.947834	0.803504583	
Windsor Armouries (old)	Cultural facilities	37 University Ave. E.	1672	0.02		49622				3969.76	0.106841627	

Confirm consecutive 12-month period (month-year to month-year)		01-2011 to 12-2011										
Type of Public Agency (Sector):		Municipal										
Agency Sub-sector		Municipality										
Organization Name		City of Windsor										
						Energy Type and Amount Purchased and Consumed in Natural Units				Total		
Operation Name	Operation Type	Address	Total Floor Area in which Operation is Conducted (Square Meters)	Average # Hours Per Week	Annual Flow (Mega Litres)	Electricity (kWh)	Natural Gas (Cubic Meter)	District Heating	District Cooling	GHG Emissions (Kg)	Energy Intensity (GJ/m2)	Energy Intensity (GJ/Mega Litres)
Windsor Arena Wyandotte st	Indoor swimming pools	334 Wyandotte St. E.	125	7			7649			14461.40592	2.34120592	
Malden Park storage/work area	Storage facilities where equipment or vehicles are maintained, repaired or stored	4301 Matchette/4455 Matchette	519	39.89		21573	29934			58319.86862	2.356334566	
Sci-Tech	Cultural facilities	930 Marion	4255	55.85		192638	38948			89047.1804	0.5131956	
Caron Ave. Pump Station	Facilities related to the pumping of water	620 Riverside Dr. W.	929	168	32030.78	1229051				98324.08	4.762737998	0.13813537

Appendix B

City of Windsor 2012 Consumption Data as per Ontario Regulation 397/11

(Intentionally blank - to be inputted by July 1st, 2014)

Appendix C

2010 – 2012 Energy Efficiency Retrofit Program - As Built Program by Measure

Table A1 – As Built Program by Measure

BUILDING / MEASURE		SAVINGS								COSTS		INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
		$ 247,081	1,767,625	5.6	3,092.6	13,885	316,568	18,216	1,127	$ 2,370,331	9.6	$ 449,131	$ 1,921,200	7.8
A - Lighting		**$ 89,342**	**994,106**	**5.5**	**3,075.8**	**-**	**-146**	**3,573**	**295**	**$ 836,261**	**9.4**	**-**	**$ 836,261**	**9.4**
A01	Lighting Retrofit & Redesign	$ 89,342	994,106	5.5	3,075.8	-	-146	3,573	295	$ 805,497	9.0	-	$ 805,497	9.0
A01c	Lighting Modifications (CO#21)		-	-	-	-	-	-	-	$ 4,190	--	-	$ 4,190	--
A05	PCB Disposal & Lamp Recycling		-	-	-	-	-	-	-	$ 26,575	--	-	$ 26,575	--
B - Mechanical		**$ 96,017**	**627,435**	**0.1**	**16.8**	**-**	**182,594**	**9,095**	**534**	**$ 803,156**	**8.4**	**-**	**$ 803,156**	**8.4**
B01	Boiler Replacements		-	-	-	-	-	-	-	$ 4,304	--	-	$ 4,304	--
B02	Boiler Controls		-	-	-	-	-	-	-	$ 337	--	-	$ 337	--
B03	DHW Heater Retrofit		-	-	-	-	-	-	-	$ 3,426	--	-	$ 3,426	--
B05	Infrared Heating Conversion		-	-	-	-	-	-	-	$ 1,081	--	-	$ 1,081	--
B06	AHU VAV Conversion	$ 6,676	26,677	-	-	-	17,141	738	41	$ 66,749	10.0	-	$ 66,749	10.0
B07	Pump VSD		-	-	-	-	-	-	-	$ 1,000	--	-	$ 1,000	--
B08	Aeration Blower VSD	$ 41,486	574,603	-	-	-	-	2,069	171	$ 149,745	3.6	-	$ 149,745	3.6
B11	Air to Air Heat Recovery	$ 45,467	11,571	-	-	-	161,068	6,072	310	$ 550,497	12.1	-	$ 550,497	12.1
B15	Steam Trap Replacements	$ 777	-	-	-	-	2,779	104	5	$ 11,989	15.4	-	$ 11,989	15.4
B16	Piping Insulation Repairs	$ 445	-	-	-	-	1,606	60	3	$ 4,521	10.2	-	$ 4,521	10.2
B18	Refrigerator Replacements	$ 1,165	14,584	0.1	16.8	-	-	53	4	$ 9,507	8.2	-	$ 9,507	8.2
C - Controls		**$ 29,423**	**146,084**	**-**	**-**	**-**	**67,519**	**3,054**	**172**	**$ 96,204**	**3.3**	**-**	**$ 96,204**	**3.3**
C01	Building Automation System Upgrades	$ 22,385	127,989	-	-	-	47,225	2,229	128	$ 62,678	2.8	-	$ 62,678	2.8
C01a	Add Jace Controllers (CO#15)		-	-	-	-	-	-	-	$ 6,994	--	-	$ 6,994	--
C01b	Upgrade Gym Unit at Gino A Marcus (CO#19)		-	-	-	-	-	-	-	$ 8,277	--	-	$ 8,277	--
C03	Programmable Thermostat Installation	$ 7,038	18,095	-	-	-	20,294	825	44	$ 18,256	2.6	-	$ 18,256	2.6
D - Water		**$ 13,399**	**-**	**-**	**-**	**13,885**	**-**	**-**	**-**	**$ 218,580**	**16.3**	**-**	**$ 218,580**	**16.3**
D01	Domestic Water Retrofits	$ 13,399	-	-	-	13,885	-	-	-	$ 208,018	15.5	-	$ 208,018	15.5
D01a	Additional Plumbing Fixtures (CO#02)		-	-	-	-	-	-	-	$ 8,743	--	-	$ 8,743	--
D01b	Re-level Sanitary Drain (CO#12)		-	-	-	-	-	-	-	$ 1,819	--	-	$ 1,819	--
E - Building Envelope		**$ 15,186**	**-**	**-**	**-**	**-**	**54,021**	**2,023**	**103**	**$ 189,460**	**12.5**	**-**	**$ 189,460**	**12.5**
E01	Building Envelope Sealing	$ 15,186	-	-	-	-	54,021	2,023	103	$ 187,760	12.4	-	$ 187,760	12.4
E05	Insulate Rink Header (CO#13)		-	-	-	-	-	-	-	$ 1,700	--	-	$ 1,700	--
F - Renewables		**$ 3,713**	**-**	**-**	**-**	**-**	**12,580**	**471**	**24**	**$ 182,039**	**49.0**	**-**	**$ 182,039**	**49.0**
F02	Solar Pool Water Heating	$ 3,713	-	-	-	-	12,580	471	24	$ 113,700	30.6	-	$ 113,700	30.6
F02a	Expand Scope Solar Pool Heating (CO#03)		-	-	-	-	-	-	-	$ 28,274	--	-	$ 28,274	--
F02b	Composite Backing for Solar Panels (CO#04)		-	-	-	-	-	-	-	$ 6,688	--	-	$ 6,688	--
F02c	Structural Change & Bldg Permits (CO#11)		-	-	-	-	-	-	-	$ 12,373	--	-	$ 12,373	--
F04	Solar Photovoltaic (CO#10)		-	-	-	-	-	-	-	$ 5,704	--	-	$ 5,704	--
F04a	Solar PV - Technical FS & Engineering Review		-	-	-	-	-	-	-	$ 15,300	--	-	$ 15,300	--

Table A1 – As Built Program by Measure Continued

BUILDING / MEASURE		SAVINGS								COSTS		INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
H - General		-	-	-	-	-	-	-	-	$ 44,630	--	-	$ 44,630	--
H01	Commissioning	-	-	-	-	-	-	-	-	$ 44,630	--	-	$ 44,630	--
I - Incentives		-	-	-	-	-	-	-	-	-	--	$ 449,131	$ -449,131	--
I01	MECF Fund	-	-	-	-	-	-	-	-	-	--	$ 100,000	$ -100,000	--
I02	NRCan ecoEnergy Retrofit Incentives	-	-	-	-	-	-	-	-	-	--	$ 103,750	$ -103,750	--
I03	NRCan ecoEnergy for Renewable Heat	-	-	-	-	-	-	-	-	-	--	$ 28,183	$ -28,183	--
I04	ERIP - Energy Retrofit Incentive Program	-	-	-	-	-	-	-	-	-	--	$ 78,043	$ -78,043	--
I05	RinC - Recreational Infrastructure Canada	-	-	-	-	-	-	-	-	-	--	$ 41,656	$ -41,656	--
I06	Union Gas - Feasibility Study Funding & Steam	-	-	-	-	-	-	-	-	-	--	$ 12,500	$ -12,500	--
I07	Union Gas - Custom Incentives	-	-	-	-	-	-	-	-	-	--	$ 68,608	$ -68,608	--
I08	OPA saveONenergy Retrofit Incentives	-	-	-	-	-	-	-	-	-	--	$ 16,391	$ -16,391	--
Program Total		**$ 247,081**	**1,767,625**	**5.6**	**3,092.6**	**13,885**	**316,568**	**18,216**	**1,127**	**$2,370,331**	**9.6**	**$ 449,131**	**$1,921,200**	**7.8**

Appendix D

2010 – 2012 Energy Efficiency Retrofit Program - As Built Program by Building

Table A2 – As Built Program by Building

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
004 - Parking Garage (Chatham) Office Area		**$ 3,473**	**41,030**	**7.2**	**86.4**	**-**	**-**	**148**	**12**	**$ 21,111**	**6.1**	**$ 1,267**	**$ 22,378**	**6.4**	**-**	**$ 21,111**	**6.1**
A - Lighting		**$ 3,191**	**37,520**	**6.8**	**81.6**	**-**	**-**	**135**	**11**	**$ 19,812**	**6.2**	**$ 1,189**	**$ 21,001**	**6.6**	**-**	**$ 19,812**	**6.2**
A01	Lighting Retrofit & Redesign	$ 3,191	37,520	6.8	81.6	-	-	135	11	$ 19,812	6.2	$ 1,189	$ 21,001	6.6	-	$ 19,812	6.2
B - Mechanical		**$ 282**	**3,510**	**0.4**	**4.8**	**-**	**-**	**13**	**1**	**$ 1,299**	**4.6**	**$ 78**	**$ 1,377**	**4.9**	**-**	**$ 1,299**	**4.6**
B18	Refrigerator Replacements	$ 282	3,510	0.4	4.8	-	-	13	1	$ 1,299	4.6	$ 78	$ 1,377	4.9	-	$ 1,299	4.6
005 - Parking Garage (Pelissier) Office Area		**$ 721**	**9,005**	**1.0**	**12.0**	**-**	**-**	**32**	**3**	**$ 7,146**	**9.9**	**$ 429**	**$ 7,575**	**10.5**	**-**	**$ 7,146**	**9.9**
A - Lighting		**$ 721**	**9,005**	**1.0**	**12.0**	**-**	**-**	**32**	**3**	**$ 7,146**	**9.9**	**$ 429**	**$ 7,575**	**10.5**	**-**	**$ 7,146**	**9.9**
A01	Lighting Retrofit & Redesign	$ 721	9,005	1.0	12.0	-	-	32	3	$ 7,146	9.9	$ 429	$ 7,575	10.5	-	$ 7,146	9.9
006 - Transit Windsor /3700 North Service Rd		**$ 47,611**	**14,034**	**1.0**	**12.0**	**882**	**164,833**	**6,222**	**318**	**$ 586,998**	**12.3**	**$ 35,165**	**$ 622,164**	**13.1**	**-**	**$ 586,998**	**12.3**
A - Lighting		**$ 166**	**1,413**	**0.9**	**10.8**	**-**	**-**	**5**	**0**	**$ 2,541**	**15.3**	**$ 152**	**$ 2,693**	**16.2**	**-**	**$ 2,541**	**15.3**
A01	Lighting Retrofit & Redesign	$ 166	1,413	0.9	10.8	-	-	5	0	$ 2,541	15.3	$ 152	$ 2,693	16.2	-	$ 2,541	15.3
B - Mechanical		**$ 45,550**	**12,621**	**0.1**	**1.2**	**-**	**161,068**	**6,076**	**310**	**$ 551,301**	**12.1**	**$ 33,078**	**$ 584,379**	**12.8**	**-**	**$ 551,301**	**12.1**
B11	Air to Air Heat Recovery	$ 45,467	11,571	-	-	-	161,068	6,072	310	$ 550,497	12.1	$ 33,030	$ 583,527	12.8	-	$ 550,497	12.1
B18	Refrigerator Replacements	$ 83	1,050	0.1	1.2	-	-	4	0	$ 804	9.7	$ 48	$ 852	10.3	-	$ 804	9.7
D - Water		**$ 851**	**-**	**-**	**-**	**882**	**-**	**-**	**-**	**$ 16,618**	**19.5**	**$ 943**	**$ 17,561**	**20.6**	**-**	**$ 16,618**	**19.5**
D01	Domestic Water Retrofits	$ 851	-	-	-	882	-	-	-	$ 13,892	16.3	$ 834	$ 14,725	17.3	-	$ 13,892	16.3
D01a	Additional Plumbing Fixtures (CO#02)	-	-	-	-	-	-	-	-	$ 907	--	-	$ 907	--	-	$ 907	--
D01b	Re-level Sanitary Drain (CO#12)	-	-	-	-	-	-	-	-	$ 1,819	--	$ 109	$ 1,928	--	-	$ 1,819	--
E - Building Envelope		**$ 1,043**	**-**	**-**	**-**	**-**	**3,765**	**141**	**7**	**$ 16,538**	**15.9**	**$ 992**	**$ 17,530**	**16.8**	**-**	**$ 16,538**	**15.9**
E01	Building Envelope Sealing	$ 1,043	-	-	-	-	3,765	141	7	$ 16,538	15.9	$ 992	$ 17,530	16.8	-	$ 16,538	15.9
009 - Glengarry Childcare - 495 Glengarry		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 857**	**–**	**$ 51**	**$ 908**	**--**	**-**	**$ 857**	**–**
B - Mechanical		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 857**	**–**	**$ 51**	**$ 908**	**--**	**-**	**$ 857**	**–**
B03	DHW Heater Retrofit	-	-	-	-	-	-	-	-	$ 857	--	$ 51	$ 908	--	-	$ 857	--
015 - Bridgeview Library		**$ 13**	**-**	**-**	**-**	**13**	**-**	**-**	**-**	**$ 980**	**78.1**	**$ 59**	**$ 1,039**	**82.8**	**-**	**$ 980**	**78.1**
B - Mechanical		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 857**	**–**	**$ 51**	**$ 908**	**--**	**-**	**$ 857**	**–**
B03	DHW Heater Retrofit	-	-	-	-	-	-	-	-	$ 857	--	$ 51	$ 908	--	-	$ 857	--
D - Water		**$ 13**	**-**	**-**	**-**	**13**	**-**	**-**	**-**	**$ 123**	**9.8**	**$ 7**	**$ 131**	**10.4**	**-**	**$ 123**	**9.8**
D01	Domestic Water Retrofits	$ 13	-	-	-	13	-	-	-	$ 123	9.8	$ 7	$ 131	10.4	-	$ 123	9.8
016 - Forest Glade - Library		**$ 325**	**3,402**	**1.5**	**18.0**	**-**	**-**	**12**	**1**	**$ 1,617**	**5.0**	**$ 97**	**$ 1,715**	**5.3**	**-**	**$ 1,617**	**5.0**
A - Lighting		**$ 325**	**3,402**	**1.5**	**18.0**	**-**	**-**	**12**	**1**	**$ 1,617**	**5.0**	**$ 97**	**$ 1,715**	**5.3**	**-**	**$ 1,617**	**5.0**
A01	Lighting Retrofit & Redesign	$ 325	3,402	1.5	18.0	-	-	12	1	$ 1,617	5.0	$ 97	$ 1,715	5.3	-	$ 1,617	5.0

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
017 - Francois Baby Library/Walker Museum		**$ 887**	**6,966**	**3.2**	**38.4**	**163**	**-**	**25**	**2**	**$ 4,897**	**5.5**	**$ 294**	**$ 5,191**	**5.9**	**-**	**$ 4,897**	**5.5**
A - Lighting		**$ 730**	**6,966**	**3.2**	**38.4**	**-**	**-**	**25**	**2**	**$ 2,821**	**3.9**	**$ 169**	**$ 2,990**	**4.1**	**-**	**$ 2,821**	**3.9**
A01	Lighting Retrofit & Redesign	$ 730	6,966	3.2	38.4	-	-	25	2	$ 2,821	3.9	$ 169	$ 2,990	4.1	-	$ 2,821	3.9
D - Water		**$ 157**	**-**	**-**	**-**	**163**	**-**	**-**	**-**	**$ 2,076**	**13.2**	**$ 125**	**$ 2,200**	**14.0**	**-**	**$ 2,076**	**13.2**
D01	Domestic Water Retrofits	$ 157	-	-	-	163	-	-	-	$ 2,076	13.2	$ 125	$ 2,200	14.0	-	$ 2,076	13.2
018 - Nicola Budimir Library		**$ 250**	**-**	**-**	**-**	**259**	**-**	**-**	**-**	**$ 4,007**	**16.0**	**$ 240**	**$ 4,248**	**17.0**	**-**	**$ 4,007**	**16.0**
D - Water		**$ 250**	**-**	**-**	**-**	**259**	**-**	**-**	**-**	**$ 4,007**	**16.0**	**$ 240**	**$ 4,248**	**17.0**	**-**	**$ 4,007**	**16.0**
D01	Domestic Water Retrofits	$ 250	-	-	-	259	-	-	-	$ 4,007	16.0	$ 240	$ 4,248	17.0	-	$ 4,007	16.0
019 - Ouellette Library		**$ 1,664**	**6,134**	**0.9**	**10.8**	**992**	**695**	**48**	**3**	**$ 27,805**	**16.7**	**$ 1,668**	**$ 29,473**	**17.7**	**-**	**$ 27,805**	**16.7**
A - Lighting		**$ 341**	**4,034**	**0.7**	**8.4**	**-**	**-**	**15**	**1**	**$ 2,201**	**6.5**	**$ 132**	**$ 2,333**	**6.8**	**-**	**$ 2,201**	**6.5**
A01	Lighting Retrofit & Redesign	$ 341	4,034	0.7	8.4	-	-	15	1	$ 2,201	6.5	$ 132	$ 2,333	6.8	-	$ 2,201	6.5
B - Mechanical		**$ 366**	**2,100**	**0.2**	**2.4**	**-**	**695**	**34**	**2**	**$ 4,827**	**13.2**	**$ 290**	**$ 5,117**	**14.0**	**-**	**$ 4,827**	**13.2**
B03	DHW Heater Retrofit	-	-	-	-	-	-	-	-	$ 857	--	$ 51	$ 908	--	-	$ 857	--
B15	Steam Trap Replacements	$ 200	-	-	-	-	695	26	1	$ 2,672	13.4	$ 160	$ 2,832	14.2	-	$ 2,672	13.4
B18	Refrigerator Replacements	$ 166	2,100	0.2	2.4	-	-	8	1	$ 1,299	7.8	$ 78	$ 1,377	8.3	-	$ 1,299	7.8
D - Water		**$ 957**	**-**	**-**	**-**	**992**	**-**	**-**	**-**	**$ 20,776**	**21.7**	**$ 1,247**	**$ 22,023**	**23.0**	**-**	**$ 20,776**	**21.7**
D01	Domestic Water Retrofits	$ 957	-	-	-	992	-	-	-	$ 19,838	20.7	$ 1,190	$ 21,028	22.0	-	$ 19,838	20.7
D01a	Additional Plumbing Fixtures (CO#02)	-	-	-	-	-	-	-	-	$ 939	--	$ 56	$ 995	--	-	$ 939	--
020 - Remington Library		**$ 73**	**-**	**-**	**-**	**-**	**246**	**9**	**0**	**$ 697**	**9.5**	**$ 42**	**$ 739**	**10.1**	**-**	**$ 697**	**9.5**
E - Building Envelope		**$ 73**	**-**	**-**	**-**	**-**	**246**	**9**	**0**	**$ 697**	**9.5**	**$ 42**	**$ 739**	**10.1**	**-**	**$ 697**	**9.5**
E01	Building Envelope Sealing	$ 73	-	-	-	-	246	9	0	$ 697	9.5	$ 42	$ 739	10.1	-	$ 697	9.5
021 - Riverside Library		**$ 368**	**3,235**	**1.9**	**22.8**	**-**	**-**	**12**	**1**	**$ 3,485**	**9.5**	**$ 209**	**$ 3,694**	**10.0**	**-**	**$ 3,485**	**9.5**
A - Lighting		**$ 368**	**3,235**	**1.9**	**22.8**	**-**	**-**	**12**	**1**	**$ 3,485**	**9.5**	**$ 209**	**$ 3,694**	**10.0**	**-**	**$ 3,485**	**9.5**
A01	Lighting Retrofit & Redesign	$ 368	3,235	1.9	22.8	-	-	12	1	$ 3,485	9.5	$ 209	$ 3,694	10.0	-	$ 3,485	9.5
022 - Sandwich Library		**$ 12**	**-**	**-**	**-**	**12**	**-**	**-**	**-**	**$ 82**	**7.1**	**$ 5**	**$ 87**	**7.5**	**-**	**$ 82**	**7.1**
D - Water		**$ 12**	**-**	**-**	**-**	**12**	**-**	**-**	**-**	**$ 82**	**7.1**	**$ 5**	**$ 87**	**7.5**	**-**	**$ 82**	**7.1**
D01	Domestic Water Retrofits	$ 12	-	-	-	12	-	-	-	$ 82	7.1	$ 5	$ 87	7.5	-	$ 82	7.1
023 - Seminole Library		**$ 8**	**-**	**-**	**-**	**8**	**-**	**-**	**-**	**$ 123**	**16.0**	**$ 7**	**$ 131**	**16.9**	**-**	**$ 123**	**16.0**
D - Water		**$ 8**	**-**	**-**	**-**	**8**	**-**	**-**	**-**	**$ 123**	**16.0**	**$ 7**	**$ 131**	**16.9**	**-**	**$ 123**	**16.0**
D01	Domestic Water Retrofits	$ 8	-	-	-	8	-	-	-	$ 123	16.0	$ 7	$ 131	16.9	-	$ 123	16.0
025 - Brock		**$ 27**	**-**	**-**	**-**	**28**	**-**	**-**	**-**	**$ 164**	**6.1**	**$ 10**	**$ 174**	**6.4**	**-**	**$ 164**	**6.1**
D - Water		**$ 27**	**-**	**-**	**-**	**28**	**-**	**-**	**-**	**$ 164**	**6.1**	**$ 10**	**$ 174**	**6.4**	**-**	**$ 164**	**6.1**
D01	Domestic Water Retrofits	$ 27	-	-	-	28	-	-	-	$ 164	6.1	$ 10	$ 174	6.4	-	$ 164	6.1

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
026 - Jefferson #2		**$ 1,639**	**7,097**	**0.8**	**9.6**	**542**	**1,900**	**97**	**6**	**$ 19,038**	**11.6**	**$ 1,142**	**$ 20,180**	**12.3**	**- $**	**19,038 $**	**11.6**
A - Lighting		**$ 486**	**6,047**	**0.7**	**8.4**	**-**	**-**	**22**	**2**	**$ 1,546**	**3.2**	**$ 93**	**$ 1,639**	**3.4**	**- $**	**1,546 $**	**3.2**
A01	Lighting Retrofit & Redesign	$ 486	6,047	0.7	8.4	-	-	22	2	$ 1,546	3.2	$ 93	$ 1,639	3.4	- $	1,546 $	3.2
B - Mechanical		**$ 83**	**1,050**	**0.1**	**1.2**	**-**	**-**	**4**	**0**	**$ 804**	**9.7**	**$ 48**	**$ 852**	**10.3**	**- $**	**804 $**	**9.7**
B18	Refrigerator Replacements	$ 83	1,050	0.1	1.2	-	-	4	0	$ 804	9.7	$ 48	$ 852	10.3	- $	804 $	9.7
D - Water		**$ 523**	**-**	**-**	**-**	**542**	**-**	**-**	**-**	**$ 8,884**	**17.0**	**$ 533**	**$ 9,418**	**18.0**	**- $**	**8,884 $**	**17.0**
D01	Domestic Water Retrofits	$ 523	-	-	-	542	-	-	-	$ 8,884	17.0	$ 533	$ 9,418	18.0	- $	8,884 $	17.0
E - Building Envelope		**$ 546**	**-**	**-**	**-**	**-**	**1,900**	**71**	**4**	**$ 7,803**	**14.3**	**$ 468**	**$ 8,271**	**15.1**	**- $**	**7,803 $**	**14.3**
E01	Building Envelope Sealing	$ 546	-	-	-	-	1,900	71	4	$ 7,803	14.3	$ 468	$ 8,271	15.1	- $	7,803 $	14.3
028 - Little River Golf Course		**$ 457**	**2,129**	**0.7**	**8.4**	**263**	**-**	**8**	**1**	**$ 4,361**	**9.5**	**$ 262**	**$ 4,623**	**10.1**	**- $**	**4,361 $**	**9.5**
A - Lighting		**$ 203**	**2,129**	**0.7**	**8.4**	**-**	**-**	**8**	**1**	**$ 1,635**	**8.0**	**$ 98**	**$ 1,733**	**8.5**	**- $**	**1,635 $**	**8.0**
A01	Lighting Retrofit & Redesign	$ 203	2,129	0.7	8.4	-	-	8	1	$ 1,635	8.0	$ 98	$ 1,733	8.5	- $	1,635 $	8.0
D - Water		**$ 254**	**-**	**-**	**-**	**263**	**-**	**-**	**-**	**$ 2,726**	**10.7**	**$ 164**	**$ 2,890**	**11.4**	**- $**	**2,726 $**	**10.7**
D01	Domestic Water Retrofits	$ 254	-	-	-	263	-	-	-	$ 2,726	10.7	$ 164	$ 2,890	11.4	- $	2,726 $	10.7
029 - Roseland Country Club		**$ 15,582**	**104,137**	**20.7**	**248.4**	**950**	**20,493**	**1,142**	**70**	**$ 169,612**	**10.9**	**$ 10,177**	**$ 179,788**	**11.5**	**- $**	**169,612 $**	**10.9**
A - Lighting		**$ 7,061**	**77,460**	**20.7**	**248.4**	**-**	**-**	**279**	**23**	**$ 64,063**	**9.1**	**$ 3,844**	**$ 67,907**	**9.6**	**- $**	**64,063 $**	**9.1**
A01	Lighting Retrofit & Redesign	$ 7,061	77,460	20.7	248.4	-	-	279	23	$ 64,063	9.1	$ 3,844	$ 67,907	9.6	- $	64,063 $	9.1
B - Mechanical		**$ 6,676**	**26,677**	**-**	**-**	**-**	**17,141**	**738**	**41**	**$ 66,749**	**10.0**	**$ 4,005**	**$ 70,754**	**10.6**	**- $**	**66,749 $**	**10.0**
B06	AHU VAV Conversion	$ 6,676	26,677	-	-	-	17,141	738	41	$ 66,749	10.0	$ 4,005	$ 70,754	10.6	- $	66,749 $	10.0
D - Water		**$ 917**	**-**	**-**	**-**	**950**	**-**	**-**	**-**	**$ 28,314**	**30.9**	**$ 1,699**	**$ 30,012**	**32.7**	**- $**	**28,314 $**	**30.9**
D01	Domestic Water Retrofits	$ 917	-	-	-	950	-	-	-	$ 23,105	25.2	$ 1,386	$ 24,491	26.7	- $	23,105 $	25.2
D01a	Additional Plumbing Fixtures (CO#02)		-	-	-	-	-	-	-	$ 5,208	--	$ 313	$ 5,521	--	- $	5,208 $	--
E - Building Envelope		**$ 929**	**-**	**-**	**-**	**-**	**3,352**	**125**	**6**	**$ 10,486**	**11.3**	**$ 629**	**$ 11,115**	**12.0**	**- $**	**10,486 $**	**11.3**
E01	Building Envelope Sealing	$ 929	-	-	-	-	3,352	125	6	$ 9,636	10.4	$ 578	$ 10,214	11.0	- $	9,636 $	10.4
E05	Insulate Rink Header (CO#13)		-	-	-	-	-	-	-	$ 850	--	$ 51	$ 901	--	- $	850 $	--
030 - 1266 Mcdougall		**$ 236**	**2,185**	**1.1**	**13.2**	**-**	**-**	**8**	**1**	**$ 3,811**	**16.2**	**$ 229**	**$ 4,040**	**17.1**	**- $**	**3,811 $**	**16.2**
A - Lighting		**$ 236**	**2,185**	**1.1**	**13.2**	**-**	**-**	**8**	**1**	**$ 3,811**	**16.2**	**$ 229**	**$ 4,040**	**17.1**	**- $**	**3,811 $**	**16.2**
A01	Lighting Retrofit & Redesign	$ 236	2,185	1.1	13.2	-	-	8	1	$ 3,811	16.2	$ 229	$ 4,040	17.1	- $	3,811 $	16.2
031 - 1269 Mercer - Office/Paint & Sign Shop		**$ 1,745**	**6,478**	**3.1**	**37.2**	**-**	**3,678**	**161**	**9**	**$ 18,558**	**10.6**	**$ 1,113**	**$ 19,671**	**11.3**	**- $**	**18,558 $**	**10.6**
A - Lighting		**$ 581**	**5,105**	**3.0**	**36.0**	**-**	**-**	**18**	**2**	**$ 9,207**	**15.8**	**$ 552**	**$ 9,759**	**16.8**	**- $**	**9,207 $**	**15.8**
A01	Lighting Retrofit & Redesign	$ 581	5,105	3.0	36.0	-	-	18	2	$ 9,207	15.8	$ 552	$ 9,759	16.8	- $	9,207 $	15.8
B - Mechanical		**$ 83**	**1,050**	**0.1**	**1.2**	**-**	**-**	**4**	**0**	**$ 804**	**9.7**	**$ 48**	**$ 852**	**10.3**	**- $**	**804 $**	**9.7**
B18	Refrigerator Replacements	$ 83	1,050	0.1	1.2	-	-	4	0	$ 804	9.7	$ 48	$ 852	10.3	- $	804 $	9.7
C - Controls		**$ 545**	**323**	**-**	**-**	**-**	**1,813**	**69**	**4**	**$ 2,098**	**3.9**	**$ 126**	**$ 2,224**	**4.1**	**- $**	**2,098 $**	**3.9**
C03	Programmable Thermostat Installation	$ 545	323	-	-	-	1,813	69	4	$ 2,098	3.9	$ 126	$ 2,224	4.1	- $	2,098 $	3.9
E - Building Envelope		**$ 536**	**-**	**-**	**-**	**-**	**1,865**	**70**	**4**	**$ 6,448**	**12.0**	**$ 387**	**$ 6,835**	**12.7**	**- $**	**6,448 $**	**12.0**
E01	Building Envelope Sealing	$ 536	-	-	-	-	1,865	70	4	$ 6,448	12.0	$ 387	$ 6,835	12.7	- $	6,448 $	12.0

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
033 - Crawford/Carpentry Shop/Storage Building		**$ 4,654**	**36,242**	**11.7**	**140.4**	**508**	**2,587**	**227**	**16**	**$ 80,398**	**17.3**	**$ 4,824**	**$ 85,222**	**18.3**	**-**	**$ 80,398**	**17.3**
A - Lighting		**$ 3,446**	**36,242**	**11.7**	**140.4**	**-**	**-**	**130**	**11**	**$ 70,259**	**20.4**	**$ 4,216**	**$ 74,474**	**21.6**	**-**	**$ 70,259**	**20.4**
A01	Lighting Retrofit & Redesign	$ 3,446	36,242	11.7	140.4	-	-	130	11	$ 70,259	20.4	$ 4,216	$ 74,474	21.6	-	$ 70,259	20.4
C - Controls		**$ 717**	**-**	**-**	**-**	**-**	**2,587**	**97**	**5**	**$ 2,165**	**3.0**	**$ 130**	**$ 2,295**	**3.2**	**-**	**$ 2,165**	**3.0**
C03	Programmable Thermostat Installation	$ 717	-	-	-	-	2,587	97	5	$ 2,165	3.0	$ 130	$ 2,295	3.2	-	$ 2,165	3.0
D - Water		**$ 490**	**-**	**-**	**-**	**508**	**-**	**-**	**-**	**$ 7,973**	**16.3**	**$ 478**	**$ 8,452**	**17.2**	**-**	**$ 7,973**	**16.3**
D01	Domestic Water Retrofits	$ 490	-	-	-	508	-	-	-	$ 7,973	16.3	$ 478	$ 8,452	17.2	-	$ 7,973	16.3
034 - Field Engineering - Pillette Road		**$ 3,042**	**24,373**	**11.7**	**140.4**	**-**	**1,572**	**147**	**10**	**$ 29,236**	**9.6**	**$ 1,754**	**$ 30,990**	**10.2**	**-**	**$ 29,236**	**9.6**
A - Lighting		**$ 2,532**	**23,573**	**11.7**	**140.4**	**-**	**-**	**85**	**7**	**$ 20,119**	**7.9**	**$ 1,207**	**$ 21,326**	**8.4**	**-**	**$ 20,119**	**7.9**
A01	Lighting Retrofit & Redesign	$ 2,532	23,573	11.7	140.4	-	-	85	7	$ 20,119	7.9	$ 1,207	$ 21,326	8.4	-	$ 20,119	7.9
B - Mechanical		**$ 58**	**800**	**-**	**-**	**-**	**-**	**3**	**0**	**$ 804**	**13.9**	**$ 48**	**$ 852**	**14.8**	**-**	**$ 804**	**13.9**
B18	Refrigerator Replacements	$ 58	800	-	-	-	-	3	0	$ 804	13.9	$ 48	$ 852	14.8	-	$ 804	13.9
E - Building Envelope		**$ 452**	**-**	**-**	**-**	**-**	**1,572**	**59**	**3**	**$ 8,312**	**18.4**	**$ 499**	**$ 8,811**	**19.5**	**-**	**$ 8,312**	**18.4**
E01	Building Envelope Sealing	$ 452	-	-	-	-	1,572	59	3	$ 8,312	18.4	$ 499	$ 8,811	19.5	-	$ 8,312	18.4
035 - 3540 E.C. Row / Recycling Center		**$ 2,556**	**28,481**	**3.2**	**38.4**	**-**	**949**	**138**	**10**	**$ 7,949**	**3.1**	**$ 477**	**$ 8,426**	**3.3**	**-**	**$ 7,949**	**3.1**
A - Lighting		**$ 2,125**	**26,284**	**3.2**	**38.4**	**-**	**-**	**95**	**8**	**$ 6,773**	**3.2**	**$ 406**	**$ 7,179**	**3.4**	**-**	**$ 6,773**	**3.2**
A01	Lighting Retrofit & Redesign	$ 2,125	26,284	3.2	38.4	-	-	95	8	$ 6,773	3.2	$ 406	$ 7,179	3.4	-	$ 6,773	3.2
C - Controls		**$ 432**	**2,197**	**-**	**-**	**-**	**949**	**43**	**2**	**$ 1,176**	**2.7**	**$ 71**	**$ 1,247**	**2.9**	**-**	**$ 1,176**	**2.7**
C03	Programmable Thermostat Installation	$ 432	2,197	-	-	-	949	43	2	$ 1,176	2.7	$ 71	$ 1,247	2.9	-	$ 1,176	2.7
036 - Little River Waste Water Treatment Plant		**$ 52,427**	**674,077**	**23.7**	**284.4**	**-**	**7,499**	**2,707**	**214**	**$ 207,321**	**4.0**	**$ 12,439**	**$ 219,761**	**4.2**	**-**	**$ 207,321**	**4.0**
A - Lighting		**$ 8,619**	**96,103**	**23.7**	**284.4**	**-**	**-**	**346**	**29**	**$ 54,433**	**6.3**	**$ 3,266**	**$ 57,699**	**6.7**	**-**	**$ 54,433**	**6.3**
A01	Lighting Retrofit & Redesign	$ 8,619	96,103	23.7	284.4	-	-	346	29	$ 54,433	6.3	$ 3,266	$ 57,699	6.7	-	$ 54,433	6.3
B - Mechanical		**$ 41,486**	**574,603**	**-**	**-**	**-**	**-**	**2,069**	**171**	**$ 150,745**	**3.6**	**$ 9,045**	**$ 159,790**	**3.9**	**-**	**$ 150,745**	**3.6**
B07	Pump VSD	-	-	-	-	-	-	-	-	$ 1,000	--	$ 60	$ 1,060	--	-	$ 1,000	--
B08	Aeration Blower VSD	$ 41,486	574,603	-	-	-	-	2,069	171	$ 149,745	3.6	$ 8,985	$ 158,730	3.8	-	$ 149,745	3.6
C - Controls		**$ 2,321**	**3,371**	**-**	**-**	**-**	**7,499**	**293**	**15**	**$ 2,143**	**0.9**	**$ 129**	**$ 2,272**	**1.0**	**-**	**$ 2,143**	**0.9**
C03	Programmable Thermostat Installation	$ 2,321	3,371	-	-	-	7,499	293	15	$ 2,143	0.9	$ 129	$ 2,272	1.0	-	$ 2,143	0.9
037 - Lou Romano Water Treatment Plant		**$ 10,496**	**109,685**	**26.2**	**314.4**	**-**	**2,592**	**492**	**38**	**$ 80,935**	**7.7**	**$ 4,856**	**$ 85,791**	**8.2**	**-**	**$ 80,935**	**7.7**
A - Lighting		**$ 9,411**	**104,613**	**26.2**	**314.4**	**-**	**-**	**377**	**31**	**$ 79,017**	**8.4**	**$ 4,741**	**$ 83,758**	**8.9**	**-**	**$ 79,017**	**8.4**
A01	Lighting Retrofit & Redesign	$ 9,411	104,613	26.2	314.4	-	-	377	31	$ 79,017	8.4	$ 4,741	$ 83,758	8.9	-	$ 79,017	8.4
C - Controls		**$ 1,084**	**5,072**	**-**	**-**	**-**	**2,592**	**115**	**6**	**$ 1,918**	**1.8**	**$ 115**	**$ 2,034**	**1.9**	**-**	**$ 1,918**	**1.8**
C03	Programmable Thermostat Installation	$ 1,084	5,072	-	-	-	2,592	115	6	$ 1,918	1.8	$ 115	$ 2,034	1.9	-	$ 1,918	1.8

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
038 - # 1 - 815 Goyeau		**$ 1,698**	**966**	**0.1**	**1.2**	**970**	**2,382**	**93**	**5**	**$ 28,848**	**17.0**	**$ 1,731**	**$ 30,579**	**18.0**	**- $**	**28,848**	**17.0**
B - Mechanical		**$ 77**	**966**	**0.1**	**1.2**	**-**	**-**	**3**	**0**	**$ 804**	**10.5**	**$ 48**	**$ 852**	**11.1**	**- $**	**804**	**10.5**
B18	Refrigerator Replacements	$ 77	966	0.1	1.2	-	-	3	0	$ 804	10.5	$ 48	$ 852	11.1	- $	804	10.5
D - Water		**$ 936**	**-**	**-**	**-**	**970**	**-**	**-**	**-**	**$ 17,361**	**18.5**	**$ 1,042**	**$ 18,403**	**19.7**	**- $**	**17,361**	**18.5**
D01	Domestic Water Retrofits	$ 936	-	-	-	970	-	-	-	$ 16,296	17.4	$ 978	$ 17,274	18.5	- $	16,296	17.4
D01a	Additional Plumbing Fixtures (CO#02)	-	-	-	-	-	-	-	-	$ 1,065	--	$ 64	$ 1,129	--	- $	1,065	--
E - Building Envelope		**$ 685**	**-**	**-**	**-**	**-**	**2,382**	**89**	**5**	**$ 10,683**	**15.6**	**$ 641**	**$ 11,324**	**16.5**	**- $**	**10,683**	**15.6**
E01	Building Envelope Sealing	$ 685	-	-	-	-	2,382	89	5	$ 10,683	15.6	$ 641	$ 11,324	16.5	- $	10,683	15.6
039 - # 2 - Walker And Richmond		**$ 275**	**-**	**-**	**-**	**285**	**-**	**-**	**-**	**$ 3,480**	**12.7**	**$ 209**	**$ 3,689**	**13.4**	**- $**	**3,480**	**12.7**
D - Water		**$ 275**	**-**	**-**	**-**	**285**	**-**	**-**	**-**	**$ 3,480**	**12.7**	**$ 209**	**$ 3,689**	**13.4**	**- $**	**3,480**	**12.7**
D01	Domestic Water Retrofits	$ 275	-	-	-	285	-	-	-	$ 3,480	12.7	$ 209	$ 3,689	13.4	- $	3,480	12.7
040 - # 3 - 2750 Ouellette		**$ 648**	**870**	**0.1**	**1.2**	**585**	**-**	**3**	**0**	**$ 4,805**	**7.4**	**$ 288**	**$ 5,093**	**7.9**	**- $**	**4,805**	**7.4**
B - Mechanical		**$ 83**	**870**	**0.1**	**1.2**	**-**	**-**	**3**	**0**	**$ 804**	**9.7**	**$ 48**	**$ 852**	**10.3**	**- $**	**804**	**9.7**
B18	Refrigerator Replacements	$ 83	870	0.1	1.2	-	-	3	0	$ 804	9.7	$ 48	$ 852	10.3	- $	804	9.7
D - Water		**$ 565**	**-**	**-**	**-**	**585**	**-**	**-**	**-**	**$ 4,000**	**7.1**	**$ 240**	**$ 4,240**	**7.5**	**- $**	**4,000**	**7.1**
D01	Domestic Water Retrofits	$ 565	-	-	-	585	-	-	-	$ 4,000	7.1	$ 240	$ 4,240	7.5	- $	4,000	7.1
041 - # 4 - 2600 College		**$ 481**	**1,050**	**0.1**	**1.2**	**-**	**1,383**	**56**	**3**	**$ 5,898**	**12.3**	**$ 354**	**$ 6,252**	**13.0**	**- $**	**5,898**	**12.3**
B - Mechanical		**$ 83**	**1,050**	**0.1**	**1.2**	**-**	**-**	**4**	**0**	**$ 804**	**9.7**	**$ 48**	**$ 852**	**10.3**	**- $**	**804**	**9.7**
B18	Refrigerator Replacements	$ 83	1,050	0.1	1.2	-	-	4	0	$ 804	9.7	$ 48	$ 852	10.3	- $	804	9.7
E - Building Envelope		**$ 398**	**-**	**-**	**-**	**-**	**1,383**	**52**	**3**	**$ 5,094**	**12.8**	**$ 306**	**$ 5,399**	**13.6**	**- $**	**5,094**	**12.8**
E01	Building Envelope Sealing	$ 398	-	-	-	-	1,383	52	3	$ 5,094	12.8	$ 306	$ 5,399	13.6	- $	5,094	12.8
042 - # 5 - 1905 Cabana West		**$ 859**	**-**	**-**	**-**	**555**	**1,123**	**42**	**2**	**$ 9,308**	**10.8**	**$ 558**	**$ 9,866**	**11.5**	**- $**	**9,308**	**10.8**
D - Water		**$ 536**	**-**	**-**	**-**	**555**	**-**	**-**	**-**	**$ 4,322**	**8.1**	**$ 259**	**$ 4,582**	**8.6**	**- $**	**4,322**	**8.1**
D01	Domestic Water Retrofits	$ 536	-	-	-	555	-	-	-	$ 4,322	8.1	$ 259	$ 4,582	8.6	- $	4,322	8.1
E - Building Envelope		**$ 323**	**-**	**-**	**-**	**-**	**1,123**	**42**	**2**	**$ 4,985**	**15.4**	**$ 299**	**$ 5,284**	**16.4**	**- $**	**4,985**	**15.4**
E01	Building Envelope Sealing	$ 323	-	-	-	-	1,123	42	2	$ 4,985	15.4	$ 299	$ 5,284	16.4	- $	4,985	15.4
046 - # 9 - 2885 Kew Street		**$ 1,953**	**9,454**	**4.0**	**48.0**	**494**	**1,774**	**100**	**6**	**$ 22,375**	**11.5**	**$ 1,343**	**$ 23,718**	**12.1**	**- $**	**22,375**	**11.5**
A - Lighting		**$ 966**	**9,454**	**4.0**	**48.0**	**-**	**-**	**34**	**3**	**$ 7,914**	**8.2**	**$ 475**	**$ 8,388**	**8.7**	**- $**	**7,914**	**8.2**
A01	Lighting Retrofit & Redesign	$ 966	9,454	4.0	48.0	-	-	34	3	$ 7,914	8.2	$ 475	$ 8,388	8.7	- $	7,914	8.2
B - Mechanical		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 1,081**	**--**	**$ 65**	**$ 1,146**	**--**	**- $**	**1,081**	**--**
B05	Infrared Heating Conversion	-	-	-	-	-	-	-	-	$ 1,081	--	$ 65	$ 1,146	--	- $	1,081	--
D - Water		**$ 477**	**-**	**-**	**-**	**494**	**-**	**-**	**-**	**$ 4,432**	**9.3**	**$ 266**	**$ 4,698**	**9.9**	**- $**	**4,432**	**9.3**
D01	Domestic Water Retrofits	$ 477	-	-	-	494	-	-	-	$ 4,432	9.3	$ 266	$ 4,698	9.9	- $	4,432	9.3
E - Building Envelope		**$ 510**	**-**	**-**	**-**	**-**	**1,774**	**66**	**3**	**$ 8,949**	**17.5**	**$ 537**	**$ 9,486**	**18.6**	**- $**	**8,949**	**17.5**
E01	Building Envelope Sealing	$ 510	-	-	-	-	1,774	66	3	$ 8,949	17.5	$ 537	$ 9,486	18.6	- $	8,949	17.5

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
047 - 65 Elliott Street / Fire Protection Services		$ 2,183	18,594	4.3	103.2	43	657	92	7	$ 21,362	9.8	$ 1,282	$ 22,644	10.4	-	$ 21,362	9.8
A - Lighting		$ 1,952	18,594	4.3	103.2	-	-	67	6	$ 18,833	9.6	$ 1,130	$ 19,963	10.2	-	$ 18,833	9.6
A01	Lighting Retrofit & Redesign	$ 1,952	18,594	4.3	103.2	-	-	67	6	$ 18,833	9.6	$ 1,130	$ 19,963	10.2	-	$ 18,833	9.6
D - Water		$ 41	-	-	-	43	-	-	-	$ 671	16.2	$ 40	$ 712	17.1	-	$ 671	16.2
D01	Domestic Water Retrofits	$ 41	-	-	-	43	-	-	-	$ 671	16.2	$ 40	$ 712	17.1	-	$ 671	16.2
E - Building Envelope		$ 189	-	-	-	-	657	25	1	$ 1,858	9.8	$ 111	$ 1,969	10.4	-	$ 1,858	9.8
E01	Building Envelope Sealing	$ 189	-	-	-	-	657	25	1	$ 1,858	9.8	$ 111	$ 1,969	10.4	-	$ 1,858	9.8
050 - College Community Centre		$ 488	5,194	1.6	19.2	-	-	19	2	$ 5,032	10.3	$ 302	$ 5,334	10.9	-	$ 5,032	10.3
A - Lighting		$ 488	5,194	1.6	19.2	-	-	19	2	$ 5,032	10.3	$ 302	$ 5,334	10.9	-	$ 5,032	10.3
A01	Lighting Retrofit & Redesign	$ 488	5,194	1.6	19.2	-	-	19	2	$ 5,032	10.3	$ 302	$ 5,334	10.9	-	$ 5,032	10.3
052 - Forest Glade Community Centre		$ 5,358	35,977	1.6	19.2	696	6,870	387	24	$ 33,842	6.3	$ 2,031	$ 35,873	6.7	-	$ 33,842	6.3
A - Lighting		$ 479	5,066	1.6	19.2	-	-	18	2	$ 6,621	13.8	$ 397	$ 7,018	14.6	-	$ 6,621	13.8
A01	Lighting Retrofit & Redesign	$ 479	5,066	1.6	19.2	-	-	18	2	$ 6,621	13.8	$ 397	$ 7,018	14.6	-	$ 6,621	13.8
C - Controls		$ 3,819	30,911	-	-	-	5,520	318	20	$ 16,440	4.3	$ 986	$ 17,426	4.6	-	$ 16,440	4.3
C01	Building Automation System Upgrades	$ 3,819	30,911	-	-	-	5,520	318	20	$ 16,440	4.3	$ 986	$ 17,426	4.6	-	$ 16,440	4.3
D - Water		$ 672	-	-	-	696	-	-	-	$ 4,535	6.8	$ 272	$ 4,807	7.2	-	$ 4,535	6.8
D01	Domestic Water Retrofits	$ 672	-	-	-	696	-	-	-	$ 4,535	6.8	$ 272	$ 4,807	7.2	-	$ 4,535	6.8
E - Building Envelope		$ 388	-	-	-	-	1,350	51	3	$ 6,247	16.1	$ 375	$ 6,622	17.1	-	$ 6,247	16.1
E01	Building Envelope Sealing	$ 388	-	-	-	-	1,350	51	3	$ 6,247	16.1	$ 375	$ 6,622	17.1	-	$ 6,247	16.1
053 - Gino A. Marcus Community Centre		$ 7,244	46,662	5.6	67.2	475	10,898	576	35	$ 71,374	9.9	$ 4,143	$ 75,517	10.4	-	$ 71,374	9.9
A - Lighting		$ 1,911	20,966	5.6	67.2	-	-	75	6	$ 19,026	10.0	$ 1,142	$ 20,168	10.6	-	$ 19,026	10.0
A01	Lighting Retrofit & Redesign	$ 1,911	20,966	5.6	67.2	-	-	75	6	$ 19,026	10.0	$ 1,142	$ 20,168	10.6	-	$ 19,026	10.0
C - Controls		$ 3,251	25,696	-	-	-	5,038	281	17	$ 24,308	7.5	$ 1,319	$ 25,627	7.9	-	$ 24,308	7.5
C01	Building Automation System Upgrades	$ 3,251	25,696	-	-	-	5,038	281	17	$ 13,700	4.2	$ 822	$ 14,522	4.5	-	$ 13,700	4.2
C01a	Add Jace Controllers (CO#15)	-	-	-	-	-	-	-	-	$ 2,331	--	-	$ 2,331	--	-	$ 2,331	--
C01b	Upgrade Gym Unit at Gino A Marcus	-	-	-	-	-	-	-	-	$ 8,277	--	$ 497	$ 8,774	--	-	$ 8,277	--
D - Water		$ 458	-	-	-	475	-	-	-	$ 8,439	18.4	$ 506	$ 8,946	19.5	-	$ 8,439	18.4
D01	Domestic Water Retrofits	$ 458	-	-	-	475	-	-	-	$ 8,439	18.4	$ 506	$ 8,946	19.5	-	$ 8,439	18.4
E - Building Envelope		$ 1,624	-	-	-	-	5,860	219	11	$ 19,600	12.1	$ 1,176	$ 20,776	12.8	-	$ 19,600	12.1
E01	Building Envelope Sealing	$ 1,624	-	-	-	-	5,860	219	11	$ 19,600	12.1	$ 1,176	$ 20,776	12.8	-	$ 19,600	12.1
054 - Glengarry Community Center		$ 256	-	-	-	265	-	-	-	$ 4,562	17.8	$ 274	$ 4,836	18.9	-	$ 4,562	17.8
D - Water		$ 256	-	-	-	265	-	-	-	$ 4,562	17.8	$ 274	$ 4,836	18.9	-	$ 4,562	17.8
D01	Domestic Water Retrofits	$ 256	-	-	-	265	-	-	-	$ 4,562	17.8	$ 274	$ 4,836	18.9	-	$ 4,562	17.8

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
055 - Malden Park Activity Centre		**$ 632**	**3,359**	**1.5**	**18.0**	**-**	**986**	**49**	**3**	**$ 6,197**	**9.8**	**$ 372**	**$ 6,569**	**10.4**	**-**	**$ 6,197**	**9.8**
A - Lighting		**$ 349**	**3,359**	**1.5**	**18.0**	**-**	**-**	**12**	**1**	**$ 2,554**	**7.3**	**$ 153**	**$ 2,707**	**7.8**	**-**	**$ 2,554**	**7.3**
A01	Lighting Retrofit & Redesign	$ 349	3,359	1.5	18.0	-	-	12	1	$ 2,554	7.3	$ 153	$ 2,707	7.8	-	$ 2,554	7.3
B - Mechanical		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 857**	**--**	**$ 51**	**$ 908**	**--**	**-**	**$ 857**	**--**
B03	DHW Heater Retrofit	-	-	-	-	-	-	-	-	$ 857	--	$ 51	$ 908	--	-	$ 857	--
E - Building Envelope		**$ 284**	**-**	**-**	**-**	**-**	**986**	**37**	**2**	**$ 2,787**	**9.8**	**$ 167**	**$ 2,954**	**10.4**	**-**	**$ 2,787**	**9.8**
E01	Building Envelope Sealing	$ 284	-	-	-	-	986	37	2	$ 2,787	9.8	$ 167	$ 2,954	10.4	-	$ 2,787	9.8
057 - Oakwood Community Centre		**$ 10,382**	**60,001**	**0.7**	**8.4**	**562**	**19,695**	**953**	**55**	**$ 42,027**	**4.0**	**$ 2,382**	**$ 44,409**	**4.3**	**-**	**$ 42,027**	**4.0**
A - Lighting		**$ 205**	**2,717**	**0.7**	**8.4**	**-**	**-146**	**4**	**1**	**$ 8,857**	**43.1**	**$ 531**	**$ 9,389**	**45.7**	**-**	**$ 8,857**	**43.1**
A01	Lighting Retrofit & Redesign	$ 205	2,717	0.7	8.4	-	-146	4	1	$ 4,668	22.7	$ 280	$ 4,948	24.1	-	$ 4,668	22.7
A01c	Lighting Modifications (CO#21)	-	-	-	-	-	-	-	-	$ 4,190	--	$ 251	$ 4,441	--	-	$ 4,190	--
C - Controls		**$ 8,864**	**57,284**	**-**	**-**	**-**	**17,064**	**845**	**49**	**$ 17,744**	**2.0**	**$ 925**	**$ 18,669**	**2.1**	**-**	**$ 17,744**	**2.0**
C01	Building Automation System Upgrades	$ 8,864	57,284	-	-	-	17,064	845	49	$ 15,413	1.7	$ 925	$ 16,337	1.8	-	$ 15,413	1.7
C01a	Add Jace Controllers (CO#15)	-	-	-	-	-	-	-	-	$ 2,331	--	-	$ 2,331	--	-	$ 2,331	--
D - Water		**$ 542**	**-**	**-**	**-**	**562**	**-**	**-**	**-**	**$ 5,254**	**9.7**	**$ 315**	**$ 5,569**	**10.3**	**-**	**$ 5,254**	**9.7**
D01	Domestic Water Retrofits	$ 542	-	-	-	562	-	-	-	$ 5,254	9.7	$ 315	$ 5,569	10.3	-	$ 5,254	9.7
E - Building Envelope		**$ 770**	**-**	**-**	**-**	**-**	**2,777**	**104**	**5**	**$ 10,172**	**13.2**	**$ 610**	**$ 10,782**	**14.0**	**-**	**$ 10,172**	**13.2**
E01	Building Envelope Sealing	$ 770	-	-	-	-	2,777	104	5	$ 10,172	13.2	$ 610	$ 10,782	14.0	-	$ 10,172	13.2
059 - Optimist Community Center		**$ 272**	**-**	**-**	**-**	**282**	**-**	**-**	**-**	**$ 4,822**	**17.7**	**$ 289**	**$ 5,112**	**18.8**	**-**	**$ 4,822**	**17.7**
D - Water		**$ 272**	**-**	**-**	**-**	**282**	**-**	**-**	**-**	**$ 4,822**	**17.7**	**$ 289**	**$ 5,112**	**18.8**	**-**	**$ 4,822**	**17.7**
D01	Domestic Water Retrofits	$ 272	-	-	-	282	-	-	-	$ 4,822	17.7	$ 289	$ 5,112	18.8	-	$ 4,822	17.7
060 - Remington Community Center		**$ 244**	**1,034**	**1.5**	**18.0**	**-**	**219**	**12**	**1**	**$ 3,932**	**16.1**	**$ 236**	**$ 4,168**	**17.1**	**-**	**$ 3,932**	**16.1**
A - Lighting		**$ 181**	**1,034**	**1.5**	**18.0**	**-**	**-**	**4**	**0**	**$ 3,313**	**18.3**	**$ 199**	**$ 3,511**	**19.4**	**-**	**$ 3,313**	**18.3**
A01	Lighting Retrofit & Redesign	$ 181	1,034	1.5	18.0	-	-	4	0	$ 3,313	18.3	$ 199	$ 3,511	19.4	-	$ 3,313	18.3
E - Building Envelope		**$ 63**	**-**	**-**	**-**	**-**	**219**	**8**	**0**	**$ 619**	**9.8**	**$ 37**	**$ 656**	**10.4**	**-**	**$ 619**	**9.8**
E01	Building Envelope Sealing	$ 63	-	-	-	-	219	8	0	$ 619	9.8	$ 37	$ 656	10.4	-	$ 619	9.8

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
061 - South Windsor Recreation Complex		**$ 18,664**	**134,052**	**26.0**	**312.0**	**-**	**25,772**	**1,447**	**89**	**$ 111,956**	**6.0**	**$ 6,717**	**$ 118,674**	**6.4**	**-**	**$ 111,956**	**6.0**
A - Lighting		**$ 10,586**	**121,282**	**25.8**	**309.6**	**-**	**-**	**437**	**36**	**$ 81,286**	**7.7**	**$ 4,877**	**$ 86,163**	**8.1**	**-**	**$ 81,286**	**7.7**
A01	Lighting Retrofit & Redesign	$ 10,586	121,282	25.8	309.6	-	-	437	36	$ 81,286	7.7	$ 4,877	$ 86,163	8.1	-	$ 81,286	7.7
B - Mechanical		**$ 169**	**2,138**	**0.2**	**2.4**	**-**	**-**	**8**	**1**	**$ 1,279**	**7.6**	**$ 77**	**$ 1,356**	**8.0**	**-**	**$ 1,279**	**7.6**
B18	Refrigerator Replacements	$ 169	2,138	0.2	2.4	-	-	8	1	$ 1,279	7.6	$ 77	$ 1,356	8.0	-	$ 1,279	7.6
C - Controls		**$ 6,115**	**10,632**	**-**	**-**	**-**	**19,299**	**761**	**40**	**$ 10,275**	**1.7**	**$ 617**	**$ 10,892**	**1.8**	**-**	**$ 10,275**	**1.7**
C01	Building Automation System Upgrades	$ 6,115	10,632	-	-	-	19,299	761	40	$ 10,275	1.7	$ 617	$ 10,892	1.8	-	$ 10,275	1.7
E - Building Envelope		**$ 1,794**	**-**	**-**	**-**	**-**	**6,473**	**242**	**12**	**$ 17,215**	**9.6**	**$ 1,033**	**$ 18,248**	**10.2**	**-**	**$ 17,215**	**9.6**
E01	Building Envelope Sealing	$ 1,794	-	-	-	-	6,473	242	12	$ 16,365	9.1	$ 982	$ 17,347	9.7	-	$ 16,365	9.1
E05	Insulate Rink Header (CO#13)	-	-	-	-	-	-	-	-	$ 850	--	$ 51	$ 901	--	-	$ 850	--
F - Renewables		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 1,901**	**--**	**$ 114**	**$ 2,015**	**--**	**-**	**$ 1,901**	**--**
F04	Solar Photovoltaic (CO#10)	-	-	-	-	-	-	-	-	$ 1,901	--	$ 114	$ 2,015	--	-	$ 1,901	--
062 - Adie Knox Herman / Indoor Pool		**$ 11,431**	**98,857**	**26.9**	**322.8**	**1,099**	**4,781**	**535**	**38**	**$ 106,364**	**9.3**	**$ 6,382**	**$ 112,746**	**9.9**	**-**	**$ 106,364**	**9.3**
A - Lighting		**$ 8,795**	**95,391**	**26.9**	**322.8**	**-**	**-**	**343**	**28**	**$ 68,331**	**7.8**	**$ 4,100**	**$ 72,431**	**8.2**	**-**	**$ 68,331**	**7.8**
A01	Lighting Retrofit & Redesign	$ 8,795	95,391	26.9	322.8	-	-	343	28	$ 68,331	7.8	$ 4,100	$ 72,431	8.2	-	$ 68,331	7.8
B - Mechanical		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 4,641**	**--**	**$ 278**	**$ 4,919**	**--**	**-**	**$ 4,641**	**--**
B01	Boiler Replacements	-	-	-	-	-	-	-	-	$ 4,304	--	$ 258	$ 4,562	--	-	$ 4,304	--
B02	Boiler Controls	-	-	-	-	-	-	-	-	$ 337	--	$ 20	$ 357	--	-	$ 337	--
C - Controls		**$ 334**	**3,466**	**-**	**-**	**-**	**304**	**24**	**2**	**$ 6,850**	**20.5**	**$ 411**	**$ 7,261**	**21.7**	**-**	**$ 6,850**	**20.5**
C01	Building Automation System Upgrades	$ 334	3,466	-	-	-	304	24	2	$ 6,850	20.5	$ 411	$ 7,261	21.7	-	$ 6,850	20.5
D - Water		**$ 1,061**	**-**	**-**	**-**	**1,099**	**-**	**-**	**-**	**$ 13,467**	**12.7**	**$ 808**	**$ 14,275**	**13.5**	**-**	**$ 13,467**	**12.7**
D01	Domestic Water Retrofits	$ 1,061	-	-	-	1,099	-	-	-	$ 13,467	12.7	$ 808	$ 14,275	13.5	-	$ 13,467	12.7
E - Building Envelope		**$ 1,241**	**-**	**-**	**-**	**-**	**4,477**	**168**	**9**	**$ 13,075**	**10.5**	**$ 784**	**$ 13,859**	**11.2**	**-**	**$ 13,075**	**10.5**
E01	Building Envelope Sealing	$ 1,241	-	-	-	-	4,477	168	9	$ 13,075	10.5	$ 784	$ 13,859	11.2	-	$ 13,075	10.5
066 - Central Pool		**$ 100**	**1,042**	**0.7**	**8.4**	**-**	**-**	**4**	**0**	**$ 1,485**	**14.9**	**$ 89**	**$ 1,575**	**15.8**	**-**	**$ 1,485**	**14.9**
A - Lighting		**$ 100**	**1,042**	**0.7**	**8.4**	**-**	**-**	**4**	**0**	**$ 1,485**	**14.9**	**$ 89**	**$ 1,575**	**15.8**	**-**	**$ 1,485**	**14.9**
A01	Lighting Retrofit & Redesign	$ 100	1,042	0.7	8.4	-	-	4	0	$ 1,485	14.9	$ 89	$ 1,575	15.8	-	$ 1,485	14.9
068 - Lanspeary Park / Outdoor Pool		**$ 4,032**	**13,313**	**9.5**	**114.0**	**-**	**9,268**	**395**	**22**	**$ 127,461**	**31.6**	**$ 7,095**	**$ 134,556**	**33.4**	**-**	**$ 127,461**	**31.6**
A - Lighting		**$ 1,271**	**13,313**	**9.5**	**114.0**	**-**	**-**	**48**	**4**	**$ 25,226**	**19.8**	**$ 1,514**	**$ 26,740**	**21.0**	**-**	**$ 25,226**	**19.8**
A01	Lighting Retrofit & Redesign	$ 1,271	13,313	9.5	114.0	-	-	48	4	$ 25,226	19.8	$ 1,514	$ 26,740	21.0	-	$ 25,226	19.8
F - Renewables		**$ 2,761**	**-**	**-**	**-**	**-**	**9,268**	**347**	**18**	**$ 102,235**	**37.0**	**$ 5,581**	**$ 107,817**	**39.1**	**-**	**$ 102,235**	**37.0**
F02	Solar Pool Water Heating	$ 2,761	-	-	-	-	9,268	347	18	$ 56,850	20.6	$ 3,411	$ 60,261	21.8	-	$ 56,850	20.6
F02a	Expand Scope Solar Pool Heating	-	-	-	-	-	-	-	-	$ 32,830	--	$ 1,970	$ 34,800	--	-	$ 32,830	--
F02b	Composite Backing for Solar Panels	-	-	-	-	-	-	-	-	$ 3,344	--	$ 201	$ 3,545	--	-	$ 3,344	--
F02c	Structural Change & Bldg Permits	-	-	-	-	-	-	-	-	$ 9,211	--	-	$ 9,211	--	-	$ 9,211	--

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
069 - Remington - Booster / Outdoor Pool		**$ 570**	**-**	**-**	**-**	**65**	**1,765**	**66**	**3**	**$ 39,397**	**69.1**	**$ 2,320**	**$ 41,717**	**73.1**	**-**	**$ 39,397**	**69.1**
A - Lighting		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**--**	**-**	**-**	**--**	**-**	**-**	**--**
A01	Lighting Retrofit & Redesign	-	-	-	-	-	-	-	-	-	--	-	-	--	-	-	--
D - Water		**$ 63**	**-**	**-**	**-**	**65**	**-**	**-**	**-**	**$ 712**	**11.4**	**$ 43**	**$ 755**	**12.0**	**-**	**$ 712**	**11.4**
D01	Domestic Water Retrofits	$ 63	-	-	-	65	-	-	-	$ 712	11.4	$ 43	$ 755	12.0	-	$ 712	11.4
F - Renewables		**$ 508**	**-**	**-**	**-**	**-**	**1,765**	**66**	**3**	**$ 38,685**	**76.2**	**$ 2,277**	**$ 40,962**	**80.7**	**-**	**$ 38,685**	**76.2**
F02	Solar Pool Water Heating	$ 508	-	-	-	-	1,765	66	3	$ 56,850	112.0	$ 3,411	$ 60,261	118.7	-	$ 56,850	112.0
F02a	Expand Scope Solar Pool Heating	-	-	-	-	-	-	-	-	$ -22,244	--	$ -1,335	$ -23,579	--	-	$ -22,244	--
F02b	Composite Backing for Solar Panels	-	-	-	-	-	-	-	-	$ 3,344	--	$ 201	$ 3,545	--	-	$ 3,344	--
F02c	Structural Change & Bldg Permits	-	-	-	-	-	-	-	-	$ 735	--	-	$ 735	--	-	$ 735	--
070 - Windsor Water World Indoor Pool		**$ 4,729**	**51,230**	**8.1**	**97.2**	**-**	**1,643**	**246**	**18**	**$ 29,139**	**6.2**	**$ 1,748**	**$ 30,887**	**6.5**	**-**	**$ 29,139**	**6.2**
A - Lighting		**$ 4,273**	**51,230**	**8.1**	**97.2**	**-**	**-**	**184**	**15**	**$ 24,494**	**5.7**	**$ 1,470**	**$ 25,964**	**6.1**	**-**	**$ 24,494**	**5.7**
A01	Lighting Retrofit & Redesign	$ 4,273	51,230	8.1	97.2	-	-	184	15	$ 24,494	5.7	$ 1,470	$ 25,964	6.1	-	$ 24,494	5.7
E - Building Envelope		**$ 455**	**-**	**-**	**-**	**-**	**1,643**	**62**	**3**	**$ 4,645**	**10.2**	**$ 279**	**$ 4,923**	**10.8**	**-**	**$ 4,645**	**10.2**
E01	Building Envelope Sealing	$ 455	-	-	-	-	1,643	62	3	$ 4,645	10.2	$ 279	$ 4,923	10.8	-	$ 4,645	10.2
073 - Forest Glade Arena		**$ 12,630**	**125,295**	**7.6**	**181.4**	**1,104**	**5,218**	**646**	**47**	**$ 139,695**	**11.1**	**$ 8,128**	**$ 147,822**	**11.7**	**-**	**$ 139,695**	**11.1**
A - Lighting		**$ 9,979**	**123,355**	**7.6**	**181.4**	**-**	**-**	**444**	**37**	**$ 92,983**	**9.3**	**$ 5,579**	**$ 98,562**	**9.9**	**-**	**$ 92,983**	**9.3**
A01	Lighting Retrofit & Redesign	$ 9,979	123,355	7.6	181.4	-	-	444	37	$ 92,983	9.3	$ 5,579	$ 98,562	9.9	-	$ 92,983	9.3
C - Controls		**$ 209**	**1,940**	**-**	**-**	**-**	**248**	**16**	**1**	**$ 4,070**	**19.5**	**$ 104**	**$ 4,174**	**20.0**	**-**	**$ 4,070**	**19.5**
C01a	Add Jace Controllers (CO#15)	-	-	-	-	-	-	-	-	$ 2,331	--	-	$ 2,331	--	-	$ 2,331	--
C03	Programmable Thermostat Installation	$ 209	1,940	-	-	-	248	16	1	$ 1,738	8.3	$ 104	$ 1,843	8.8	-	$ 1,738	8.3
D - Water		**$ 1,065**	**-**	**-**	**-**	**1,104**	**-**	**-**	**-**	**$ 25,034**	**23.5**	**$ 1,502**	**$ 26,536**	**24.9**	**-**	**$ 25,034**	**23.5**
D01	Domestic Water Retrofits	$ 1,065	-	-	-	1,104	-	-	-	$ 24,411	22.9	$ 1,465	$ 25,875	24.3	-	$ 24,411	22.9
D01a	Additional Plumbing Fixtures (CO#02)	-	-	-	-	-	-	-	-	$ 624	--	$ 37	$ 661	--	-	$ 624	--
E - Building Envelope		**$ 1,377**	**-**	**-**	**-**	**-**	**4,970**	**186**	**9**	**$ 15,707**	**11.4**	**$ 942**	**$ 16,649**	**12.1**	**-**	**$ 15,707**	**11.4**
E01	Building Envelope Sealing	$ 1,377	-	-	-	-	4,970	186	9	$ 15,707	11.4	$ 942	$ 16,649	12.1	-	$ 15,707	11.4
F - Renewables		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 1,901**	**--**	**-**	**$ 1,901**	**--**	**-**	**$ 1,901**	**--**
F04	Solar Photovoltaic (CO#10)	-	-	-	-	-	-	-	-	$ 1,901	--	-	$ 1,901	--	-	$ 1,901	--
076 - Windsor Arena		**$ 5,908**	**38,385**	**3.4**	**80.4**	**-**	**9,604**	**498**	**30**	**$ 69,440**	**11.8**	**$ 4,166**	**$ 73,607**	**12.5**	**-**	**$ 69,440**	**11.8**
A - Lighting		**$ 3,131**	**36,785**	**3.4**	**80.4**	**-**	**-**	**132**	**11**	**$ 46,483**	**14.8**	**$ 2,789**	**$ 49,271**	**15.7**	**-**	**$ 46,483**	**14.8**
A01	Lighting Retrofit & Redesign	$ 3,131	36,785	3.4	80.4	-	-	132	11	$ 46,483	14.8	$ 2,789	$ 49,271	15.7	-	$ 46,483	14.8
B - Mechanical		**$ 1,022**	**-**	**-**	**-**	**-**	**3,690**	**138**	**7**	**$ 13,838**	**13.5**	**$ 830**	**$ 14,669**	**14.3**	**-**	**$ 13,838**	**13.5**
B15	Steam Trap Replacements	$ 577	-	-	-	-	2,084	78	4	$ 9,317	16.1	$ 559	$ 9,876	17.1	-	$ 9,317	16.1
B16	Piping Insulation Repairs	$ 445	-	-	-	-	1,606	60	3	$ 4,521	10.2	$ 271	$ 4,792	10.8	-	$ 4,521	10.2
C - Controls		**$ 996**	**1,600**	**-**	**-**	**-**	**3,176**	**125**	**7**	**$ 1,378**	**1.4**	**$ 83**	**$ 1,461**	**1.5**	**-**	**$ 1,378**	**1.4**
C03	Programmable Thermostat Installation	$ 996	1,600	-	-	-	3,176	125	7	$ 1,378	1.4	$ 83	$ 1,461	1.5	-	$ 1,378	1.4
E - Building Envelope		**$ 759**	**-**	**-**	**-**	**-**	**2,738**	**103**	**5**	**$ 7,741**	**10.2**	**$ 464**	**$ 8,206**	**10.8**	**-**	**$ 7,741**	**10.2**
E01	Building Envelope Sealing	$ 759	-	-	-	-	2,738	103	5	$ 7,741	10.2	$ 464	$ 8,206	10.8	-	$ 7,741	10.2

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
080 - Administrative Building - 2450 Mcdougall		**$ 1,159**	**5,029**	**2.2**	**26.4**	**328**	**1,084**	**59**	**4**	**$ 13,428**	**11.6**	**$ 806**	**$ 14,234**	**12.3**	**- $**	**13,428**	**11.6**
A - Lighting		**$ 495**	**4,696**	**2.2**	**26.4**	**-**	**-**	**17**	**1**	**$ 3,169**	**6.4**	**$ 190**	**$ 3,360**	**6.8**	**- $**	**3,169**	**6.4**
A01	Lighting Retrofit & Redesign	$ 495	4,696	2.2	26.4	-	-	17	1	$ 3,169	6.4	$ 190	$ 3,360	6.8	- $	3,169	6.4
C - Controls		**$ 65**	**333**	**-**	**-**	**-**	**137**	**6**	**0**	**$ 1,198**	**18.5**	**$ 72**	**$ 1,270**	**19.6**	**- $**	**1,198**	**18.5**
C03	Programmable Thermostat Installation	$ 65	333	-	-	-	137	6	0	$ 1,198	18.5	$ 72	$ 1,270	19.6	- $	1,198	18.5
D - Water		**$ 317**	**-**	**-**	**-**	**328**	**-**	**-**	**-**	**$ 4,179**	**13.2**	**$ 251**	**$ 4,429**	**14.0**	**- $**	**4,179**	**13.2**
D01	Domestic Water Retrofits	$ 317	-	-	-	328	-	-	-	$ 4,179	13.2	$ 251	$ 4,429	14.0	- $	4,179	13.2
E - Building Envelope		**$ 282**	**-**	**-**	**-**	**-**	**947**	**35**	**2**	**$ 2,980**	**10.6**	**$ 179**	**$ 3,159**	**11.2**	**- $**	**2,980**	**10.6**
E01	Building Envelope Sealing	$ 282	-	-	-	-	947	35	2	$ 2,980	10.6	$ 179	$ 3,159	11.2	- $	2,980	10.6
F - Renewables		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 1,901**	**–**	**$ 114**	**$ 2,015**	**--**	**- $**	**1,901**	**–**
F04	Solar Photovoltaic (CO#10)	-	-	-	-	-	-	-	-	$ 1,901	--	$ 114	$ 2,015	--	- $	1,901	--
081 - Ako / Club House / Pool / Community Center		**$ 717**	**4,141**	**1.2**	**14.4**	**125**	**712**	**42**	**3**	**$ 8,846**	**12.3**	**$ 531**	**$ 9,376**	**13.1**	**- $**	**8,846**	**12.3**
A - Lighting		**$ 384**	**4,141**	**1.2**	**14.4**	**-**	**-**	**15**	**1**	**$ 5,464**	**14.2**	**$ 328**	**$ 5,791**	**15.1**	**- $**	**5,464**	**14.2**
A01	Lighting Retrofit & Redesign	$ 384	4,141	1.2	14.4	-	-	15	1	$ 5,464	14.2	$ 328	$ 5,791	15.1	- $	5,464	14.2
D - Water		**$ 121**	**-**	**-**	**-**	**125**	**-**	**-**	**-**	**$ 1,137**	**9.4**	**$ 68**	**$ 1,205**	**10.0**	**- $**	**1,137**	**9.4**
D01	Domestic Water Retrofits	$ 121	-	-	-	125	-	-	-	$ 1,137	9.4	$ 68	$ 1,205	10.0	- $	1,137	9.4
E - Building Envelope		**$ 212**	**-**	**-**	**-**	**-**	**712**	**27**	**1**	**$ 2,245**	**10.6**	**$ 135**	**$ 2,380**	**11.2**	**- $**	**2,245**	**10.6**
E01	Building Envelope Sealing	$ 212	-	-	-	-	712	27	1	$ 2,245	10.6	$ 135	$ 2,380	11.2	- $	2,245	10.6
093 - East Division Yard /Main Bldg Little River		**$ 289**	**3,022**	**1.2**	**14.4**	**-**	**-**	**11**	**1**	**$ 2,358**	**8.2**	**$ 141**	**$ 2,499**	**8.7**	**- $**	**2,358**	**8.2**
A - Lighting		**$ 289**	**3,022**	**1.2**	**14.4**	**-**	**-**	**11**	**1**	**$ 2,358**	**8.2**	**$ 141**	**$ 2,499**	**8.7**	**- $**	**2,358**	**8.2**
A01	Lighting Retrofit & Redesign	$ 289	3,022	1.2	14.4	-	-	11	1	$ 2,358	8.2	$ 141	$ 2,499	8.7	- $	2,358	8.2
094 - Field House		**$ 638**	**3,754**	**1.6**	**19.2**	**-**	**850**	**45**	**3**	**$ 6,747**	**10.6**	**$ 405**	**$ 7,152**	**11.2**	**- $**	**6,747**	**10.6**
A - Lighting		**$ 385**	**3,754**	**1.6**	**19.2**	**-**	**-**	**14**	**1**	**$ 2,172**	**5.6**	**$ 130**	**$ 2,303**	**6.0**	**- $**	**2,172**	**5.6**
A01	Lighting Retrofit & Redesign	$ 385	3,754	1.6	19.2	-	-	14	1	$ 2,172	5.6	$ 130	$ 2,303	6.0	- $	2,172	5.6
E - Building Envelope		**$ 253**	**-**	**-**	**-**	**-**	**850**	**32**	**2**	**$ 4,575**	**18.1**	**$ 274**	**$ 4,849**	**19.2**	**- $**	**4,575**	**18.1**
E01	Building Envelope Sealing	$ 253	-	-	-	-	850	32	2	$ 4,575	18.1	$ 274	$ 4,849	19.2	- $	4,575	18.1
096 - Jackson Park - Lawn Bowling Clubhouse		**$ 106**	**786**	**0.7**	**8.4**	**-**	**-**	**3**	**0**	**$ 1,638**	**15.4**	**$ 98**	**$ 1,736**	**16.3**	**- $**	**1,638**	**15.4**
A - Lighting		**$ 106**	**786**	**0.7**	**8.4**	**-**	**-**	**3**	**0**	**$ 1,638**	**15.4**	**$ 98**	**$ 1,736**	**16.3**	**- $**	**1,638**	**15.4**
A01	Lighting Retrofit & Redesign	$ 106	786	0.7	8.4	-	-	3	0	$ 1,638	15.4	$ 98	$ 1,736	16.3	- $	1,638	15.4
100 - Lanspeary Park- Various Buildings		**$ 106**	**580**	**0.9**	**10.8**	**-**	**-**	**2**	**0**	**$ 644**	**6.1**	**$ 39**	**$ 683**	**6.5**	**- $**	**644**	**6.1**
A - Lighting		**$ 106**	**580**	**0.9**	**10.8**	**-**	**-**	**2**	**0**	**$ 644**	**6.1**	**$ 39**	**$ 683**	**6.5**	**- $**	**644**	**6.1**
A01	Lighting Retrofit & Redesign	$ 106	580	0.9	10.8	-	-	2	0	$ 644	6.1	$ 39	$ 683	6.5	- $	644	6.1

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
102 - Mackenzie Hall		**$ 1,065**	**4,325**	**0.9**	**10.8**	**714**	**-**	**16**	**1**	**$ 18,629**	**17.5**	**$ 1,118**	**$ 19,747**	**18.5**	**-**	**$ 18,629**	**17.5**
A - Lighting		**$ 376**	**4,325**	**0.9**	**10.8**	**-**	**-**	**16**	**1**	**$ 7,135**	**19.0**	**$ 428**	**$ 7,563**	**20.1**	**-**	**$ 7,135**	**19.0**
A01	Lighting Retrofit & Redesign	$ 376	4,325	0.9	10.8	-	-	16	1	$ 7,135	19.0	$ 428	$ 7,563	20.1	-	$ 7,135	19.0
D - Water		**$ 689**	**-**	**-**	**-**	**714**	**-**	**-**	**-**	**$ 11,494**	**16.7**	**$ 690**	**$ 12,184**	**17.7**	**-**	**$ 11,494**	**16.7**
D01	Domestic Water Retrofits	$ 689	-	-	-	714	-	-	-	$ 11,494	16.7	$ 690	$ 12,184	17.7	-	$ 11,494	16.7
103 - Mainenance Building - 2461 Mcdougall		**$ 499**	**4,946**	**2.0**	**24.0**	**-**	**-**	**18**	**1**	**$ 5,770**	**11.6**	**$ 346**	**$ 6,116**	**12.3**	**-**	**$ 5,770**	**11.6**
A - Lighting		**$ 499**	**4,946**	**2.0**	**24.0**	**-**	**-**	**18**	**1**	**$ 5,770**	**11.6**	**$ 346**	**$ 6,116**	**12.3**	**-**	**$ 5,770**	**11.6**
A01	Lighting Retrofit & Redesign	$ 499	4,946	2.0	24.0	-	-	18	1	$ 5,770	11.6	$ 346	$ 6,116	12.3	-	$ 5,770	11.6
104 - Micmac Park -Comfort Station		**$ 445**	**-**	**-**	**-**	**-**	**1,547**	**58**	**3**	**$ 20,115**	**45.2**	**$ 1,061**	**$ 21,176**	**47.6**	**-**	**$ 20,115**	**45.2**
F - Renewables		**$ 445**	**-**	**-**	**-**	**-**	**1,547**	**58**	**3**	**$ 20,115**	**45.2**	**$ 1,061**	**$ 21,176**	**47.6**	**-**	**$ 20,115**	**45.2**
F02	Solar Pool Water Heating	$ 445	-	-	-	-	1,547	58	3	-	-	-	-	-	-	-	-
F02a	Expand Scope Solar Pool Heating	-	-	-	-	-	-	-	-	$ 17,688	--	$ 1,061	$ 18,749	--	-	$ 17,688	--
F02c	Structural Change & Bldg Permits	-	-	-	-	-	-	-	-	$ 2,427	--	-	$ 2,427	--	-	$ 2,427	--
117 - Willistead Coach House		**$ 539**	**3,046**	**4.5**	**54.0**	**-**	**-**	**11**	**1**	**$ 7,310**	**13.6**	**$ 439**	**$ 7,749**	**14.4**	**-**	**$ 7,310**	**13.6**
A - Lighting		**$ 539**	**3,046**	**4.5**	**54.0**	**-**	**-**	**11**	**1**	**$ 7,310**	**13.6**	**$ 439**	**$ 7,749**	**14.4**	**-**	**$ 7,310**	**13.6**
A01	Lighting Retrofit & Redesign	$ 539	3,046	4.5	54.0	-	-	11	1	$ 7,310	13.6	$ 439	$ 7,749	14.4	-	$ 7,310	13.6
119 - Willistead Manor - Main House		**$ 1,058**	**7,325**	**3.3**	**39.6**	**-**	**1,293**	**75**	**5**	**$ 12,873**	**12.2**	**$ 772**	**$ 13,645**	**12.9**	**-**	**$ 12,873**	**12.2**
A - Lighting		**$ 388**	**4,066**	**3.3**	**39.6**	**-**	**-**	**15**	**1**	**$ 8,435**	**21.7**	**$ 506**	**$ 8,941**	**23.0**	**-**	**$ 8,435**	**21.7**
A01	Lighting Retrofit & Redesign	$ 388	4,066	3.3	39.6	-	-	15	1	$ 8,435	21.7	$ 506	$ 8,941	23.0	-	$ 8,435	21.7
C - Controls		**$ 670**	**3,259**	**-**	**-**	**-**	**1,293**	**60**	**3**	**$ 4,438**	**6.6**	**$ 266**	**$ 4,705**	**7.0**	**-**	**$ 4,438**	**6.6**
C03	Programmable Thermostat Installation	$ 670	3,259	-	-	-	1,293	60	3	$ 4,438	6.6	$ 266	$ 4,705	7.0	-	$ 4,438	6.6
123 - 400 City Hall Square East		**$ 596**	**-**	**-**	**-**	**618**	**-**	**-**	**-**	**$ 8,809**	**14.8**	**$ 529**	**$ 9,338**	**15.7**	**-**	**$ 8,809**	**14.8**
D - Water		**$ 596**	**-**	**-**	**-**	**618**	**-**	**-**	**-**	**$ 8,809**	**14.8**	**$ 529**	**$ 9,338**	**15.7**	**-**	**$ 8,809**	**14.8**
D01	Domestic Water Retrofits	$ 596	-	-	-	618	-	-	-	$ 8,809	14.8	$ 529	$ 9,338	15.7	-	$ 8,809	14.8
145 - St. Paul		**$ 565**	**6,646**	**1.2**	**14.4**	**-**	**-**	**24**	**2**	**$ 2,667**	**4.7**	**$ 160**	**$ 2,827**	**5.0**	**-**	**$ 2,667**	**4.7**
A - Lighting		**$ 565**	**6,646**	**1.2**	**14.4**	**-**	**-**	**24**	**2**	**$ 2,667**	**4.7**	**$ 160**	**$ 2,827**	**5.0**	**-**	**$ 2,667**	**4.7**
A01	Lighting Retrofit & Redesign	$ 565	6,646	1.2	14.4	-	-	24	2	$ 2,667	4.7	$ 160	$ 2,827	5.0	-	$ 2,667	4.7

Table A2 – As Built Program by Building Continued

BUILDING / MEASURE		SAVINGS								COSTS					INCENTIVES		
Bldg # Msr Tag	Building Measure	Total Savings [$]	Electricity Consumption [kWh]	Electricity Demand Peak/Month [kW/kVa]	Annual Electricity Demand [kW/kVa]	Domestic Water [m³]	Natural Gas [m³]	Energy [GJ]	eCO2 [Tonnes]	Total Measure Cost [$]	Simple Payback [Years]	Tax GST [$]	Measure Cost w/Tax [$]	Simple Payback w/Tax [Years]	Total Incentives [$]	Total Measure Cost w/Incentives [$]	Simple Payback w/Incentives [Years]
160 - General		-	-	-	-	-	-	-	-	$ 86,505	–	$ 2,678	$ 89,183	--	$ 449,131	$ -362,626	–
A - Lighting		-	-	-	-	-	-	-	-	$ 26,575	–	-	$ 26,575	--	-	$ 26,575	–
A05	PCB Disposal & Lamp Recycling	-	-	-	-	-	-	-	-	$ 26,575	--	-	$ 26,575	--	-	$ 26,575	--
F - Renewables		-	-	-	-	-	-	-	-	$ 15,300	–	-	$ 15,300	--	-	$ 15,300	–
F04a	Solar PV - Technical FS & Engineering	-	-	-	-	-	-	-	-	$ 15,300	--	-	$ 15,300	--	-	$ 15,300	--
H - General		-	-	-	-	-	-	-	-	$ 44,630	–	$ 2,678	$ 47,308	--	-	$ 44,630	–
H01	Commissioning	-	-	-	-	-	-	-	-	$ 44,630	--	$ 2,678	$ 47,308	--	-	$ 44,630	--
I - Incentives		-	-	-	-	-	-	-	-	-	–	-	-	--	$ 449,131	$ -449,131	–
I01	MECF Fund	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 100,000	$ -100,000	--
I02	NRCan ecoEnergy Retrofit Incentives	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 103,750	$ -103,750	--
I03	NRCan ecoEnergy for Renewable Heat	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 28,183	$ -28,183	--
I04	ERIP - Energy Retrofit Incentive	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 78,043	$ -78,043	--
I05	RinC - Recreational Infrastructure	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 41,656	$ -41,656	--
I06	Union Gas - Feasibility Study Funding	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 12,500	$ -12,500	--
I07	Union Gas - Custom Incentives	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 68,608	$ -68,608	--
I08	OPA saveONenergy Retrofit Incentives	-	-	-	-	-	-	-	-	-	--	-	-	--	$ 16,391	$ -16,391	--
Program Total		**$ 247,081**	**1,767,625**	**242.5**	**3,092.6**	**13,885**	**316,568**	**18,216**	**1,127**	**$2,370,331**	**9.6**	**$ 138,377**	**$2,508,708**	**10.2**	**$ 449,131**	**$1,921,200**	**7.8**