

# Energy Conservation and Demand Management Plan

Town of Arnprior

O Reg. 397/11

2014 – 2019



# Commitment

## Declaration of Commitment

Resolution: That Council shall direct staff to allocate the necessary resources to develop and implement a strategic energy management plan that will reduce Arnprior's energy consumption and overall environmental impact.

## Vision

The Corporation of the Town of Arnprior's vision is to reduce overall energy consumption and emissions, and to mitigate costs through the wise use of energy whilst pursuing a carbon neutral future.

## Policy

In 2009, the Province of Ontario Enacted the Green Energy Act with the intention of creating growth in renewable energy and green jobs while encouraging energy conservation. Under the Act, Ontario Regulation 397/11 states that all public agencies (Municipalities, Hospitals, and School Boards) must prepare an Energy Conservation and Demand Management Plan (CDM Plan).

The CDM plan for Arnprior consists of two main sections:

- A summary of the Town's annual energy consumption and greenhouse gas emissions for its operations
- A description of previous, current and proposed measures for conserving and otherwise reducing the amount of energy consumed by the Town's operations and for managing the Town's demand for energy, including a forecast of the expected results of current and proposed measures.

## Goals

The Town of Arnprior's Conservation and Demand Management Plan has been developed to help achieve the following goals:

- Reduce overall energy and emissions in all facilities
- Decrease operating costs
- Incorporate Renewable Generation in future building projects (i.e Solar)

## Overall Target

The Town Of Arnprior plans to reduce consumptions of electricity and fuels in all municipal operations by an average of 1-2%/year between 2014 and 2019. With a total energy usage of 9,052,657.04 equivalent kWh in 2011, the Town estimates an

approximate reduction in energy usage of between 90,526 – 181,052 equivalent kWh per year.

### **Objectives:**

In order for Arnprior to successfully meet an energy use reduction target of 1-2% per year, the CDM Plan must include reasonable objectives and goals that are attainable within the timeframe of each reporting period (5 years). Objectives 1 – 3 listed below will be used to successfully meet the Town's objectives.

Additional projects, as covered by Objective 4 that could result in additional energy reductions should be encouraged and developed as part of long range planning; however it must be understood that yearly variations in budget allowances can easily throw off a well laid out plan. The plan as developed should be robust, so that it may handle variable budget pressures. In order to ensure that the Town ultimately reaches the goals they set, estimated reduction amounts will be focused on smaller, less costly processes and projects (Objectives 1-3) that are less susceptible to budgetary pressures.

That being said, if a large opportunity to conserve energy becomes available, such as through the development of a new technology or grant, regardless of whether the current years target has been met, the Town should always choose to act on any potential opportunities, as ultimately, any energy savings opportunity has the potential to save the Town thousands of dollars each year.

The 4 objectives outlined below provide a high level framework that will help the Town to build a robust energy conservation program throughout each Town-owned building.

#### ***Objective 1 - The creation of a culture of conservation in Town employees.***

People and their energy conservation habits can have a dramatic effect on the amount energy used in each building. Therefore the development of a clear and defined message of simple expectations regarding energy conservation should be communicated to all staff. Simple habits, such as turning off computers at night, turning off lights when you leave the room, and setting your computer's screen saver should be fostered through consistent communication to all staff. A discussion of these expectations can be communicated to new hires, during group training (even if that training is for a separate topic), through short lunch and learn presentations, and through the development of standard and clear language policies for staff.

#### ***Objective 2 – Removal of all inefficient T12 and incandescent light bulbs***

The implementation of a policy to eliminate all T12 florescent and incandescent bulbs from all facilities due to their inefficiencies. Fixtures should be replaced with much more efficient T8 or T5 bulbs.

### ***Objective 3 – Operational Polices***

Objective 3 involves the gradual implementation of policies that place focus on optimizing the operation and maintenance practices throughout each building to complement the daily habits adopted by staff.

In addition Objective 3 will also include the implementation of a process to review (and update if required) this CDM plan on an annual basis. A review of other external reports (2008 Ainsworth Audit Report) should also be undertaken to assess if other energy efficiency measures previously identified can be implemented at the Nick Smith Centre.

### ***Objective 4 – Continuous Improvement***

The last objective of the CDM plan is to provide a forum for discussion within the Corporation on energy management to explore new ideas and trends as they become available. This objective sets expectations for improvements in asset purchasing with regard for energy efficiency. Although Objective 4 does not directly factor into the yearly energy reduction goal of 1-2% per year, this objective seeks to capture larger ticket items that occasionally will help the Town to go over and above of a goal of 1-2% per year. Budget variances year over year can make planning for energy savings realized from 'big ticket items' difficult to predict; therefore these one off increases will generally not be included in the year's energy savings forecast and goal.

# Organizational Understanding

## Current Energy Concerns

Since the 2003 blackout, residents of Ontario have known how delicate the stability and security of our energy supply is. If energy consumption is not managed appropriately the frequency of energy interruption and the subsequent societal disruption will increase.

## Environmental

The Government of Ontario estimates that 75% of greenhouse gas emissions are associated with the consumption of fossil fuels for energy purposes (coal, gas and oil). Greenhouse gases are not the only energy related by product, both air pollution and smog have also been connected to the consumption of energy.

The by-products of fossil fuel generation stations include carbon dioxide, sulphur dioxide and nitrogen oxides. Each compound has its own negative effects on the environment, from global warming to acidic rain to breathing problems associated with smog inhalation. By reducing both natural gas usage, and electricity usage, the Town can reduce the amount of carbon dioxide, sulphur dioxide and nitrogen oxides that they produce either directly through gas fired boilers for heating or indirectly through the use of electricity that may be produced by the burning of fossil fuels.

## Future Energy Costs

Ontario has now phased out coal power, and is slowly bringing back online a number of nuclear facilities. Although energy use has dropped in Ontario by about 10%, electricity prices are still expected to rise. Electricity bills are expected to rise by 33 per cent over the next five years, 54 per cent over the next 10 years, and 68 per cent over the next two decades.

In addition to electricity rates, during the winter of 2013/2014, natural gas reserves became very low, which in turn drove up natural gas prices. In January 2014, gas prices were 11.74 cents per m<sup>3</sup> of gas, which is much lower than historic rates from as recent as 2008 which were 38.15 cents per m<sup>3</sup> of gas. As a result of the gas shortages in the later part of the 2013/2014 winter, rates nearly doubled to 20.89 cents per m<sup>3</sup> of gas and expectations are that gas prices will remain high over the coming year and will continue to rise over time.

Gas rates can prove to be very volatile, resulting in substantial increases on gas bills. The volatility of natural gas prices is a reason to focus on energy conservation. The Town is working with LAS to control the rate at which we purchase natural gas and electricity; however the largest way that we can control energy usage costs is through controlling the amount we use.

## Stakeholder Needs

Internal stakeholders (Council, CAO, and staff) need:

- An up-to-date and relevant energy management plan with clear vision, goals, and targets in order to clearly communicate the corporate commitment to energy efficiency
- Timely, regular reports and information to maintain awareness of energy use and
- Training and support to develop the skills and knowledge required to implement energy management practices and measures.

## Municipal Energy Situation

### *Energy Data Management*

The Town of Arnprior has traditionally tracked energy costs through the finance department; however, consumption data has not specifically been tracked in the past. With the new O. Reg. 397/11 energy reporting requirements, additional management practices with more stringent tracking practices are required in order to accurately meet our reporting obligations.

The result of the new requirements meant that there was a need to create a comprehensive management program. The Town of Arnprior, since 2013, has incorporated an 'Energy Planning Tool' (EPT) procured from Local Authority Service (LAS) and the My Account login from Hydro One to start tracking energy usage and cost.

With both of these tools now in place, the Town of Arnprior will be better able to track monthly and yearly energy consumption amounts, while gaining a greater understanding of the overall impact of energy management on the Town's budget.

### *Energy Supply Management*

The Town of Arnprior has been proactive in ensuring that it receives the best possible rates for electricity and natural gas. The Town is already enrolled in a program through LAS Spot Market Pricing.

The LAS Electricity Program was created by municipalities, for municipalities. It provides a means for the Town to ensure predictable costs for required electricity through a professionally managed program that leverages aggregated (i.e., group purchasing power) purchasing and "spot market" exposure. The primary goals of the program are to help municipalities realize predictable prices for electricity and to provide municipalities with cost savings through the purchase of this required commodity.

### *Energy Use in Facilities*

Through the deployment of the new EPT software staff will be equipped with necessary information to make effective energy management decisions.

## ***Ainsworth Detailed Feasibility Study***

In 2008 Ainsworth Inc. was invited by the Town to conduct an energy assessment of Town facilities. The report that was generate by Ainsworth evaluated existing conditions at each building and proposed energy conservation measures, as well as the expected energy savings for each. In the end, the Town elected to only follow through on some of the recommendation items that were set out for the Nick Smith Centre. The Town chose not to proceed with the remaining recommendations made for other buildings.

A summary of the recommendations made by Ainsworth Plan included:

- Lighting retrofits at all facilities
- Installation of lighting controls at all facilities
- Optimization of the refrigeration system at the Nick Smith Centre
- Installation of variable frequency drives at the Nick Smith Centre and Water Pollution Control Centre
- Installation of high frequency motors at the Nick Smith Centre and Water Filtration Plant
- Transformer upgrades at the Town Hall and the Nick Smith Centre
- Installation of power factor correction equipment at the Nick Smith Centre
- Installation of a pool cover at the Nick Smith Centre
- Installation of a low emissivity ceiling at the Nick Smith Centre ice rinks
- Time of day scheduling of equipment using programmable thermostats at the fire/police hall museum, Nick Smith Centre, public library, public works garage, and water pollution control center.
- Retro-commissioning of the Building Automation System at Town Hall
- Building envelope sealing upgrades at various facilities

In addition a number of other optional upgrades to boilers, water heaters, desiccants and humidifiers in various buildings were recommended.

### ***How We Manage Energy Today:***

The management of energy data has typically been the responsibility of the finance department in relation to paying invoices. By increasing the flow of information (such as consumption data) out of the finance department and into the hands of those that control the processes that utilize energy, public works department staff (engineering, maintenance & operations) will be able to more easily identify wasteful activities that increase usage rates. Until this point, energy usage data for each building was not something that was reviewed yearly, or compared year over year. The Town may have been able to spot cost increase year over year; however those increases wouldn't necessarily be a result of increased usage, but more likely increased rates. By utilizing the mandatory energy reporting requirement as a tool to determine usage and not just overall cost, there is a large potential to be able to spot yearly irregularities that may be due to faulty, inefficient equipment.

The Town will utilize energy consumption data reported in 2011 as a baseline for future analysis and yearly review. In the section below, a sample of the analysis that can be performed is outlined.

## Summary of Current Energy Consumption, Cost and GHGs

The following section provides energy consumption data for each of the Town-owned buildings that are required to be reported under O. Reg. 397/11 and include:

- Arnprior Public Library
- Museum
- Fire Hall
- OPP
- Nick Smith Centre
- Public Works Garage
- Pump Stations 1-5
- Water Tower
- Town Hall
- Arnprior Waste Water Treatment Plant
- Water Filtration Plant

The Town has also elected to include the reporting of energy use information on two small, unheated buildings at Robert Simpson Park, the concession stand and washrooms.

### 2011 – Energy Usage

#### Natural Gas

The volume of natural gas consumed in 2011 by buildings that are reported under O. Reg. 397/11 was 438,033.00 m<sup>3</sup> for a total cost of \$146,490.59.

#### Electricity

The amount of electricity consumed in 2011 by buildings that are reported under O. Reg. 397/11 was 4,397,340.00 ekWh/yr, for a total cost of \$335,758.67. For comparison reasons it should be noted that in 2011, electricity usage amounts were not reported for the Arnprior Water Tower.

#### Total Annual Energy Consumption

The total annual energy consumption in 2011, including natural gas and electricity for buildings that are reported under O. Reg. 397/11 in 2012, was 9,052,657.04 ekWh, at a cost of \$482,249.26 for the year. In addition greenhouse gas (GHG) emissions totaled 1,250,477.55 tones eCO<sub>2</sub> in 2012. For comparison reasons it should be noted that in

2011, total annual energy amounts do not include the electricity usage from the Arnprior Water Tower.

## **2012 – Energy Usage**

### **Natural Gas**

The volume of natural gas consumed in 2012 by buildings that are reported under O. Reg. 397/11 was 421,159 m<sup>3</sup> for a total cost of \$126,471.40.

### **Electricity**

The amount of electricity consumed in 2012 by buildings that are reported under O. Reg. 397/11 was 4,627,617 kWh/yr, for a total cost of \$ 376,644.74

### **Total Annual Energy Consumption**

The total annual energy consumption in 2012, including natural gas and electricity for buildings that are reported under O Reg. 397/11 in 2012, was 9,103,600.93 ekWh, at a cost of \$503,116.15 for the year. In addition greenhouse gas (GHG) emissions totaled 1,240,690.91 tones eCO<sub>2</sub> in 2012.

## Trends in Energy Consumption

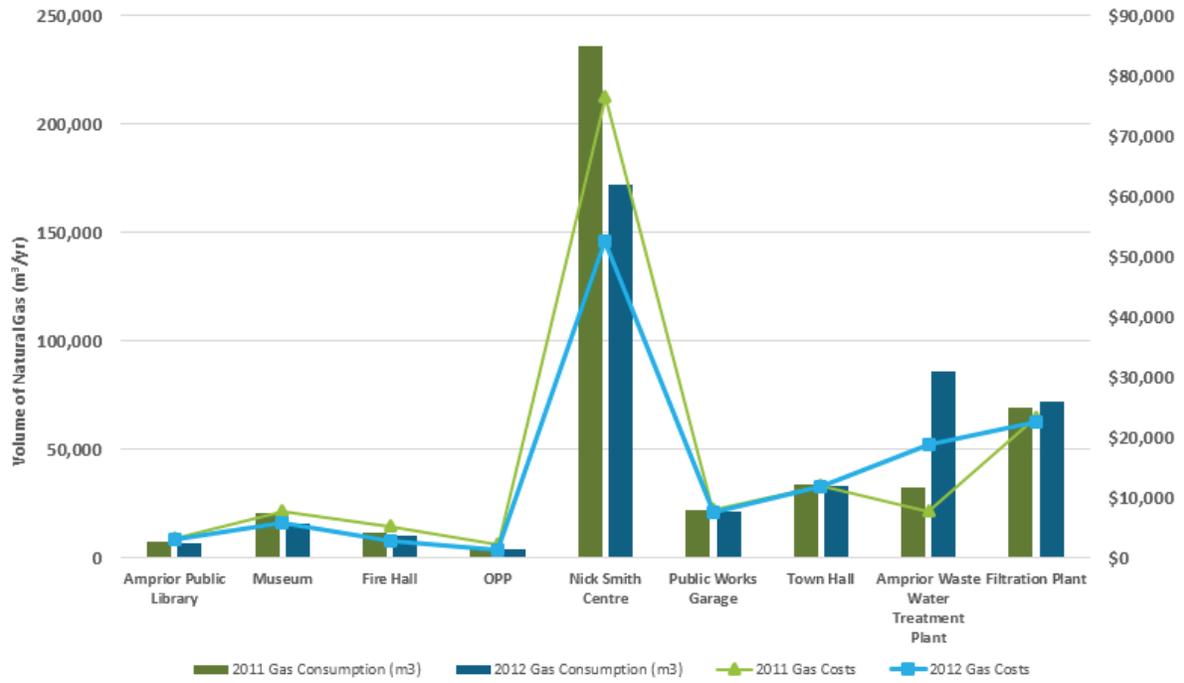
### Gas Consumption Trends – 2011 → 2012

Building Name	2011 Gas Consumption (m <sup>3</sup> )	2012 Gas Consumption (m <sup>3</sup> )	2011 Gas Costs (\$)	2012 Gas Costs (\$)
<b>Arnprior Public Library</b>	7,277.00	6,582.00	\$3,288.29	\$3,102.71
<b>Museum</b>	20,992.00	15,650.00	\$7,767.61	\$5,937.28
<b>Fire Hall</b>	11,667.91	10,329.62	\$5,303.76	\$2,944.48
<b>OPP</b>	4,993.09	4,420.38	\$2,269.66	\$1,260.04
<b>Nick Smith Centre</b>	235,817.00	172,378.00	\$76,491.25	\$52,527.25
<b>Public Works Garage</b>	22,012.00	21,143.00	\$8,078.25	\$7,487.60
<b>Robert Simpson Park - Washrooms</b>	n/a	n/a	n/a	n/a
<b>Robert Simpson Park - Concession</b>	n/a	n/a	n/a	n/a
<b>Pump Station 1</b>	n/a	n/a	n/a	n/a
<b>Pump Station 2</b>	n/a	n/a	n/a	n/a
<b>Pump Station 3</b>	n/a	n/a	n/a	n/a
<b>Pump Station 4</b>	n/a	n/a	n/a	n/a
<b>Pump Station 5</b>	n/a	n/a	n/a	n/a
<b>Water Tower</b>	n/a	n/a	n/a	n/a
<b>Town Hall</b>	34,036.00	33,034.00	\$12,047.91	\$11,726.50
<b>Arnprior Waste Water Treatment Plant</b>	32,216.00	85,764.00	\$7,776.32	\$18,828.51
<b>Filtration Plant</b>	69,022.00	71,858.00	\$23,467.54	\$22,657.04
<b>Yearly Total</b>	438,033.00	421,159.00	\$ 146,490.59	\$ 126,471.41

The total cost of natural gas purchases across all applicable Town buildings reported under O. Reg. 397/111, decreased by approximately \$20,019 from 2011 to 2012 or approximately 13%.

The total reduction in the volume of natural gas utilized in each of the Town's buildings reported under O. Reg. 397/111 was 16,874 m<sup>3</sup> or approximately 3.8%.

## 2011 - 2012 Gas Consumption and Price Trends



## Electricity Consumption Trends – 2011 → 2012

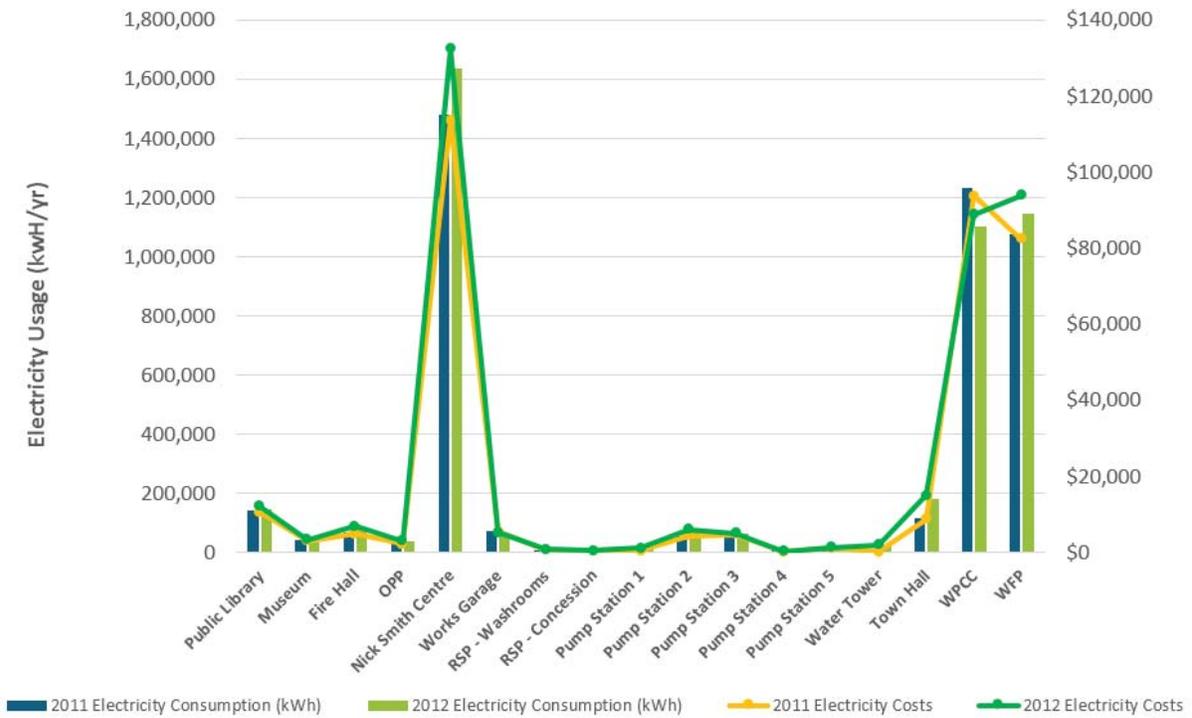
Building Name	2011 Electricity Consumption (kWh)	2012 Electricity Consumption (kWh)	2011 Electricity Costs (\$)	2012 Electricity Costs (\$)
Public Library	139,549.00	146,352.00	\$10,491.51	\$12,043.05
Museum	39,643.00	40,945.00	\$2,995.78	\$3,323.98
Fire Hall	66,823.87	83,648.18	\$4,875.01	\$6,883.43
OPP	28,596.13	35,795.82	\$2,086.18	\$2,945.64
Nick Smith Centre	1,479,673.00	1,634,992.00	\$113,684.65	\$132,325.00
Works Garage	72,731.00	61,923.00	\$5,528.37	\$5,082.03
Robert Simpson Park - Washrooms	7,522.33	8,556.00	\$511.73	\$699.47
Robert Simpson Park - Concession	3,815.67	4,340.00	\$259.57	\$354.81
Pump Station 1	6,301.00	13,271.00	\$485.30	\$1,108.59
Pump Station 2	55,181.00	72,541.00	\$4,285.90	\$6,021.32
Pump Station 3	59,816.00	61,250.00	\$4,625.65	\$5,034.81
Pump Station 4	2,708.00	2,841.00	\$22.87	\$235.10
Pump Station 5	14,662.00	14,276.00	\$1,130.58	\$1,175.18
Water Tower	Not reported	23,501.00	Not reported	\$1,920.81
Town Hall	112,956.00	180,625.00	\$8,672.16	\$14,859.95
Arnprior Waste Water Treatment Plant	1,232,967.00	1,099,281.00	\$93,723.16	\$88,722.29
Filtration Plant	1,074,395.00	1,143,479.00	\$82,380.25	\$93,909.28
<b>Yearly Total</b>	<b>4,397,340.00</b>	<b>4,627,617.00</b>	<b>\$335,758.67</b>	<b>\$376,644.74</b>

The total cost of electricity purchases across all applicable Town buildings reported under O. Reg. 397/111, increased by approximately \$40,886.07 from 2011 to 2012, an increase of approximately 12%.

The total increase in the volume of electricity utilized in each of the Town's buildings reported under O. Reg. 397/111 was 230,277 kWh or an increase of approximately 5.2%.

## 2011 - 2012 Electricity Consumption and Price Trends

Chart Area



**Overall Consumption and Cost Changes (2011 – 2012) - Natural Gas and Electricity**

Building Name	Natural Gas		Electricity	
	Consumption Change 2011 – 2012 (m3)	Change in Cost (2011 – 2012)	Consumption Change 2011 - 2012 (kWh)	Change in Cost (2011 – 2012)
<b>Arnprior Public Library</b>	-695.00	\$ -185.58	6,803.00	\$1,551.54
<b>Museum</b>	-5,342.00	\$ -1,830.33	1,302.00	\$328.20
<b>Fire Hall</b>	-1,338.29	\$ -2,359.28	16,824.31	\$2,008.42
<b>OPP</b>	-572.71	\$ -1,009.62	7,199.69	\$859.46
<b>Nick Smith Centre</b>	-63,439.00	\$ -23,964.00	155,319.00	\$18,640.35
<b>Public Works Garage</b>	-869.00	\$ -590.65	-10,808.00	- \$446.34
<b>Robert Simpson Park - Washrooms</b>	n/a	n/a	1,033.67	\$187.74
<b>Robert Simpson Park - Concession</b>	n/a	n/a	524.33	\$95.24
<b>Pump Station 1</b>	n/a	n/a	6,970.00	\$623.29
<b>Pump Station 2</b>	n/a	n/a	17,360.00	\$1,735.42
<b>Pump Station 3</b>	n/a	n/a	1,434.00	\$409.16
<b>Pump Station 4</b>	n/a	n/a	133.00	\$212.23
<b>Pump Station 5</b>	n/a	n/a	-386.00	\$44.60
<b>Water Tower</b>	n/a	n/a	n/a	n/a
<b>Town Hall</b>	-1,002.00	\$ -321.41	67,669.00	\$6,187.79
<b>Arnprior Waste Water Treatment Plant</b>	53,548.00	\$ 11,052.19	-133,686.00	- \$5,000.87
<b>Filtration Plant</b>	2,836.00	\$ -810.50	69,084.00	\$11,529.03
<b>Yearly Total</b>	-16,874.00	<b>\$ -20,019.18</b>	230,277.00	<b>\$40,886.07</b>

## Summary Greenhouse Gas Emissions (2011 – 2012)

Building Name	2011 GHG Emissions Per Building (Tonnes CO <sub>2</sub> e/yr)	2012 GHG Emissions Per Building (Tonnes CO <sub>2</sub> e/yr)	Change in Emissions (Tonnes CO <sub>2</sub> e) (2011 – 2012)	Percent Change (2011 – 2012)
Arnprior Public Library	27.16038	26.49976	-0.66062	-2.43%
Museum	43.49535	33.52067	-9.97468	-22.93%
Fire Hall	28.47743	27.56302	-0.91441	-3.21%
OPP	12.18643	11.79513	-0.3913	-3.21%
Nick Smith Centre	587.94978	482.92713	-105.02265	-17.86%
Public Works Garage	48.60157	45.92061	-2.68096	-5.52%
Robert Simpson Park - Washrooms	0.72244	0.82172	0.09928	13.74%
Robert Simpson Park - Concession	0.36646	0.41681	0.05035	13.74%
Pump Station 1	0.60515	1.27455	0.6694	110.62%
Pump Station 2	5.29958	6.96684	1.66726	31.46%
Pump Station 3	5.74473	5.88245	0.13772	2.40%
Pump Station 4	0.26008	0.27285	0.01277	4.91%
Pump Station 5	1.40814	1.37107	-0.03707	-2.63%
Water Tower	Not reported	2.25704	2.25704	n/a
Town Hall	75.19767	79.80219	4.60452	6.12%
Arnprior Waste Water Treatment Plant	179.32259	267.72268	88.40009	49.30%
Filtration Plant	233.67976	245.67639	11.99663	5.13%
<b>Yearly Total</b>	1250.47754	1240.69091	-9.78663	<b>-0.78%</b>

Overall, from 2011 to 2012, the Town experienced a net reduction of equivalent CO<sub>2</sub> greenhouse emissions of approximately 10 tonnes or approximately 0.78%. This amount also includes the amount reported for the Water Tower that was not reported in 2011. Therefore, the CO<sub>2</sub>e emissions may actually be 2.25 tonnes less than the 2011 amounts if there was no increase in the Water Tower energy usage from 2011 – 2012.

### Overall Energy Consumption Comparison 2011- 2012

The total annual energy consumption in 2012, including natural gas and electricity for buildings that are reported under O Reg. 397/11 in 2012, was 9,103,600.93 ekWh

The total annual energy consumption in 2011, including natural gas and electricity for buildings that are reported under O Reg. 397/11 in 2012, was 9,052,657.04 ekWh

The calculated change between 2011 and 2012 was an increase of 50,943.89 ekWh, or approximately 0.58%. When the energy amounts related to the Water Tower in 2012 are removed, the net increase was 27,442.89 ekWh or an increase of 0.30%.

## Implementation Plan

A target of 1-2% reduction in energy usage (measured in equivalent kWh) and GHG's per year will be attained by following Objectives 1 – 3 outlined below. Reductions realized by projects conducted under Objective 4, though not included as part of the 1-2% target, should be encouraged for their additional savings:

### Objective 1 - Creation of a culture of conservation in Town employees

The easiest energy conservation efforts that the Town can implement are through simple behavioral changes of employees. The Ministry of Energy guide for creating CDM Plans states that it is generally accepted that the implementation of behavioral programs can result in a 5–10% reduction in energy use. Therefore over 5 years of the program, an estimate of 1-2% should be expected per year. With a total energy usage of 9,052,657.04 ekWh in 2011, the Town estimates an approximate reduction in energy usage of between 90,526 – 181,052 equivalent kWh.

A number of simple awareness programs will be developed by staff over the next 1-2 years that will give employees a clear set of expectations for energy saving habits including:

- Turning the lights off when you leave a room
- Ensuring that electronic devices with physical switches are turned off at night to avoid phantom power draw
- Employees with thermostats in their offices should turn down heating in the winter to 18°C (66°F) overnight.
- Turn on power saving features on printer, computers, etc.
- The development of a 'night watchmen' program where the last person to leave completes a sweep of the building.
- Friendly reminders could be given out to those who leave computers on overnight.

These expectations can be communicated in the following ways:

- By HR during employee orientation
- On small signs or stickers near light switches
- On posters posted in employee and public areas
- During short lunch and learn presentations
- Through word of mouth and leadership of senior personnel and management.

Additionally energy conservation habits could be developed through the following points:

- Energy Conservation ideas or concerns will be a required agenda at every other bi-weekly department meetings. Regular senior management meetings should also include energy conservation discussions.
- Create staff awareness of phantom power and the concept of phantom power. This can be achieved through energy monitoring devices that can display energy being used when a device is not in operation. By creating staff awareness unneeded electrical charges can be eliminated.
- Currently, employees leave computer systems on overnight to allow the Town's computer system management provider time to complete system updates and install security patches. The Town can investigate whether better coordination with the service provider could allow employees to turn off computer systems at night or on weekends to help reduce unnecessary power usage.
- Town workers working at Town Hall will be encouraged to turn down their personal thermostats (if applicable) at the end of each work day. This will prevent excessive heating of the building at night when no one is working. This may require posters or signs throughout the building to act as a reminder to do this each day. It is estimated that a house saves 3% on their heating bill for every degree it is turned down.
- All computers and printers at Town Hall will have the "Power Savings" setting turned on. This may include automatic standby of the computer after a set period of inactivity, as well as reduced brightness of the monitor display. A desktop computer typically uses 65-250 watts, if it is on standby it only uses 1-6 watts.

Lastly, the Town should invite employees from all departments, on a yearly basis, to recommend ideas to reduce energy use in their departments.

## **Objective 2 - Removal of inefficient bulbs**

### ***Save on Energy Retrofit Program***

#### **2012 Assessment**

In 2012, the Town participated in the SaveOnEnergy Retrofit program offered by Hydro One. The program is funded by the OPA and offers incentives for small businesses that remove their old inefficient lights from their building for more efficient lights. The program covered up to \$1,000 (now it's \$1,500) to remove inefficient bulbs and replace them with more efficient options. The Town agreed upon a contract that replaced 53 fluorescent bulbs, and 10 other lamps for more efficient bulbs. For each building assessed in 2012, the Town took advantage of the \$1,000 of funding available. The following 4 buildings participated in the lamp replacement program:

- Town Hall
- Public Works Garage
- Museum

- Fire Hall

Estimated savings of \$ \$4,241.82 could have been achieved by the Town if all the recommended bulbs were replaced. At the time, however, the Town did not elect to replace all of the bulbs considered to be inefficient in 2012. The following inefficient bulbs remain in place today:

- 49 x 4 - 4' 40W M-Ballast
- 49 x 2 - 4' 40W M-Ballast
- 6 x 1 - 4' 40W M-Ballast
- 2 x Exit Sign 2-15W Lamps

## **2014 Assessment**

In early 2014, a number of additional buildings that did not take part in the first round of bulb replacements in 2012 were assessed:

- Water Tower
- Nick Smith Centre
- Robert Simpson Park (Concession and Washroom)

The savings to the Town if each inefficient bulb in these buildings is replaced is estimated at \$1,675 per year, with no upfront cost to the Town.

## **LED Street Light Retrofit**

The Town has committed to installing 812 cobrahead LED streetlight fixtures in place of older less efficient lighting. The project is being undertaken by Realterm Energy and will begin in the late summer or early fall of 2014.

Annual electricity reductions expected after the installation of the LED street lights has been estimated by Realterm at 462,540 kWh, which is approximately 10% of the amount of energy reported by required buildings under O. Reg. 397/11 (4,627,617 kWh/yr).

It is estimated that through the replacement of streetlight fixtures with new LED fixtures, greenhouse gases (GHG) will be reduced by 46.3 metric tonnes.

## **Objective 3 – Operational Policies and Practices**

### **Policies**

Objective 3 should be undertaken in conjunction with Objective 1. A culture of conservation should not only apply to daily activities such as turning off a light switches, but energy conservation should be a driving force in all operational policies that are established.

As an example, the Town could consider amending its procurement policy to include a mandatory assessment of all asset purchases to consider energy efficiency, energy star and life cycle costing research. This addition would be in keeping with the Town's Strategic Plan of developing a sound financial model. An addition to the Town's procurement policy could state that, during the decision making process for all asset purchases, preference be given to assets that use less kWh or are Energy Star rated. Serious consideration should be undertaken to assess long term cost savings over short term budget constraints.

Council could consider setting aside a minimum amount of funds each year for energy saving projects and technologies. A proactive approach to funding will make it easier to come up with and plan out projects if a known amount of money is sitting in place and available for use. An approach such as this will allow staff to take advantage of opportunities within an existing budget year, rather than waiting until the next year when budget is available, but the potential grant is not.

Often times, projects where energy savings are potentially available come up as a secondary thought or are only undertaken if there is no cost to the Town. The proactive replacement of inefficient systems has typically not been the approach taken by the Town in the past. Generally big ticket items, such as boilers and HVAC units were only replaced once the older models failed. In many instances, by replacing inefficient systems before failure, the Town will realize the cost savings much earlier than if you wait for something to break. The cost savings realized by more efficient equipment can often pay for itself in a relatively short time span, such as over the course of 2-5 years.

For example, in 2012 during the Save on Energy Retrofit Program, additional energy saving light bulbs could have been replaced in at least one building (Town Hall). In 2012, the Save on Energy Retrofit Program covered up to \$1,000 (now \$1,500) to remove inefficient bulbs and replace them with more efficient options. In 2012, when the Town Hall building was assessed and the estimated net cost for the Town to complete the replacement of all inefficient bulbs was approximately \$5,000; therefore the Town did not elect to complete all of the replacements recommended as there was no room in the current year's budget.

The Town took advantage of the \$1,000 of funding available at 100%.

If the Town had elected to replace the remaining bulbs under the Save on Energy Retrofit Program, the total cost to replace the remaining bulbs would have been approximately \$7,000, with an additional \$2,000 of funding from Hydro One, for a net cost to the Town of \$5,000. In addition, if the Town had elected to replace all of the inefficient fixtures recommended, this would have resulted in energy savings of approximately \$3,000 per year. The energy savings that would have resulted if all bulb upgrades were completed would have paid for itself in less than two years. As no money was previously set aside in the budget for this program, the additional funding that was available at the time was unfortunately lost. The inclusion of funds each year for energy efficiency would have allowed the Town to take full advantage of the program at the time.

## **Practices**

Natural gas and electricity usage and costs should be monitored to identify trends and anomalies to better predict future usage requirements and make timely corrective actions when required.

The Municipality will adopt a strategy to ensure that lighting is turned off during periods where facilities are not in use after hours. Staff who use the facilities after hours will be advised to keep only the areas of occupation lit after hours.

## **Other Projects for Consideration in upcoming years**

There are a number of projects or technologies that should be considered by the Town in upcoming years that could be added to the Town's CDM plan and would add additional energy savings on top of the realistic targets set in this plan and achieved by the programs, policies, and practices identified in the sections above. These projects would require that funds are set aside in either the operating or capital funds.

## **Occupancy sensors**

Occupancy sensors are ideally suited for applications that require a higher degree of control than can be economically achieved using scheduling (e.g., offices lights that must be controlled individually as opposed to the lighting requirements for main areas of an entire floor). Sensors are also considered most suitable when the space is intermittently occupied, meaning it is unoccupied for two or more hours per day, and where the lights are typically left on when the space is unoccupied. Appropriate applications include offices, classrooms, copy rooms, restrooms, storage areas, conference rooms, warehouses, break rooms, corridors, and filing areas. Occupancy sensors can cut workplace energy costs significantly, especially when used in meeting rooms, cafeterias and stairwells, where safety lighting can be dimmed when people aren't present.

Occupancy sensors can reduce lighting energy use by 30 to 60%, depending on the frequency of room usage. Sensors cost from \$75 to \$200 each depending on the style and technology used. The payback on the investment is quoted as being generally less than two years.

## **Building Automation**

In addition to occupancy sensors and lighting, the Town may have the opportunity to make several large investments in energy savings projects through building automation. Some older Town buildings currently have no or only or partial building automation. Building automation may include mechanical, electrical, and plumbing (MEP) systems, and in many instances can be retrofitted. For instance, the heating, ventilation, and air-conditioning (HVAC) systems can be better controlled; and therefore more energy efficient if properly automated.

The Town Hall building does contain some automation equipment for heating and cooling; however the system has not been optimized to allow for different day and night settings. The D.A. Gillies building may also represent another location that could potentially have automation of heating and cooling investigated.

## **Grant Programs**

### ***Union Gas Incentive Program***

The Nick Smith Centre has been approached by a consultant representing Union Gas through Hydro One to conduct a Detailed Energy Study, to see if there are any areas where possible energy savings could be realized. The consultant will complete a Process & System Upgrade audit, which will be at no net cost to the Town.

The Process & System Upgrade will provide the Nick Smith Centre with major funding and expertise to:

- Find and study our best opportunities to save energy dollars
- Modernize our key systems not only for energy efficiency, but also for enhanced productivity, product quality and reliability
- Take charge of our energy, in order that our savings will continue to grow
- Equip our team with up-to-the-minute data about energy use
- Create a real, sustainable competitive advantage through energy management best practices.

Staff have conducted an initial meeting with a Consultant to discuss other possible energy saving projects that could be looked at within the Nick Smith Centre, including looking at equipment that would be within our 10 Year Capital Forecast including:

- Replacement of Condenser Unit for Arenas
- Replacement of Electrical Panel in Compressor Room
- Replacement of the Pump in the Filter Room that runs continuously.
- Investigation of Cogen/absorption Chiller to support current ice making system.

The cost of the Study will be covered under Hydro One's Preliminary Engineering Study incentive. Further details of this proposed program will be covered by the Director of Recreation Services in a future report to council.

The completion of a detailed energy study on each remaining Town owned building may also be available. Staff will continue to investigate other opportunities that may be available within the Union Gas suite of energy saving programs.

A top priority of Staff will be to be on the lookout for future energy grants and programs as they become available.

## **New Building Construction**

Although new building construction is not anticipated within the timeframe of this plan (5 years), the construction of a new Town Hall may become an item that is part of the 5-10 year long range forecast. If and when planning activities for new building construction begin, renewable energy options such as solar, ground source thermal, and heat pump technology should be included in any option evaluated. The Town should also consider incorporating the Leadership in Energy and Environmental Design (LEED) building practices and investigate the possibility of LEED certification.

## **Resources Planning**

### **Energy Leader:**

The Town of Arnprior has unofficially appointed the Environmental Engineering Officer as the Energy Leader for implementation of the Town's CDM plan.

### **Energy Team:**

The Town of Arnprior plans on appointing at least one person at each facility to be a part of the Energy Team. This member will report to the Energy Team Leader (Environmental Engineering Officer) and will be responsible for implementing (in conjunction with the team) any new programs, processes or projects that are related to energy conservation measure for their specific building.

# Review

## Energy Plan Review

The Town of Arnprior will review and re-evaluate the CDM plan on a yearly basis, alongside the annual required energy consumption progress report that is required by O. Reg 397/11. This will give the Town the opportunity to make necessary changes to the Energy Plan as the program matures and changes are implemented.

## Summary

### *2011 and 2012 Energy Usage*

The total annual energy consumption in 2011, including natural gas and electricity for buildings that are reported under O Reg. 397/11 in 2012, was 9,052,657.04 ekWh, not including the Water Tower.

The total annual energy consumption in 2012, including natural gas and electricity for buildings that are reported under O Reg. 397/11 in 2012, was 9,103,600.93 ekWh.

The calculated change between 2011 and 2012 was an increase of 50,943.89 ekWh, or approximately 0.58%. When the energy amounts related to the Water Tower from 2012 are removed, the net increase in energy used was 27,442.89 ekWh or 0.30%.

### *2011 and 2012 Energy Costs*

The total annual energy cost in 2011, including natural gas and electricity for buildings that are reported under O Reg. 397/11 in 2011, was \$482,249.26, which did not include the Water Tower.

The total annual energy cost in 2012, including natural gas and electricity for buildings that are reported under O Reg. 397/11 in 2012, was \$ 503,116.15, which did include the Water Tower.

### *Goals*

The Town Of Arnprior's goal is to reduce consumptions of electricity and fuels in all municipal operations by an average of 1-2%/year between 2014 and 2019. A total energy usage of 9,052,657.04 equivalent kWh was used in 2012, the Town has therefore set a proposed a reduction goal of approximately 90,526 – 181,052 equivalent kWh per year.

In 2012 the combined rate for natural gas and electricity per equivalent kWh was \$0.05526562 ekWh. If the Town realizes a reduction of 90,526 – 181,052 equivalent kWh per year (1-2% of the 2011 yearly total), and if energy rates remained the same in 2014, the Town can potentially save between \$2,500 - \$5,000.