

SWM Energy Management Plan

Executive Summary

In accordance with Ontario Regulation 397/11 the Municipality of Southwest Middlesex (SWM) has assembled an Energy Management Team to work together on identifying energy-related opportunities and to be the driving force behind the development and execution of our Energy (Conservation and Demand) Management Plan.

The intent of this plan is to provide SWM with structured guidelines to allow for continuous improvement in our management of energy and to maximize our potential energy-related savings. The increasing cost of hydro and gas has heightened the benefits of energy conservation, sustainability and local controls. This 5-year plan is a “living document” which will be formally reviewed by Municipal Council on an annual basis to monitor progress and consider any adjustments to the plan.

Municipal Council Support

On June 4, 2014 municipal council officially accepted this Energy Management Plan. Results and progress with regards to the various goals and targets of this plan will be presented to and reviewed by Council on an annual basis.

Energy Management Team

In order to meet and exceed our energy management plan goals, energy conservation must become a priority for all municipal staff. The Energy Management Team has been created to focus on the objectives of this plan. This team will meet a minimum of twice per year to discuss the plan and the progress being made on the various objectives. These meetings will also be used to determine what updates shall be communicated to municipal staff and council. The Energy Management Team consists of: Clerk/Administrator, Facilities & Recreation Manager, Facilities & Recreation Assistant Manager, Public Works Manager and Treasurer.

Annual Energy Consumption

Please refer to Appendix A for a snapshot of energy consumption in 2011. These figures will be used as a starting point, from which we will endeavour to improve on.

Municipal-wide totals for 2011 can be summarized as follows:

Electricity Consumption	= 1,343,849 kWh
Natural Gas Consumption	= 87,513 Cubic Metres
Green House Gases	= 272,963 kilograms

Goals and Objectives

Goals:

- Improve energy efficiency for SWM facilities through the reduction of energy consumption which in turn will result in reductions to operating costs and greenhouse gas emissions.
- Implement an energy management program to reduce energy consumption, realize cost savings and meet greenhouse gas emission targets.
- Improve two-way energy-related communication between staff and management, including sharing ideas along with communicating targets, progress and results.
- Maximize the reliability and efficiency of SWM's equipment and reduce maintenance.

Objectives:

1. Create a culture of energy efficiency and sustainability.
2. Promote sustainable use of resources through:
 - a. Energy conservation
 - b. Energy efficiency
 - c. Renewable energy
3. Reduce energy costs via implementation of best practices and improved technologies.
4. Increase equipment reliability/efficiency and reduce maintenance costs.

Proposed Measures

Energy Audit Initiative

In an effort to help ensure continual improvement, SWM will endeavour to always have a minimum of one energy audit in the works. At any one given time at least one energy audit is being worked on, whether that be the audit being conducted or the subsequent following-up on recommended actions from the audit findings. The results of each energy audit will be reported to council. Audits will focus on those facilities with the greatest opportunity for energy savings (generally the largest energy consumers and the oldest facilities).

Energy Usage Communication Policy

In an effort to ensure that all staff are aware of the energy consumption and energy management plan initiatives for the municipal facilities that they are involved with, all staff will receive energy management plan updates a minimum of twice per year (following each Energy Management Team meeting). Update sessions with staff will include the opportunity for all to discuss and share further energy savings ideas.

Equipment Efficiency

Municipal equipment will be analyzed to ensure energy consumption is maximized without sacrificing services provided. Preventative maintenance, alternative energy sources, and new technologies will all play a role in this initiative.

Renewable Energy Opportunities

SWM will continue to seek out and explore opportunities for solar power, and other renewable energy options.

Energy Procurement

SWM will continue to utilize purchasing cooperatives for natural gas and electricity. As other opportunities for energy procurement become available they will be considered based on savings, energy quality & reliability and other applicable performance factors.

Evaluation

The results of our energy management plan initiatives will be evaluated by monitoring our progress towards our consumption reduction targets. Our evaluation will also include a review and update of our energy management plan as required. Evaluation will be an ongoing process that will help drive continuous improvement.

Reduction Targets

Using 2011 figures (provided in Appendix A) as a baseline, the following targets have been set for this 5 year plan (to be attained by July 1, 2019):

10% overall reduction of electricity consumption

10% reduction of natural gas consumption

60% reduction of electricity consumption for street lighting

10% reduction in greenhouse gas emissions

75,000 Watts capacity of energy generated by Renewable Energy Sources

Achievements to Date (Completed and In Progress)

LED Streetlight Upgrades

The LED Streetlight Conversion is to start up in July of 2014 and be completed by the end of the year. The program will include the complete conversion of all street lights to LED fixtures, 20% arm replacement and the rewiring and refusing of all fixtures. The program:

- has been estimated to cost \$362,346.00
- will achieve energy savings of 66%
- replace energy consumption by 58.06KW
- reduce GHG (metric tonne) 25.1
- over the life of the luminaire it will reduce GHG (metric tonnes) by 376
- Have a payback period of 5.5 years.

Fire Hall Improvements

In the fall of 2013 LAS/AMO conducted an Energy Audit of the Glencoe Fire Hall, as a result of concerns voiced by Council regarding the questionably high hydro rates that with a ground source heat pump. Options regarding window upgrades and other changes are currently being evaluated and considered.

Arena Lighting Upgrades

Our 20 year old 250 watt Metal Halide H10 bulbs are budgeted for an upgrade to T5 4-lamp fluorescent fixtures. Benefits of this change will include:

- produce brighter light (16,400 lumens vs. 15,000 lumens)
- increase effective lighting levels by 50% as these fixtures distribute the light more evenly and will greatly reduce the “dark spots” with the current system
- more energy efficient (saving 3.46 kW per hour)
- do not lose their intensity as quickly (good for 60,000 hours), requiring replacement every 5 or 6 years at approximate the same cost as the current bulbs.
- Eligible for approximately \$5,000 in grant money through the Ontario Power Authority’s Save on Energy “Retrofit Program”

The approximate cost for this project will be \$15,995.00 before HST and before the grant, meaning approximately \$11,995.00 after the grant, and a payback period of 4.9 years.

Variable Frequency Drive

The 2014 budget includes installation of variable frequency drive on one blower at the Glencoe Wastewater Treatment plant, estimated to save 99,600 kWh with a payback of 2.5 years.

Lighting Upgrade

The 2014 budget includes replacing T12 fluorescent lights with energy efficient T8 with electronic ballasts also lighting controls will include IR occupancy sensors for the Wardsville Wastewater Treatment Plant, estimated to save 562 kWh with a payback of 2.5 years.

Lighting Upgrade

The 2014 budget includes retrofit of T12 fluorescent lights with energy efficient T8 with electronic ballasts, install IR occupancy sensors at the Southwest Middlesex Reservoir, estimated 1,680 kWh savings and a payback period of 1.1 years.

Motor Upgrade

The 2014 budget includes replacement of low efficiency duty motor with premium efficient motor at the Southwest Middlesex Reservoir, estimated saving of 2,100 kWh with a payback of 3 years.

Renewable Energy Generation Facilities

Glencoe Public Works Garage

In 2013 we installed forty 250 watt Hanwha solar panels on the roof of our Public Works garage on Appin Road in Glencoe. We are still capturing data for the first year before we can predict annual electricity which is generated.



Glencoe Public Library

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Municipal Office

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Glencoe Fire Station

In 2011 the construction of a new fire station was completed, which included four geothermal heat units. There are two 10-ton water to water units which heats the water in a 200 gallon tank for the big truck bay area and the perimeter walls of the office areas. There is a 5-ton water to air unit that heats and cools the front office areas and assists with the domestic hot water tank. As well there is another 5-ton water to air unit heats and cools the upstairs rooms. There are two 1.5 horse power loop pumps that are designed to operate on demand. There is then a loop pump which delivers that water mixture to the geothermal units and then back out to the loop exchanger bed.

Renewable Energy Generation Facilities - Work in Progress

Other renewable energy projects being considered at this time:

- Combined Heat & Power (CHP) Systems – the municipality is in the process of considering CHP systems for the Glencoe Arena and the Glencoe Waste Water Treatment Plant. If either/both location is deemed a good fit then the benefits will include reducing base load electrical supply, reducing primary energy costs, and reducing our carbon footprint.
- Rooftop Solar Panels – Glencoe Arena
- Rooftop Solar Panels – Glencoe Fire Station
- Large Renewable Procurement Solar Project - Glencoe Business Park

References

City of Burlington – Corporate Energy Management Plan (March 27, 2013 Draft)

County of Peterborough – Energy Management Plan (February 2013)

Town of Caledon – Corporate Energy Management Plan

APPENDIX A - 2011 Annual Energy Consumption Totals for SWM

Operation Name	Address	Annual Flow (Mega Litres)	Energy Consumption		Totals		
			Electricity (kwh)	Natural Gas (CuM)	GHG Emissions (Kg)	Intensity (ekWh/sqft)	Energy Intensity (ekWh/Mega Litres)
Wardsville Community Centre	21996 Hagerty Rd	0.00	9,941.47	2,031.00	4,635.18	7.78	
Glencoe Ball Park	Simpson St	0.00	45.57		3.65	455.70	
Glencoe Pool	138 North St	0.00	42,763.00	2,133.00	7,453.75	654,320.48	
Wardsville Library	21935 Hagerty Rd	0.00	5,563.43	647.00	1,668.31	12.04	
Glencoe Arena	138 Mill St	0.00	327,394.08	40,271.00	102,328.97	19.92	
Glencoe Library	178 McKellar St	0.00	41,109.41	977.00	5,135.90	13.27	
Glencoe Park-Project 2000	138 Mill St	0.00	18,942.47		1,515.40	13.91	
Municipal Office & Fire Hall	153 McKellar St	0.00	92,387.85	14,418.00	34,650.09	30.00	
Glencoe Train Station	157 McRae St	0.00	9,986.03	2,206.00	4,969.61	28.45	
Melbourne Library	6570 Longwoods Rd	0.00	5,563.43	1,208.00	2,728.95	61.34	
Appin Community centre	48 Wellington Ave	0.00	15,727.03	8,503.00	17,334.16	17.38	
Appin Park	49 Wellington Ave	0.00	725.94		58.08	7,259.40	
Appin Park Pavillion	50 Wellington Ave	0.00	1,099.70		87.98	0.63	
Wardsville Park	Hagerty Rd	0.00	58.35		4.67	583.53	
Wardsville Pavillion	Hagerty Rd	0.00	4.45		0.36	0.00	
Appin Garage	48 Wellington St	0.00	16,725.00	6,147.00	12,959.68	8.92	
Central Garage	266 Appin Rd	0.00	19,595.16	7,041.00	14,879.52	9.67	
Wardsville Garage	137 O'Mara St	0.00	7.05		0.56	0.02	
Sewer Pump Station	153 Victoria St	2.32	49,939.32		3,995.15	81.60	21,488.52
Wardsville sewer Main Plant	1659 Longwoods Rd	0.33	84,867.08		6,789.37	89.15	256,318.57
Sewer Pump Station	1948 Longwoods Rd,	0.09	658.66		52.69	6,586.57	7,676.66
Wardsville sewer Main Plant	144 Davis St	0.33	21,178.34		1,694.27	211,783.36	63,963.56
Wardsville Sewer Pump	100 Kennedy St	0.17	714.04		57.12	7,140.37	4,250.22
Industrial Park Pump Station	99 Industrial Rd	0.00	3,130.00	155.15	543.72	47,788.57	477,885,709.04
Sewer Pump Station	278 South St	0.09	1,458.98		116.72	2.38	16,210.85
Old Water Tower (demolished Sept 2011)	Main St	2.81	29,178.20		2,334.26	25.73	10,387.40
Bulk Water Depot	22804 Pratt Siding Rd	0.00	4,361.32		348.91	68.15	436,132,000.00
Water Station	11901 Graham Rd	5.63	150,993.46		12,079.48	17.64	26,805.16
Water Station - Storage	21918 Springfield Water	0.00	2,173.23		173.86	1.41	217,323,333.33
Newbiggen Sewage Lagoon	3888 Newbiggen Dr	2.57	346,706.00		27,736.48	89.82	134,957.57
Water Pump Station -By-pass Chamber	5140 Parkhouse Dr	0.00	2,597.80		207.82	25,978.03	259,780,333.33
Melbourne Water Tower	6547 Longwoods Rd	0.31	10,308.27		824.66	171.80	32,828.87
Wardsville Fire Department	1784 Longwoods Rd	0.00	4,949.83	1,648.00	3,511.74	9.89	
PUC Building-Old (Rental Unit)	235 Main St	0.00	22,995.28	128.00	2,081.62	9.74	
TOTALS			1,343,849.21	87,513.15	272,962.65	962,686.67	1,391,696,263.09