June 26, 2019

Energy Conservation and Demand Management Plan

Township of Sables-Spanish Rivers

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Scope:

To provide council with an Energy Conservation and Demand Management Plan in an effort to meet the requirements of the *Green Energy Act 2009*. The report will also provide some recommendations for improving energy management practices and energy conservation projects for improving energy use, lowering emissions and reducing energy consumption in the long term.

Background:

Ontario Regulation 507/18, made under the *Electricity Act, 1998* was revised and published in December 2018 to supplant Ontario Regulation 397/11, made under the *Green Energy Act 2009*. This Regulation requires that all public agencies prepare an Energy Conservation and Demand Management Plan.

The Energy Plan Consists of Two Components

- A listing of the annual energy consumption and greenhouse gas (GHG) emissions for our municipally owned facilities. The first report was due by July 1st 2013 and was a report for the 2011 calendar year.
- An Energy Conservation and Demand Management Plan (CDM) that includes a description of previous and proposed conservation measures. The first CDM was due on/before July 1st 2014 and is required to be reviewed every 5 years thereafter.

Data

Ontario Regulation 507/18 requires municipalities to submit an Energy Consumption and Greenhouse Gas Emission and the CDM strategy to the Ministry of Energy and to publish this report on its website and make the report available to the public in printed form.

The data has been compiled by the accounting department for the Township and forwarded to the department heads for information. The data shows all energy consumed by the municipal facilities and sub facilities that meet the criteria of the regulation for the 2011 and subsequent calendar years. The data has been submitted to the Ministry of Energy in compliance with O. Reg. 507/18 and the report has been published on the Township's website for public viewing. The report for 2017 is attached as Appendix A to this document.

Energy Intensity:

The energy intensity breakdown expresses the amount of energy consumed per square foot of a facility. Fig. 1 provides a breakdown of energy intensity by facility for 2017.

Fig. 1

Fire Station #2	8.44
Fire Station #1	8.48
Fire Station #4	16.65
Walford Community Centre	8.48
Fire Station #5	34.14
Public Works Garage	27.50
Public Works Accessory Building	27.50
Municipal Office	7.43
Resource Centre	33.44
Massey & District Arena	16.78
Sadowski Room	16.78
Massey Medical Clinic	15.97
Water Treatment Plant	0.0
Webbwood Pump Station	0.0
Webbwood Public Works Bldg.	26.56

Please note that for the Water Treatment Plant and the Webbwood Pump Station, energy intensity is expressed as kwh consumed per mega litre of water/waste water processed. For the Water Treatment Plant, the energy intensity for 2017 is 1,504.99 and for the Webbwood Pump Station, the energy intensity for 2017 is 516.68.

Kilowatt Hours

The municipality, as a whole, consumed 794,906.50 kwh in 2017, which is 33,690.81 less than in 2011. Fig. 2 provides a breakdown of percentage of total kilowatt hour consumption by facility.

Fig. 2

Fire Station #2	3.82
Fire Station #1	1.71
Fire Station #4	0.77
Walford Community Centre	4.90
Fire Station #5	3.01
Public Works Garage	5.61
Public Works Accessory Building	1.13
Municipal Office	3.14
Resource Centre	2.32
Massey & District Arena	31.74
Sadowski Room	3.54
Massey Medical Clinic	5.51
Water Treatment Plant	29.69
Webbwood Pump Station	2.39
Webbwood Public Works Bldg.	0.72

Data Analysis

The data provided above shows that the Water Treatment plant and the Arena consume the most energy and these facilities should be reviewed first for energy conservation options. The Arena, which includes the ice surface and the Sadowski Room as a whole, is the highest consumer of Kilowatts at 35.28% of the total consumption of the municipality. The water treatment plant is not far behind at 29.69% but the plant will be harder to conserve since the cost of treating water is a hard cost to change. When it comes to energy intensity, which is a calculation of square footage and hours of operation, the Training and Resource Centre has a high rating but this is because the building has low user hours which affect the energy intensity of the building. Energy intensity can be an indication that a building may require attention for energy conservation, but in this case the Resource and Training Centre is actually one of the more energy efficient buildings when it comes to appliances and heating source.

From the data analysis, it becomes apparent that we should concentrate our energy conservation efforts on the Arena, the Public Works Garages, the Water Treatment Plant and the Municipal Office through a combination of capital investment and behavioral conservation.

Energy Management Plan Development

To develop the energy management plan department heads, as a team, will review previous energy conservation initiatives and suggest ideas of future endeavors that should include the review of potential use of renewable energy sources.

Initial steps of Energy Conservation Plan

- Review Previous Initiatives
- Develop a listing of priorities
- Identify resource requirements (financial and human)
- Implementation and continuous improvement of the CDM

Completed Initiatives

Massey Arena

- On demand hot water system for domestic water
- New overhead doors Service building
- Night set back timers domestic heating
- Sensor activated lights in service areas
- On demand hot water for flood water
- Timed thermostat with setback for refrigeration plant

Massey Medical Clinic

- Upgraded Lighting
- Upgraded Baseboard heaters
- Upgraded main floor HVAC system

Township Office

- Upgraded lighting
- Replaced southern exposure windows
- Insulated walls and roof
- Installed convection heaters

Fire Station #2

- Sensor activated lighting bay area

Public Works Main Garage

- Replaced overhead door gaskets

Water Treatment Plant

- Replaced four heaters

Energy Reduction Target

The Township of Sables-Spanish Rivers proposes a 20% total energy use reduction target by 2024 (in reference to a baseline year of 2014). This will mean that the Township will need to find opportunities to cut down 275,000 ekWh of energy use across its facilities. In order to do this, the following initiatives are proposed, prioritized by the best opportunities for meeting this target.

Recommendations for Specific Energy Conservation Initiatives

A. The Massey & District Arena
   i. LED Lighting in Ice surface area with dimmers consistent with industry standards for lighting levels
   ii. LED lighting in Sadowski Room with dimmers
   iii. Variable Frequency Drive for Condenser
   iv. Overall Building Envelope
   v. Update Compressor #2
   vi. Update electrical motors on Compressor #1

B. Public Works Main Garage
   i. LED Lighting Main Shop
   ii. Overall Building envelope

C. Water Treatment Plant
   OCWA will be consulted to determine where energy conservation can be achieved through processing efficiency measures.

D. Municipal Office
   i. Switching overhead lights to LED equivalents with occupancy sensor controls
   ii. Tint windows to reduce radiant heat transfer

E. Fire Stations
   i. Replace heaters with more energy efficient ones

F. Medical Clinic
   i. Upgrade lights to LED equivalent
   ii. Tint window to reduce radiant heat transfer

Summary of Proposed Initiatives and Estimated Savings

Facility	Initiative	Estimated Savings (ekWh)
Massey Arena	Building envelope upgrade	75,000 – 150,000
	Ice rink, Sadowski room and common area lighting upgrade	20,000 – 22,000
	LED dimmers, automated controls, “please turn off” stickers in service areas, zone controlled lighting and other behavioural changes	1,000 – 2,000
PW Buildings	Switching over metal halide lights to LED equivalents	10,000 – 12,000
Office	Switching over office overhead lights to LED equivalents with some dimmers, zonal control and using more natural light + tinting windows to reduce need for electric cooling and other behavioural changes	3,500 – 4,000
Fire Stations	Replacing heaters with more energy efficient ones, replacing current lighting with LED equivalents, and other behavioural changes	
Medical Clinic	Upgrading lights to LED equivalent, tint windows to reduce radiant heat transfer	1,300 – 1,500
	Total	**110,800 – 200,000**

Financial Investment

The overall investment to complete the majority of the priority list is estimated to be close to $300,000. Priority would be given to those projects that realize a short-term return on investment. Cost vs savings ratios would be utilized throughout. Long-term planning with be coordinated with the Township's Asset Management Plan.

We will take advantage of any funding opportunities that may become available to provide upgrades to municipal facilities where energy conservation measures can be achieved.

Behavioral Energy Consumption

Behavioral energy consumption is simply being aware of energy and conserving through staff actions. Training staff to be mindful is the cheapest form of energy conservation.

Lighting

- Train staff to shut off lights in areas not being used
- Reduce the amount lights in an area to enough to perform duties safely
- Develop a light plan for different events at the Arena (i.e. hockey full lights , public skating 2 banks)

Heating

- Reduce temperatures to levels still comfortable but not excessive e.g. 2-3 degrees below the comfort zone (21 degrees Celsius).
- Reduce Heat 5 degrees below comfort zone before leaving for the night.

Electronics

- Shut down and unplug electronic devices when not in use

Water Heating

- Reduce Temperature to 105 degrees Fahrenheit which is more than capable of performing hand washing, dish washing or showers.
- Turn off hot water heaters that are not in use due to seasonal operations.

Final Conclusion

While in the past we have made positive strides to reduce energy consumption and lower our carbon foot print there is still room for improvement. We can achieve nearly all of our next energy goals by focusing on key initiatives that have other co-benefits besides reducing energy use, cost and emissions.

1. Replacing older and burned out lighting with LEDs with occupancy sensor controls where feasible to improve indoor lighting in all facilities.
2. Improving building envelope for Arena and Public Works buildings by integrating repairs into long term asset management plan for the facilities
3. Continue to build on existing and proposed small behavioural changes, championed by energy management leadership team.

As these benefits and savings are realized, the Township of Sables-Spanish Rivers will work with Smart Green Communities and other partners to complete a more comprehensive energy audit that will help realize more opportunities for savings. The Township will continue to build on this success and pursue broader community-wide reductions in energy use, costs and emissions through its ongoing partnership with Smart Green Communities and Partners for Climate Protection (PCP) program.