CONSERVATION AND DEMAND MANAGEMENT PLAN - UPDATE

2019 - 2024

INTRODUCTION

In accordance with the Electricity Act 1998, Ontario Regulation 507/18, broader public sector agencies within Ontario are required to develop an energy Conservation and Demand Management plan (CDM) and update every five years. A summary of the public agency's annual energy consumption and greenhouse gas emissions for its operations must be provided. The CDM plan is to include a record of measures for conserving and reducing energy consumption by the public agency's operations, and the results of these measures.

The Township of Woolwich is prescribed as a public agency and is required to record and make public our annual energy consumption and CDM plan update. The Township's updated plan was developed in compliance with the regulation and covers the period from 2020 to 2024. The plan was approved by Senior Management on June 25, 2019.

The updated plan describes the Township's:

- Energy conservation goals and objectives;
- Results from the 2014 CDM plan; and
- Proposed energy conservation initiatives.

The Township's updated CDM plan builds on the municipality's initial plan, developed in 2014, and the experience gained in energy conservation over the past 5 years.

In addition to energy conservation, the updated CDM plan supports the Township's Strategic Plan, Asset Management Plan, Annual Business plan and both the capital forecast and budget process.

The Township dedicates funds in its annual capital budget to support a wide range of energy efficiencies, retrofits and equipment upgrades. Additionally, the Township has committed $50,000 annually to leverage additional funding from both provincial and federal grant programs to support energy efficiencies.

Hard copies of the plan are available at Townhall, located at 24 Church St. West, Elmira.

GOALS AND OBJECTIVES

The Township of Woolwich has several goals and objectives for conserving and reducing energy consumption and managing our energy demand, taking a proactive

approach, and focussing efforts on technical, organizational, and behavioural conservation measures.

Technical initiatives include the implementation of facility and equipment related upgrades and retrofits that have the potential to realize reduced energy consumption. The Township continues to focus on implementing electrical, water, heating and cooling energy saving measures at major facilities in order to generate potential savings.

The Township also continues to look at growth through use of clean, renewable energy sources, and when the climate and resources are available, moves forward with pursuing such opportunities.

Within the Township's facility inventory there are buildings which still require energy audits to be completed. Such efforts are continuous and are required to evaluate and identify appropriate energy saving projects, and assign subsequent funding.

Organizational initiatives are those actions by the Township that guide all municipal work with a focus on energy conservation. Such initiatives include the Township's Vision, Strategic Plan, and the formation of the Green Team. Township decisions are influenced by the Strategic Plan, with energy conservation a primary focus.

Behavioural initiatives are those measures focussed on influencing behavioural change to work towards the common goal of energy conservation. The Township continues to educate and focus staff energies to do their part to commit to energy savings, and seeks out training programs for building operations professionals.

Our energy conservation objectives include:

- Reducing our overall energy consumption by 10%;
- Reducing our water consumption by 10%;
- Integrating the Conservation and Demand Management Plan with capital planning.

TRACKING ENERGY CONSUMPTION AND SAVINGS

Annual energy reporting is required under the regulation and allows the Township to understand how energy is used in our facilities, identify potential energy conservation opportunities, and track progress on energy conservation efforts.

A recent highlight in energy savings is evident at St. Jacobs Arena with a 24% reduction in electricity consumption from 2016 to 2017, resulting from the installation and

programming of a new refrigeration plant control panel, and increased efficiency dehumidifier replacement. Additional energy savings are predicted from 2017 to 2019 with the replacement of the condenser system, chiller, and a second dehumidifier.

In addition to the municipality benefitting from reducing its energy use, residents and local businesses also benefit from more efficient use of tax payer dollars and better maintained/operated public buildings and facilities.

2014 CDM CONSERVATION INITIATIVES

The Township has committed to implementing the initiatives outlined in the previous CDM five-year plan. Provided operational discrepancies from year to year, the Township has seen a reduction in energy use at certain facilities as a result retrofits and equipment renewals.

Organizational / Behavioural Initiatives

Strategic Plan

The Strategic Plan was a community led initiative that established (6) focus areas that will guide the decisions and actions of Council and the administration and shape the direction of our community.

Goals and strategic directions of note include:

- Promote and support environmental stewardship efforts,
- Promote water conservation and wastewater efficiency,
- Evaluate benefits of green energy technology,
- Maintain infrastructure and equipment for continuous improvement and greater efficiencies,
- Ensure a municipal wide infrastructure maintenance program,
- Ensure energy efficiency of street lighting,
- Examine alternative energy services.

Asset management

Staff are working to build the Asset Management Plan to provide evidence-based decision making and risk management guidelines for long-term infrastructure planning. In 2019, a new policy will come into effect to assist in complying with Ont. Reg 588/17. Assets will be evaluated based on their full lifecycle costs, including costs of acquiring, operating, maintaining, renewing and disposing. This will provide an integrated business approach aiming to minimize lifecycle costs of operating assets, at an

acceptable level of risk while delivering an established level of service. By implementing an asset management plan, infrastructure needs can be prioritized over time with minimal repair and rehabilitation costs, and replaced when required with energy conservation demand a priority.

Life Cycle Costing

The Township incorporates life cycle costing when purchasing is related to building systems, such as lighting, office equipment and paper. Life cycle analysis looks at the overall cost of purchasing, operating and disposing a product.

Sustainable Waterloo Region (SWR)

Sustainable Waterloo Region is a non-profit organization that supports partner organizations to measure base-line consumption data in order to assist with reducing energy consumption and greenhouse gas emissions.

They assist partners in identifying appropriate measures and reduction targets and they assist with creating an implementation plan to successfully achieve established targets.

SWR will work with the Township on various initiatives. They will work with the Green Team to generate innovate solutions to use less energy through educational campaigns; and evaluate some operations to identify potential ways to decrease consumption. Additionally, SWR will support the Township in developing its 5 year capital plan for facilities with potential uses of new technology and more efficient equipment.

Green Team

The Township continues to utilize the Green Team, with representation from core function areas, such as finance and building operations. The Green Team meets monthly, reviewing all new and existing energy conservation initiatives, developing business cases for senior management approval.

- Green Team is allocated $5,000 per year for project implementation (i.e. 2019 purchase of recycling stations for the administration offices)
- Simple payback less than a year
- Ongoing application.

Green Team Mission Statement:

- Move existing initiatives forward;

- Identify new opportunities to cost effectively protect our natural environment.

Green Team Purpose:

- Demonstrate leadership in environmental stewardship for the Township;
- Serve as a forum for addressing specific energy efficiency, environmental and sustainability issues and aid departments in pursuing efficiencies.

Technical Initiatives

Woolwich Memorial Centre (WMC)

2018 was a busy year for the facility from a sport tourism perspective whereby the facility hosted (3) major events including the Ontario Curling Championships, Canadian Sledge Hockey Championships and the Canadian University Ringette Championships. The sheer volume of patrons visiting the facility during the events certainly impacted consumption rates with over 50,000 people attending those (3) events alone over 15 days.

Projects completed between 2014 and 2018 to increase building operating efficiencies:

- Installed air curtain on entrance sliding doors, contributing to tighter building envelope (2018);
- Installation of LED score clock to reduce electricity consumption (2018);
- Battery operated ice resurfacer to reduce propane consumption (2018);
- Installation of motion sensor faucets to reduce water consumption (2016);
- Installation of (5) new solar powered parking lot light standards to reduce electricity consumption (2017);
- Installation of soft starts on 2 pumps to reduce electricity demand peaks (2017, 2018);
- Installation of new BAS to control temperatures and refrigeration plant settings (2018);
- Increased ice floor temps by 3 degrees at night to reduce electricity consumption (2018);
- Installation of LED lighting in Snyder arena to reduce electricity consumption (2018).

Retrofit Lighting Project	Snyder Ice Surface
Project Cost	$65,000
Annual Kilowatt Savings	126781
Annual Energy Savings	$30,041.22
ROI payback	2.4 years

St. Jacobs Arena

- Installation of building insulation and siding, to reduce refrigeration plant requirements and contribute to tighter building envelope (2017);
- Replaced aging equipment with high efficiency water heater (2017);
- Installation of upgraded refrigeration plant BAS, allowing for reduced energy consumption during off hours (2017);
- Floating head pressure (2017);
- Installation of energy efficient dehumidifier to reduce electricity consumption (2017);
- Installation of LED energy efficient lighting over arena surface (2017);
- Installation of energy efficient Condenser to reduce electricity consumption (2018).

Administration Building

- Installation of programmable HVAC system to allow for nightly setbacks;
- Installation of heat loop pumps to reduce water waste in locations where sinks are a distance from the hot water source.

Breslau Community Centre

- Installation of instantaneous wall mounted boilers to reduce natural gas consumption;
- Installation of a high efficiency gas fired furnace to reduce natural gas consumption;
- HVAC system is now programmed and upgraded to use natural gas.

Bloomingdale Community Centre

- Installation of natural gas to the facility including a gas fire roof top unit with air conditioning (2015).

Maryhill Community Centre

- Installation of (2) solar powered parking lot lights.

Conestogo Clubhouse

- BCA was completed in 2018 which identified various potential upgrades to support energy efficiencies.

Heidelberg Community Centre

- The Heidelberg Community Centre was constructed in 2017 with energy conservation and demand management a focus, utilizing Energy Star certified HVAC equipment components.

Conestogo Works Yard

- BCA was completed in 2018 which identified the following upgrades to support energy efficiencies. Heat Loss is evident in this facility.
    - Replaced fuse panel with new breaker system (2019)
    - Replaced old inefficient HVAC equipment with new furnace and tube heater (2018)

Elmira Works Yard

- BCA was completed in 2018 that identified equipment updates, enhancements to the building envelope and energy efficient lighting and heating to incorporate in the facility in the next (5) years.

Howard Street Yard

- Installation of upgraded HVAC equipment to reduce electricity consumption.

St. Jacobs Fire Station

- Replaced existing roof, contributing to tighter building envelope (2016).

Breslau Fire Station

- The Breslau Fire Hall was constructed in 2018 with energy conservation and demand management a focus, utilizing Energy Star certified HVAC equipment components.

Elmira Fire Station

- Installation of (2) high energy efficient furnaces to reduce natural gas consumption.

Lawn Bowling Facility

- Installation of new exterior wall packs to reduce electricity consumption;
- Installation of programmable thermostat to reduce energy consumption during off hours.

Woolwich Youth Soccer Office

- Installation of new windows, contributing to tighter building envelope (2017);
- Installation of water efficient washroom faucets/toilets to reduce water consumption (2017).

Parks

- Replacement of ball diamond lighting at Industrial Ball Park, with increased efficiency HID system. Remote system installed to limit usage to scheduled times (2015);
- Replacement of existing (2) parking lot lights with solar powered lights each year;
- Replacing existing ball diamond lights with more efficient system at Lions Park (2019).

Arthur St. LED Lighting (2018/2019)

- Implementation of LED street lighting to reduce electricity consumption.

Street Lighting Project	
Project Cost after Rebate	$78,274
Annual Kilowatt Savings	368,514
Annual Energy Savings	$101,428
ROI Payback	0.77 years

CHANGES FROM PREVIOUS PLAN TO ACHIEVE GOALS AND OBJECTIVES

While the Township met several conservation objectives from the 2014 plan, we continue to identify potential measures to ensure savings continue and that new

conservation efforts are implemented. To achieve continued success, the Township's Green Team and staff continue to consider such opportunities for energy conservation and related operations savings.

The CDM plan is reviewed by our Green Team on an annual basis to monitor the progress and results of the proposed measures and provide input on potential plan adjustments.

2020-2024 PROPOSED CONSERVATION INITIATIVES

Potential energy conservation projects are, when possible, identified by comparing building-level energy benchmarks to the median energy benchmark for that building type.

Energy conservation initiatives throughout all Township facilities include the implementation of various organizational and behavioural changes, Building Condition Assessments, Energy Audits, LED lighting retrofits and occupancy sensors, and replacement of existing HVAC components with higher efficiency equipment.

Oversight of implementation of the plan is the responsibility of the Community Services Department with the assistance of an internal "Green Team" working to identify on-going energy efficiencies and support educational campaigns geared to change culture.

Implementation of the proposed projects is dependent on:

- Funding allocated annually through Council budget deliberations;
- Internal revolving fund (representing 50% of the savings from previous conservation projects);
- Independent Electricity System Operator and utilities incentives;
- Availability of qualified staff; and
- Retaining a qualified contractor to implement the initiative.

Proposed energy conservation and demand management initiatives at Township facilities for years 2020 through 2024 include:

Organizational / Behavioural Initiatives

- Campaigns to encourage staff to "Hit the Switch" when vacating meeting rooms and offices;
- Implement anti-idling policy;

- Adjust building climates by one degree Celsius (increase in summer, decrease in winter);
- Provide Township staff and public increased opportunities for recycling in facilities.

Technical Initiatives

Woolwich Memorial Centre

- Retrofit Snyder arena lights with LED energy efficient lighting;
- Retrofit all lobby pot lights with LED energy efficient lighting;
- Retrofit any remaining T5 lights with LED energy efficient lighting;
- Refrigeration plant replacement;
- Install Cogeneration system;
- Boiler replacement with high efficiency unit;
- Rainwater collection systems – evaluate opportunities to reuse gray water;
- Adjust building climates by one degree Celsius (increase in summer, decrease in winter);
- Turn off lights in pool area when not in use – currently operates 24 hours a day, seven days a week.

Lighting Retrofit (2019/2020)

Retrofit Lighting Project	McLeod Arena
Project Cost	$65,000
Incentive	$10,515
Annual Kilowatt Savings	112,781
Annual Energy Savings	$27,114
ROI Payback	2.3 years
Retrofit Lighting Project	Lobby Retrofit
Project Cost	$20,290
Incentive	TBD
Annual Kilowatt Savings	TBD
Annual Energy Savings	TBD
ROI Payback	TBD

Cogeneration (2020)

The project objectives include reducing the overall cost of energy (electricity, gas and water), while reducing operations related repairs and maintenance. Specifically, to improve on the efficiencies in the pools and ice rinks, and the heating and cooling systems.

Cogeneration Project	
Project Cost	$1,000,000
Annual Kilowatt Savings	1,279
Incentive	$255,800
Annual Energy Savings	$96,000
ROI Payback	8.93 years

Geothermal Project (2020/2021)

Installation of a geothermal field and heat pump system to store and reclaim waste heat produced by the ice plant for use in space heating when needed. The field will include 14 boreholes proposed for the north west corner of the facility. It is anticipated that the CHP system will result in a reduction of 189 tonnes of CO2 emissions.

Geothermal Project	
Project Cost	$200,000
ROI	34.3 years

Refrigeration Plant Replacement (2020/2021)

Refrigeration Plant Replacement	
Project Cost	$1,900,000
Annual Kilowatt Savings	403,312
Incentive	289,000.24
Annual Energy Savings	$96,707.84
ROI Payback	34.3 years

St. Jacob's Arena

- Install energy efficient heating equipment;
- Install energy efficient chiller (2019/2020);
- Install energy efficient dehumidifier (2019);
- Retrofit all dressing showers and washrooms with water efficient devices;
- Install timers on arena stand heaters to ensure the units are not left on for extended periods of time – additionally, impacting ice temperatures requiring additional energy to operate refrigeration plant;
- Explore opportunities for retrofitting arena lighting.

Estimated Lighting Retrofit Savings

Retrofit Lighting Project	St. Jacobs Arena

Project Cost	$65,000
Annual Kilowatt Savings	126,781
Annual Energy Savings	$30,041.22
ROI Payback	2.4 years

Administration Building

- Install occupancy motion sensors in washrooms and meeting rooms;
- Retrofit, in stages, all building lighting with energy efficient LED lighting (Main Floor – 2019).

Retrofit Lighting Project	Administration Building Main Floor
Project Cost	$36,000
Annual Kilowatt Savings	32,238
Incentive	$9,950
Annual Energy Savings	$14,644
ROI Payback	4 years

BRESLAU COMMUNITY CENTRE

- Reduce building operating hours to meet demands – reduction from 60 hours per week to 24 hours per week, thereby reducing electricity and HVAC energy demands.

Bloomingdale Community Centre

- Township to undertake BCA in 2021 to review building components and equipment to identify potential improvements and operating efficiencies to capture in the 5-year capital forecast.
- Retrofit existing facility lighting with higher efficiency lighting;
- Upgrade exterior wall packs to LED units.

Maryhill Community Centre

- Township to undertake BCA in 2021 to review building components and equipment to identify potential improvements and operating efficiencies to capture in the 5-year capital forecast;
- Install (1) solar powered parking lot light standard.

Conestogo Clubhouse

- Install new exterior Energy Star certified doors;
- Replace existing lighting with energy efficient LED lighting system;
- Replace existing windows with Energy Star certified replacements.

Conestogo Works Yard

- Replace existing windows and doors with Energy Star certified replacements;
- Install insulated truck bay doors;
- Retrofit outdated lighting with energy efficient LED system;
- Install energy efficient HVAC equipment;
- Install water efficient washroom fixtures.

Elmira Works Yard

- Upgrade and retrofit all facility lighting;
- Install programmable thermostats to allow nightly setbacks, and prevent heat generation while truck bay doors are in the open position;
- Replace existing windows with Energy Star certified replacements.

Howard Street Yards Facility

- Retrofit existing facility lighting with energy efficient replacements.

St. Jacob's Fire Station

- Township to undertake BCA in 2020 to review building components and equipment to identify potential improvements and operating efficiencies to capture in the 5-year capital forecast;
- Replace existing exterior with insulated siding.

Conestogo Fire Station

- Township to undertake BCA to review building components and equipment to identify potential improvements and operating efficiencies to capture in the 5-year capital forecast.
- Retrofit lighting in truck bays with energy efficient LED system;
- Replace existing furnace with Energy Star equipment;
- Replace flat roof to better insulate the building envelope.

Maryhill Fire Station

In 2020, the Township is undertaking both a BCA and feasibility study to determine whether to renovate or replace the facility. This will allow the Township to address facility needs and forecast appropriately. Should Council decide to renovate the facility it would involve a significant renovation, completely retrofitting and upgrading all the extremely outdated building components including roof, HVAC equipment, electrical components, and washroom facilities.

Elmira Fire Station

- Township to undertake BCA to review building components and equipment to identify potential improvements and operating efficiencies to capture in the 5-year capital forecast;
- Retrofit outdated lighting with energy efficient LED motion sensor system;
- Replace flat roofs, windows and all exterior doors to better insulate the building envelope;
- Replace original electrical equipment.

Lawn Bowling Facility

- Retrofit existing lighting with high efficiency replacements;
- Investigate potential for reusing gray water to water grounds;
- Install occupancy sensors to reduce electricity consumption.

Woolwich Youth Soccer Office

- Township to undertake BCA in 2020 to review building components and equipment to identify potential improvements and operating efficiencies to capture in the 5-year capital forecast;
- Replace electric wall board heater;
- Install either small capacity or tankless water heater;
- Retrofit T8 light fixtures with higher efficiency lighting;
- Install occupancy sensors and programmable thermostats.

Victoria Glenn Pumping Station

- Investigate viability for installation of VFD's and soft starts on pumps;
- Install occupancy sensors.

River Run Pumping Station

- Investigate viability for installation of VFD's and soft starts on pumps;
- Install occupancy sensors.

North Arthur Pumping Station

- Investigate viability for installation of VFD's and soft starts on pumps;
- Install occupancy sensors.

Libraries

- Replace existing windows with Energy Star certified replacements.

Parks

- Identify opportunities to establish rain water collection systems or reuse gray water for watering community gardens;
- Reduce water consumption at the Elmira splash pad in Bolender Park by 25% through sequencing the spray features. Provided water usage totaled 27,000,000 US Gallons in 2018, the Township expects the sequencing to result in significant energy savings;
- Stage replacement of existing park and parking lot lights with LED lighting.
- Stage replacement of existing HID ball diamond lights with LED and programmable MUSCO lighting systems.