

**2014-2019 Energy Conservation and Demand Management
Plan**

Township of Norwich

March 10, 2015

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Commitment

Declaration of Commitment

Council Resolution: We will allocate the necessary resources to develop and implement a strategic energy conservation and demand management plan that will reduce our energy consumption and its related environmental impact.

Vision

The Corporation of the Township of Norwich will continue to reduce energy consumption and mitigate costs through the wise use of energy. This will involve a collaborative effort to increase the education, awareness, and understanding of energy management within the Corporation. The vision for the Corporation is to reduce total energy consumption and transition to a carbon neutral future through the wise and efficient use of energy and resources, while still maintaining an efficient and effective level of services to our customers and general public. Total energy consumption includes electricity, natural gas, diesel, gasoline and propane. This vision can be achieved through the integration of energy efficient facility infrastructure, operational efficiencies and building the foundation for a culture of energy awareness and knowledge within the Corporation. At the organizational level, commitment from Council and Senior Administration will demonstrate the leadership and commitment required to ensure the fulfillment of the Energy Plan by all energy consumers. Everyone has a role in the wise use of energy and to showcase the appropriate leadership within corporate facilities and operations.

Policy

The Township of Norwich continues to face rising costs to maintain and repair aging infrastructure, to deliver services to the community and to obtain the necessary energy to power its facilities. The generation and use of energy also contributes to climate change through greenhouse gas (GHG) emissions. The development of a comprehensive energy management program will ensure that energy conservation and efficiency is a key consideration in the Municipality's facility renewal actions. The implementation of conservation measures will

reduce corporate GHG emissions and energy costs for Municipal facilities through decreased energy consumption. Simple measures like lighting retrofits can result in short payback periods of less than two years. Longer payback periods may be experienced for larger capital investment items such as HVAC (heating, ventilation & air conditioning).

The first step in implementing an energy management program is the completion of energy audits for corporate facilities. Audits involve a technical review of a facility and its operations, the development and analysis of a baseline energy profile for the facility and identification of energy management opportunities and savings. Another important component of an energy management program is the re-commissioning of municipal facilities. Over the life cycle of a facility, the mechanical building automation and distribution systems are adjusted from day-to-day to suit user room temperature requirements. Moreover, mechanical distribution or building controls instrumentation is sometimes over-looked when renovations take place. Re-commissioning involves examining the original mechanical design and operating specification against any building renovations and recalibrates the settings to suit today's energy efficient standard practices. It also ensures that mechanical operating practices are current and appropriate to maximize building system efficiencies.

The use of renewable energy measures can also help reduce overall corporate greenhouse gas emissions by lessening our demand for fossil fuel generated energy (oil, gas or coal). The investment for these types of measures can be significantly greater than conservation initiatives and therefore, should be considered on a case-by-case basis through a cost and environmental benefits analysis. However, it is acknowledged that the use of technologies such as wind, solar and geothermal can show community leadership and help raise awareness of the benefits of utilizing renewable energy.

The success of the energy management program can only be determined through the measurement of savings. The implementation of an energy tracking tool will help the Corporation monitor progress, provide constant and consistent reports to ensure efficiencies in facility operations, identify successful retrofits that can be replicated in other facilities, highlight problem areas or facilities, as well as track and report on greenhouse gas emissions. In order to sustain a corporate culture of conservation, staff must be engaged in an effective awareness and education program. Although facilities staffs have the lead responsibility in ensuring city facilities operate efficiently, all Municipal staff should be familiar with and utilize energy efficient measures where possible.

Goals

The Township of Norwich Energy Conservation and Demand Management Plan was completed to help achieve the following goals:

- Maximize fiscal resources through direct and indirect energy savings
- Reduce the environmental impact of the Municipality's operations

- Increase the comfort and safety of staff and patrons of municipal facilities
- Improve the reliability of Municipal equipment and reduce maintenance
- Provide the guidance and leadership necessary for the adoption of a culture of sustainability

The primary objective of this Plan is to improve the management of the Municipality's energy consumption. Part of this objective is setting a conservation target that will see the Township of Norwich reduce its energy consumption by 5% by the end of 2019. It is also the objective of this plan to improve the Municipality's understanding of energy consumption which is essential for the Municipality to meet its corporate energy management goals.

Overall Target

The key to a successful long term energy conservation and demand management vision is a strong energy policy, with measurable and achievable targets. 2012 has been established as the Municipality's base year that facility and water energy reduction results will be measured against, as accurate energy data has already been collected in response to Ontario Regulation 397/11 under the Green Energy Act, 2009. By using 2012 as the baseline, the Township will reduce its consumption of fuels and electricity in all municipal operations by an average of 1% per year between now and 2019.

Objectives

In order to achieve the success of the strategic direction of the Energy Conservation and Demand Management Plan, there are a number of goals and objectives that must align with its development and implementation. The following are the strategic objectives:

- The creation of a culture of conservation within the Township will serve to reduce greenhouse gas emissions and ensure the wise use of resources
- Fiscal accountability through savings and cost avoidance will lead to both direct and indirect savings.
- Demonstrate leadership within the Township and community as to the commitment to energy management and investigation of new and emerging technology
- Demonstrate sound operating and maintenance practices to complement the energy efficiencies implemented through the capital asset renewal program
- Provide a forum for discussion within the Township on energy management to be able to explore new ideas and trends
- With the development of the Energy Plan, all departments within the Township will receive literature to ensure energy management is a consideration in all operations and facility based decisions.

The integration of operational processes, facility based infrastructure improvements and staff awareness is critical to move the Township towards the goal of reducing GHG emissions and transition to a carbon neutral future.

Organizational Understanding

Stakeholder Needs

Internal stakeholders (Council, staff) need to be able to clearly communicate the corporate commitment to energy efficiency, and to develop the skills and knowledge required to implement energy management practices and measures. External stakeholders (the Province, community citizens and groups) need the Township to be accountable for energy performance and to minimize the energy component of the costs of municipal services.

Internal stakeholders (Council, committees of council, 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

While the Township of Norwich has always closely managed its energy consumption, the Ontario government has required an increase in municipal energy management. This results in the need to enhance current practices and develop new approaches. To meet this need the Township of Norwich will design a comprehensive program for collecting and analyzing monthly energy billing information, and ensuring staff is informed about energy consumption. This effort will produce an energy costs and consumption database that will be used for monitoring excessive variations, targeting facility follow-up evaluations, and highlighting areas that could be candidates for improved conservation. These monitoring enhancements will improve the Municipality's understanding of the bottom line impact of energy management.

How We Manage Energy Today

The management of energy consumption and the energy performance of our facilities and equipment are the responsibilities of the Financial Services Department (cost management), Community Services Department (maintenance), and department managers (operations). In order to be successful in the reduction of GHGs, the Township must continue to develop strategies within operations to work towards reducing energy consumption. This can be done by:

- Integrating best practices into daily operations, where feasible, to reduce energy consumption.

- Providing a forum for discussion on energy management strategies that may benefit all Departments Increasing corporate awareness of the consumption of energy within each Department

Renewable Energy

The Township of Norwich aspires to show leadership in the promotion and development of renewable energy systems that are compatible with our asset management and land use planning objectives. While the Township of Norwich does not currently utilize renewable energy systems, we will continue to investigate the potential to develop renewable energy systems throughout our municipal facilities and operations.

Structure Planning

Staffing requirements and duties

We will incorporate energy efficiency into standard operating procedures and the knowledge requirements for operational jobs.

Consideration of energy efficiency for all projects

It is important that energy efficiency is considered at the outset of any new initiative or project. CDM Retrofits tend to be initiatives or project specific, where a new energy efficient technology or group of technologies are added or retrofit within a facility or group of facilities. Capital Renewal/Life Cycle Replacements are generally managed by the division who carries responsibility for operating and maintaining the existing or original equipment e.g. Community Services.

Typical projects include major capital replacements of chillers, boilers, roofs, windows, fans, pumps, piping etc. Typically equipment to be considered for this process includes:

- HVAC equipment (e.g. boilers, chillers, pumps, motors etc.)
- Lighting and controls
- Building envelope (e.g. roofs, insulation, windows and doors etc.)
- Water use (e.g. pools, toilets, water reclaim etc.)
- BAS (building automation system) controls
- Process improvements
- Back-up generators
- Any other energy consuming device.

These types of projects generally follow 4 steps:

1. Project Identification & Feasibility - Energy Audits, Feasibility Analysis or through detailed Condition Assessments.

2. Planning & Budgeting - Project Financing, Incentives, Business Case & Approvals
3. Implementation Tender, Project Execution, Project Management, Commissioning
4. Monitoring & Verification - Measure and Verify Results, Reporting Achievements

The intent is to make energy conservation and demand management (CDM) part of the Township's normal course of business for all facility and operational retrofits, including capital renewal and life cycle replacements projects. Success means incorporating CDM options at the initial stages of a project design. This ensures that options for improving energy efficiency are considered, evaluated and quantified in terms of life cycle costing analysis, including cost, maintenance and emission reductions.

<u>SAMPLE PROJECT ENERGY EFFICIENCY CHECKLIST</u>	
<input checked="" type="checkbox"/>	Check for incentive/ funding sources
<input checked="" type="checkbox"/>	Applications/ Information needed for funding
<input checked="" type="checkbox"/>	Determine project base case
<input checked="" type="checkbox"/>	Review Energy Efficient (EE) options
<input checked="" type="checkbox"/>	Project costs (base case & EE option)
<input checked="" type="checkbox"/>	Project savings
<input checked="" type="checkbox"/>	Maintenance savings
<input checked="" type="checkbox"/>	Financial benefits
<input checked="" type="checkbox"/>	Environment benefits
<input checked="" type="checkbox"/>	Incentives/ funding
<input checked="" type="checkbox"/>	Overall benefits and Life Cycle Analysis
<input checked="" type="checkbox"/>	Recommendations

Resources Planning

Energy Leader

The Township will clearly designate leadership and overall responsibility for corporate energy management.

Implementation Planning

Communication Programs

A staff awareness and training plan will be developed as part of the energy management plan to build on past energy conservation practices. Examples of awareness and training include energy

conservation displays, promoting home energy audits, and circulating reminders to turn lights off.

Projects Execution

Municipal Level

The administration and implementation of this plan will be responsibility of the Director of Community Services. Since we all use energy in our daily activities, it will also be the responsibility of all Municipal staff to be aware of their energy use and work towards a culture of conservation. Through staff training and web base energy management tools, staff will be able to see the results of their efforts, and benchmark between corporate facilities and with industry standards.

Asset Level

In order to sustain a corporate culture of conservation, staff must be engaged in an effective awareness and education program. Although facilities staff have the lead responsibility in ensuring municipal facilities operate efficiently, all municipal staff should be familiar with and utilize energy efficient measures where possible. The first step in implementing an energy management program is the completion of energy audits for corporate facilities. Audits involve a technical review of a facility and its operations, the development and analysis of a baseline energy profile for the facility and identification of energy management opportunities and savings.

Another important component of an energy management program is the re-commissioning of Municipal facilities. Over the life cycle of a facility, the mechanical building automation and distribution systems are adjusted from day-to-day to suit user room temperature requirements. Moreover, mechanical distribution or building controls instrumentation is sometimes overlooked when renovations take place. Re-commissioning involves examining the original mechanical design and operating specification against any building renovations and recalibrates the settings to suit today's energy efficient standard practices. It also ensures that mechanical operating practices are current and appropriate to maximize building system efficiencies. The use of renewable energy measures can also help reduce overall corporate greenhouse gas emissions by lessening our demand for fossil fuel generated energy (oil, gas or coal). The investment for these types of measures can be significantly greater than conservation initiatives and therefore, should be considered on a case-by-case basis through a cost and environmental benefits analysis. However, it is acknowledged that the use of technologies such as wind, solar and geothermal can show community leadership and help raise awareness of the benefits of utilizing renewable energy.

Past Initiatives

New Municipal Administration Facility Design/Construction

- LED lighting throughout the facility
- High insulation values
- Day lit building – reduction of lighting levels required
- Motion sensor light switches
- Energy efficient furnaces/hot water heaters
- Energy efficient appliances
- Programmable Thermostats

Reduction of Surplus Buildings

- 6 John Street, Norwich
- 15 Dover Street, Otterville

Medical Centre

- Installation of Programmable Thermostats
- Lighting upgrades
 - installation of photo control sensors for parking lot & exterior lights
 - conversion to exterior LEDs
- Backup Generator – Completed December 2013

Norwich Community Centre

- New appliances in kitchen
 - new commercial convection oven
 - new high efficiency double door cooler
 - new digital thermostat and compressor - 2nd cooler
- East wall upgrade - strap/insulate with R22 spray foam insulation and metal clad

Norwich Arena

- New lighting arena surface - metal halide to 4 lamp fluorescent fixture
- Reduce gas heaters
- Reduce ice season
- Exterior lighting - replaced exterior lighting with LED lighting
- Parking lot lighting - replaced all parking lot lighting with LED lights

Oxford Centre Hall

- Lighting replacement - replaced all lighting from T12 to T8
- New roof
- Appliance replacement

new high efficiency double door cooler
Exterior lighting replacement - all exterior lighting replaced with LED lighting

Pioneer Hall

Replace lighting - replaced interior lighting from T12 to T8
Replace doors - replaced all exterior doors with steel insulated doors
Replace windows - replaced all windows with new thermal pane windows
Exterior lighting replacement - all exterior lighting replaced with LED lighting
Toilet replacement - replaced toilets with low flow toilets
Purchase blinds for windows

Cornell Hall

Interior lighting - replaced interior lighting with LED

Parks

Burgessville lighting update - updated exterior T12 to T8
Old PUC shop lighting update - updated interior T12 to T8
Otterville Pool guardhouse lighting update - updated interior T12 to T8
Otterville snack bar/pavilion - updated interior T12 to T8/convert to LED

Burgessville Library

Interior lighting - updated interior T12 to T8/convert to LED

Upcoming Projects

Reduction of Surplus Buildings

18 Oxford Street, Otterville

Medical Centre

Window replacement (est. 2017)

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HVAC upgrade (est. 2018)

Norwich Arena

Seasonal controller - high efficiency controller (est. 2015)

Pioneer Hall

Roof replacement - roof with additional R25 insulation

Springford Hall

Interior lighting - replace interior potlights/other lighting with LED

Parks

Otterville Park lighting update - replace main hydro service, converting lighting to LED (est. 2015)

Fire Halls

Install LED lighting in outside lights at Station 1

Install programmable thermostats at Station 3 and 4

Review

Energy Plan Review

As part of any energy management strategy, continuous monitoring, verification, and reporting is an essential tool to track consumption and dollar savings and/or avoidance as the result of implemented initiatives. Currently, the Finance Department is responsible for providing an annual energy consumption data as per Ontario Regulation 397/11 under the Green Energy Act, 2009. As part the Energy Plan, the implemented processes improvements, program implementation and projects will continued to be documented and reviewed annually to update consumption savings. By regularly monitoring and reporting consumption and dollar savings to Departments, the outcomes of their participation in energy management initiatives can be demonstrated, and feedback can be obtained for any new ideas. Reporting of the Municipal energy management initiatives and consumption data will continue to be presented to Council annually. This monitoring and reporting will also align with the requirements of the Green Energy Acts Conservation Plans to develop energy conservation plans which would include a high level description of how the Township will conserve energy and reduce demand over the life of the plan, as well as a forecast of the expected results.

Evaluation Progress

Summary of Current Energy Consumption, Cost and GHGs

Please see **Schedule A** for a summary of current Energy Consumption and GHGs for the years 2011 & 2012.