

Energy Conservation and Demand Management Plan

2014 to 2019

Town of Lakeshore

Commitment

Declaration of Commitment

The Town of Lakeshore strives to be an environmentally sustainable community. By developing and implementing an Energy Conservation and Demand Management Plan, the Town is demonstrating its commitment to a balanced and sustainable approach to energy usage and management, while maintaining a high level of services for Town residents, businesses, and visitors. To this end, the Town has created an Energy Management Committee with the mandate of identifying and implementing effective energy conservation measures throughout the Town of Lakeshore.

The Energy Management Committee will undertake a gradual and measured approach to conserving energy. The Energy Management Committee will endeavour to better understand how energy is used in the provision of municipal services, and will progressively implement energy conservation initiatives that emphasize education, behaviour modifications, and policy implementation ahead of capital intensive measures. As proficiency in energy management is further acquired and understanding is enhanced, the Energy Management Committee will endeavour to expand energy conservation activities into more complex or sophisticated conservation initiatives over time, with an emphasis on cost effectiveness.

All reasonable efforts will be taken by the Energy Management Committee to maintain or improve the quality of services, improve efficiency, protect the natural environment, lower the quantity of energy consumed and energy intensity per facility, and minimize energy costs. The Town of Lakeshore is committed to providing the necessary resources to support the Energy Management Committee.

Vision

The Town of Lakeshore will reduce energy consumption and minimize costs through prudent use and management of energy. This will involve a collaborative effort to increase the education, awareness, and understanding of energy management within the municipal Corporation. The vision for the Town of Lakeshore, as effected (or alternatively implemented) by the Energy Management Committee, is to reduce total energy consumption through the prudent and efficient use of energy and resources while continuing to maintain an efficient and effective level of service to residents, businesses, and visitors.

Policy

Like many other municipalities, the Town of Lakeshore continues to face rising costs associated with community growth, maintaining and repairing aging infrastructure, delivery of services to the community, and obtaining the energy that is required to power its facilities and provide services. The development of an Energy Conservation and Demand Management ("ECDM") Plan will ensure that energy conservation and efficiency is a key consideration in the Town's growth and renewal actions. The gradual implementation of progressively sophisticated conservation measures will reduce corporate Greenhouse Gas ("GHG") Emissions and energy costs for facilities through decreased energy consumption.

The Town will initially focus on low-to-no cost initiatives with short payback periods until greater knowledge is obtained. Larger capital investment initiatives such as HVAC or building envelope efficiency improvements may require longer payback period. However the Energy Management Committee will seek to maximize the savings available through education, policies, standards, procedures, behaviour modifications, and other low cost solutions before recommending solutions requiring higher capital investment.

The first step in creating the ECDM plan is to create an inventory of facilities and identify the current state of energy consumption in order to establish a baseline reference. The Town established this baseline in July 2013, using 2011 as the baseline year for energy consumption. With this knowledge, the next step is to conduct energy audits at selected corporate facilities. The Energy Management Committee will prioritize facility audits so that those facilities with the greatest opportunity for savings are studied first and in greater detail.

The results of the energy audits will identify energy saving opportunities that the Town can prioritize for implementation with the available resources. In addition to conservation efforts which will range from the “free and simple” to the “complex and costly”, the ECDM plan will also consider how renewable energy generation can lower GHG emissions and peak electricity demand for the municipality. Renewable generation lowers the stresses on the distribution grid, carries significant environmental benefits, and further positions the municipality as a leader in sustainability. Opportunities for renewable generation can also result in additional long term revenue streams to the municipality, if developed under the current FIT and microFIT programs offered by the Ontario Power Authority.

Goals

The Town of Lakeshore’s 5-Year Energy Conservation and Demand Management Plan was envisioned to achieve the following goals:

- To maximize financial resources through direct and indirect energy savings
- To reduce the environmental impact of the Town's operations
- To increase the comfort and safety of staff and users of Lakeshore facilities
- To improve the reliability of Town equipment and reduce maintenance
- To provide leadership and awareness to further adopt a culture of sustainability

The principal goal of the ECDM plan is to continuously improve the management of the Town's energy consumption. The Energy Management Committee has established a goal of achieving a net reduction in aggregate energy consumed by the Town’s facilities.

Census data shows that The Town of Lakeshore’s population grew 3.9% from 2006 to 2011, despite a population decrease of 1.9% in all of Essex County over the same period. It is assumed that Lakeshore’s population growth will continue into the foreseeable future, and that additional energy consumption will be required by the Town’s operations to serve this incremental growth.

It is the Energy Management Committee's goal to implement conservation measures that result in a net reduction in energy intensity (energy use per unit of output such as cubic metres of drinking water supplied) at Town facilities from the 2011 reference year, over the five year horizon of this ECDM plan. Ideally, a net reduction in total energy consumed will also be realized, despite the anticipated growth in population and associated energy required. The measurement of success will be based on several indicators:

- Realizing a reduction in energy intensity at Town facilities compared to the 2011 baseline year
- Realizing a reduction in total energy consumption in compared to the 2011 baseline year
- Realizing a reduction in GHG emissions compared to the 2011 baseline year
- Minimizing energy costs in the face of growing populations and increasing energy and fuel costs generally
- Making energy management and efficiency an integral part of the Town's operations and decision making processes
- Increasing knowledge, proficiency, and capability in energy management

It should be noted however that the individual actions arising from the ECDM will have their own unique measurements of success.

Overall Target

In its first Energy Conservation and Demand Management Plan, the Town of Lakeshore will strive to realize a net reduction in energy intensity and GHG emissions at each facility, and will try to realize a net reduction in total energy consumed over the 5 year term of the ECDM plan.

As this is the Town's first effort in creating and implementing an ECDM plan, the Energy Management Committee has established that increasing education, knowledge and competency while concurrently driving net reductions in energy intensity, total consumption, and GHG emissions through low-to-no cost measures shall be the targets of this first ECDM plan. As knowledge and competency is accumulated over this initial 5 year planning horizon, the Energy Management Committee will assimilate more complex or capital intensive measures into subsequent plans, or as resources allow.

Objectives

In order to achieve the success envisioned in the ECDM plan, the Energy Management Committee maintains the following objectives:

- To implement energy audits, with a level of detail suitable to the facility in question, on the majority of municipal facilities during the next five years
- To reduce total energy consumption and intensity in municipal facilities over the next five years
- To create a culture of sustainability and conservation within the Corporation.
- To promote renewable energy opportunities where feasible
- To demonstrate sound operating and maintenance practices that complement the energy efficiencies implemented through the ECDM
- To educate all departments and staff members about the importance of energy conservation, and how personal behaviour can achieve conservation

Organizational Understanding

Stakeholder Needs

Stakeholders in the efficient and prudent use of energy exist both internally and externally to the Town of Lakeshore, and their collective needs are addressed through the ECDM plan.

Internal stakeholders include Council, Senior Management Team and staff. These groups need to be able to clearly communicate the municipality's commitment to energy efficiency, and need to develop the skills and knowledge required to implement energy management practices and measures. Internal stakeholders require an initial period of training and support in order to develop the skills and knowledge necessary to effectively implement and maintain energy management practices and measures.

External stakeholders include the Province of Ontario, Town of Lakeshore residents and visitors, customers, and community groups. These external stakeholders need the municipality to be accountable for energy performance, and to minimize the energy component in the costs of municipal service delivery.

How We Manage Energy Today

The Energy Management Committee is responsible for leading the energy management and conservation efforts in the Town of Lakeshore and is tasked to ensure that the ECDM plan remains a priority within each operation. The Committee is composed of a cross-functional team of internal stakeholders who have direct responsibility in the consumption and management of energy within municipal departments and facilities.

The Committee is currently comprised of four members from the Town's Finance, Facilities, and Engineering departments.

Summary of Current Energy Consumption, Cost and GHGs

For the 2011 baseline year, the total annual energy consumption in municipal operations is 11,637,453 ekWh at a cost of \$1,113,430.13.

For the 2011 baseline year, GHG emissions of 1,426,988.48 kg CO₂e were observed.

Summary of Current Technical Practices

The Town of Lakeshore has implemented several energy conservation and demand management initiatives in the past. To date, these initiatives have involved:

- Establishment of the Energy Management Committee to drive conservation and efficiency
- Collection, tracking and analysis of facility consumption and cost data
- Installation of energy control devices such as occupancy sensors and programmable thermostats at various municipal facilities
- Solicitation of energy conservation ideas from increasingly aware and knowledgeable facility managers and occupants
- Widespread retrofitting of lighting systems at various municipal facilities to energy efficient alternatives such as T-8, T-5, compact fluorescent, or LED technologies

- Where practical, intermittent installation of energy efficient pumps/motors and Variable Frequency Drives, which control AC motor speed and torque by varying motor input frequency and voltage
- Commitments to develop a large scale solar photovoltaic rooftop system at the Town's new Multi-Use Recreation Facility

The Town has taken concrete steps to date with the intention of reducing energy use and costs. By taking the next step to develop a 5-year ECDM plan, the Town is positioning itself to expand these efforts in other facilities, processes and operations.

Renewable Energy Utilized or Planned

Although energy conservation and improving efficiency are the main focus of the ECDM plan, sustainable buildings can also include renewable energy generation as a means of lowering GHG emissions. Available technologies include solar photovoltaic, wind, solar water/air heating, passive heating and cooling technologies, ground source heat pumps, biomass, and others.

The Town has embraced renewable energy generation through its commitment to develop a large scale solar photovoltaic system on the rooftop of the new Multi-Use Recreation Facility ("MURF"). This system is anticipated to be approximately 700 kW (DC), and is expected to generate roughly 792,000 kWh annually, which offsets approximately 6.8% of the 11,637,453 kWh of energy used by the Town in the 2011 baseline year. In terms of GHG emissions, the MURF solar PV system is expected to offset approximately 546,124 kg of CO₂e annually, which represents roughly 3.8% of the total GHG emissions from the Town on the 2011 baseline year.

The Town will consider additional renewable energy generation at other municipal facilities where possible. Residents of Lakeshore have demonstrated their commitment to renewable energy through the development of both wind turbines and solar PV on private lands. The Town of Lakeshore is supportive of renewable energy generation and may investigate other opportunities in the future.

Structure Planning

Staffing requirements and duties

The Town of Lakeshore will incorporate energy conservation and efficiency into standard operating procedures and the knowledge requirements for management level positions with a direct responsibility for facility energy consumption. Department heads and managers will endeavour to incorporate energy efficiency and conservation into all operations and processes.

Consideration of energy efficiency for all projects

At the management level, the Town of Lakeshore will incorporate life cycle cost analysis into the design procedures for all capital projects. Typical projects might include major capital replacements of chillers, boilers, roofs, windows, fans, pumps, piping, motors, and the like. Equipment to be considered in this process typically includes:

- HVAC equipment (boilers, chillers, pumps, motors, etc.)
- Lighting and controls Building envelope (roofs, insulation, windows, doors, etc.)
- Water use (pools, toilets, water reclamation, etc.)

- Building Automation System controls
- Process improvements
- Back-up generators
- Any other energy consuming device

Energy conservation project selection and development generally follows a four step process:

1. Project Identification and Feasibility - This includes energy audits, feasibility analysis, or detailed Condition Assessments
2. Planning and Budgeting - This includes project financing considerations, incentives, business case, and approvals
3. Implementation - This step generally involves tendering, project execution, project management, and commissioning
4. Monitoring and Verification - This step involves measuring and verifying results, and reporting achievements.

The intention of the ECDM plan is to dovetail energy conservation and demand management as part of Lakeshore's normal course of business for all facility and operational retrofits, including capital renewal and life cycle replacement projects.

Success in these endeavours requires incorporating conservation and demand management options at the initial stages of a project's design. In so doing, this ensures that options for improving energy efficiency are considered, evaluated, and quantified in terms of life cycle costing analysis, including cost, maintenance and emissions reductions. A project energy efficiency checklist might include the following line items:

- Check for incentive/funding sources
- Applications/Information required for funding
- Determine project base case
- Review Energy Efficient options
- Project costs (base case vs. energy efficient case)
- Project savings
- Maintenance savings
- Financial benefits
- Environmental benefits
- Incentives/funding
- Overall benefits
- Life Cycle Analysis Recommendations

Resources Planning

Energy Leader

The Town of Lakeshore has clearly designated leadership and overall responsibility for corporate energy management. This leadership role is being performed by the Energy Management Committee. In many instances, this position might be assigned to an individual rather than a committee. The Town of Lakeshore believes that a committee approach is the ideal framework, as this lends itself to greater collaboration, more functional skill sets and knowledge transfer, and continuity in the event of staff turnover.

Energy Team

The Town of Lakeshore will consider appointing employees to act as departmental energy efficiency team members, where it is appropriate and practical.

Key Individuals

The Town of Lakeshore will identify staff members and personnel from our critical service providers who carry significant responsibility for energy performance or who can make essential input to energy management processes, and will consider including these key individuals either directly or indirectly into the Energy Management Committee.

External Consultants and Suppliers

The Town of Lakeshore will give due consideration to energy conservation and efficiency based on ECDM goals and objectives when selecting external consultants and energy suppliers.

Energy Training

Training facility staff on energy management practices and concepts builds competencies that they can use to operate their facilities and carry out operations more effectively and efficiently. The Town of Lakeshore will seek to include energy training concepts for relevant staff, where appropriate. Training may not be limited to operators and maintainers with "hands-on" involvement with energy consuming equipment but will also include others since they also make energy consumption decision in their daily work. Training focused on the energy use and conservation opportunities associated with employees' job functions will be utilized whenever feasible and appropriate.

Procurement Planning

Energy Purchasing

Conservation of energy is critical not only for its environmental and sustainability benefits, but also as a means of cost control for the Town of Lakeshore. To this end, and in light of steadily increasing energy costs in recent years, the procurement of energy is similarly important. Many options are available to reduce and manage energy costs; however cost is only one consideration. In addition to costs, consideration should be given to available energy services, energy quality and reliability, and supplier performance.

Historically, the Town has engaged with Local Authority Services (a subsidiary of the Association of Municipalities of Ontario) to manage risk and mitigate the cost of energy. While LAS-AMO offers both electricity and natural gas procurement strategies, the Town of

Lakeshore will endeavour to further ascertain the offerings available in the market, in an effort to continuously pursue energy purchasing strategies that most effectively meet the needs of the municipality.

Consideration of energy efficiency for all projects

The Town of Lakeshore will consider life cycle cost analysis into the design procedures for all capital projects.

Consideration of energy efficiency of acquired equipment

The Town of Lakeshore will consider energy efficient criteria when evaluating, comparing, selecting, or purchasing materials and equipment.

Implementation Planning

Communication Programs

Individual behaviour modification has the potential to be a primary driver of energy conservation. In order to encourage behaviours that further advance the Town's ECDM plan, the Town will consider developing a communication strategy that creates and sustains awareness of energy efficiency as a priority among employees, conveys a commitment to stakeholders, and nurtures a culture of conservation, sustainability, and efficiency.

Projects Execution

Municipal Level

The Town of Lakeshore is undertaking this 5 year Energy Conservation and Demand Management Plan so as to reduce the energy consumed in the provision of municipal services. In so doing, the Town's conservation actions will positively impact all internal and external stakeholders. The guiding philosophy of this initial 5 year ECDM plan is to gain understanding, knowledge, and competencies through the implementation of no-to-low cost energy conservation activities. As the Energy Management Committee continues to develop skills and knowledge, increasingly sophisticated and capital intensive measures will be analyzed and implemented where feasible. The Energy Management Committee will evaluate the available energy conservation measures for municipal facilities, and will make recommendations for implementation of such measures as the availability of resources allows.

The Town of Lakeshore continues to grow and improve the quality of services to residents, visitors, and businesses. As older, aging facilities are reaching the end of their useful lives, new facilities are taking their place. New arenas, street lighting, roads, bridges, and water treatment and distribution infrastructure projects are changing the profile and landscape of the municipality. During this period of regeneration, growth, and renewal, the Town of Lakeshore has committed considerable efforts, funds, and resources towards bringing these municipal service improvements to reality.

It is the Town's position that unrealistic or over-ambitious conservation targets should be avoided during the implementation of an initial conservation plan, particularly during this significant period of growth and renewal. This growth and renewal generally requires a similar growth in the energy required to support the growth. As such, in the face of increasing energy requirements over the foreseeable future, the Energy Management Committee seeks overall reductions in energy consumption, expenditures, and intensity.

Energy audits were conducted at 26 municipal facilities. The most significant energy conservation opportunities are generally found in the largest energy consuming facilities. The Energy Management Committee selected five of the higher energy consuming facilities that represented the best opportunities for savings, and initiated detailed energy audits at:

1. Lakeshore Town Hall - 419 Notre Dame St.
2. Denis St. Pierre Water Pollution Control Plant - 276 Rourke Line Rd.
3. John George Water Treatment Plant - 492 Lakeview Drive
4. Stoney Point Water Treatment Plant - 6011 St. Clair Road
5. Lakeshore East Public Works Garage - 1089 Puce Road

These energy audits were performed by Mr. Todd Salerno of Stantec Consulting Ltd. These audits produced a series of recommendations for possible energy conservation measures to be undertaken at each facility. These opportunities were categorized in three groupings:

- Low Cost/No Cost
- Capital Intensive
- Future Considerations

The focus of the efforts resulting from these detailed audits would centre on the Low Cost/No Cost opportunities within each facility. These opportunities will allow the Town of Lakeshore to undertake conservation efforts that will provide the most immediate payback. As these efforts are exhausted over time, and savings from these efforts are realized, the focus can shift toward the Capital Intensive and Future Considerations opportunities, as resources allow. The list of potential energy conservation measures are presented within the audit reports for each facility. These reports are included as Appendices A through E at the end of this report document.

The remaining 21 facilities presented relatively fewer opportunities for immediate energy savings. These facilities were examined with a less rigorous "walk through" audit, performed by Essex Energy Corporation staff. These audits focused on the most immediate conservation opportunities, with an emphasis on low-to-no cost efforts. The facilities inspected were:

- Haycroft Reservoir and Booster Pump Station
- Comber Community Centre
- Comber Library
- Comber OPP Dispatch
- Comber Reservoir and Booster Pump Station
- North Woodslee WPCP
- South Woodslee WPCP
- Belle River Marina
- Fire Station #1
- Fire Station #2

- Fire Station #3
- Fire Station #4
- Fire Station #5
- Lakeshore East Rochester Public Works Garage
- Puce Community Hall
- Maidstone Museum
- OPP Station
- Dog Pound
- Water Distribution Garage
- Stoney Point Pump House
- Comber Pump House
- Belle River Pump House

The results of these audits are summarized for each facility and presented collectively as Appendix F.

Asset Level

The Energy Management Committee holds overall responsibility for the development of the ECDM, and the implementation of energy conservation measures. The Committee will evaluate the potential energy saving opportunities within each facility, and will prioritize the efforts to be undertaken based on the expected energy and cost savings, the payback for the individual measure to be employed, and the availability of Town resources to affect the improvement.

Once individual conservation efforts have been recommended, approved, and funded the Energy Management Committee will drive the implementation of specific measures through facility occupants and staff. Measurements of effectiveness will be undertaken annually, through the existing requirement for the Town to publish annual updates on the energy consumption and GHG emissions reported for the 2011 baseline year.

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 Energy Management Committee is responsible for providing an annual progress report with energy consumption data and initiatives undertaken, as specified under O. Reg. 397/11 of the Green Energy Act.

As part the ECDM plan, the implemented process improvements, program implementation and projects will continue to be documented and reviewed annually to update consumption savings. By regularly monitoring and reporting consumption and dollar savings and/or avoidance 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 energy management initiatives and consumption data will continue to be presented to Council through the Energy Management Committee.