THE CORPORATION OF THE TOWNSHIP OF ADJALA-TOSORONTIO

ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN

(2019-2023)

EXECUTIVE SUMMARY

The Township of Adjala-Tosorontio has initiated an Energy Conservation and Demand Management (CDM) Plan update to guide energy conservation initiatives. This CDM Plan fulfills the requirements of Ontario Regulation (O. Reg.) 507/18, under the Electricity Act.

This CDM Plan Update includes the tracking of annual energy consumption and Greenhouse Gas (GHG) emissions at all Township-owned facilities. Performance metrics are then compared to a representative sample of other municipally owned facilities in Ontario. Analysis of this data reveals that the Township's facilities consume less energy than the median benchmark.

Considering the findings of this analysis, future CDM Plan Updates are proposed to include technical, organizational, and behavioral energy conservation measures. Energy performance statistics for the Township's facilities are currently limited relative to some benchmarked facilities. Therefore, policies and activities are recommended to improve the Township's energy performance measurements. This will allow the identification of meaningful performance enhancements.

This CDM update provides new goals and objectives for the Township's energy consumption that will be utilized to foster continuous improvement for the next five years.

CDM PLAN REVIEW

The CDM Plan has been structured as a living document, to be refined and updated on a regular basis to ensure continuing relevance and direction.

Under O. Reg. 507/18, CDM Updates must be published on or before July 1, 2014 and on or before every fifth anniversary thereafter. Following this 2019 CDM Update, the next update is required by July 1, 2024.

AUTHORITY AND COMMUNICATION OF THE CDM PLAN UPDATE

The CDM Plan Update was developed through a working group of Staff across various departments.

The principles of this CDM Plan Update are aligned with the applicable regulatory requirements, literature review findings, principles of evidence-based decision making, corporate executive judgement, and perceived community expectations.

In accordance with O. Reg. 507/18, this CDM Plan Update has been made publicly available by publishing it on the Township's website, publishing it on the Township's intranet site, and making it available to the public in printed form at the Municipal Offices located at 7855 Sideroad 30, Alliston, Ontario.

1.0 INTRODUCTION

The Township of Adjala-Tosorontio is committed to managing its facilities in a responsible manner and to exploring cost-effective solutions for energy conservation. With these commitments in mind, the Township has continued to meet all Broader Public Sector energy reporting and planning requirements of O. Reg. 507/18, formerly O. Reg. 397/11.

Improving the Township's energy efficiency may provide long-term cost-savings while also reducing its carbon footprint.

The Township recognizes that tracking energy consumption facilitates action through evidence-based decision-making and promotes continuous improvement. The purpose of the CDM Plan, therefore, is to provide a framework to guide energy reduction initiatives within the Township's facilities in a holistic manner. The CDM Plan is intended as a tool to help set energy conservation goals and guide decisions over a multi-year-term. It is not intended to restrict future decisions of Council in the annual budgeting process. It is recognized that budget decisions require a consideration of many factors which the CDM Plan Update may not fully consider.

2.0 ACTUAL 2017 ENERGY CONSUMPTION DATA

Reporting

Energy consumption is reported for the last year for which complete information is available, therefore 2017 energy consumption is reported in 2019. The Township's 2017 energy consumption data is reported in accordance with the Provincial requirements.

The CDM Plan applies to all Township-owned facilities. Under the regulation, facilities are defined as "structures which are heated and cooled." Based on this definition, the Township reports on energy consumption for the list of buildings detailed in Table 1 (below). The Township's facilities rely on electricity, natural gas and propane for its energy needs.

17 Energy use for all Facilities

Municipal Service Area	Facility Name	Address		Floor Area (m^2)	Average Hours/Week	Annual Flow (Mega Litres)	Energy Source(s)	2017 Consumption	GHG Emissions (Kg)	Energy Intensity ($ekWh/m^2$)	Energy Intensity (ekWh/Mega Litre)
Town Hall	Municipal Offices	#7855 30 Sideroad	Alliston	1575	40	-	Electricity	109792 kWh	15401.75	10.11	-
							Propane	8762 Litres			
Fire Department	Station #1 Everett Fire Hall	#6234 County Road 13	Everett	958	40	-	Electricity	17248 kWh	17525.75	11.06	-
							Natural Gas	9112 m^3			
	Station #2 Loretto Fire Hall	#2821 County Road #50	Loretto	1332	40	-	Electricity	46238 kWh	23712.33	12.21	-
							Natural Gas	12119 m^3			
Public Works	South Public Works Depot	#3036 Concession 4 Adjala	Loretto	1362	40	-	Electricity	33909.0 kWh	19346.65	8.15	-
							Propane	12174 Litres			
	North Public Works Depot	#6240 County Road #13	Everett	464	40	-	Electricity	14197 kWh	15264.72	19.75	-
							Natural Gas	7944 m^3			
Municipal Drinking Water	Ball Park Pumphouse	#8186 Main Street	Everett	-	168	54.4	Electricity	41588 kWh	719.39	-	764.48
	Colgan Pumphouse	#1669 Concession Rd 8	Colgan	-	168	58.7	Electricity	46992 kWh	812.87	-	800.55
	Colgan Reservoir	#2139 Concession Rd 8	Colgan	-	168	12.9	Electricity	20315 kWh	351.41	-	1574.80
	Grohal Pumphouse	#18 Pine Park Blvd	Everett	-	168	58.9	Electricity	58800 kWh	1017.12	-	998.30
	Hockley Pumphouse	#12 Baxter Ave	Hockley	-	168	3	Electricity	14565 kWh	251.95	-	4855.07
	Lisle Pumphouse	#50 Princess Drive	Lisle	-	168	14	Electricity	18008 kWh	311.50	-	1286.28
	Loretto Heights Pumphouse	#6 Henry Court	Loretto	-	168	7.9	Electricity	18527 kWh	320.48	-	2345.16
	Rosemont #1 Pumphouse	#1A Jamieson Drive	Rosemont	-	168	4.9	Electricity	25753 kWh	445.47	-	5255.70
	Rosemont #3 Pumphouse	#1 Park Street	Rosemont	-	168	4.8	Electricity	93 kWh	1.60	-	19.30
	WECA #1 Pumphouse	#2 John Street	Loretto	-	168	7.4	Electricity	9156 kWh	158.38	-	1237.31
	WECA #2 Pumphouse	#4B Catherine Street	Loretto	-	168	20.2	Electricity	21479 kWh	371.55	-	1063.33
Municipal Wastewater	New Horizons Treatment Plant	#27 Dekker Street	Everett	-	168	23.9	Electricity	84644 kWh	1464.17	-	3541.58

All reported energy consumptions are converted to the total amount of greenhouse gas emissions (GHGs) as tonnes of carbon dioxide equivalent (tCO_2e) by the Ministry of Energy based on universally accepted conversion factors associated with each energy source. Furthermore, energy intensity performance metrics are calculated to enable meaningful benchmarking.

Tracking

Since 2013, the Township has reported its annual energy consumptions in accordance with the Broader Public Sector energy reporting requirements under O. Reg 507/18, formerly O. Reg. 397/11.

Tracking and benchmarking of annual energy consumption enables the Township to identify which facilities have the highest relative consumption, to investigate trends, and to review the savings associated with conservation measures. Then, via detailed inspection, the Township may arrange conservation measures to reduce energy consumption. Therefore, tracking is a key driver for actioning continuous improvement.

Benchmarking

Benchmarking enables the Township to review the energy performance of each facility relative to a sample of comparable facilities owned and managed by other municipalities in Ontario. The metric used for benchmarking is a function of the total annual energy used in a building divided by its indoor floor area, expressed as equivalent kilowatt hours per square foot (ekWh/sqft). “Equivalent kilowatt hours” are determined by converting all applicable energy types, such as natural gas and propane, into an equivalent kilowatt hour of electricity.

The Ministry provides a comprehensive database which compiles all 2012 energy consumption data reported by Broader Public Sector (BPS) agencies. This information is self-reported by BPS organizations and could contain errors. Considering this, the Township established a representative median benchmark of values based on the 2012 raw energy database. This median benchmark utilizes comparable floor area and hours of operation to create a representative sample for each facility type. Knowing the median energy consumption for each facility type, the Township may consider conventional rates of consumption in decision-making.

The median represents the middle value for the raw energy benchmarks and is not impacted by outliers, unlike the mean. Use of the median value becomes more applicable as the sample size increases. Facility types with a small reported sample size may not have a meaningful median benchmark.

Guiding Principles for Future Energy Conservation Measures

The 2019 CDM Plan Update contains key high-level principles that should serve as guidelines when considering future proposed energy conservation measures.

Buildings that have a relatively high energy consumption, where the most cost-effective energy savings are available, should be prioritized. Furthermore, the applicability of non-technical conservation methods, such as organizational and behavioral measures should also be considered.

Fiscal Responsibility

Budget constraints associated with capital investment represent the Township's major barrier to implementing conservation measures. Considering a limited budget, future projects related to energy efficiency should adhere to the following requirements:

- Demonstrate value-for-money
- Seek grant funding from senior levels of government, or cost-sharing arrangements with neighboring municipal partners
- Consider both technical and non-technical energy conservation measures
- If the cost-savings are greater than the interest rate for borrowing and the payback period is relatively short, it may be feasible to finance conservation measures through debenture.

Grant Funding

The Township should continue to seek financial assistance from higher levels of government to fund capital projects that contribute to a reduction in energy consumption.

For purposes of this Plan, grant funding will not be considered as an available resource due to its variability in availability and reliability within the budgeting process.

Technical Feasibility

The Township's delivery of services depends upon its facilities' reliability and predictability. If efficient building systems are integrated, then facility services may be delivered in a more cost-effective manner. However, careful technical planning is required to ensure the delivery and integration of these systems.

Since most of the Township's building system assets aggregate with each other, capital planning regarding asset maintenance and replacement are to be informed by a holistic planning approach. By managing each asset in a coordinated manner, the Township improves service delivery via greater efficiency, improved asset lifespan, and reduced replacement and maintenance costs.

Technical improvements of small components of the Townships building systems may increase system efficiency, however their integration also increases the complexity of asset management. To provide reliable and predictable services, asset improvements should also be considered in relation to their associated systems. Integration planning and associated risk analysis of the whole system will better display the feasibility of

improvements. Then, the Township will be better prepared to maximize the value of the system over its lifecycle and will retain its standard of service.

Ensuring that regular maintenance programs are being carried out at all facilities is also important. Maintenance should be scheduled to help reduce repair costs and to provide better forecasting of repair/replacement activities, with the goal of eliminating unforeseen events.

Accessibility

All proposed energy-saving retrofits at the Township's facilities must be designed for compliance with accessibility standards. The Township strives for a reduction in energy consumption without compromising the level or service provided to people with disabilities.

Asset Management

Conservation projects should be integrated with Asset Management Planning to ensure alignment with the lifecycle management strategy of any related operating systems.

The development of the Township's Asset Management Plan provides an opportunity to integrate energy conservation planning into a formalized plan. Through proper planning, efficiencies should be generated with a coordinated approach to asset rehabilitation. Assets should be replaced before repair costs or reliability become an issue. Replacement of assets should be timed to provide the lowest lifecycle cost while still achieving a standard level of service. Capital planning should strive to incorporate best energy conservation management practices when considering an asset's planned end-of-life replacement.

At times, it may make economic sense to consider renewal of assets which are strategically located together or technically integrated. When considering end-of-life replacement options or the procurement of new assets, energy efficiency should be evaluated. A marginal increase in upfront capital cost could produce significant long-term cost savings.

Routine maintenance, repairs, and recommissioning of mechanical building systems is to be forecasted and prioritized within annual budgets.

Technical energy conservation measures should be aligned with multi-year capital forecasts to ensure that upgrades are not being considered for facilities that are in poor condition and/or may be candidates for closure, sale, or demolition in the near future. Based on the current situation, investments in the Loretto Firehall #1 and the New Horizons Wastewater Treatment Plant may not be advisable due to appreciable deferred maintenance and/or future development plans.

Goals and Objectives

The CDM Update outlines the Township's goals and objectives for conservation and the reduction of energy consumption. The Plan is contingent on funding availability due to budget constraints.

No specific reduction targets were set out in the 2014 CDM, the objectives detailed have generally been adhered to. To provide better guidance on energy conservation projects an evidence-based approach will be followed. In this CDM update, the Township has included specific, measurable, attainable, realistic objectives. These are as follows:

Objective 1: Implement energy efficient retrofits to collectively reduce GHG emissions in all Municipal Drinking Water Pumphouses by at least 10%. Given the reality of budget constraints, this objective is contingent on being successful in securing grant funding. A project of this nature would currently be eligible for grant funding through the Federation of Canadian Municipalities (FCM) Green Municipal Fund. The Ontario Clean Water Agency (OCWA) who currently operates and maintains the Township's drinking water facilities is currently investigating the feasibility and effectiveness of various energy conservation measures.

Objective 2: Carry out an Energy Audit in at a minimum of one facility to inform capital planning with respect to future technical measures. Energy audits are typically completed by independent contractors using specialized technologies such as thermal imaging. The study would evaluate the existing building systems and identify conservation measures with the lowest financial costs and highest potential for energy reduction. This will serve as a pilot project so that staff can develop the analytic tool kit to support the findings and develop meaningful evidence-based recommendations.

Objective 3: Integrate Asset Management Planning processes with energy conservation best management practices and the principles outlined in the CDM Plan. The integration of energy performance and capital planning will ensure that information which the Township is already collecting is contributes to unified decision-making.

Objective 4: As noted in the 2014 CDM Plan, financial savings achieved through conservation measures (or a percentage thereof) should continue to be allocated to annual reserve contributions to fund future energy-saving projects. This will ensure that funding is available for proposed projects, particularly the Township's cost-share in the case of grant funding opportunities.
The timeframe for completing the four (4) above-noted objectives is by 2024, before the next scheduled CDM Plan update.

3.0 EVALUATION AND IMPROVEMENT

To optimize the use of the Township's limited resources, it is prudent to ensure that processes are in place to inform evidence-based decision-making and avail the

necessary funding. The objectives detailed above would be reinforced by developing robust processes in the following respects:

Capital Planning

Historically, the Township's energy conservation retrofit projects were established on an ad-hoc basis. They have been without a formal multi-year plan and dependent upon funding availability.

By formalizing its historical and desired actions into a cohesive and succinct structure, the Township may effectively share its vision as to the Township's asset management objectives.

The process of tracking and reporting energy consumption under O. Reg. 507/18 ensures that historical data is available to support meaningful analyses of future conservation measures. As outlined in Objective 3, this data should be formally integrated with the Township's asset management planning processes, which are currently under development as part of the O. Reg. 588/17 requirements.

Reserves

Reserve contributions are to be built from energy cost-savings and will fund future initiatives.

Historically, the Township has used reserve and reserve funds revenue to invest in capital assets. This process helps to stabilize the annual tax impact on residents. The Township should continue to build reserve contributions for future capital investments.

When possible, reserves are used to meet the Township's contribution requirements in grant-funded projects. Should there be operational surpluses, these funds should be directed to the Department's reserves.

Renewable Energy Production

For the CDM to offer meaningful guidance, the goals it sets out must be realistic and attainable.

Historically, the Township has avoided making major capital investments unless funds are available without incurring debt.

Renewable energy supply is not considered in this update of the CDM plan, as the initial capital investment would be cost-prohibitive considering the Township's current financial means. As on-site renewable energy production technologies become more efficient, generally accepted, and less costly, more opportunities may become available. More extensive cost-benefit analysis will be considered if technological advances and macro-economic forces grant increased accessibility. Ground source heat pumps and solar panels may be of interest, especially when considered in new construction projects.

4.0 Current Energy Conservation Performance

4.1 Current conservation measures

LED Lighting Retrofit

In 2016, Light-Emitting Diode (LED) retrofits were implemented on all the Township's streetlights and were made the standard for facilities. This project was undertaken in partnership with Local Authority Services (LAS).

RESULTS

This retrofit technology was highly successful as it reduced energy consumption and provided cost-savings while maintaining the same level of service in operations. Since the provincial requirements only pertain to facilities, the energy consumptions of the Township's streetlights are not compiled on an annual basis.

There is no data readily available to determine the exact amount of energy and cost-savings. It is estimated that the 434 fixtures reduced annual electricity consumption of the street lighting network by 63%. This energy savings translates to annual cost savings of about $56,000.

4.2 Upcoming 2019 Conservation Measures

Based on the success of the streetlight LED retrofits, the Township's Council approved a 2019 budget allocation to implement an LED retrofit program for the Municipal Offices, again in partnership with Local Authority Services (LAS) through the Association of

Municipalities of Ontario (AMO). The project is underway and will include the retrofit of all remaining fluorescent and halogen lighting at the Municipal Offices facility.

The Township will review the actual energy performance of LED lighting retrofit. Consideration will be given for similar retrofits in other facilities. The 2014 CDM Plan states that fluorescent lighting fixtures were installed in 2011 as a conservation retrofit measure.

Roof Replacement

A 2019 budget allocation was made for replacing the roof at the Municipal Offices. This project has the potential to improve the Municipal Office's overall energy efficiency. The intention is to replace the existing asphalt shingles with an energy efficient and durable metal roofing system. However, the quotations received to complete the work may necessitate a change in the design specifications to complete the work within budget.

Air Conditioner Servicing

Performance deficiencies with the air conditioning system were experienced in 2018. As a result, capital funding was made available in the 2019 budget for maintenance,

recommissioning, or replacement. The efficiency of the system should be improved because of the project.

AIR LEAKAGES

A 2019 budget allocation was made for re-apply caulking around windows and doors where the existing seals had been cracked and/or deteriorated. The caulking renewal project will improve the thermal efficiency of the building envelope, thereby reducing energy consumption associated with temperature control.

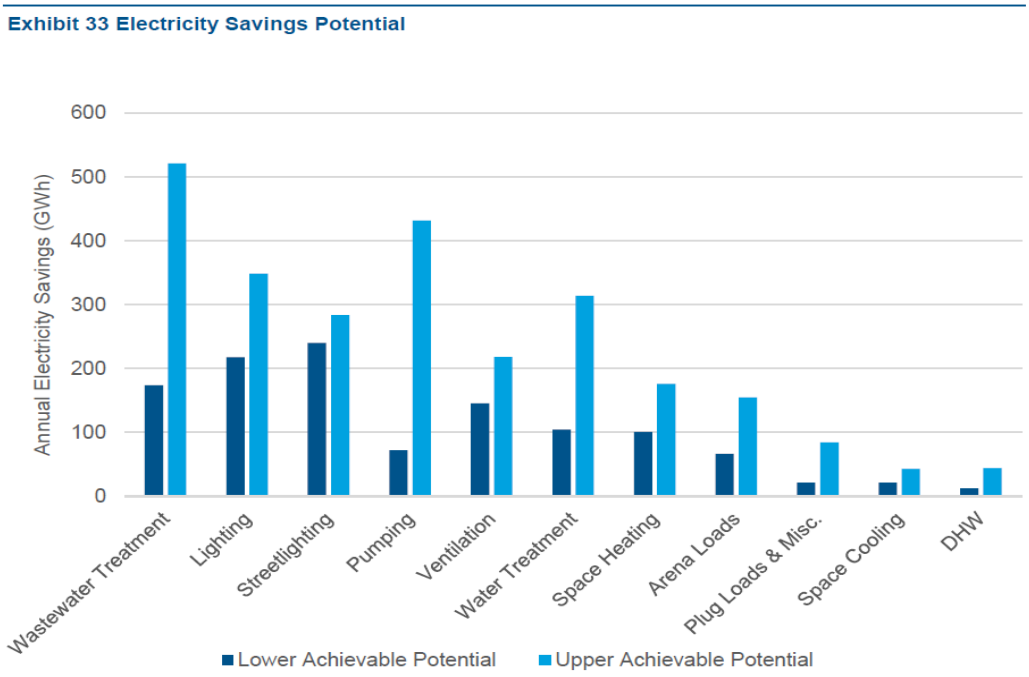
ACCESSIBILITY UPGRADES

In 2019 the Township installed push-button door openers to increase accessibility. Energy consumption for this system was considered as a part of the Township's procurement specifications.

4.3 PROPOSED CONSERVATION MEASURES

Current technical literature was reviewed as part of this CDM Update. Figure 1, taken from ICF Canada, Municipal Energy Report, 2018, illustrates the typical electricity savings potential for municipalities by operation type.

Figure 1: Source – ICF Canada Municipal Energy Report 2018



Energy Audit

To prioritize future energy conservation projects, the current state of energy consumption must be assessed.

An Energy Audit should be carried out to determine the energy performance of each building system component. Inspection and testing methods, such as the use of infrared cameras, may allow the isolation of building components where the most significant energy savings are available.

Based on the financial costs and energy savings associated with each technical upgrade, a Marginal GHG Abatement Cost Analysis could be carried out to determine the most efficient and economically feasible technical measures.

This information would allow the energy-savings from each technology to be expressed as tonnes of CO2 equivalent abated per dollar spent (tCO2e/$) and prioritized in ascending order.

Ranking the potential projects in this manner would improve the effectiveness and transparency of the capital planning process. This approach would ensure that the “low-hanging fruit” is picked before contemplating more costly and high-risk energy conservation measures.

Currently, Staff believe that the following conservation measures should be considered due to their perceived simplicity and relative cost-effectiveness:

Programmable Thermostats

In facilities that are generally unoccupied on evenings and weekends, energy savings can be achieved by programming the temperature setting on thermostats to consume slightly less energy during unoccupied periods. Programmable thermostats are relatively inexpensive and therefore their implementation has the potential for a short payback period.

HVAC

Historically, technical conservation measures for HVAC systems have not been undertaken at the Township’s facilities, meaning that it is highly likely that energy consumption could be significantly reduced through retrofit or eventual end-of-life replacement.

Insulation

At some facilities where drywall is not present (for example, the Public Works Depots) there are visible insulation deficiencies. Simple and obvious measures such as reinstating displaced insulation will improve the overall thermal resistivity of the building envelope and contribute to a reduction in energy use.

In areas with interior wall finishes, the insulation cannot be seen with the naked eye, however an Energy Audit would determine R-value of the building envelope.

Variable Frequency Drives

There is a high potential for electricity savings associated with pumping, as seen in Figure 1.

The Township operates drinking water systems and one wastewater system. Currently OCWA is exploring grant funding opportunities on the Township's behalf.

Maintenance Programs

Routine maintenance programs will be created or improved upon to ensure mechanical systems are operating optimally, which will minimize total costs over the lifespan of the asset. Consideration should be made to recommission rather than replace when functionality becomes compromised due to normal wear and tear.

Continuous Improvement

The Township will continue tracking and reporting annual energy consumptions. The Township Council will continue to be apprised of findings via communication from employees.

Update Engineering Design Standards

Best practices will be applied to new facilities assumed by the Township, and engineering standards (e.g. water and wastewater) will be updated to comply with new rules and regulations. For example, the engineering standards should specify the use of LED streetlights that will reduce long-term operating costs, decrease maintenance costs, and increase asset lifespan.

Alignment of the CDM Plan with other Policies, Plans, and Programs

Policies should be continued, amended, or adopted with the intent of lowering annual energy costs.

Disposal of surplus asset policies will guide the replacement of fleet vehicles, and consideration will include fuel economy improvements into the decision-making framework for replacements.

Evaluation and Improvement

A follow up process will be developed which allows for comparison between the previous and current situation. The Township will use this process to review the actual energy performance of LED lighting retrofit.

5.0 CONCLUSION

The Township is committed to ensuring that resources are being allocated efficiently, and in the context of energy conservation measures, understands that this commitment yields both environmental and financial benefit. Over the next five years, as the

requirements of Ontario Regulation 588/17 are being phased in, municipal capital planning is increasingly being driven by strategic Asset Management. Municipal Asset Management should therefore be integrated with CDM Planning. Tracking is a key pre-requisite for evidence-based decision making related to the asset management and CDM processes. Then, to foster continuous improvement of energy efficiency in the Township's facilities, it is important to continue benchmarking and goal setting, and to adhere to the strategic principles outlined within the Plan.

The CDM Plan should be considered a living document, to be updated and reviewed on a regular basis to provide important funding decisions for Council and Staff as we plan for the future.