Energy Conservation and Demand Management Plan

2025-2029

June, 2024

Tri-county Water Supply System

Table of Revisions

Revision #	Date	Description of Revision	Revised by
0	June 25, 2024	Initial Issue	Tri-County Water Board

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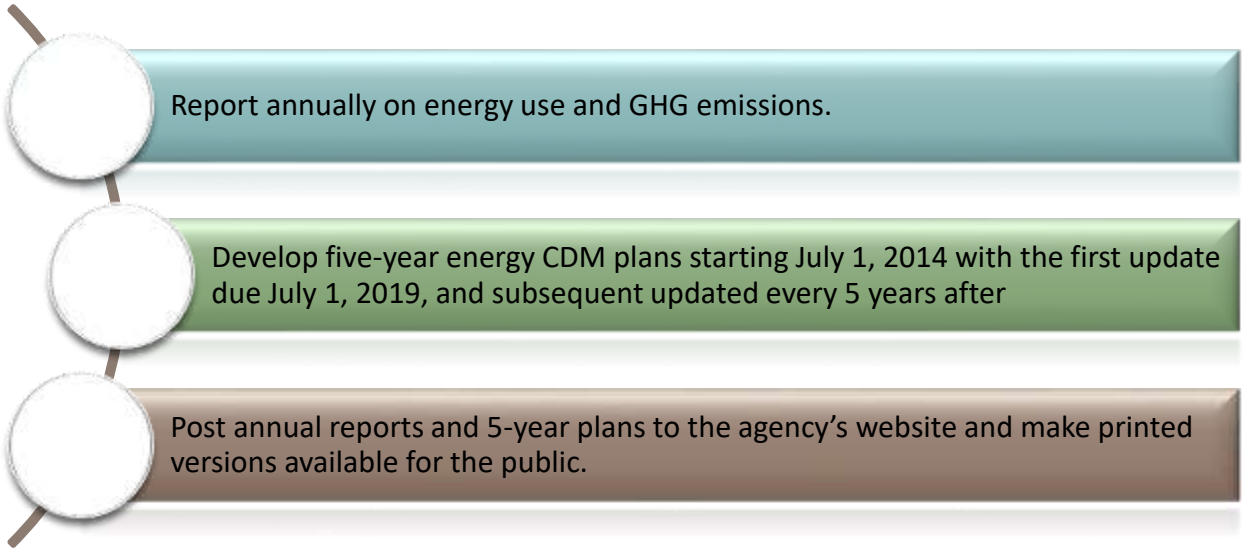
Executive Summary

By 2014, Ontario Government has mandated that all of the Broader public service entities develop a Five Year Conservation and Demand Management (CDM) Plan for the system in compliance with the requirements of Ontario Regulation 397/11 under the Green Energy Act, 2009. This regulation was replaced with Ontario Regulation 507/18 under the *Electricity Act, 1998* in 2018. The Regulation 507/18 was replaced with Ontario Regulation 25/23 in 2023.

Ontario Regulation 25/23 requires public agencies to:



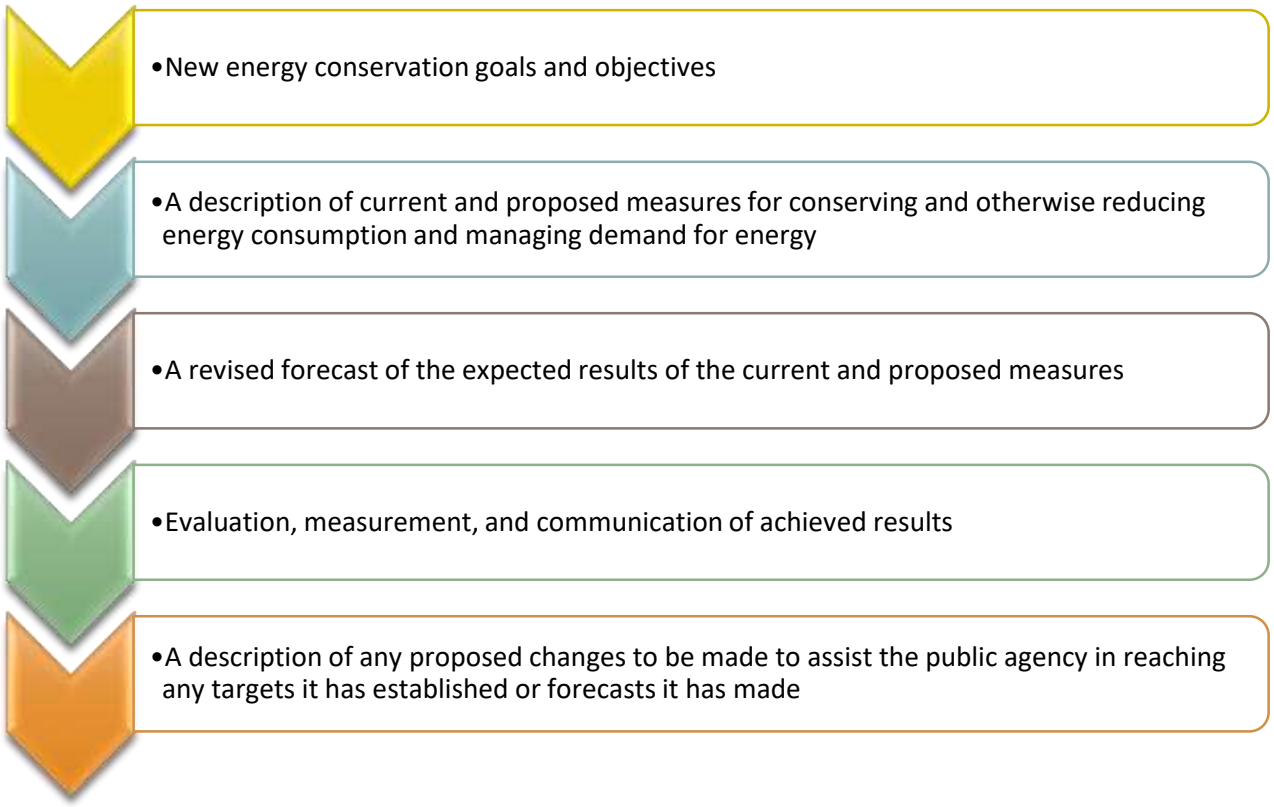
The Tri-County Drinking Water System serves the following systems: Southwest Middlesex, West Elgin, Dutton-Dunwich, Newbury and Bothwell Distribution Systems. The Southwest Middlesex and West Elgin Distribution Systems receive all their water directly from the Tri-County Drinking Water System. Dutton-Dunwich receives a portion of their water supply from the Tri-County Drinking Water System with the remainder coming from the Southwold Distribution System. Newbury and Bothwell Distribution Systems receive water indirectly from the Tri-County Drinking Water System via the Southwest Middlesex Distribution System. The system is operated under contract by the Ontario Clean Water Agency (OCWA).

The Tri-County retained OCWA to build the system's first CDM Plan in 2024. This CDM plan was developed as per the regulation and guidelines provided by Ministry of Energy, Northern Development and Mines and covers the period from 2025 to 2029. The plan was presented to the Management Board and approved on June 25, 2024.

The intent of the CDM Plan is to provide a basis for the Tri-County to implement improvements to its infrastructure and operations that reduce energy use, their associated costs, as well as environmental

effects of the system's activities. It is a living document that will evolve with the system's energy needs. This plan is designed to meet the current energy conservation needs of the Tri-County.

The CDM Plan should be consistent with other existing planning documents that relate to energy conservation. The updated CDM Plan will outline the following:



The Tri-County is committed to the promotion of responsible energy management through the implementation of economically viable energy efficiencies and environmental care throughout all facilities, plants and equipment. The Tri-County will take reasonable efforts to minimize impacts to the environment when allocating resources, while recognizing the needs of our community.

The Tri-County will exercise stewardship in the use of finite resources to demonstrate leadership, optimize our delivery of services, and enhance the overall quality of life in the community. We will strive to continually reduce our total energy consumption and associated carbon footprint through wise and efficient use of energy and resources.

Tri-County has always been very proactive towards energy conservation and Greenhouse Gas (GHG) reduction. It has engaged with various stakeholders and carried out innovative studies and pilot projects towards this direction. Tri-County has made energy benchmarking an utmost priority and is in the process of establishing its energy baseline for all facilities. It has plans to explore renewable sources

of energy opportunities and installation of new technologies along with operational and behavioral changes. Tri-County is focused in three key areas namely; people, process and technology to achieve its energy efficiency goals.

Concerns over ever-increasing energy prices and the negative impact of fossil fuels on the environment have raised interest in sustainability and predictable energy rates. Energy conservation has been an on-going process in all buildings.

The Tri-County will strive to ***reduce our electricity consumption by 5% by the end of 2029 from the 2022 baseline and to maintain the natural gas 2022 consumption levels prior to the proposed HVAC retrofit***. This Energy Reduction Target will apply to all departments and facilities owned by the Tri-County.

The Tri-County commits to the following objectives for the 2025-2029 period:

1. • Improve the Tri-County's understanding of energy consumption.
2. • Increase staff awareness and motivate staff to use energy more efficiently.
3. • Report energy performance changes and improvements annually.
4. • Improve the efficiency of energy use through low–cost opportunities by implementing the following:
   - Sound operating and maintenance practices;
   - Employee training, and staff awareness;
   - Monitoring and tracking system; and
   - Energy Demand Management program.

Included herein are the measures that will be undertaken to support the achievement of these objectives and goals.

Introduction and Background

By 2014, Ontario Government has mandated that all of the Broader public service entities develop a Five Year Conservation and Demand Management (CDM) Plan for the system in compliance with the requirements of Ontario Regulation 397/11 under the Green Energy Act, 2009. This regulation was replaced with Ontario Regulation 507/18 under the *Electricity Act, 1998* in 2018. The Regulation 507/18 was replaced with Ontario Regulation 25/23 in 2023.

Under Ontario Regulation 25/23, the requirements for broader public sector energy planning and reporting are identical to those under the former Ontario Regulations 397/11 and 507/18.

Under Ontario Regulation 25/23, all BPS organizations, including municipalities, service boards and townships, are required to report annually on energy use and greenhouse gas (GHG) emissions. The organizations are also required to develop a CDM plan and update it every five years, with this first update due July 1, 2019. The second update is required by July 1st 2024.

Ontario Regulation 25/23 requires public agencies to:

- Report annually on energy use and GHG emissions.
- Develop five-year energy CDM plans starting July 1, 2014 with the current update due July 1, 2024.
- Post annual reports and 5-year plans to the agency's website and make printed versions available for the public.

The Tri-County retained OCWA to build the system's first CDM Plan in 2024. This CDM plan was developed as per the regulation and guidelines provided by Ministry of Energy, Northern Development and Mines and covers the period from 2025 to 2029. The plan was presented to the Management Board and approved on June 25, 2024.

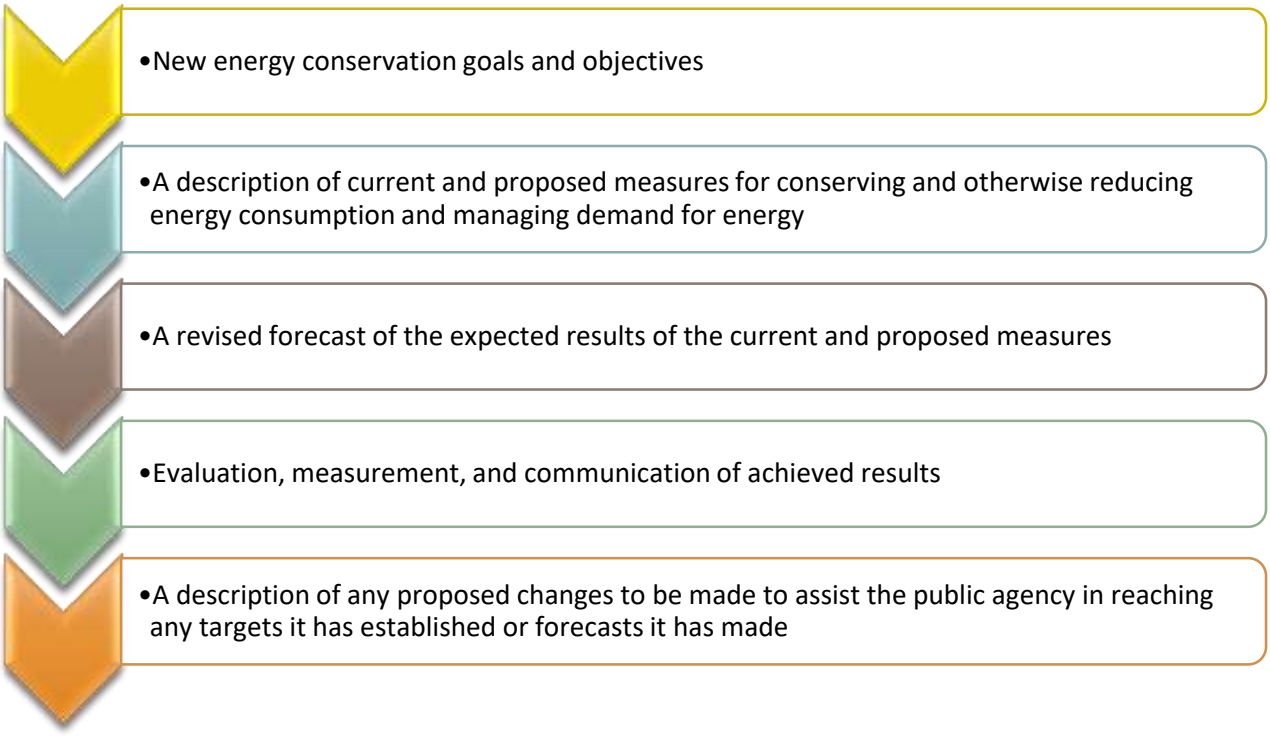
Overview

Municipalities are under a huge pressure to increase water rates to maintain their water systems and increasing energy cost to operate these plants.

There are significant advantages to developing and implementing a CDM Plan. The lowest cost options for meeting energy demands could be to implement simple energy efficiency measures. Simple actions of turning off lights and appliances, shutting off heaters in the summer and establishing efficient usage times, efficient production requirement, and many other ***actions can result in energy savings, while providing many other environmental, economic and social benefits, including reducing GHG emissions***. Reducing energy consumption translates to reducing costs to municipalities and the savings could be directed to more important works in the municipalities.

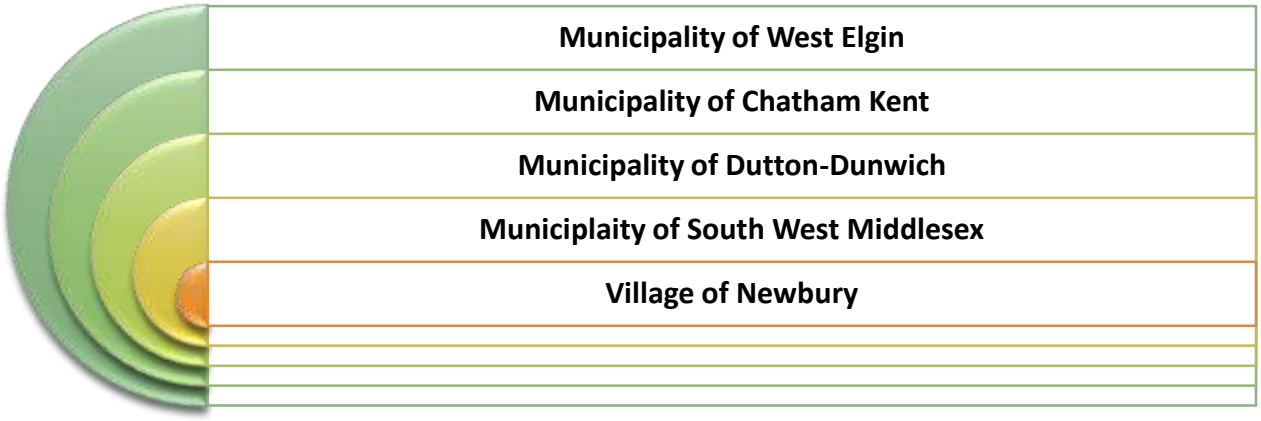
The intent of the CDM Plan is to provide a basis for the Tri-County to implement improvements to its infrastructure and operations that reduce energy use, their associated costs, as well as environmental effects of the system's activities. It is a living document that will evolve with the system's energy needs. This plan is designed to meet the current energy conservation needs of the Tri-County.

The CDM Plan should be consistent with other existing planning documents that relate to energy conservation. The updated CDM Plan will outline the following:



Tri-County Water Supply System

Tri-County is overseen by a Management Board comprised of individuals from ***5 municipalities***:



The water treatment plant is owned by the Municipality of West Elgin and is operated by the Ontario Clean Water Agency.

The Tri-County Drinking Water System consists of the Tri-County Water Treatment Plant (WTP) and the Tri-County Transmission Main. The Tri-County WTP is a membrane filtration surface water treatment facility with a total design capacity of 12,160m^3/day, located at 9210 Graham Road in the Municipality of West Elgin. The low lift pumping station is located south of the WTP at 8662 Graham Road, on the shores of Lake Erie.

The water treatment facility consists of an intake system, a low lift pumping station, a treatment system and distribution pumping system. The Tri-County Drinking Water System serves the following systems: Southwest Middlesex, West Elgin, Dutton-Dunwich, Newbury and Bothwell Distribution Systems. The Southwest Middlesex and West Elgin Distribution Systems receive all their water directly from the Tri-County Drinking Water System. Dutton-Dunwich receives a portion of their water supply from the Tri-County Drinking Water System with the remainder coming from the Southwold Distribution System. Newbury and Bothwell Distribution Systems receive water indirectly from the Tri-County Drinking Water System via the Southwest Middlesex Distribution System.

Energy Demand and Costs

Managing municipal energy consumption efficiently means providing the same services with less energy. Energy conservation measures are often the lowest cost options for providing many other environmental, economic and social benefits. This also results in cost savings, lower environmental load by avoiding GHG and local air, water and land emissions associated with energy production and consumption, local economic development opportunities and associated new jobs, enhanced reliability of energy systems, and reduced price volatility, and improved energy supply security.

Energy consumption and costs are relatively high in Ontario. The figure below shows the significant increase in electricity costs over the last decade, taxing municipal reserves.

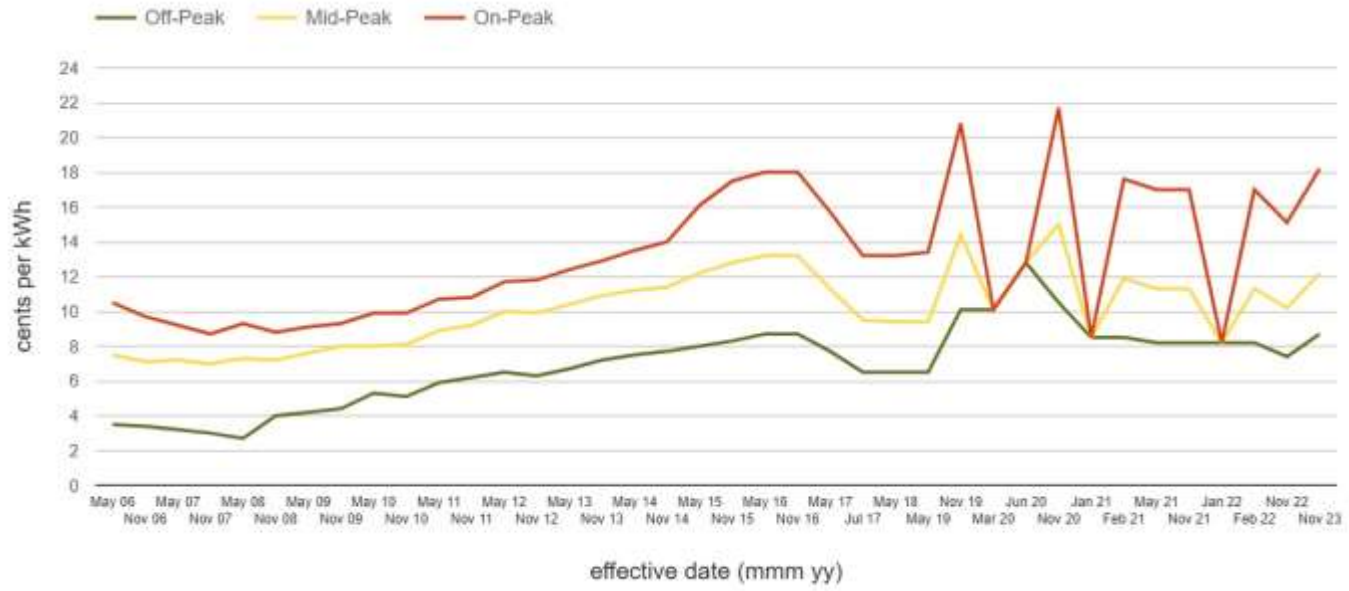


Figure 1 Historical TOU Electricity Rates[1]

The TOU prices are primarily for users with utilization rates under 50kW of average demand such as small pumping station, small commercial and residential locations.

Figure 2 Historical Tiered Prices[2]

[1] Ontario Energy Board, 2024
[2] Ontario Energy Board, 2024

Tiered is primarily for the medium size facilities, where Tri-County facilities fall under this category. However, for the purposes of highlighting the rise in the electricity prices over the years both of the above figures display a comparable trend.

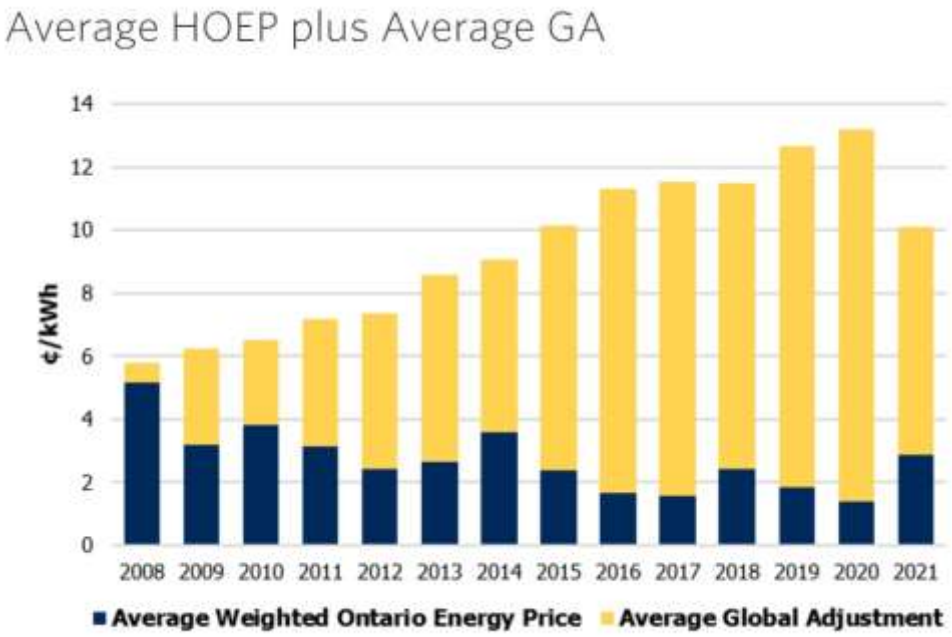


Figure 3 Historic HOEP and GA Blended Cost[3]

Another aspect of the hydro costs is the Global Adjustment charges, where the facilities such as the water treatment plant of Tri-County fall under. The plant falls under the class B category and the charges are based on the total consumption of the monthly basis. The primary way of reducing said charges is by reducing the facility electrical consumption.

[3] IESO, 2024

The Ontario water and wastewater treatment sectors are the largest municipal electricity consumers, representing more than a third of annual electricity consumption. In 2011, water and wastewater systems used about 1,815 gigawatt-hours (GWh) of electricity (enough to power about 200,000 homes) and 40 million m^3 of natural gas (enough to heat approximately 15,000 homes). This energy use may rise due to ever-more stringent treatment requirements, but these systems also have many opportunities to become more energy efficient, and generate renewable energy.[4]

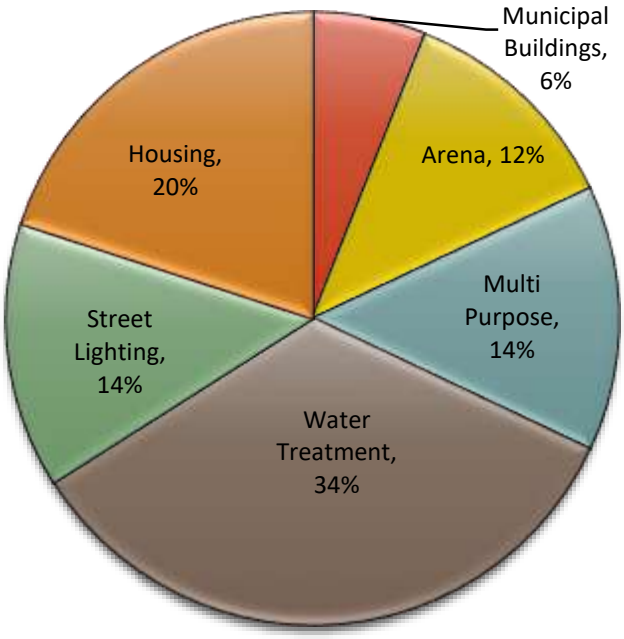
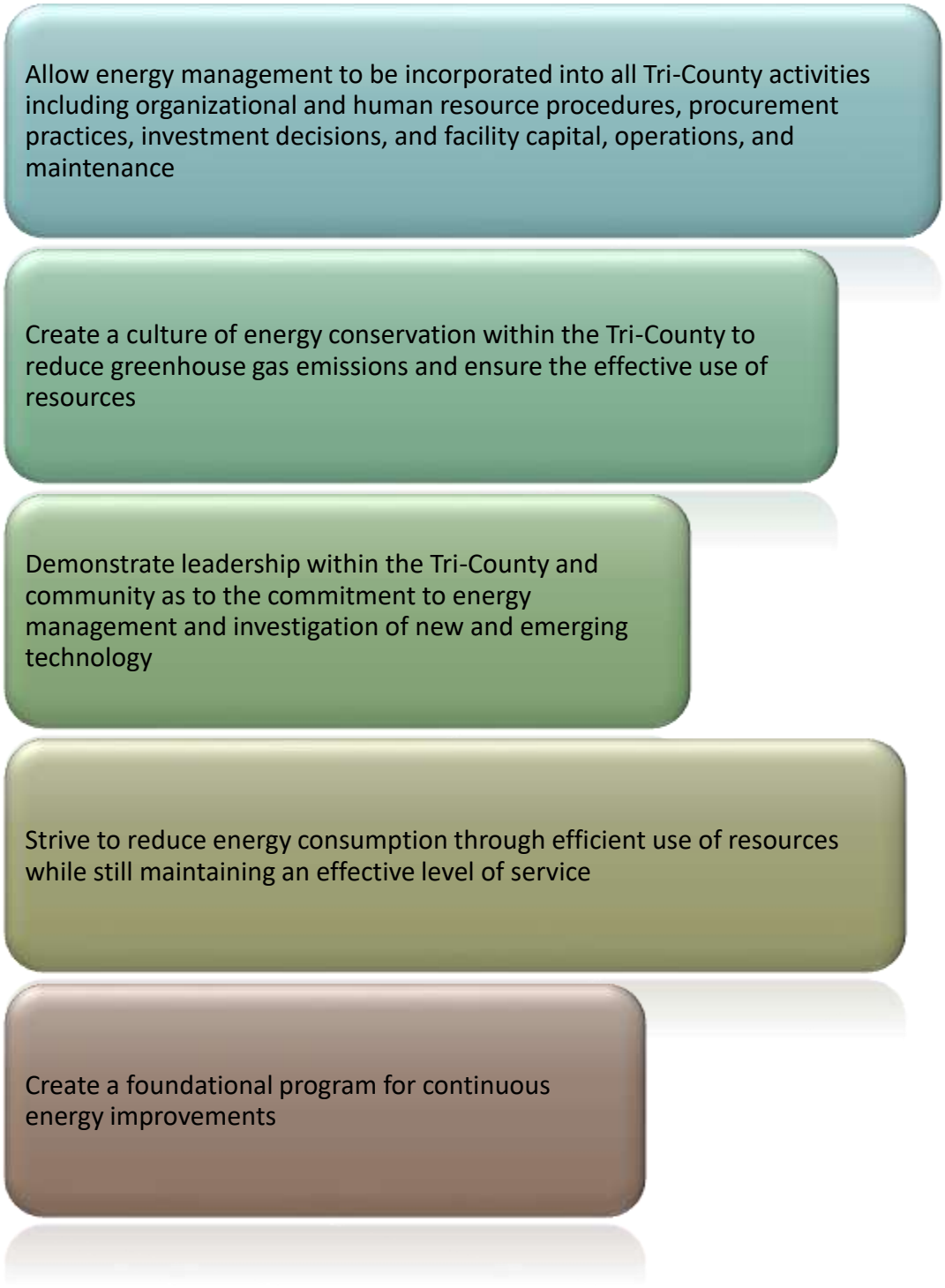


Figure 4 Municipal Energy Use by Sector in Ontario[3]

[4] Every Drop Counts, ECO, 2017

Goals and Objectives

The Tri-County's Energy Conservation and Demand Management Plan was completed to help achieve the following objectives:



Commitment

The Tri-County is committed to the promotion of responsible energy management through the implementation of economically viable energy efficiencies and environmental care throughout all facilities, plants and equipment. Tri-County will take reasonable efforts to minimize impacts to the environment when allocating resources, while recognizing the needs of our community.

Vision

The Tri-County will exercise stewardship in the use of finite resources to demonstrate leadership, optimize our delivery of services, and enhance the overall quality of life in the community. We will strive to continually reduce our total energy consumption and associated carbon footprint through wise and efficient use of energy and resources.

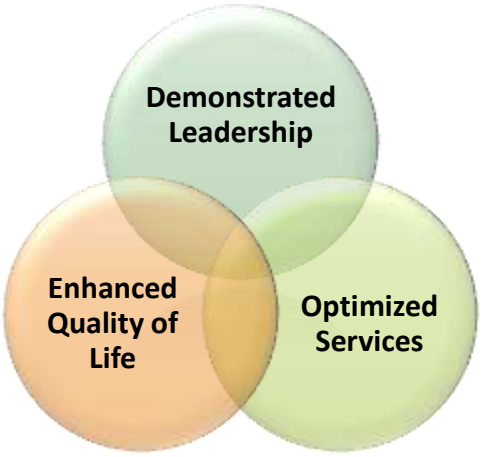


Figure 5 Vision Diagram

The preferred state of energy usage in the Tri-County is to continue to seek improvement to its energy conservation and management practices where applicable.

Energy Conservation Initiatives

The Tri-County is aware that energy conservation and management is imperative to creating a sustainable environment and reducing on-going operations/energy costs. Tri-County is working towards reducing energy in its facilities, as energy conservation benefits include:

- **Energy efficiency saves money** – Energy savings can be achieved by improving energy efficiency, which means using less energy to provide the same level of service and water quality.
- **Energy efficiency extends the life of existing infrastructure** – By monitoring equipment for energy efficiency, water systems are more attuned to the overall state of their infrastructure and can proactively take steps to ensure equipment is operating efficiently, thus reducing equipment strain and lowering operation and maintenance requirements.
- **Energy efficiency reduces GHG emissions** – Reducing energy consumption has a direct impact on reducing GHG emissions.
- **Energy efficiency enhances customer relations** – Customer expectations and concerns for water are increasing, thus energy providers are encouraging energy conservation and energy efficiency in consumer purchases. Effectively communicating

energy management efforts and successes to customers and other stakeholders is an opportunity for a water system to establish itself as an environmental steward in the community.

Water Conservation

Energy conservation and management does not only include electricity usage reduction in buildings. Water conservation also plays a direct role in the overall target for efficient energy management. The lower the amount of water and waste produced the less energy required for treatment and disposal.

Water efficiency efforts will result in energy savings, as the less water required the less energy consumed to treat, pump and distribute the water through the water system. Savings can be realized through supply side water efficiency efforts and through demand side water conservation efforts. Some supply side water efficiency efforts would be water accounting, water loss control, or leak detection and repair. Some demand side water conservation efforts would include public outreach and education programs to reduce water consumption, free water audits for large volume customers, retrofit programs for residential customer, water price, and water use regulations.

One way to encourage water conservation is to ***ensure all users are metered***. As Tri-County supplies water to the municipalities who then sell the water to customers, it is up to each municipality to determine whether their customers are metered. The majority of the municipal water users are metered. Additionally, Tri-County does have multiple water meters throughout the distribution system to determine each municipality's water system usage.

Tri-County could encourage the municipalities to install water meters for all customers, as the installation of water meters have **multiple benefits**:

Immediate water usage reduction

Historical statistics have shown that buildings reduce water consumption immediately following the installation of water meters.

Ability to detect water loss/leaks

The summation of all water meter readings over a period of time can be compared to the amount of water output at the WTP over the same period of time to see how much of the treated water actually gets consumed. This verification check could provide an indication of water loss or watermain leaks should the consumption be much lower than the water output.

These two parameters should be compared on an annual basis for a meaningful analysis. Should the gap between them increase, it is likely that watermain leaks are worsening and an investigation may be warranted.

Increase capacity of Water Systems

All water systems have a rated capacity or maximum output that they can produce. Should output be near the rated capacity (~80% of rated capacity) as demand increases, studies should be initiated to increase the capacity which would typically involve major upgrades to the systems.

Reducing water consumption has a direct effect on reducing output of the water systems and could avoid costly capital upgrades.

This is in turn beneficial from the municipal planning perspective as there would be capacity to accommodate new housing or commercial/industrial developments.

Decrease energy consumption of Water Systems

Water systems are costly to operate. The treatment and pumping of water are very energy and chemically intensive. Reducing output from these systems directly decreases energy and chemical costs.

Summary of Estimated Energy Savings and Cost for Completed and Planned Projects at Tri-County:

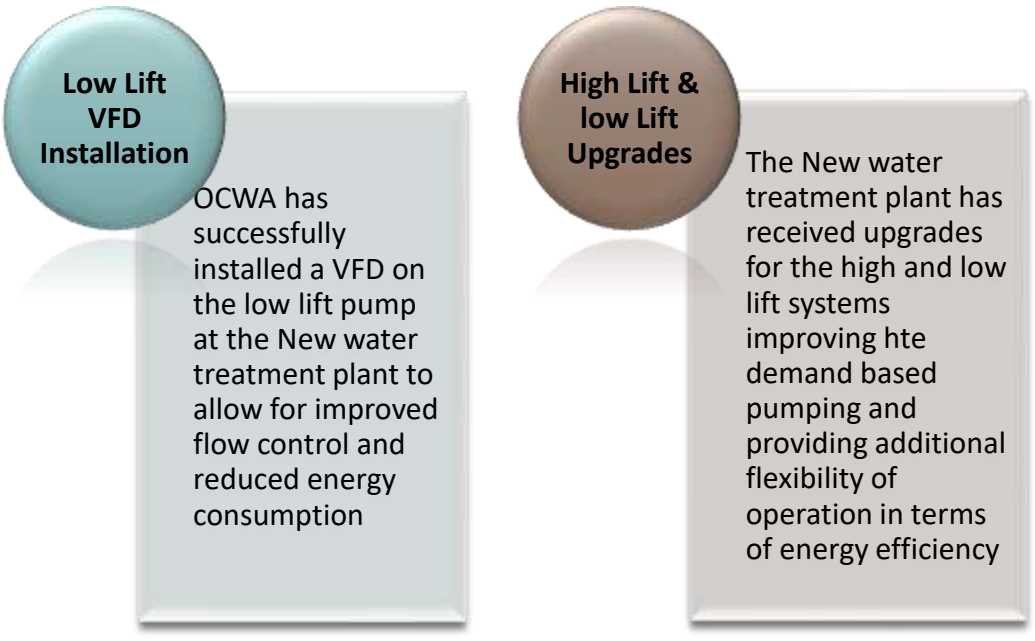
Table 1 Estimated Savings of Projects

Project	Estimated Yearly Energy Savings (kWh)	Estimated Demand Savings (kW)	Estimated Capital Cost ($)	Estimated Simple Payback Period (years)*	Project Forecasted completion date
Low Lift Pumps VFD Install	20,000	5	$12,000	$3,980 Incentive received 3 year simple payback	2022 (Complete)
Low Lift & High Lift PumpsVFD install (1 high lift pump 100 hp, and install 1 75 HP VFD on low lift pump)	158,259	17.6	$44,000	$11,400 Incentive received 1.5 year simple payback	2024 (Complete, system being optimized)

Project	Estimated Yearly Energy Savings (kWh)	Estimated Demand Savings (kW)	Estimated Capital Cost ($)	Estimated Simple Payback Period (years)*	Project Forecasted completion date
HVAC Upgrades at New Water Treatment Plant	25,000	6	$75,000	N/A	2027
High Lift Motor/pumps Rebuild at Water Treatment Plant	30,000	5	$25,000	N/A	2027-2029
Low Lift Motors/pumps Rebuild at Water Treatment Plant	20,000	3	$25,000	N/A	2027-2029
Total				-	-

***assuming $0.15/kWh and not including any IESO incentives**

Table 2 Most Successful Recent Energy Projects

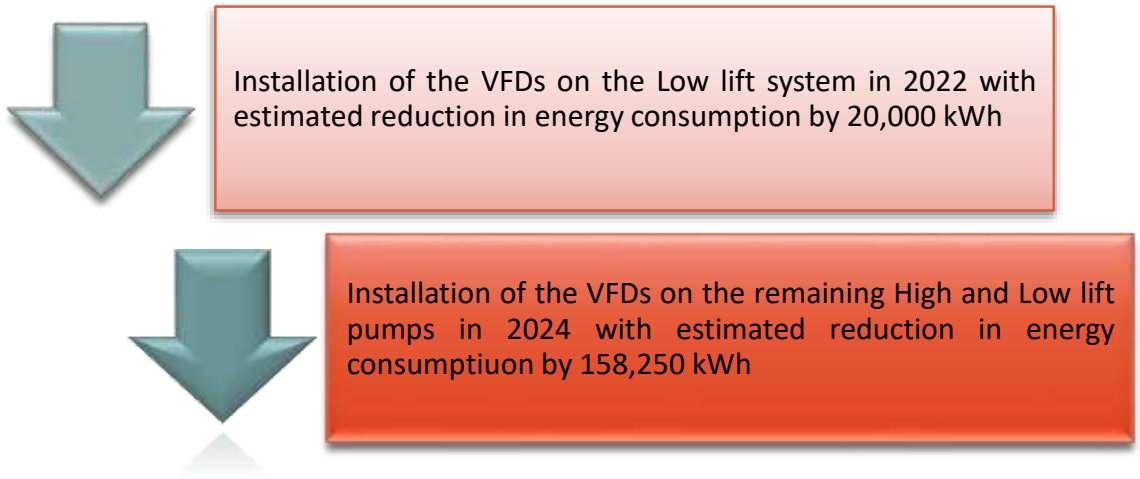


2019-2024 Energy Consumption Summary

Tracking Energy Consumption and Savings

Annual energy reporting is required under the regulation and allows the Tri-County to understand how energy is used in our buildings, identify potential energy conservation opportunities and track progress on energy conservation efforts. In addition to including the Tri-County's 2021 annual energy report as required under the regulation, we have also included and considered our 2022 annual energy consumption information, which helped us to report on our achievements and inform the development of new measures (see Schedule 1). Our previous years' annual energy reports, along with the current energy conservation and demand management plan can be found on Municipality of West Elgin website.

From 2019 to 2024, the greatest reductions achieved at the Tri-County were:



In addition to the municipalities 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.

Looking at the energy consumption levels from 2019 to 2022 years, Tricounty has increase consumption by 3.27% in terms of electricity and 23% in terms of natural gas consumption levels.

Please see Schedule 1 for a detailed analysis of the Tri-County's energy consumption from 2019 to 2022.

Looking forward: 2025-2029

Concerns over ever-increasing energy prices and the negative impact of fossil fuels on the environment have raised interest in sustainability and predictable energy rates. Energy conservation has been an on-going process in all buildings.

The Tri-County will strive to ***reduce our energy consumption (electricity) by 5% by the end of 2029 from the 2022 baseline and to maintain the natural gas 2022 consumption levels prior to the proposed HVAC retrofit***. This Energy Reduction Target will apply to all departments and facilities owned by the Tri-County.

The Tri-County commits to the following objectives for the 2025-2029 period:

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   - Energy Demand Management program.

Proposed Energy Conservation Measures

Energy conservation projects can be categorized as technical (switching street lighting from high pressure sodium to LED), organizational (establishing a green team), or behavioral (running a daylight harvesting campaign, where lights are turned off on sunny days).

Potential energy conservation projects were identified by comparing building-level energy benchmarks to the median energy benchmark for that building type. Building equipment tend to

lose their efficiency as they approach the end of their useful life. A plan should be developed to replace the equipment by evaluating the life cycle cost of the replacement options.
As discussed previously, the Tri-County has been continuously improving equipment and their energy efficiency. The creation of this Plan confirms that Tri-County already conforms with the steps for an energy improvement program. Tri-County has already implemented many ECMs.
Based on the steps for the energy improvement plan described in the Implementation section below, Tri-County has proposed the following conservation measures for implementation in the next 5 years:

Technical Measures Summary

Table 3 Technical Measures

Efficiency Measure	Status
Integrate the CUI tool into the decision making process for consideration of energy projects within the distribution system and the High Lift process at the WTP	To be completed 2026
Review the lighting replacement schedule to ensure consideration for new lighting technologies such as LEDs are considered to reduce the buildings electrical base load	To be completed 2028
Consider an energy walk through the Water treatment facilities to identify additional ECMs and/or to find opportunities for process optimization based on setpoint adjustment(s)	To be completed 2028

Organizational Measures

Table 4 Organizational Measures

Efficiency Measure	Status
Review of the Energy Management Team participants	Ongoing
Identification of energy champions for energy conservation opportunities identification (staff engagement)	Ongoing
Introduction of Working Energy Group for staff – energy efficiency awareness sessions for water treatment and distribution facilities staff	Ongoing

Behavioural Measures

Table 5 Behavioural Measures

Efficiency Measure	Status
Review of the BAS system controls and importance of holistic approach to climate management for staff (in light of newly retrofitted HVAC system at the WTP) – typical BAS optimization yields 5-15% in efficiency gains in terms of energy consumption.	To be completed 2028
Public education campaign (One Water Program) administered to the Grades 7 and 8 to promote the water conservation in the Tri-County area. The program aims to reduce the water consumption rates and teach water conservation principles at early age for developing long term water conservation habits among the residents supplied by Tri-County.	Ongoing Program

Renewable Energy Projects

Table 6 Renewable Energy Projects

Efficiency Measure	Status
Investigate options for solar renewable energy at the WTP – investigation of the solar energy collection opportunities. The systems can range from providing direct energy thorugh PV systems, or the hot water systems that utilize the solar radiation as means of heating up the water/glycol 50/50 loop to supplement the natural gas heating systems.	To be completed 2028

Best Practices

Best practices for implementing energy savings by reducing energy consumption or implementing other measures are described below for different methods for water systems and buildings.

Water Systems

Water systems consume a lot of energy in the production and distribution of drinking water. There are substantial opportunities to reduce energy costs by implementing operational changes, adding VFDs, using properly sized equipment, etc. Installing renewable energy will also assist in reducing energy costs. Best practices for these items are discussed in more details below.

Variable Frequency Drives

Normally, pumping represents the largest portion of energy consumption at a drinking water system. Improving pump and motor efficiency should be the focus of a system's energy management program, thus correcting for inappropriate pump sizing, upgrading standard efficiency motors with premium efficiency motors to installing variable frequency drives (VFDs). VFDs are electronic control devices that modulates the amount of power being delivered to a motor to allow for continuous matching of motor speed to load requirement for the pump. VFDs accommodate fluctuating flow demands, avoiding losses from throttled valves and bypass lines (unless it is a static head system), allow "soft starts" (reduces wear and tear on the motor) and provide more precise control of the process. Normally, savings of 10 – 50 % can result when VFDs are installed to increase motor and pump efficiency in drinking water systems.

Motor Efficiency

An effective way for drinking water systems to improve their energy performance is to replace the inefficient motors with higher efficiency models. By maintaining ventilation and temperature control to the optimal operating conditions provided by the motor manufacture will can result in motor efficiency at the operations level with very little capital expenditure.

Operational Changes

Changing normal operational settings can result in energy cost savings. Energy savings can be realized by increasing the difference between the high and low set points for water towers and reservoirs. Some operational settings could be changed to allow energy usage during the off peak energy times to decrease the electricity costs for the system. Some energy providers offer incentives and rebates for consultations with them, as agreements may be negotiated about load shifting opportunities.

Proper Equipment Sizing

Water systems are often designed for future demand purposes, and are therefore oversized for the current usage. Proper equipment sizing involves matching pumps to their intended duty and flow rate, as oversized pumps add to system operating cost in terms of energy and maintenance requirements. Some corrective actions to address oversized pumps are to replace the pump/motor with a downsized version; replace the impeller with a smaller one; install VFDs to match variable speed to load requirements for the pumps, and add a small pump to reduce the intermittent operation of the existing pump.

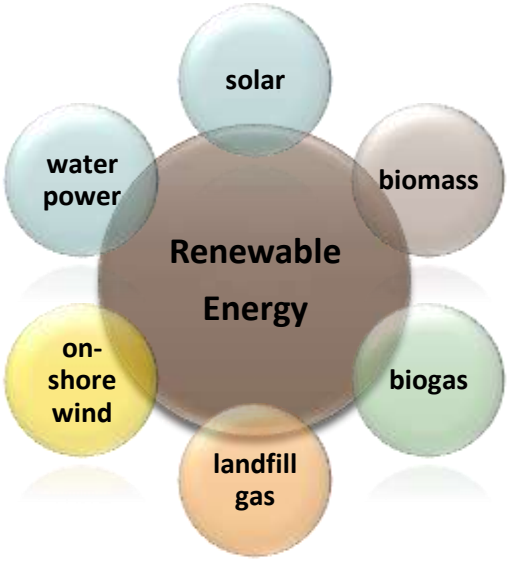


Figure 6 Renewable Energy Sources

Renewable Energy

Renewable energy projects can be built to reduce the dependence on the energy grid. Renewable energy projects could include solar, wind, or geothermal system to generate power. For solar systems, West Lambton booster station has room available for the switchgear as well as the open area for solar panels themselves.

Buildings

Nearly all buildings have lighting and heating, ventilation and air conditioning (HVAC) components, and they typically account for nearly all of the energy consumption in non-industrial buildings. Lighting and HVAC along with the building envelope upgrades are the major works that could lead to energy savings. Best practice measures of the three components are provided below.

Lighting Retrofits

There have been significant improvements in the area of lighting technology in recent years. Energy savings can be achieved by replacing older incandescent, T12 fluorescent, and metal halide lamps with T8 fluorescent, T5 fluorescent, compact fluorescent (CFL), and LED (light-emitting diode) lamps. Newer technology can produce the same amount of light for half or less of the input power, thereby reducing half or more energy consumption.

Lighting motion sensors could be a beneficial add-on for areas of infrequent occupancy, as most people do not turn off lights when they leave the area. This would ensure the light is automatically turned off when the area is not occupied.

Heating, Ventilation and Air Conditioning (HVAC) System Upgrades

HVAC system improvements offer the greatest potential for energy savings in most buildings. The first step for reducing HVAC operating costs in large buildings is to reduce HVAC loads. "Greening" an existing building may also include replacing equipment with more efficient models, improving controls and operating procedures, and retrofitting existing equipment to operate more efficiently. It must be realized, however, that HVAC systems contain many interrelated components, and upgrading them takes careful planning, professional engineering design, and careful implementation. Properly designed, installed and maintained HVAC systems are efficient, provide comfort to the occupants, and inhibit the growth of moulds and fungi.

Chiller manufacturers now provide a standard rating for part-load efficiency, reflecting the fact that chillers operate at less than full load 99% of the time. Staging multiple chillers or boilers to meet varying demand also greatly improves efficiencies at low and moderate building loads. Pairing different-sized chillers or boilers in parallel offers greater flexibility. Units should be staged with microprocessor controls to optimize system performance.

The fan motors in packaged units typically run at constant speeds. Variable frequency drives (VFDs) can be installed on the motors to match the fan output to the required airflow. Energy savings vary depending on the specific system characteristics, but in certain cases can be 50% or higher.

Programmable thermostats should be utilized where possible. It can be used to specify an automatic reduction in temperature overnight. Typical savings are 2% of the heating bill for every 1°C that the temperature is reduced overnight.

Building Envelope Upgrades

Reducing a building's energy consumption often revolves around changes to its mechanical and electrical operations or system. However, a building's roof and walls may also provide significant energy savings.

Adding/improving insulation to the roof and walls reduces the amount of heat lost to the environment in the winter and also reduces the heat coming into the building in the summer.
By implementing this measure, studies have shown a building could reduce the heating and cooling load substantially. This is generally a high cost measure for existing buildings since the

roof and walls essentially need to be rebuilt. The most effective strategy is to coordinate the work with a roof or wall replacement.

Plan Implementation

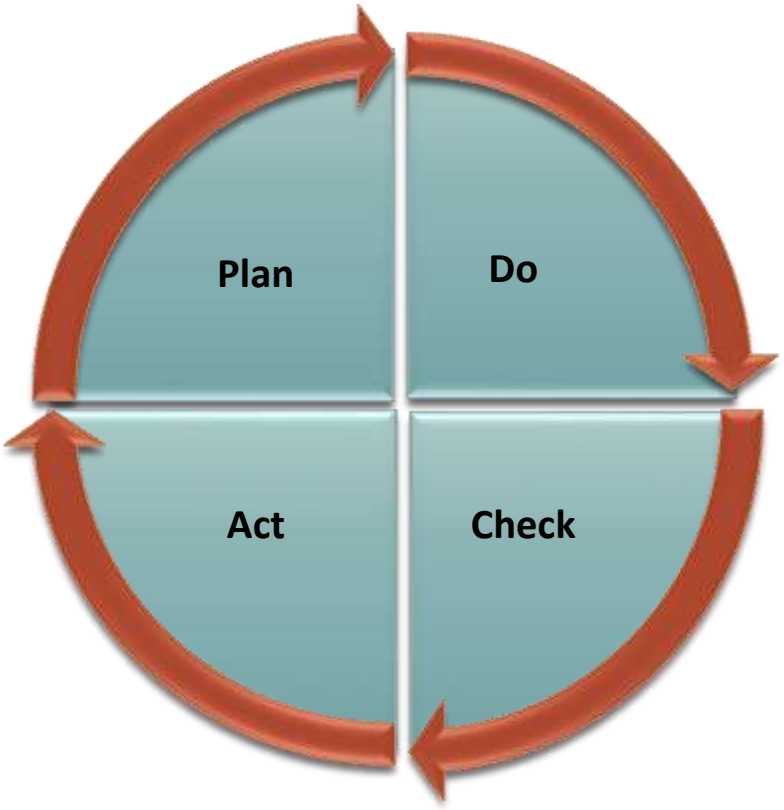
Ontario Regulation 25/23 requires increased municipal energy management and engagement. The main driver for a local municipality or service board to change the way energy is used relates to fiscal benefits and financial incentives. Energy is a manageable input to the business process, much like any other resource cost. The Tri-County is maintaining and developing current and planned services that continue to be affordable to taxpayers.

This CDM Plan provides the "big picture" view as an ongoing framework for optimizing overall energy use and achieving success.

Current practices must be enhanced and new approaches must be developed. To meet these needs, the Tri-County will consider designing a comprehensive program for collecting and analyzing monthly energy billing information, and ensuring that staff is informed about energy consumption. The resulting energy costs and consumption database will be used to monitor excessive variations, target facility follow-up assessments, and determine areas that could be candidates for improved conservation. These monitoring enhancements will improve the Tri-County understanding of the bottom line impact of energy management.

In order to establish a baseline for managing energy costs, the Tri-County has captured information critical to energy management planning. This formalizes the process involved in understanding the relative magnitude of energy costs, the possible ways to reduce energy use, energy targets that are likely to be achievable, and other associated activities that need to occur.

CDM Planning is intended to be a process of "continuous improvement." The Tri-County Intends to implement the *NRCAN, ISO 50001*'s four step plan–do–check–act management methodology, used in business for the control and continuous improvement of processes.


Plan
Do
Act
Check

PLAN

Establish the energy conservation objectives and processes necessary to deliver results in accordance with the expected outputs: the energy conservation targets or goals. Start on a small scale to test possible effects and financial feasibility. Develop an Energy Conservation Demand Management Plan prioritizing budgets, resources, and timelines.

DO

Implement the plan and collect data for analysis in the following "CHECK" and "ACT" steps. Develop projects' design and execution, preparing status reports, and implementing the communication strategy.

CHECK

Study the actual results (measured and collected in "DO" above) and compare against the expected results (targets or goals from the "PLAN") to ascertain any differences. Evaluate any deviations in implementation from the plan and also evaluate the appropriateness and completeness of the plan to enable the execution, i.e., "Do".

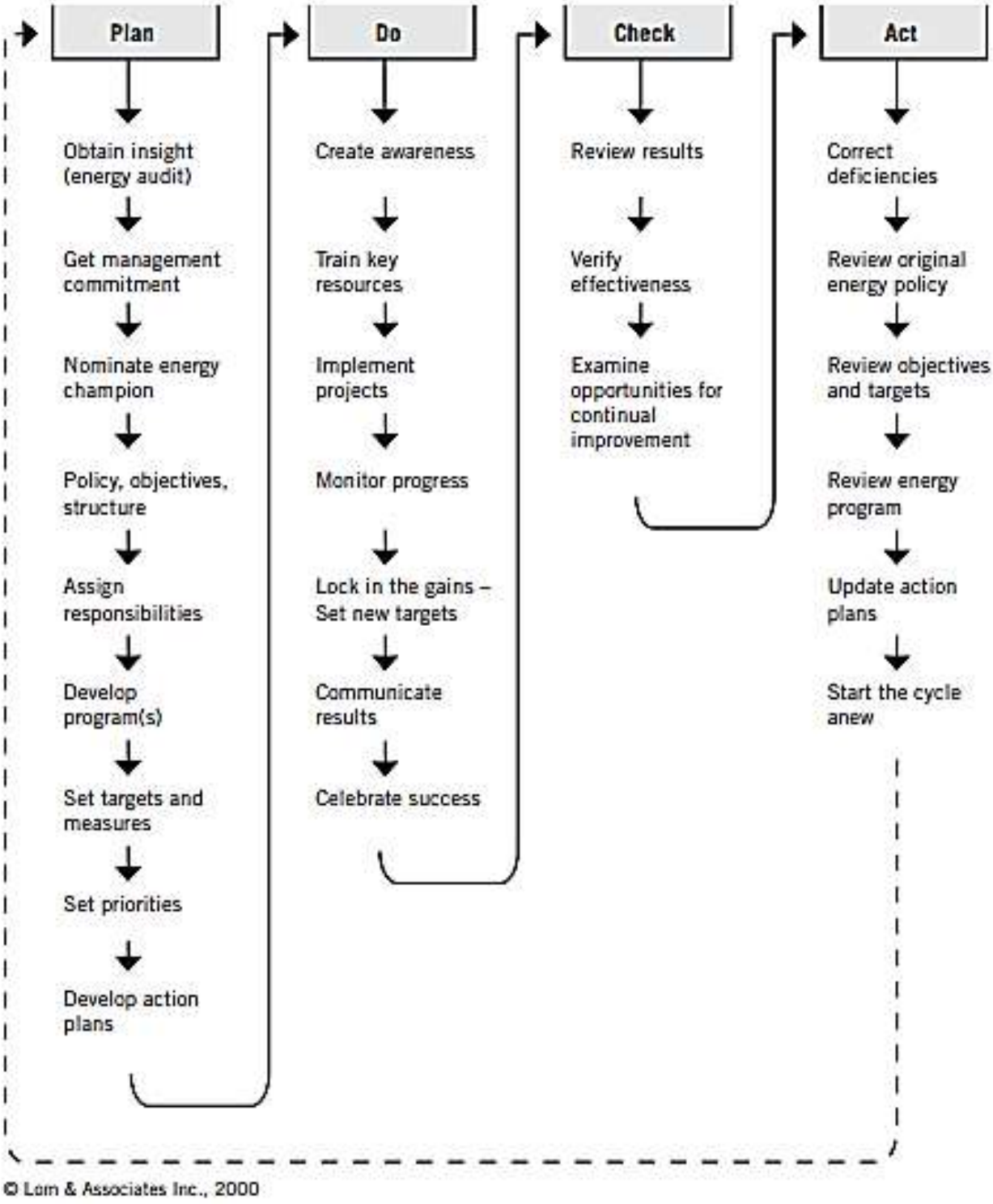
ACT

Recommend improvements and adjustments to the initial plan; determine the course of corrections and modifications to the plan.

The Tri-County implements tools to maintain and continually improve energy conservation and demand management. Benchmarking is the process that the Tri-County has implemented for collecting, analyzing and relating energy performance data of comparable activities to evaluate and comparing performance between or within entities.

The detailed energy conservation project planning process is visually illustrated below.

Figure 7 Energy Conservation Project Planning Process[5]



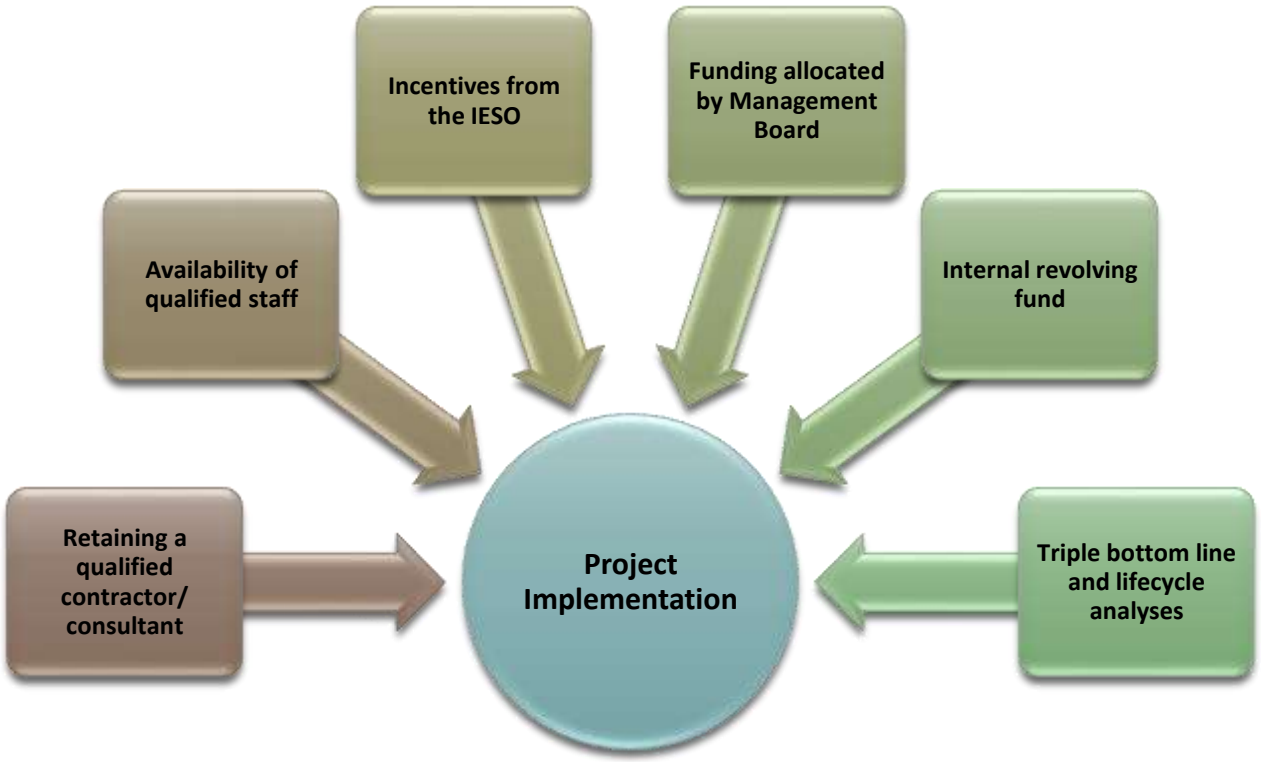
[5] Energy Efficiency Planning and Management Guide, CIPEC, 2002

Evaluation Metric Development

Energy conservation projects will be evaluated using an internal rate of return (the rate of interest the project could generate), along with simple payback (the number of years it would take to pay off the project from the savings). Hydro cost savings and life cycle analysis will be used to derive these parameters. In addition, costlier conservation projects will be bundled with more cost-effective ones to ensure their successful implementation.

Implementation of the proposed projects depends on:

Figure 8 Energy Projects Implementation



Timelines

Timelines are assigned based on measures/facility prioritization. These timelines allow for flexibility during implementation, and will be dependent upon the costs/incentives and business decisions driven by the Tri-County. We will carry out the required development of business procedures and communication programs and implement them methodically according to the planned timelines within the resources constraints that apply.

2024 & Beyond

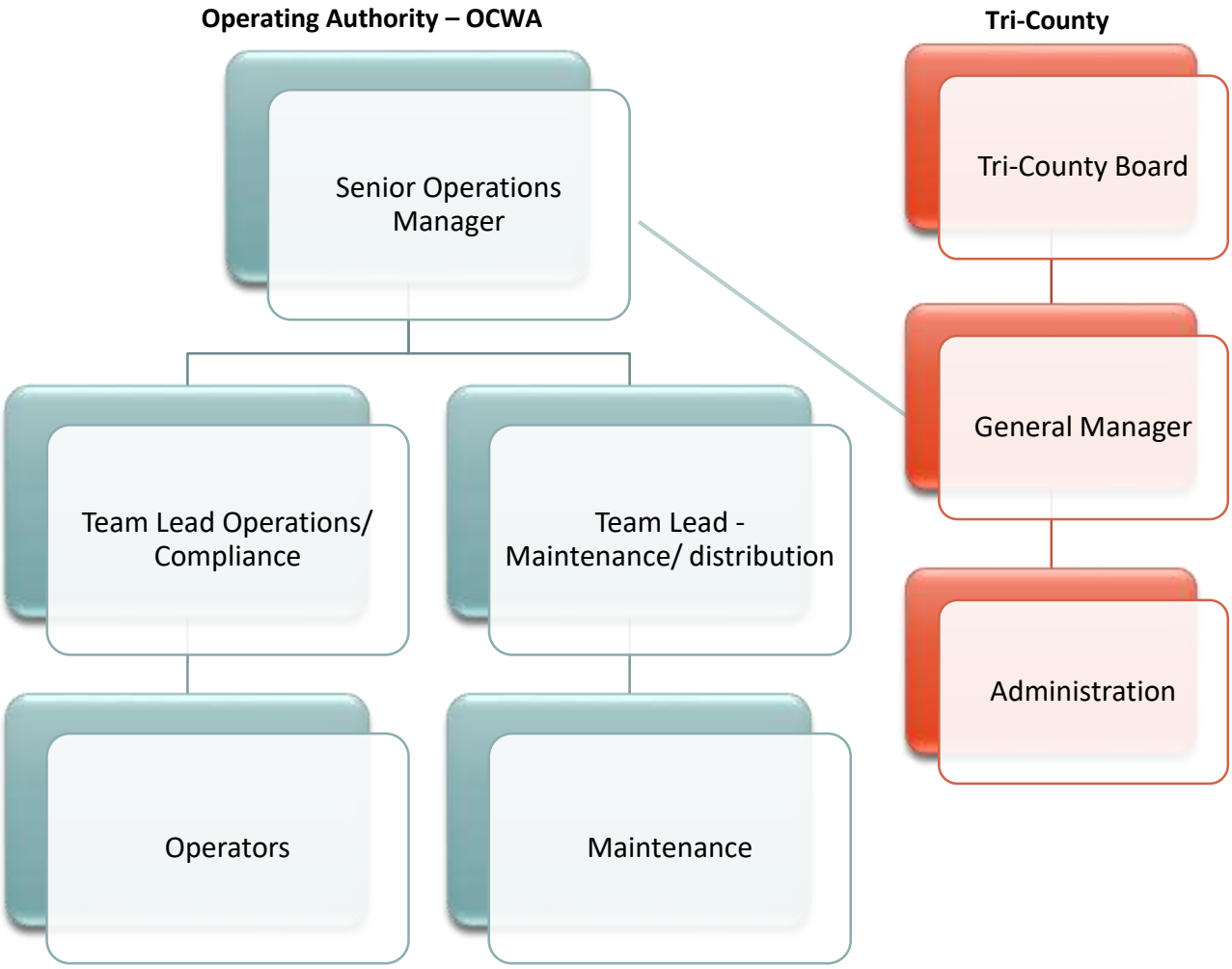
The Energy Conservation and Demand Management Plan is intended to be a living document and flexible roadmap that will provide guidance and encourage the Tri-County to incorporate energy management into their daily and future decisions. As capacity building and development of the foundation for successful energy management practices will be the primary focus for the initial implementation of the CDM Plan, future years will allow staff to apply their knowledge to investigate energy efficiency initiatives that will emerge as the energy management field continues to thrive and evolve.

Responsibilities

Energy Management Team

All Tri-County staff and its Board should have a responsibility to contribute to overall municipal energy management objectives. Technology alone will not achieve energy conservation and demand management objectives. Tri-County will benefit when staff realizes how everyday actions can reduce energy waste and decrease operating costs. Simple actions such as turning off lights, computers and printers, ensuring that filters on heating and cooling coils are clean and dust-free, etc., all contribute to reduced energy use and energy costs in Tri-County buildings. The Tri-County will thus create an energy management team incorporating the system operator, OCWA.

Figure 9 Structure of the Energy Management Team



Tri-County will support the Energy Management Team to maintain a methodical focus on energy costs. This Team will provide a vehicle for key staff from critical departments to track energy budgets, update energy related projects and develop accountability for achieving energy reduction targets. The Team will have the lead responsibility and accountability for monitoring and achieving energy reduction targets.

The role of monitoring progress will fall upon an Energy Management Team to be appointed by the Management Board. The Team will ensure that both the capital projects and behavioural changes outlined in this Plan are maintained on a continuing basis seeing as ***managing energy consumption is important to both environmental and financial stewardship.***

The specific mandate for the proposed Team shall be established by the Management Board and the Terms of Reference created by the Team (and approved by the Management Board) upon creation and shall be based generally on the following:

- Track energy spending by department/facility
- Analyze and prioritize projects for consideration by the Management Board on an annual basis
- Identify potential projects to consider in the future
- Create an energy awareness strategy for operational staff
- Report and track all utility incentives to take full advantage of them

Participation and education will be solicited from utility partners, both electrical and gas supplier (if applicable), to ensure up to date information on incentive programs, energy rates and other available assistance. Active participation from these partners will make the Energy Management Team that much more effective.

Monitoring and Evaluation

We will review and evaluate our energy plan, revising and updating it as necessary, on an annual basis within our corporate planning process.

To ensure the Tri-County meets its goals in energy consumption reduction, it is critical that there is regular monitoring and evaluation of its progress. Progress on projects will be monitored using the annual energy reports prepared under the regulation. A separate summary for each project will be prepared and archived.

Short Term Goal

As a minimum, there will be an evaluation at the end of 2026. As stated, a short term target of 3% energy reduction by the end of 2026 from the 2022 baseline is established. Energy usage of each facility for the year 2026 will be compiled and compared to the baseline energy usage in 2022. The comparison would provide the Tri-County an idea where it stands in meeting the short term goal and the long term goals.

This also provides an opportunity to examine measures implemented and their effectiveness in reducing energy consumption at mid-term. A plan could be developed to further implement the successful measures for other facilities.

Long Term Goal & CDM Plan Update

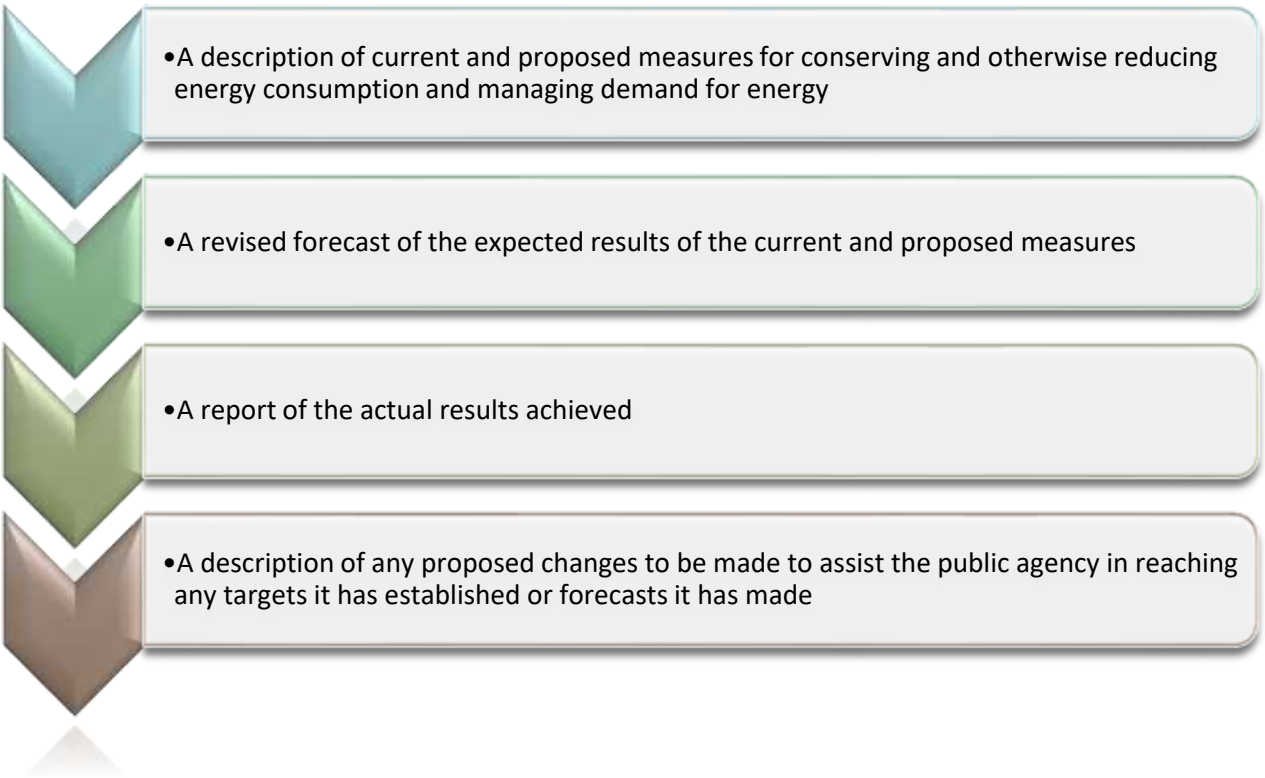
The Tri-County will strive to reduce total system-wide electricity consumption by 5% by the end of 2029 from the 2022 baseline. The natural gas consumption intensity to remain at baseline levels until the HVAC retrofit.

Currently, with the establishment of the year 2022 as the baseline year, a number of energy conservation of projects will be coming to completion in year year 2024 and beyond. Based on the total annual energy consumption of approximately 1,500 MWh, and the VFD upgrade completing in 2024 with estimated savings of 150 MWh per year representing 10% of the total annual consumption based on the 2022 electrical consumption levels. If the upgrade delivers the enrgy savings as estimated, the 5% electricity reduction target is achievable.

For the natural gas, it is anticipated that the facilities will not reduce the NG consumption until the proposed retrofit of the HVAC system at the New Water Treatmen plant. The HVAC retrofit is not anticipated to completed before the 2028 and the natural gas consumption reduction will likely not be realized in the 2029 CDM Update.

The Energy Consumption and GHG Emission template that is required to be submitted in 2028 will document the 2024 energy usage results. This template will show if the energy reduction was achieved or not.

As with this plan update, the updated CDM Plan in 2028 will include the following items:



Annual Energy and GHG Emissions Reporting and Five-Year Plan Update

Ontario Regulation 25/23 requires that the Tri-County report on the results of the CDM Plan at the end of the five-year planning period. As in this update, in the next update due in 2028, the Tri-County will provide an update to include any revisions to the 2025-2029 CDM Plan. The Tri-County has submitted and published all of its annual Energy and GHG Emission Reports and will continue to do so annually until July 1, 2028. At that time, the revised Plan will provide:

- A description of current and proposed measures for conserving and otherwise reducing energy consumption and managing its demand for energy;
- A revised forecast of the expected results of the current and proposed measures;
- A report of the actual results achieved;
- A description of any proposed changes to be made to assist the public agency in reaching any targets it has established or forecasts it has made; and
- Any additional initiatives geared at achieving or establishing new targets.

Incentive Funding

Tri-County has demonstrated the ability to secure the incentive funding over the years as evident by a number of incentivized projects taken to completion over the years. This highlights that the energy management team is functioning as intended, identifying opportunities, analyzing the potential, and most importantly, reducing the energy footprint of Tri-County facilities. To ensure

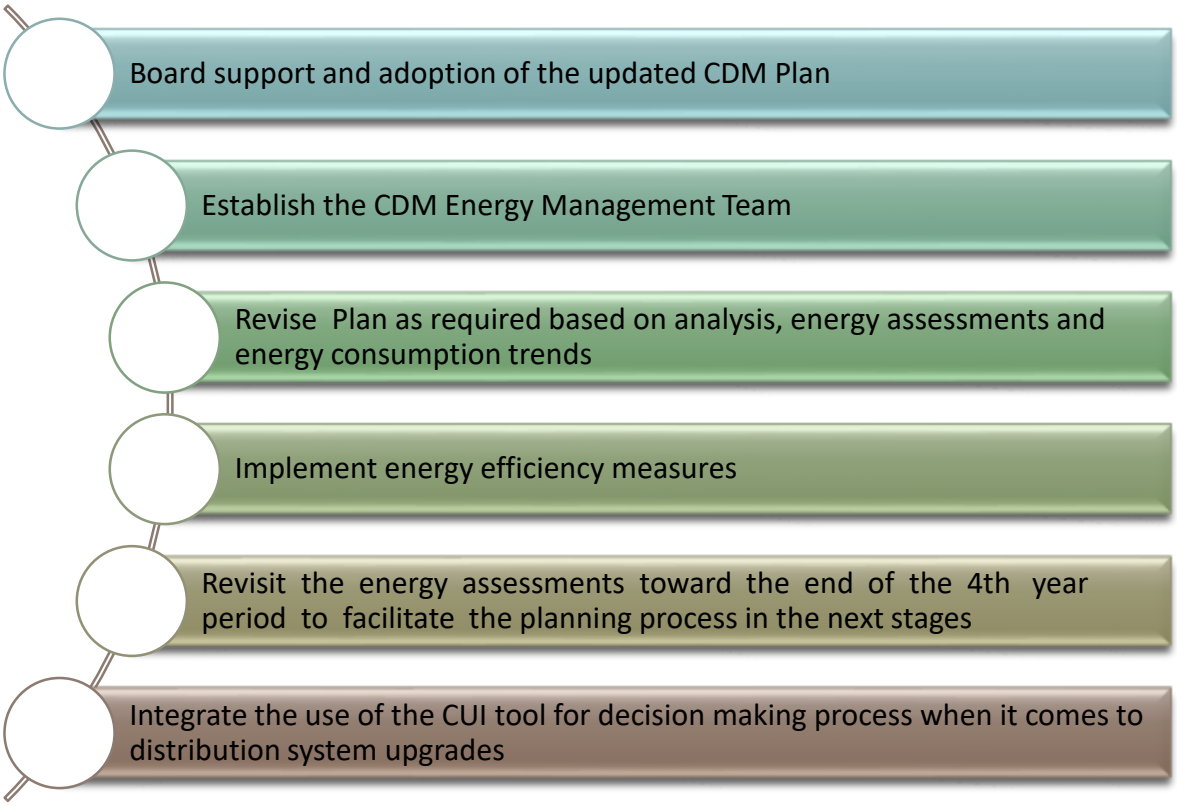
that the Tri-County will take advantage of all funding and grant opportunities related to energy efficient projects, the Tri-County will liaise with representatives from municipalities and local utility providers. Tri-County operational staff and utility representatives are in a unique position to review current and future process improvements, program implementations and projects that can meet future funding requirements. As funding opportunities arise that are suitable for specific energy conservation projects, Operations Staff will report to the Management Board and clearly outline the cost savings associated with a successful application.

Conclusions and Recommendations

Conclusions

- ✓ The Tri-County is on its way to the implementation of a structured Conservation Program
- ✓ The Tri-County plans to further investigate investment decisions in technologies to reduce electricity expenditures and revise the current plan where appropriate
- ✓ Reasonable reductions must be targeted based on analysis through facility assessments
- ✓ A structured implementation framework will be followed to ensure the success of the CDM initiative

Recommendations



Schedule 1:
Actual 2022 Energy Consumption

2019-2022 Municipal Energy Consumption

A lot of changes have occurred to the Tri-County facilities over the last five years, many of which resulted in energy efficiencies and consumption reductions. However the increase in population for all of the municipalities that Tricounty serves has increased the water demand and subsequent energy consumption. The table below shows the change in electricity consumption at Tri-County three facilities reported on from 2019 to 2022.

Table S-1: Change in Electricity Consumption (2011-2022)

Total Annual Electricity Consumption (kWh)			
Facility	**2019**	**2022**	**2019-2022 Electricity Consumption Variance**
New Water Treatment Plant	895,920	899,487	**0.40%**
Old Water Treatment Plant	500,160	538,424	**7.65%**
West Lorne Water Tower Storage	15,521	19,849	**27.89%**
Tric-County TOTAL	**1,411,601**	**1,457,760**	**3.27%**

The following figure shows the distribution of electricity consumption amongst the Tri-County three facilities in 2022.

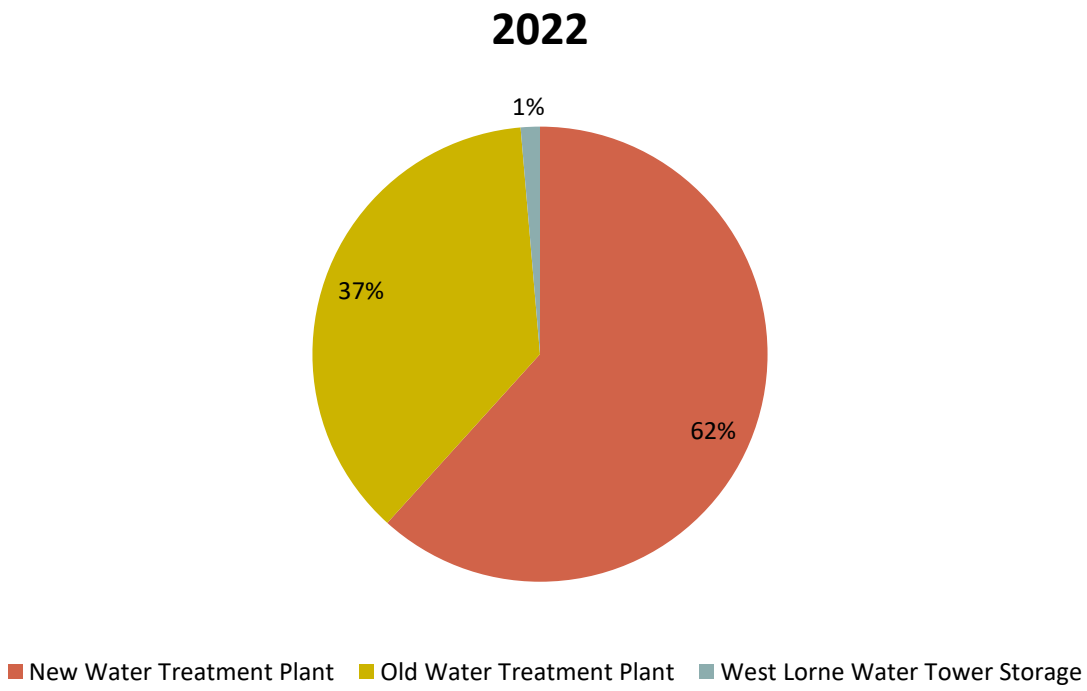


Figure 10 2022 Tri-County Electricity Consumption Profile

2019-2022 Natural Gas Consumption

Table 7 Natural Gas Consumption

Total Annual Natural Gas Usage (m^3)			
Facility	**2019**	**2022**	**2019-2022 Natural Gas Consumption Variance**
New Water Treatment Plant	75,385	93,473	**+23%**
Tri-County TOTAL	**75,385**	**93,473**	**+23%**