City of Kenora

5-Year Corporate Energy Conservation and Demand Management Plan

July 2019

Prepared in co-operation with:

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Introduction – Executive Summary

Background

The City of Kenora's Energy Conservation and Demand Management (ECDM) Plan was developed in response to Ontario Regulation 507/18 which requires all public sector organizations to complete an update to their original 2014 ECDM Plan by July 1, 2019. In response to this regulatory requirement, as well as rising energy costs, the City of Kenora has developed this Energy Conservation and Demand Management (ECDM) Plan. This comprehensive Plan is the most effective method of identifying energy conservation opportunities, selectively implementing the best projects and then measuring their effectiveness. The Plan has been developed to protect the interests of our constituents and ensure that the City of Kenora obtains the best possible value from our operating budgets. In addition to meeting our regulatory obligations, the City believes that a strong commitment to energy conservation and a reduction of energy use is demonstrated evidence of our belief in becoming a more sustainable community while operating in a cost-effective manner that respects the value of taxpayer dollars.

Purpose of the Plan

The 5-Year Corporate Energy Conservation and Demand Management Plan is designed to guide the City of Kenora towards a more energy-efficient future. The policies, practices and energy conservation measures identified illustrate the importance the City places on acting responsibly towards energy consumption through the wise use of resources in City operations.

To enhance our understanding of energy use and return on investment through conservation, this document contains a thorough review of the measures implemented since the creation of the original plan, issued on July 1, 2014. Since then, the City has initiated several substantial energy projects, yielding significant savings results including:

- LED lighting retrofits in numerous building
- Updating of building envelopes including window and door replacement
- HVAC and controls upgrades
- Roof change-out projects

The wise and efficient use of energy are two of the lowest cost options for meeting energy demands. They also provide many other environmental, economic and social benefits, including reducing greenhouse gas (GHG) emissions, cost avoidance and savings. Along with the primary benefits, the responsible use of energy also promotes local economic development opportunities, energy system reliability, improved energy supply security and reduced-price volatility.

Following the path of our previous ECDM Plan, this document is a continuation of a process involving the:

- Integration of establishing and evaluating a baseline for performance to be measured against;

- Reviewing the effectiveness of previous conservation efforts while setting future performance goals and objectives;
- Continuous improvement through identification of energy conservation potential;
- Strategic alignment of improvement measure implementation and fiscal constraints; and,
- Evaluation, measurement and communication of results achieved.

The following report summarizes the significant efforts applied by the City of Kenora Conservation Team to create a Plan that can be implemented responsibly, over time, to create lasting results. The Plan takes advantage of internal expertise as well as all available external financial incentives and rebates currently being offered to support the implementation of energy savings ideas. The current energy picture for the City of Kenora and our future Vision, Goals and Objectives as shown in the Corporate Energy Conservation and Management Policy are outlined. Our strategic focus areas are discussed in detail and our 5-year Action Plan is laid out on a project-by-project basis.

1.0 Historic Energy Performance

Historical Energy Usage

Effectively managing energy requires the creation of a robust energy monitoring strategy and procedures and establishing an accurate energy baseline is an essential first step in this process. This baseline assists with energy conservation and greenhouse gas reduction target setting, energy procurement and budgeting, bill verification, energy awareness, and the selection and assessment of potential energy projects. The City of Kenora, similar to many other communities, relies on utility bills to establish this energy baseline.

To evaluate the effectiveness of the City's previous energy conservation measures, the year 2013 was chosen as the base year for measurement; this aligns with the Ministry of Energy's Regulation 507/18 requirements for reporting. Overall, the City's consumption in 2013 was 10 million kWh of electricity and 520,000 m^3 of natural gas. The breakdown of energy use by facility type is as follows:

Figure 1-1 – Energy Use by Facility Type in 2013

FACILITY TYPE	Electricity (kWh)	Natural Gas (m3)
Administrative offices and related facilities, including municipal council chambers	910,138	101,245
Cultural facilities	515,335	28,143
Facilities related to the treatment of sewage	3,224,000	-
Facilities related to the treatment of water	1,926,000	-
Fire stations and associated offices and facilities	63,317	13,213
Indoor ice rinks	1,656,828	241,899
Indoor sports arenas	791,086	17,954
Indoor swimming pools	426,274	3,848
Parking garages	67,196	17,735
Police stations and associated offices and facilities	121,097	32,022
Public libraries	166,548	19,741
Storage facilities where equipment or vehicles are maintained, repaired or stored	351,460	44,701

For comparative purposes, the raw energy consumption breakdowns by year since the original baseline (2013) for the City are as follows:

Figure 1-2 – Electricity Use (2013 – 2017)

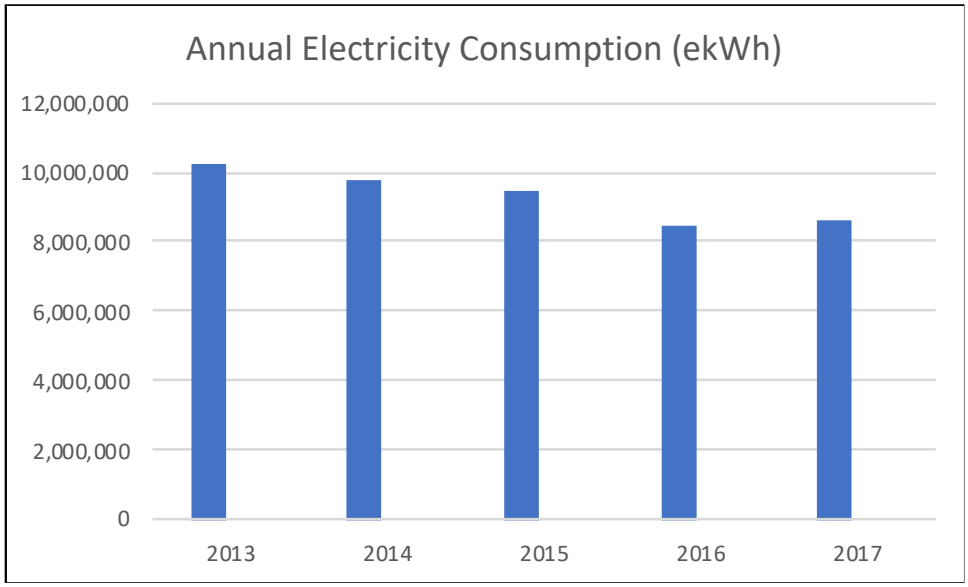


Figure 1-3 – Natural Gas Use (2013 – 2017)

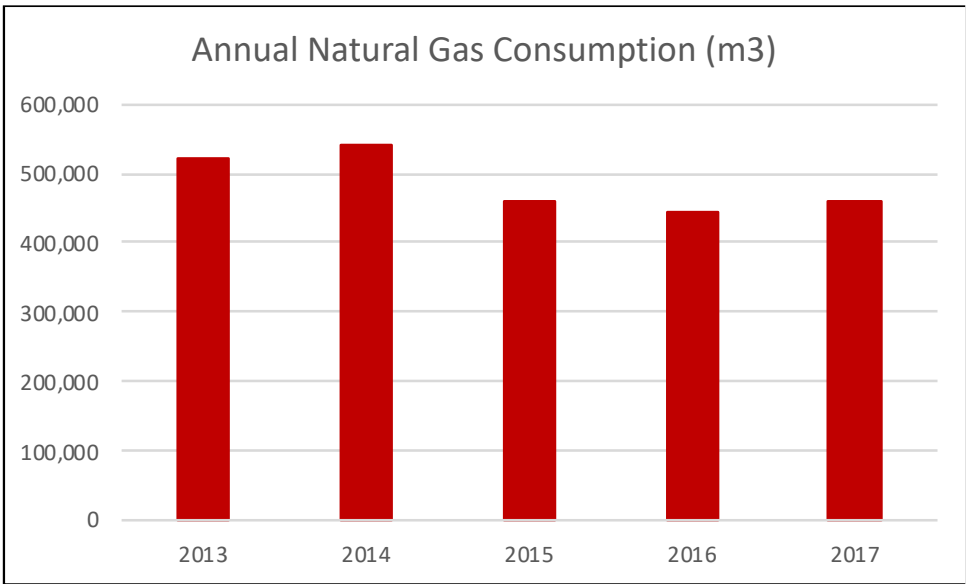
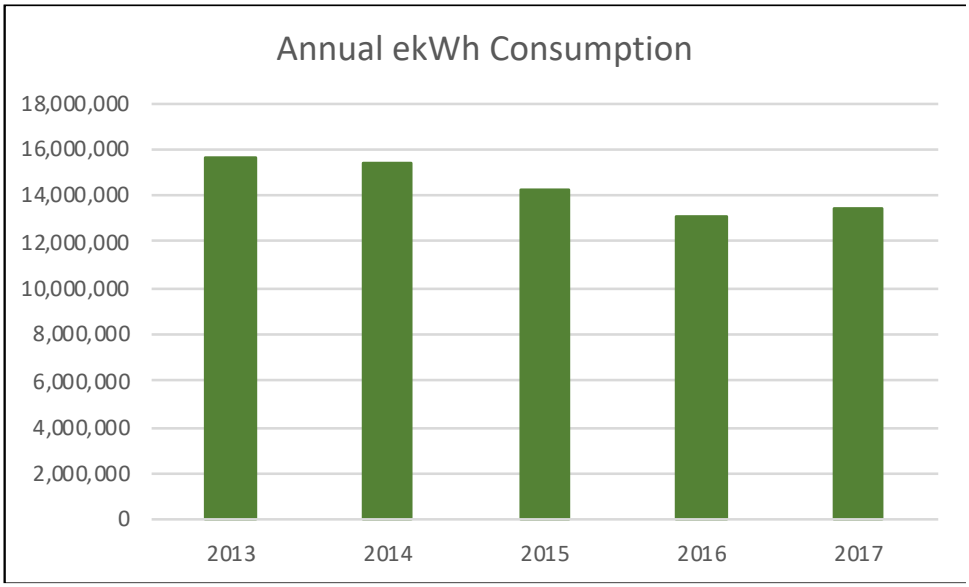


Figure 1-4 – Equivalent kWh Energy Use (2013 – 2017)



In order to view the full energy picture, we have used equivalent kilowatt hours. This allows us to combine natural gas and electricity usage to provide a full analysis of consumption. Due to the large reduction in natural gas usage, ekWh consumption shows a 14% decline between 2013 and 2017. Electricity presented a decrease of 16%, while natural gas presented an 11% reduction.

While the City of Kenora did not set a specific reduction target in its original plan, the data itself reveals that the City achieved a steady decrease over the life of the original Plan (2014 to 2018), resulting in a successful reduction in consumption.

Energy Conservation Project Successes

Since the creation of the last 5-Year ECDM Plan, the City has initiated significant investments in energy efficiency and energy-cost reduction. These projects include:

Facility-Related Projects

2016

- Operations Building – Lighting retrofit, conversion from T8 to LED (Bulb and ballast replacement)
- Kenora Recreation Centre – Track and dressing room light lighting conversion (new fixtures and bulb and ballast replacement)

2017

- City Hall Window Replacement – 75% of windows replaced
- Kenora Recreation Centre (Aquatic Area) – Lighting retrofit to LED (new fixtures)
- Keewatin Memorial Arena – Lighting and astrofoil, replace existing HPS with LED over rink area
- Water Treatment Plant – Lighting retrofit, LED bulb and ballast replacement, entire facility including new exterior lighting.
- Waste Water Plant – Replacement of 4 exterior door systems (buildings 100, 300, and 400) .

2018

- Keewatin Memorial Arena – Lighting retrofit, LED bulb and ballast replacement in all interior locations (except ice surface, completed previous year). Note: Only exterior lighting remains.
- Kenora Sportsplex (JM arena) – Lighting retrofit over field surface from HPS to LED.
- Kenora Library – Lighting retrofit, LED bulbs and ballasts
- Waste Water Facility – Lighting retrofit, LED bulbs and ballasts
- Water Treatment Plant - Natural gas conversion (replacement of 12 electric heaters)

City-Wide Street Lighting

Beginning in 2015, the City of Kenora embarked on a major street lighting retrofit across the City. This project included the replacement of over 1,900 HPS street lights, leading to an annual savings of over 70% of the energy used by the lights. In addition, the City continues to accrue significant maintenance savings (expected to be over 80% of maintenance costs) due to the longer life of LED lights.

2.0 Energy Conservation and Management Policy

Our Commitment

The City of Kenora is committed to allocating the staff and resources required to implement a strategic Energy Conservation and Demand Management (ECDM) program to reduce energy consumption and minimize our environmental impact. As an organization, we value the notion of efficient operations and creating a more sustainable community.

We are committed to managing energy responsibly and will use energy efficiency practices throughout our facilities, fleet, operations and equipment wherever it is cost effective to do so.

This ECDM Plan forms the practical approach to achieving the goals of our Community Energy Plan by providing the details of our planned future organizational actions.

Our Vision

The City of Kenora will minimize energy consumption, related costs, and carbon emissions by continuously improving its energy management practices without compromising the level of service delivery to the community.

Our Goals and Objectives

As part of our 2019 ECDM Plan, the City created several strategic avenues to achieve specific goals and targets with regards to energy management. We have re-examined our past objectives and are re-committing to this updated version.

1. Reduce energy intensity in City facilities by 5% by 2024 compared to our revised base year (2018). This is in addition to the over 14% reduction achieved between 2013 and 2018, based on our original 2013 base year.

2. Enhance our culture of conservation through training and outreach to staff, clients and business partners. All employees will have the appropriate knowledge and training to be empowered to reduce energy consumption.

3. Expand upon our comprehensive corporate energy management policy and practices by enhancing key existing business practices to include energy efficiency standards and energy management best practices.

4. Expand our monitoring and tracking program for energy use by providing access to our energy management system to make energy consumption visible to everyone in the Corporation and support facility / management decision making.
5. Deliver energy cost savings through the identification and implementation of processes, programs and projects that will reduce energy consumption.
    - Re-assess and benchmark the top energy consuming facilities across the Corporation (2019)

- Review previously identified energy savings opportunities by reviewing past energy audits and plan to renew energy audits and analysis of the capital asset renewal program (Ongoing)
- Review and/or enhance standard operating and maintenance procedures to include energy conservation best practices (Ongoing)
- Seek funding for energy-related projects from various sources to enhance the payback and reduce implementation costs. (Ongoing)

Strategic Action Plan

To achieve our new ECDM Plan, the City will employ the following strategic designed to ensure a positive outcome over the next 5 years. These key strategies support the delivery of our Goals and Objectives.

Strategy 1. Corporate Practices

Develop Corporate policies and practices that support the energy conservation effort and show leadership and commitment within the Corporation and community.

- Energy Management Team: Roles, Responsibilities and Accountability
- Energy Procurement
- Corporate Policy

Strategy 2. Education, Awareness & Outreach

Provide the guidance, leadership and framework necessary to empower employees and develop a culture of conservation.

- Energy Skills Training Program
- Energy Awareness Training
- Outreach, Engagement and Recognition Programs
- Feedback System for Employee Suggestions
- Employee Brainstorming Sessions

Strategy 3. Energy Conservation Action Plan and Energy Information Management

Continually identify and deliver energy conservation processes, programs and projects in all areas of the Corporation (facilities, fleet, equipment, water plants etc.). Demonstrate sound operating and maintenance practices to complement the energy efficiencies implemented through the capital asset renewal program. Employ a robust Energy Information Management System to ensure that all conservation activities are measured and verified to ensure the City receives and maintains specified energy reductions and savings.

Energy Conservation Action Plan

- Key facility energy audits and building re/retro commissioning studies
- Asset renewal plan and energy conservation project delivery
- Standard facility operations procedure review

Energy Information Management

- Maintenance and improvement of current energy monitoring and reporting system (electricity, natural gas and fuels)
- Regular Energy Use Review presentations for the community, council, accountable staff and energy users
- Consistent updates and review of key performance indicators (KPIs) / Benchmarking
- Standardize and implement project measurement and verification
- Reporting requirements for Regulation 507/18 (formerly 397/11)

3.0 STRATEGY 1: Energy Management Corporate Practices

The City of Kenora has implemented essential corporate practices, including key personnel deployment, to ensure a strong focus on energy management and savings. These efforts remain a key component of our renewed ECDM Plan.

The Energy Management Team: Roles and Responsibilities

Energy Sponsor: Community Services Manager

The Energy Sponsor is ultimately responsible for creating budgets, securing spending authority and resources for the program. This role is responsible for setting and/or legitimizing the program's high-level goals and objectives, keeping track of major project activities and approving resources and funding for the team and its approved projects.

The Energy Sponsor has direct knowledge of the organization's major energy-using systems and is responsible for developing and maintaining the focus for the Energy Management activities as well as coordinates meetings, set agendas, and delegates and manages tasks. This role also helps create the vision for the program and will help the program maintain momentum particularly when barriers arise. The Energy Sponsor is also responsible for ensuring that the monitoring and tracking systems for energy are accurate, up-to-date and available for use by City employees.

Energy Project Champion: Parks and Facilities Division Lead

The Energy Project Champion should have a technical background and is responsible for supporting and reporting on the technical aspects of the energy projects at all facilities. This role may also lead energy conservation projects as the project manager.

Corporate Energy Management Team

Together, the Corporate Energy Management Team functions on a strategic level to set expectations for each of the facilities, develop metrics for tracking overall energy improvement, and build accountability for energy management activities. In addition, this cross-functional team has direct responsibility for the consumption of energy within their respective departments. As a group, the team supports and monitors the energy management initiatives (processes, programs, and projects) at the various facilities and across the Corporation.

Actions: Continue to seek cross-departmental membership and support for the Energy Management Team. Continue to meet bi-weekly to discuss the Energy Management Program to ensure implementation of new savings ideas as well as maintain the positive momentum built over the past 5 years.

Energy Procurement

The City continues to utilize the energy procurement service provided by Local Authority Services (LAS). This program provides options for fixed-price energy procurement services permitting the City to maintain predictable electricity and natural gas commodity costs. In addition, the program permits the City to work

together with a large number of other municipal entities throughout the province to create bulk-buying power to leverage aggregated energy purchasing opportunities.

Actions: Continue to review the LAS program annually and evaluate the City's level of participation. Review potential alternative programs for merit and analyze the net result of City participation annually.

4.0 STRATEGY 2: Education, Awareness and Outreach

The City's Education, Awareness and Outreach program has been utilized over the to assist with the maintenance of the City's culture of conservation. This has been achieved by raising the level of awareness, understanding and general knowledge amongst employees regarding energy spending, usage and conservation. Public and Stakeholder Meetings were a key piece of the City's previous Community Energy Planning process and was quite well received.

The City will continue to utilize a combination of program engagement, direct awareness marketing and hands-on training to enhance our energy reduction efforts to support the achievement of our energy conservation goals and objectives. As well, energy will continue to be a regular agenda item at staff meetings to solicit new ideas for reduction of energy use, promote continued awareness of the cost of energy and ensure that energy conservation remains a key consideration for all City employees.

The Education, Awareness and Outreach program provides guidance, leadership and the framework to empower employees and foster our culture of conservation. The program informs the organization of current energy use, operational practices as well as improvement opportunities, while ensuring that all City of Kenora employees have an opportunity to remain informed of the City's energy reduction efforts. This continued practice will foster the greatest possible impact of education and awareness.

The program is comprised of the following four focus areas:

Energy Skills Training Program

The Energy Skills Training Program is a vehicle for employees to continue to develop a general awareness and understanding of current energy use within City facilities as well as skills to identify opportunities for improvement. The Training Program combines both general knowledge training and hands-on experience to gain maximum benefit.

Employee Brainstorming Sessions are an important part of the Energy Skills Training Program and are encouraged during the Energy Team meetings as a way of generating new ideas for energy conservation. As regular users and managers of City facilities, our employees are one of the City's most valuable resources to both generate and implement our energy conservation strategies.

Outreach, Engagement, Recognition and Energy Awareness Training Program

The City will continue to engage all users of City facilities (both staff and the general public) and recognizes that this is essential to the continued success of the energy management program. Our energy program will continue to employ a comprehensive approach to both engaging employees and recognizing the efforts of City staff who provide important support and ideas.

The Energy Awareness Training Program has been developed to provide consistent energy conservation messaging throughout all departments using Community-Based Social Marketing (CBSM) techniques to engage all users of City facilities. Specific methods used to date include conservation tips, eye-catching posters, City intranet messaging and other relevant marketing tools. It is the intention of this Plan to expand our ability and focus to enable the City to become a 'clearinghouse' of information for local residents to discover ideas and incentives to improve their own energy usage practices.

Feedback System for Employee Suggestions

The City will continue to employ a feedback system to encourage employees to provide input and ideas. The email messages that are sent to a specific address and are forwarded to members of the Energy Management Team in order to ensure prompt response. The Energy Team members can engage relevant City employees to ensure that all suggestions are captured and explored.

Actions: Review available energy training opportunities both generally (i.e. all staff) and for specific facilities (i.e. arenas and water plant). Establish and maintain at least annual Outreach and Engagement efforts to keep energy conservation 'top-of-mind' for staff and stakeholders.

5.0 STRATEGY 3: Energy Conservation Activities and Information Management

Energy Conservation Action Plan

The Energy Conservation Action Plan forms the roadmap for implementing energy conservation and cost saving measures. The City has created a list of potential projects based on previous facility energy audits. The attached action plans have been created to guide the City of Kenora through this process based on a prioritized implementation schedule. All available incentives and funding sources will be explored to minimize the implementation cost of each measure. In addition to the measures shown, the City anticipates that further energy audits, completed over the next 5 years, will augment the list of available energy conservation measures.

Below are a number of potential energy projects (separated by payback terms) which were developed through a series of facility energy audits in 2017/18. These measures can be implemented as funding becomes available in order to assist the City in meeting its energy reduction goals. These measures are summarized as:

Energy Conservation Measure (ECM) Savings Summary				
PAYBACK TERM	ECM Cost	ECM SAVINGS	SIMPLE PAYBACK	TOTAL Kg CO2e Savings
Short	$21,089	$17,140	1.2	23,370
Medium	$155,615	$50,072	3.1	31,127
Long-term	$1,190,922	$116,189	10.2	16,758

Figure 5-1: Energy Conservation Measures Investment and Savings Summary:

Additional measures will be added as funding becomes available on an annual basis. In general terms, our actions are expected to yield the following results:

- Education, Awareness and Outreach: 1-2% annual energy savings
- On-going regular reviews of consumption and baselines: 0.5 to 1% annual energy savings
- Re/retro Commissioning: 2-7% annual energy savings within the facilities where it is implemented (estimated to be 1% overall potential total annual savings)

Actions: Maintain an updated schedule of energy audit and re/retro-commissioning studies to ensure that our list of measures is up-to-date and that previous measures are still functional and providing savings. Perform periodic reviews of available incentives and stay up-to-date on potential sources of funding to offset the implementation costs of the proposed future measures. Review the list of measures at least annually and update as necessary.

Energy Information Management

Online Energy Monitoring and Reporting System

The City of Kenora has a system for managing and reporting its energy consumption (electricity, natural gas, fuels). The motivation for this effort is the notion that "you can't manage what you are not aware of". It will be important for the City to make our energy usage visual and keep the information up-to-date to allow all personnel to have broader access to the information. All personnel can benefit from understanding the nature of energy use in their facilities, as well as the impact their actions or inactions have on the City's overall energy cost and budgeting. This information is also key in evaluating the potential of new conservation projects as well as measuring the effectiveness of initiatives already taken.

Actions: Continue to gather and upload energy data into the Energy Information Management System regularly and analyze the data for patterns and savings opportunities.

Energy Management Presentations for the Community, Council, Accountable Staff and Energy Users

To gain traction for the initiatives within this Plan and ensure that the City of Kenora reaches its stated reduction targets, it is imperative that information regarding energy usage and cost, as well as the City's energy conservation plans and projects, are well understood and top of mind of everyone from front-line employees to senior department heads and City Council. This broad awareness will lead to additional buy-in and support for the City's continued efforts to reduce its energy usage and spending.

Actions: Make energy a key topic at staff and senior management meetings as well as provide an update on energy use and conservation to Council at least annually.

Key Performance Indicators (KPI's) and Monitoring and Verification

To ensure momentum continues, and the City of Kenora receives value-for-money with regards to its energy conservation efforts, a rigorous program of establishing KPI's and then monitoring and verifying ongoing savings is an essential element of this Plan. By establishing agreed upon KPI's (as suggested in the table below) and then performing regular and frequent monitoring, not only will City personnel be able to verify that savings expected from various projects is achieved, but that the savings continue for the duration of the project or retrofit's useful life. This practice will protect the City's investments as well as provide transparency and support for successful savings initiatives

Figure 5.1 – KPI Suggestions

Facility Type	Energy KPIs	Measured Variables
Cultural Facilities, Indoor Recreational Facilities and Community Centres	Baseline Electricity (Summer/Winter/Shoulder Season) • kWh / month • Peak kW / month Baseline Natural Gas • m^3 / month Other Energy Sources	• Daily Weather • Occupancy Rates / month • Sheet rentals / month
Facilities Related to Treatment or Pumping of Water or Sewage	Baseline Electricity (Summer/Winter/Shoulder Season) • kWh / month • Peak kW / month Baseline Natural Gas • m^3 / month Other Energy Sources	• Daily Weather (Temperature and Rainfall) • m^3 treated water or waste water / day
Administrative Offices	Baseline Electricity (Summer/Winter/Shoulder Season) • kWh / month • Peak kW / month Baseline Natural Gas • m^3 / month Other Energy Sources	• Daily Weather
Public Libraries	Baseline Electricity (Summer/Winter/Shoulder Season) • kWh / month • Peak kW / month Baseline Natural Gas • m^3 / month Other Energy Sources	• Daily Weather • Occupancy
Fire Stations and Associated Offices	Baseline Electricity (Summer/Winter/Shoulder Season) • kWh / month • Peak kW / month Baseline Natural Gas • m^3 / month Other Energy Sources	• Daily Weather • Occupancy
Storage Facilities	Baseline Electricity (Summer/Winter/Shoulder Season) • kWh / month • Peak kW / month Baseline Natural Gas • m^3 / month Other Energy Sources	• Daily Weather
Street Lighting	Electricity	• Number of Lights
Recreation and Outdoor Lighting	Baseline Electricity (Summer/Winter/Shoulder Season) • kWh / month • Peak kW / month	• Occupancy or Rentals / Month • Opening / Closing Dates
Fleet	Baseline Diesel Use Baseline Gasoline Use	• Number of Vehicles • km driven / month

Actions: Review all conservation initiatives to understand the most appropriate monitoring and verification process. Review the project savings at pre-defined regular intervals and report outcomes to senior management/City Council.

Ongoing Ontario Regulation 507/18 Reporting

In addition to completing this Plan, the City of Kenora is required to submit annual energy consumption and greenhouse gas emissions templates to the appropriate Ministry of Energy portal. Gathering and recording monthly energy invoices are necessary to complete these reports.

Actions: Complete all required regulatory reporting by July 1 of each year.

APPENDIX A:

Energy Conservation Action Plan Measures Summary

APPENDIX A: Potential Energy Conservation Measures Details

Short-Term Energy Projects (Payback less than 2 years):

Facility	Summary	Electricity Energy (kWh)	Natural Gas (m^3)	Total Energy Savings	ECM Cost	ECM Cost after Incentives	Simple Payback (Years)	Kg CO2e Savings
Keewatin Library	Install Smart Thermostat in Main Library			$350	$200	$200	0.6	
Kenora Public Library	Install new weatherstripping on doors	695	402	$232	$200	$200	0.9	700
City Hall	Upgradr weather stripping on the doors	720	369	$226	$200	$200	0.9	700
Operations Centre	Tie washroom exhaust fans to occ sensors	6,526	N/A	$1,044	$1,000	$1,000	1.0	22
Operations Centre	Weather stripping on the exterior doors	4,484	729	$936	$1,000	$1,000	1.1	1,393
Operations Centre	Cogged belt on AHU1 and AHU2 instead of flat V-belt	838	N/A	$134	$150	$150	1.1	3
Kenora Sportsplex	Install programmable thermostat on 3 unit heaters in the field	N/A	2,700	$810	$1,000	$1,000	1.2	5103
Keewatin Memorial Arena	Exterior Wallpack LED retrofit	15615	N/A	$2,498	$4,000	$3,219	1.6	53
Operations Centre	Functional Performance Test (FPT)	44,837	7,289	$9,361	$16,359	$11,359	1.7	13,929
Kenora Sportsplex	Weather Stripping on exterior doors	N/A	753	$226	$400	$400	1.8	1424
Sewage Treatment Plant	Exterior LED Lighting Retrofit	11,892	N/A	$1,189	$3,300	$2,111	1.8	40
Keewatin Memorial Arena	Replace V-belt with cogged belt on on compressor1,2 and AHU	833.506	N/A	$133	$250	$250	1.9	3

Medium-Term Energy Projects (Payback less than 2 to 5 years)

Facility	Summary	Electricity Energy (kWh)	Natural Gas (m^3)	Total Energy Savings	ECM Cost	ECM Cost after Incentives	Simple Payback (Years)	Kg CO2e Savings
Wellness Centre and Swimming Pool	Exterior Lighting Retrofit	5,943	0	$594	$1,560	$1,263	2.1	475
Water Treatment Plant	Weather Stripping for Doors and Loading Dock	5,270		$791	$2,000	$2,000	2.5	18
Operations Centre	Install occ sensors in Stores and OPG	1,969	N/A	$315	$800	$603	2.5	7
Keewatin Memorial Arena	Replace Motor on cold brine pump with premium eff.	9391	N/A	$1,503	$4,000	$3,061	2.7	32
Water Treatment Plant	Cogged Belt in Blower of AHU	234		$35	$100	$100	2.8	1
Sewage Treatment Plant	Install VFD on 4 the Motor of 4 Blowers to Run Based on Demand	161,350		$16,136	$70,000	$50,000	3.1	549
Kenora Sportsplex	Exterior Wallpack LED Retrofit	1995	N/A	$319	$1,000	$900	3.1	160
Keewatin Memorial Arena	Occ sensors on change rooms and washrooms	1792	N/A	$287	$900	$721	3.1	6
Wellness Centre and Swimming Pool	Retro-Commissioning	64,888	3,999	$11,382	$40,000	$33,511	3.2	8,077
Operations Centre	Energy Resouces & Awareness program	6,726	1,093	$1,404	$5,000	$5,000	3.6	2,089
Keewatin Memorial Arena	Install REALice technology (de-aeration technology) in laying and resurfacing the ice	50000	10,000	$11,000	$40,000	$35,000	3.6	19070
Keewatin Memorial Arena	LED Retrofit for T8 and T12 fixtures	33145	N/A	$5,303	$21,000	$19,343	4.0	113
City Hall	Occ sensor in the offices in Main Floor,second and third floor	2,276	0	$364	$1,500	$1,272	4.1	8
Kenora Sportsplex	Occ sensors on change rooms and washrooms	594	N/A	$95	$400	$341	4.2	48
City Hall	Energy Resource & Awareness Program	2,944	246	$545	$2,500	$2,500	4.6	475

Long-Term Energy Projects (Payback less than 2 to 5 years)

Facility	Summary	Electricity Energy (kWh)	Natural Gas (m^3)	Total Energy Savings	ECM Cost	ECM Cost after Incentives	Simple Payback (Years)	Kg CO2e Savings
Sewage Treatment Plant	Replace Doors and Windows in Buildings 100,300,400 with Efficient Ones	48,995		$4,900	$30,000	$25,100	5.1	167
Wellness Centre and Swimming Pool	REALice® Technology	60,000	3,200	$12,000	$70,000	$64,000	5.3	6,528
City Hall	LED retrofit for T8 and T12	18,009	0	$2,881	$15,500	$14,599	5.4	61
Sewage Treatment Plant	Interior LED Lighting Retrofit in Buildings 100,300,400,600 and 700	9,144		$914	$11,550	$10,294	6.2	31
Wellness Centre and Swimming Pool	Arena LED Lighting Retrofit	40,000	0	$6,400	$50,000	$48,000	7.5	320
Sewage Treatment Plant	Replace Electric Heaters with Multi-Split Ductless Heat Pump (MSDHP)	117,589		$11,759	$100,000	$88,241	7.5	400
Water Treatment Plant	Replace Electric Heaters with Multi-Split Ductless Heat Pump (MSDHP)	126,491		$12,649	$120,000	$107,351	8.5	430
Kenora Sportsplex	Interior T12 Retrofit with LED	2068.2	N/A	$331	$2,850	$2,747	8.6	165
Water Treatment Plant	Install Solar Wall On South Side	31,533		$4,730	$50,000	$46,847	9.9	107
Water Treatment Plant	Install Solar Panel On The Roof	25,000		$3,750	$40,000	$40,000	10.7	85
Keewatin Memorial Arena	Install Soalr panel on the roof (net-metering)	71415	N/A	$11,426	$150,000	$150,000	13.1	243
Operations Centre	Solar panel on the roof (net metering)	142,000	N/A	$22,720	$300,000	$300,000	13.2	483
Wellness Centre and Swimming Pool	Soalr Panel for Electricity Generation	70,000	0	$11,200	$150,000	$150,000	13.4	560
City Hall	Envelop Insulation Upgrade (capital investment)	58,880	3,692	$10,528	$150,000	$143,743	14.2	7,178
Water Treatment Plant	Install VFD On The High Lift Pumps	TBD	TBD	TBD	TBD	TBD	TBD	TBD
City Hall	Insulate pipes in boiler room	TBD	TBD	TBD	TBD	TBD	TBD	TBD
City Hall	Replace 3 old Fan Coil Units with effiecient one	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Discovery Centre	Repair Crack in Timber framing	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Keewatin Memorial Arena	Combined Heat and Power(Co-Gen)-needs detailed engineering study	TBD	TBD	TBD	TBD	TBD	TBD	TBD