Community Energy Plan 2018

Project funding support provided by the Government of Ontario

A COLLABORATION BETWEEN THE CITY OF KENORA AND VIP ENERGY SERVICES, INC.

Table of Contents

EXECUTIVE SUMMARY

High-quality, reliable, efficient, low cost energy services are fundamental to the overall competitiveness and environmental impact of cities and towns. In the future, energy prices globally are likely to be volatile, with an underlying upward trend. Concerns over climate change resulting from the greenhouse gases caused by energy use are growing and are increasingly the subject of national and international legislation and agreements. Canada has one of the highest energy usage rates and greenhouse gas emissions per capita in the industrialized world[1]. Eighty percent of Canada's energy is used in urban centres. Municipalities that embrace the challenges of energy efficiency, climate change and overall energy costs will create major and sustainable opportunities for their residents and businesses.

The Towns of Kenora, Keewatin and Jaffray Melick amalgamated on January 1, 2000 to form the present-day City of Kenora. With an approximate population of 15,096 people, Kenora is located in Northwestern Ontario and is known as the "Premier Boating Destination of North America," The City is a vibrant city situated on the north shore of the Lake of the Woods. Kenora has approximately 300 km of roads with about 173 km paved, 130 km unpaved, and 18 bridges. We provide potable water and sanitary sewer to approximately 15,000 customers, and we offer curbside garbage and recycle collection within the municipal boundaries.

Kenora's location in the heart of the Boreal forest has long supported a forest products industry and regional mineral deposits support a sector of mining services companies. Kenora is also the largest healthcare centre outside of Thunder Bay as well as a hub for other government operations serving Northwestern Ontario. Development of resources, tourism, cottages, and infrastructure across the vast area of Kenora District has also supported a cluster of construction businesses in Kenora that complete projects throughout the region.

The City of Kenora is undertaking a Community Energy Plan (CEP) to build the community's energy resilience in light of future risks, align with provincial, national and international climate policy directives and foster opportunities for cost-savings and environmental sustainability.

The CEP is designed to create the roadmap to help achieve its environmental targets as well as equip the community to control rising energy costs and help develop the local 'green' economy. The energy plan is seen as a key driver to expand current Municipal efforts to expand its retrofit

[1] Canada is only surpassed by Iceland and Luxemburg in terms of total energy use per capita. Energy Use (kg of oil equivalent per capita), World Bank, 2013.

practices throughout Kenora and foster a 'Conservation Culture' in the community through engagement that can lead to a broader understanding of energy including land-use planning, transportation, water and waste diversion. The City of Kenora recognizes the vital importance of a sustainable, long-term approach to energy consumption and supply. The Community Energy Plan (CEP) aims to ensure its energy use and energy services will make it one of the most attractive Canadian communities in which to live, work, play, learn and invest. At the same time the City's CEP will ensure that its impact on the environment will always meet or exceed global best practice. The CEP is a critical element in supporting sustainable growth.

The Plan outlines specific and broad measures that will be implemented to reduce the overall energy used, the emissions levels per capita and reduce or negate the impacts of future growth on both energy use and emission levels. These results will be achieved by implementing the CEP recommendations to ensure all of the links in the energy supply chain from the energy source to its final use are as reliable, economic, efficient and are developed with an emphasis on reducing environmental impacts. These recommendations build on each other and form an integrated solution. They begin with measures specifically geared towards municipal operations and broaden to include community-wide measures.

As a catalyst of commitment, the CEP is a long-term road map that will require a sustained commitment of the present and future elected leadership as well as the community to succeed. Some short-term decisions involving planning and energy infrastructure need to be made to secure the long-term implementation. Following the final approval of the CEP, a commitment is being made to put in place the necessary detailed information, guidelines and policies to ensure there is no ambiguity around what is expected.

The progress of the plan, in terms of the key goals, is to attract investment, create jobs, increase energy efficiency and reduce greenhouse gas emissions, and should be consistently measured and reported on a regular basis. The CEP recommendations ensure the overall energy structure has flexibility to add multiple renewable heating, cooling and electricity sources in the future years, further reducing impact of Municipal operations on the environment.

At least once every five years the plan's targets should be revisited to ensure they are still consistent with the overriding commitment to use global best practices and act as a model for other municipalities to show that competitive growth can occur with sensitivity for the environment and climate.

1 INTRODUCTION

The City of Kenora has made it a priority to promote environmental sustainability and awareness. We have taken many steps towards creating an operational environment that values the minimization of the environmental impacts of our operations.

We believe that climate change is an important issue confronting the world and accept that human activity has a major impact on our environment through our use of non-renewable energy, depletion of natural resources, and the emission of greenhouse gases. We are motivated to encourage residents, visitors and the employers to lessen their ecological footprint and accept responsibility in this regard.

Energy conservation has been embraced through a spectrum of inspired ideas. The steps we have taken represent a strong commitment to playing a greater role in environmental stewardship. We have developed and implemented policies that will allow us to weave 'sustainable' thinking throughout all future planning and day-to-day operations. An action-based, goal-oriented Energy Conservation and Demand Management Plan 2014 (CDM Plan 2014) was developed to guide our transformation from inspired ideas into a strategy for all future operations and policies. A commitment to completing the required 2019 CDM Plan update has been made and includes updated facility audits to support our next phase of energy optimization and efficiency improvements.

Corporate CDM Plans (2014 and the soon-to-be completed 2019) were developed to be a guiding reference for our energy-conservation initiatives and policies. The timing of the CDM Plans are aligned with Ontario Regulation 397/11 made under the former Green Energy Act, 2009. The Plans contain progressive initiatives and goals stemming from other organizations and jurisdictions and a commitment from all levels of our organization to take action. The Plan is intended to promote sustainable operations' management through a series of short, medium and long-term action steps.

Our comprehensive CDM Planning Process clearly describes the conservation measures that are or will be deployed to reduce energy consumption. It documents answers to areas such as:

- Strategic Planning and integration with other municipal plans
- Structure Plans including staffing requirements and consideration of energy efficiency for all City projects
- Resources Planning and identification of key internal and external resource requirements including energy training
- Procurement Planning in terms of procurement of energy and energy efficiency considerations for purchased equipment
- Implementation Planning outlining energy considerations in Building Standards and the development of Communication Programs
- Investment Planning identifying the funding sources for energy-related projects
- Implementation Planning and a Projects Execution strategy

Furthermore, goals and objectives for our Energy Conservation and Demand Management Planning have been established as:

- Ensuring energy efficiency consistency across municipal facilities.
- Monitoring and reporting on energy consumption in quarterly intervals. Staff will monitor and verify ROI to enable reinvestment in energy projects and report on energy consumption four times per year.
- Better analysis of energy costs and looking for savings opportunities. This will include reviewing energy commodity procurement options and taking advantage of all available resources and funding for energy projects.
- Raising staff and Council awareness around energy efficiency. This will include communicating successes to both internal and external stakeholders.
- Strengthening partnerships with external stakeholders such as electric and gas utilities.
- Identifying and seizing renewable energy generation opportunities.

A natural progression from this foundation was the adoption of a strategy to create a Community Energy Plan (CEP). A CEP is a comprehensive long-term plan to improve energy efficiency, reduce energy consumption and greenhouse gas emissions, foster green energy solutions and support the City's economic development. The CEP looks at energy use across the entire municipality and includes residential, commercial, industrial, transportation and public-sector energy use (municipal operations and energy and water infrastructure). Energy conservation for all sectors are examined within a broader context of the built environment, land use planning, growth

planning and the generation and transmission infrastructure. Further, the CEP enables the City to communicate its commitment to other Regional and Provincial Energy Plans.

Municipalities play a significant role in determining how energy is used. Efficient energy use is a Provincial priority and has been communicated in print via ***the Planning Act***[2], the ***Provincial Policy Statement, 2005***[3], and the ***Places to Grow Act, 2005***[4].

This CEP 2018 begins with a review of the historic energy consumption patterns at each of our facilities. We have approached this strategic plan with consideration for its social, economic and environmental responsibilities and is committed to creating a culture of conservation and efficiency within the Community.

[2] Section 2 of the Planning Act states the "Supply, efficient use and conservation of energy" is a matter of provincial interest; Section 7 identifies energy efficiency as an eligible cost of a Municipal improvement plan; and Section 6 states that subdivision planning shall be designed to optimize the available supply, means of supplying, efficient use and conservation of energy efficiency.
[3] Section 1.8 of the Provincial Policy Statement, 2005 sets out a number of policies requiring planning authorities to support energy efficiency.
[4] Section 6 of the Places to Grow Act, 2005 lists the conservation of energy as a consideration in growth plans.

2 AN OVERVIEW OF THE CITY OF KENORA

2.1 Vision

This Community Energy Plan was created with our defining goals in mind. The City of Kenora's Strategic Plan: 2015 to 2020 identifies our community Vision:

Kenora is a City of choice, renowned as a sustainable, lifestyle community supported by a Municipality committed to excellence.

And our Mission:

To deliver quality, cost-effective Municipal services.

This CEP process will support both of these core concepts by driving future thinking, planning and action with regards to energy supply, use and conservation strategies. We will continue to reduce energy consumption and costs through the efficient use of energy. This will involve education, awareness and an understanding of energy management.

"To raise staff and Council awareness around energy efficiency. This will include communicating successes to both internal and external stakeholders."[5]

In a phrase, we will continue to strive to establish a community-wide 'Conservation Culture'. Using these guiding principles, measures have been established to reduce our Energy Use and Carbon Footprint while taking a leading role in Sustainable Operations and Development. This vision can be achieved through the integration of energy efficient facilities, infrastructure, operational strategies and a shift in the awareness and knowledge of energy in the community.

This document will be our strategy to achieve our energy conservation and sustainability goals. These initiatives will guide us and educate our community as we move towards energy and environmental management leadership locally, provincially and nationally.

2.2 Importance of a Community Energy Management Plan

Energy management is currently viewed as a key activity for all municipal organizations. A large portion of the energy used within our buildings is based on fossil or non-renewable fuels. This

[5] Energy Conservation and Demand Management Plan, City of Kenora, 2014

not only depletes scarce resources but is also viewed as a key driver of greenhouse gas emissions and climate change.

Globally, it is widely accepted that climate change can in many ways be attributed to the effect of human-created pollution on the climate. Primarily, the burning of fossil fuels causes emissions of large amounts of greenhouse gases to enter the atmosphere, of which the most prevalent is carbon dioxide (CO_2). These emissions absorb infrared radiation emitted by the earth's surface and act as "blankets" over the atmosphere, creating warmer climatic conditions. Global warming has been linked to several important global issues such as melting of the polar ice cap and a subsequent rise in sea levels, creating more arid climates where freshwater resources are depleted; crop patterns are altered and decreased air quality and smog lead to overall human health challenges.

Despite the availability of alternate sources of renewable energy, the limited uptake of these technologies has meant that they are not yet widespread enough to eliminate dependence on fossil fuels. As municipal leaders, it is important to reduce our energy consumption in order to minimize our environmental impact. Reducing our overall energy consumption, in addition to reducing our environmental footprint, will also promote fiscal responsibility by helping to reduce our operating costs.

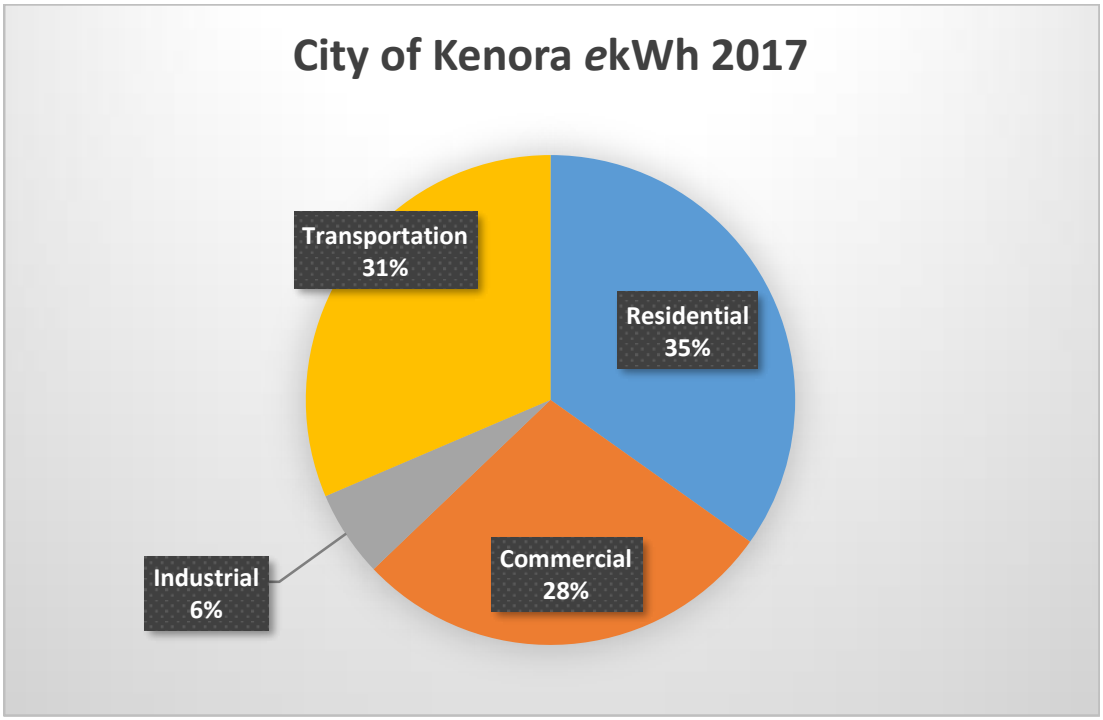
The Canadian Green Building Council notes that design, operation and behaviour each share a one-third responsibility for long-term energy performance. This Community Energy Plan is a key piece to a cohesive overall strategy.

3 CITY OF KENORA ENERGY PERFORMANCE

3.1 Energy Consumption

The predominant forms of energy consumed in Kenora are electricity, natural gas, and transportation fuels such as gasoline and diesel. Synergy North (SN), Hydro One Networks Incorporated (H1) and Unions Gas Limited (UG) supply and deliver the electricity and natural gas, while gasoline and diesel are provided by multiple local vendors. Through data submitted to the Ontario Ministry of Energy, Northern Development and Mines, as well as data provided by the City, a comprehensive analysis of City energy used by the estimated 15,096 residents (as per the 2016 census data) was generated. As no comprehensive transportation studies were available, the energy consumed by the transportation sector has been derived from census data and provincial averages of fuel economy and annual travel distances. An actual local study would affect the illustration of the energy consumption of this sector and may differ from the data presented below. It should also be noted that a lack of data from other fuel sources, such as fuel oil, has led to these fuel types being omitted from this chart. However, it is expected that their contribution would not drastically alter the overall energy distribution.

Figure 3-1 Total Energy Consumption Distribution



Residential and commercial buildings represent the greatest opportunities for improvement in Kenora and analysis shows that overall consumption grew by 2% from 2016 to 2017. However, energy distribution did not significantly change from year to year. On a per capita basis, Kenora consumes approximately 8.7 *e*MWh/capita. This is slightly lower than the Ontario average of approximately 10 *e*MWh/capita[6] and is much lower than the averages seen in larger cities like Toronto (29 *e*MWh/capita)[7].

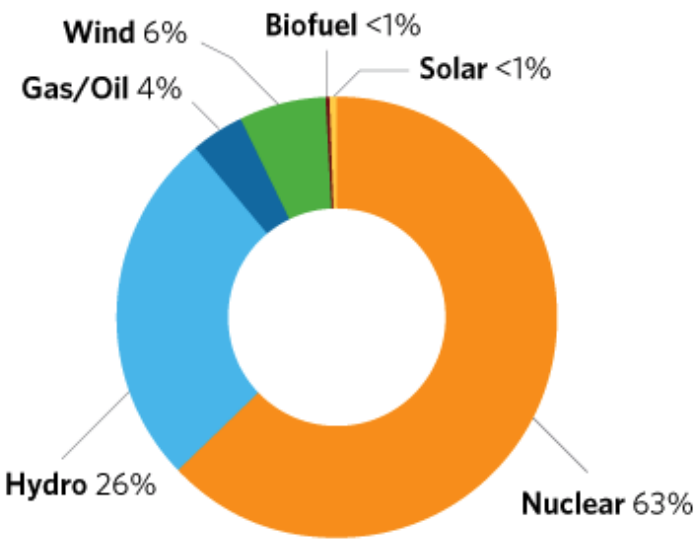
3.1.1 Electricity

Hydro One (H1) owns and operates one of the largest electrical grids in the world and services communities all across Ontario. H1 has shown commitment to managing its and its clients' environmental impacts and delivering social and societal benefits while maintaining a strong economic performance. Recently, in 2015, H1 received a "Sustainable Electricity Company" designation by the Canadian Electricity Association in recognition of these efforts. Likewise, Synergy North has been created through a coming together of Kenora Hydro and Thunder Bay Hydro in order to create a more efficient overall delivery mechanism for their clients.

The energy supply mix in Ontario has changed over the past several years. Ontario has removed its coal-fired power generation, adding renewable energy sources which have become key contributors to the overall energy supply. Bio-mass coal plant conversions, wind farms and solar plants are now all represented in the power generation grid and have grown in importance, allowing for a reduction in the environmental impacts of our electrical generation. Nuclear generation has long been a major part of Ontario's energy supply, but our nuclear generating stations are aging and will require costly refurbishment in the coming years. To avoid the high costs associated with new nuclear stations, Ontario will increasingly look to new, innovative ways to sustainably support our growing energy demand. The electrical infrastructure itself is also aging. This will lead to repairs, maintenance and refurbishments of substations, power lines, and generating stations which will lead to a desire to create more localized electricity supply options. All of this activity will reduce the funding available for improving or expanding the existing infrastructure and place further pressure on Ontario to reduce this growing demand. Below is a representation of the energy supply mix on Ontario's transmission system as reported by the IESO's most recent 18-Month Outlook, released September 2018[8].

[6] Ontario electricity Options Comparison, Strategic Policy Economics, 2013
[7] Toronto's Sustainable Energy Plan, 2007
[8] http://www.ieso.ca/Learn/Ontario-Supply-Mix/Ontario-Energy-Capacity

Figure 3-2 IESO Ontario Supply Mix[9]

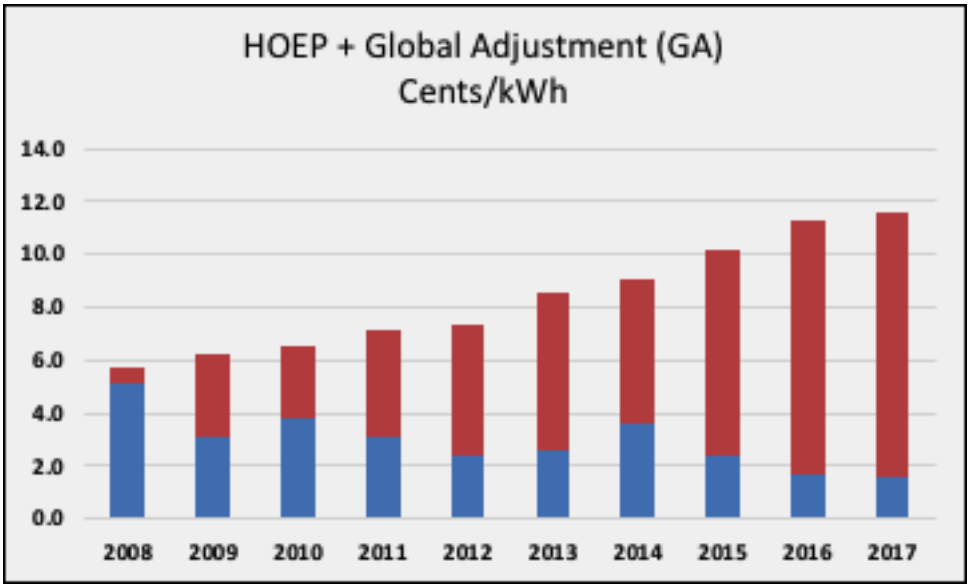


Nuclear	90.6 TWh or 63%
Hydro	37.7 TWh or 26%
Gas/Oil	5.9 TWh or 4%
Wind	9.2 TWh or 6%
Biofuel	0.4 TWh or <1%
Solar	0.5 TWh or <1%

As Ontario has attempted to correct its electricity pricing to better reflect true market value, the costs of residential electricity have been steadily rising. These rising costs have been compounded by the decision to purchase renewably produced electricity at a premium over more traditionally produced electricity. Historical electricity commodity and Global Adjustment prices are shown in the table below.

[9] http://www.ieso.ca/Power-Data/Supply-Overview/Transmission-Connected-Generation

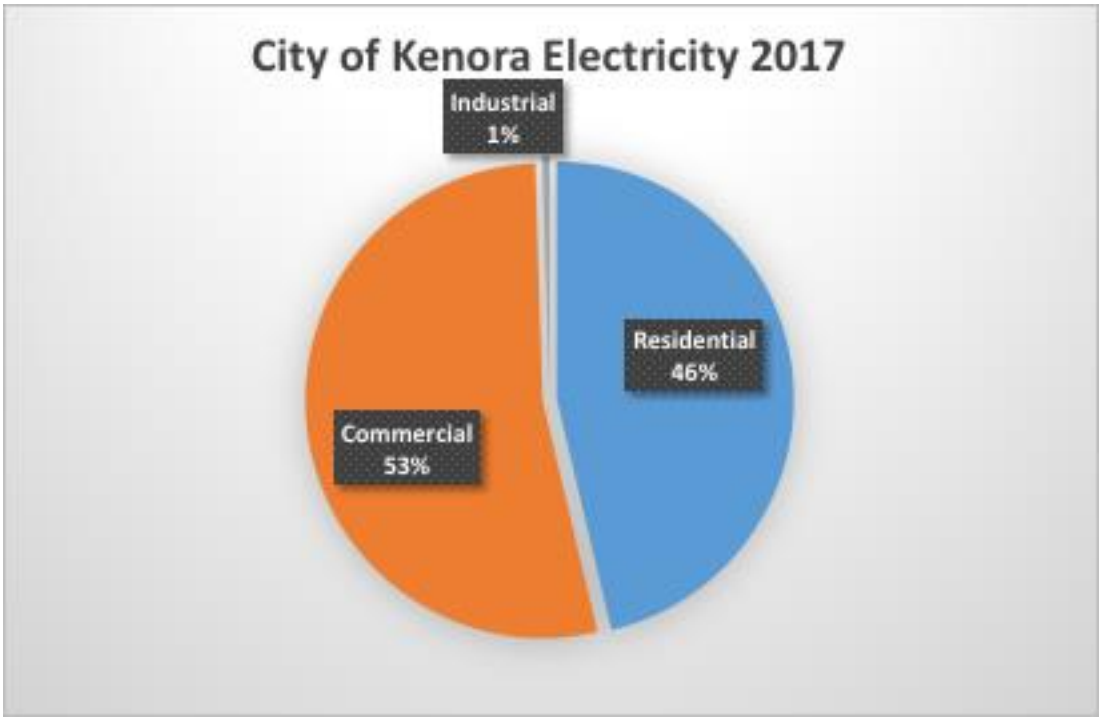
Figure 3-3 Residential Electricity Pricing[10]



Within the City of Kenora, electricity consumption accounts for 24% of the total energy used and totalled approximately 128,000 MWh in 2017. The table below further defines where the electricity was consumed, and this data is also presented geographically in ***Section 5.1.2:*** *Energy Mapping* of the CEP. The majority of electrical consumption is being used by the commercial and residential sectors. A small percentage of electricity consumption is exhibited by industrial facilities.

[10] http://www.ieso.ca/Power-Data/Price-Overview/Global-Adjustment

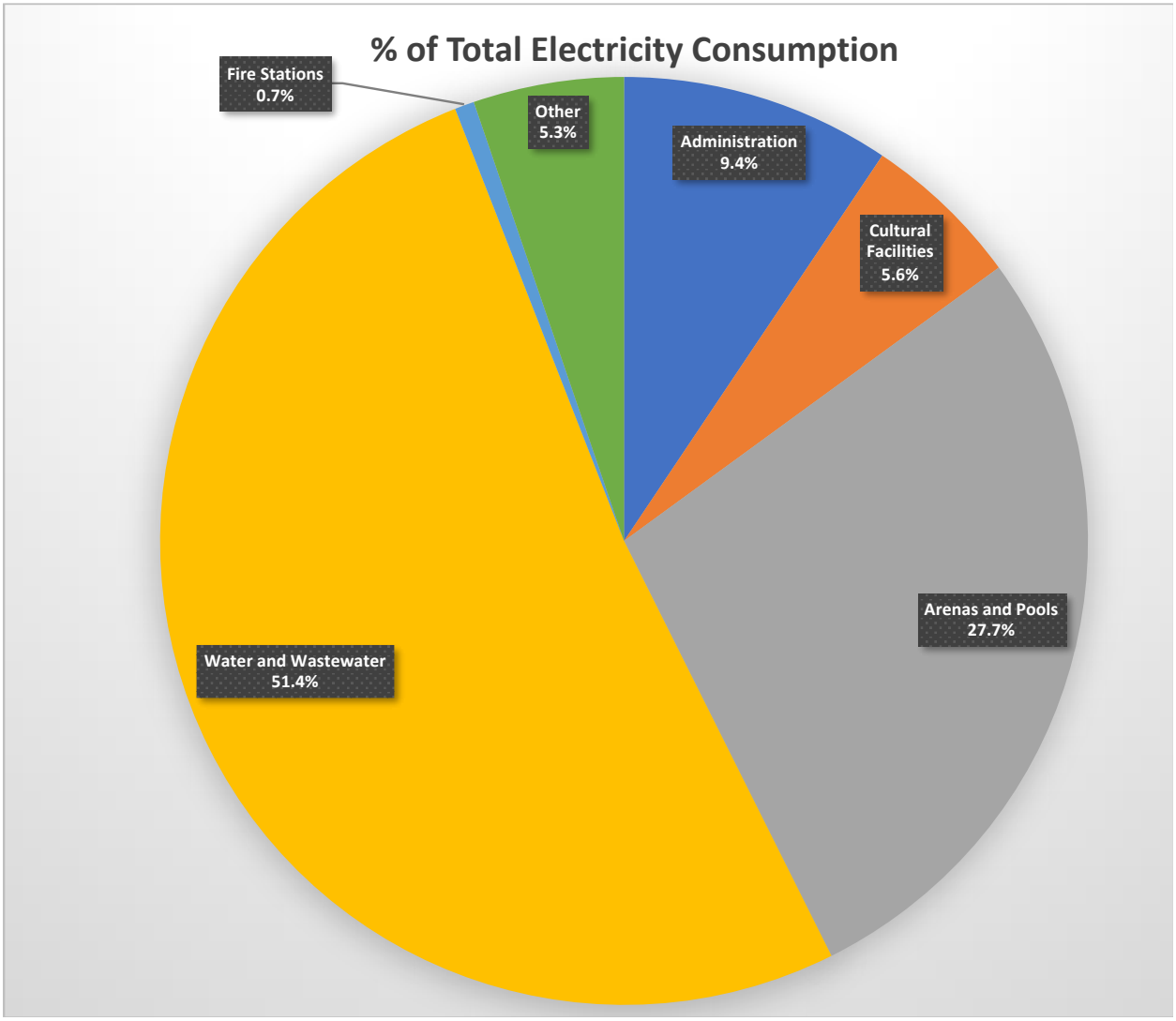
Figure 3-4 Electrical Consumption Distribution[11]



Municipal buildings represent about 7.6% of the total electrical consumption, and 13.9% of electricity consumed in the commercial sector. This highlights the key role that Municipal facilities play in the electrical profile of Kenora as-a-whole and the amount of positive impact the conservation measures outlined in this CEP will have in the largest consumption sector. Currently, approximately 50% of Municipal electricity consumption is used in water supply and wastewater treatment facilities. Consumption distribution among municipal facilities is shown below. These high consumption categories actually bode well for the municipality as they are areas in which energy efficient retrofits are popular and decreasing in price. LED lighting is becoming more popular and prices are dropping, allowing cities to take advantage of the large electrical savings that can be achieved with high efficiency lighting systems. Even though the replacement of streetlights as well as facility lighting has been completed, there are still many opportunities to add further retrofits, as well as increase controls. Pumping stations can reduce their consumption through re-commissioning and higher efficiency motors, although these projects tend to have longer payback periods. In any case, the data below will help to guide decisions on energy conservation measures as we move through the CEP.

[11] H1 and Kenora Hydro supplied Billing Data

Figure 3-5 Electricity Use by Municipal Building Type[12]



Historically, a decrease in electrical consumption has been observed by municipal facilities. For example, between 2014 and 2015, corporate electricity consumption decreased by approximately 3%, largely driven by work completed at recreational facilities, resulting in over 8% of year-over-year consumption reductions.

3.1.2 Natural Gas

Union Gas is one of Ontario's largest providers of natural gas, with pipelines stretching across the province. Union gas serves 1.4 million residential commercial and industrial customers in more

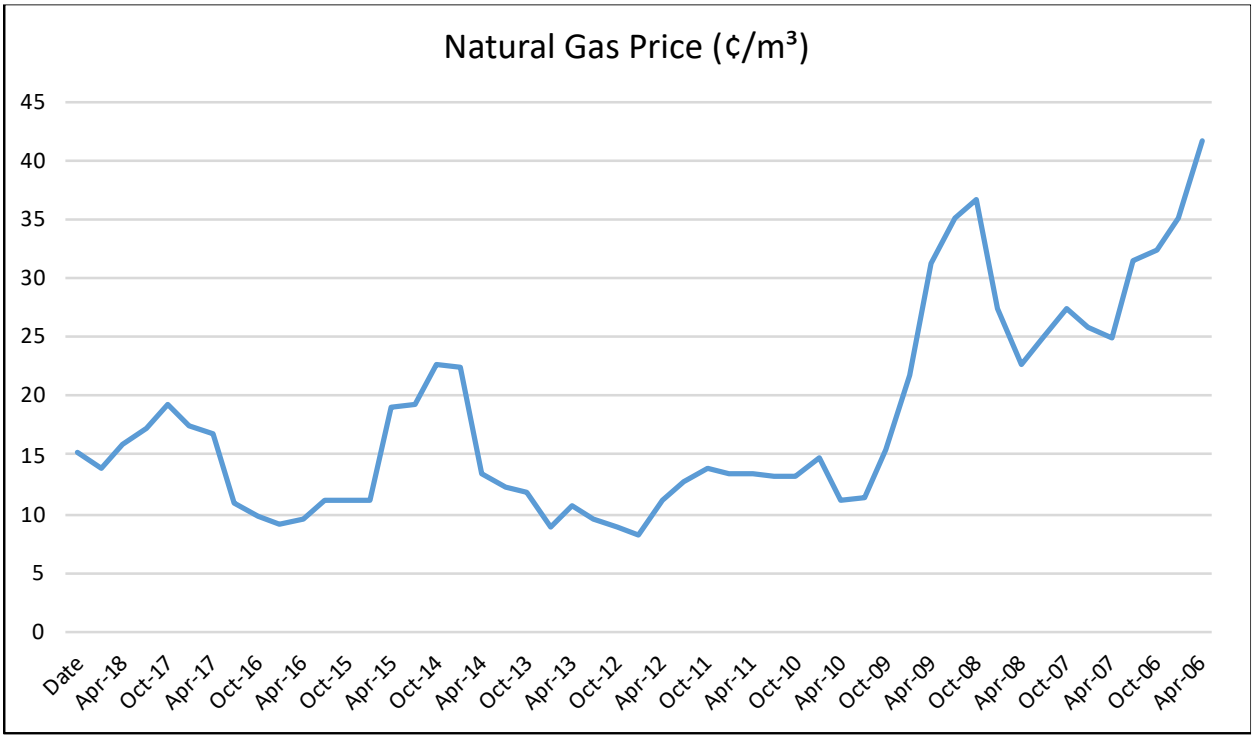
[12] Hydro One supplied Billing Data

than 400 communities across northern, southwestern and eastern Ontario. Union Gas's storage and transmission business offers a variety of storage and transportation services to customers at the Dawn Hub, the largest integrated underground storage facility in Canada and one of the largest in North America. The Dawn Hub offers customers an important link in the movement of natural gas from Western Canadian and U.S. supply basins to markets in central Canada and the northeast U.S.

Historically, natural gas prices have been dropping in Ontario which have now recently stabilized and no longer display the large volatility seen in the early 2000's. This is largely due to the influx of supply from non-traditional natural gas reserves being exploited through new hydraulic fracturing techniques. This increase in supply has reduced consumer pricing and made natural gas heating and electricity generation more attractive. This trend is worrisome in the context of carbon emissions as natural gas is a comparatively-high GHG producer when compared to electricity produced in Ontario. One kWh of electricity from the provincial power grid generates approximately 0.096 kg of GHG emissions while 1 *e*kWh produced via natural gas will generate approximately 1.02 kg GHG[13]. This GHG effect can be counter-productive to conservation efforts as the low natural gas prices can cause projects which displace natural gas consumption can have increased payback periods. This trend is strengthened by the recent repeal of the Cap-and-Trade program in Ontario, although the potential imposition of a Federal Carbon Tax may help to reverse this trend.

[13] When using conversion rates used in the Ontario Ministry of Energy, Northern Development and Mines Emissions' Template

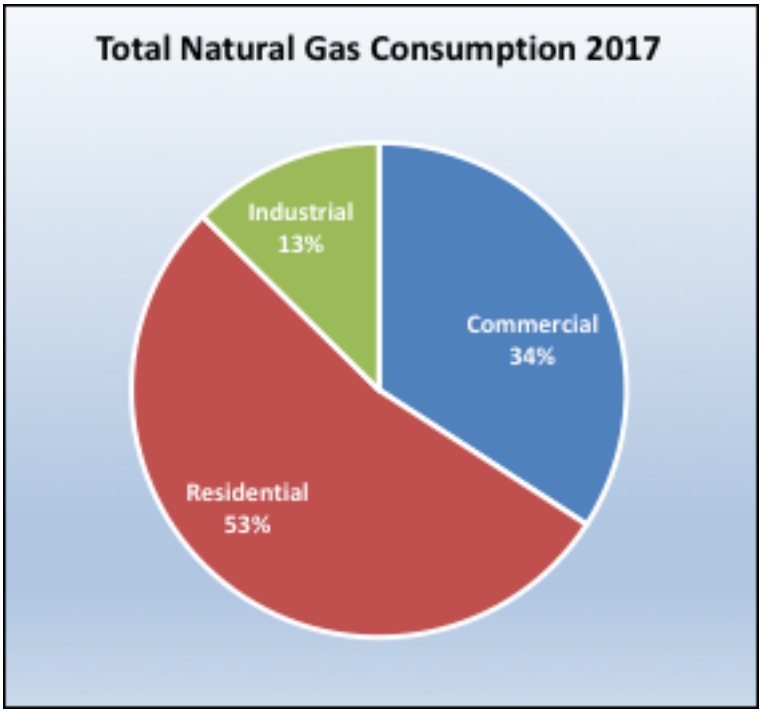
Figure 3-6 Natural Gas Pricing[14]



In Kenora, natural gas use accounts for 234 million ekWh or just over 44% of the total energy use. This use is distributed into the different zoning types as shown in the figure below.

[14] https://www.oeb.ca/rates-and-your-bill/natural-gas-rates/historical-natural-gas-rates

Figure 3-7 Natural Gas Consumption Distribution[15]

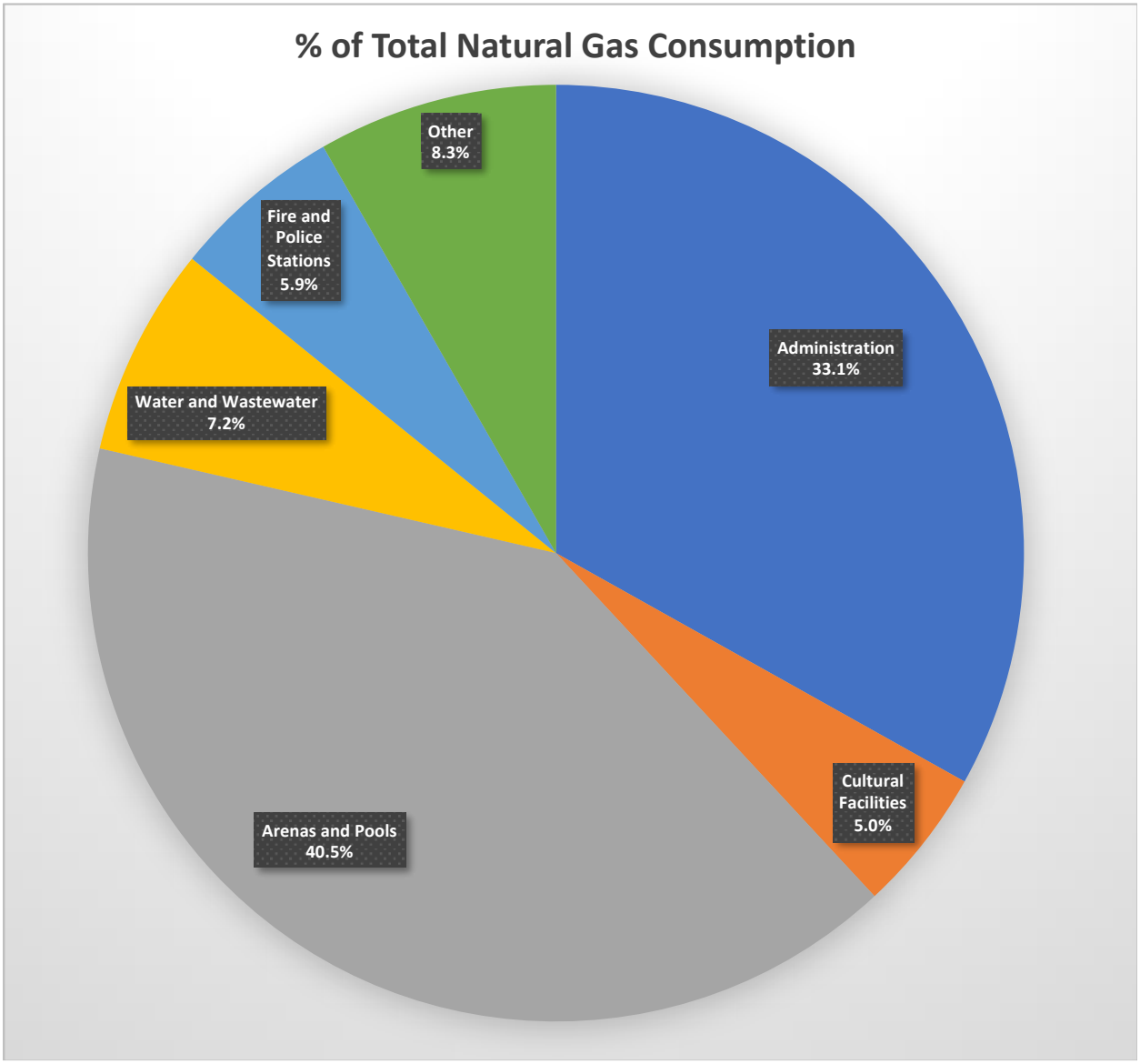


Natural gas consumption is primarily located in the commercial and residential sectors with a much smaller contribution from industry. This is due mostly to the increased heating requirements of the local climate and residential and commercial natural gas burning furnaces. This offers opportunity to invest in greater thermal efficiencies of buildings and boilers to help reduce natural gas use.

The municipal buildings in Kenora only account for approximately 2% of this total consumption (2016 data). This use is distributed into the facility categories shown in the figure below. With arenas, pools and fitness centres accounting for over 40% of the total, there is significant room for improvement in these process heavy facilities. Building re-commissioning, boiler upgrades, operational changes and the incorporation of solar water heating for pools can all have a significant impact on the overall usage at these facilities.

[15] Union Gas supplied bill data

Figure 3-8 Natural Gas Use at Municipal Buildings[16]



Looking at the historical natural gas usage of municipal facilities we see that like electricity, consumption levels have been on the decline, dropping by 18% between 2014 and 2016 (2015 exhibited a 15% decrease over 2014 and this time period is where most of the reductions were created). From an environmental stand point, this trend is encouraging as natural gas combustion generates much more GHG on a per kW basis than does electricity from Ontario's electrical grid. Going forward the City will need to continue to carefully balance the financial incentives of

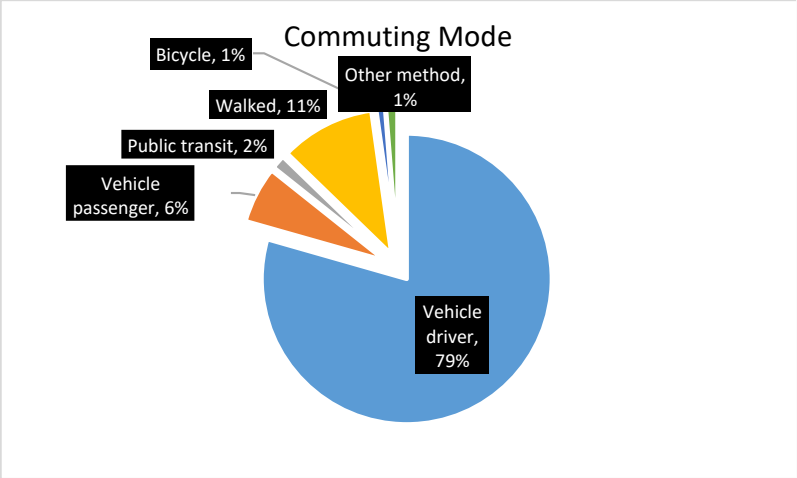
[16] Union Gas supplied bill data

cheaper fossil fuel energy sources with the social responsibility of reducing GHGs in order to avoid any slippage in this area.

3.1.3 Transportation

In Canada, transportation accounts for around 166 million *e*kWh annually, approximately 31% of total energy use and 43% of greenhouse gas emissions[17]. In Ontario, transportation is the single largest contributor of GHG emissions, accounting for over 30% of totals[18] meaning that Kenora is in line with the provincial average. Transportation includes vehicles used for public transportation, personal use and industrial uses.

As of the 2016 Census, public transit accounted for only 2% of total commuting methods. Provincially, primary drivers account for 70% of transportation to work modes with 13% using public transit. While these provincial numbers are buoyed by the large populations using public transportation to and from the GTA, the above data does highlight the need for improved public transportation within Kenora. Efforts to improve public transport are necessary to reduce the community's GHG emissions profile.



According to the 2016 Census, the median time travelled to work in the City of Kenora was over 15 minutes for 31% of the respondents; this is much lower than the Ontario average of 76%.

3.2 Carbon Footprint

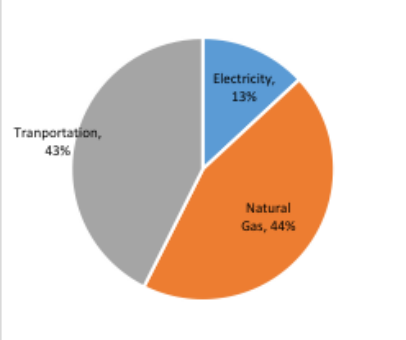
One of the most important steps toward sustainability is the understanding of our current energy usage patterns and carbon footprint. In order to allow the City to quantify its environmental impact, we look at our resource consumption and contribution through greenhouse gas emissions. These factors create a measure known as our carbon footprint.

[17] Energy Efficiency Trends in Canada, 1990 to 2010
[18] Driving Down Carbon. Pembina Institute. 2009

Tracking CO_2 Equivalent

The dominant man-made greenhouse gas, carbon dioxide (CO_2), is emitted when fossil fuels are burned in homes, vehicles, factories, or power stations. But there are other greenhouse gases such as methane (CH_4) and nitrous oxide (N_2O). These are much more potent than CO_2 but are less prevalent.

In order to simplify the estimation of the City's carbon footprint for an activity or product, and compare data in a meaningful way, all carbon footprint estimates are written in terms of carbon dioxide equivalent or CO_2e. This means that the total climate change impact of all the greenhouse gases caused by an item or activity are combined and expressed in terms of the amount of carbon dioxide that would have the same impact. CO_2e is expressed in tonnes (tCO_2e). For the purposes of this CEP 2018, the emissions related to natural gas, transportation and electricity consumption are reported.

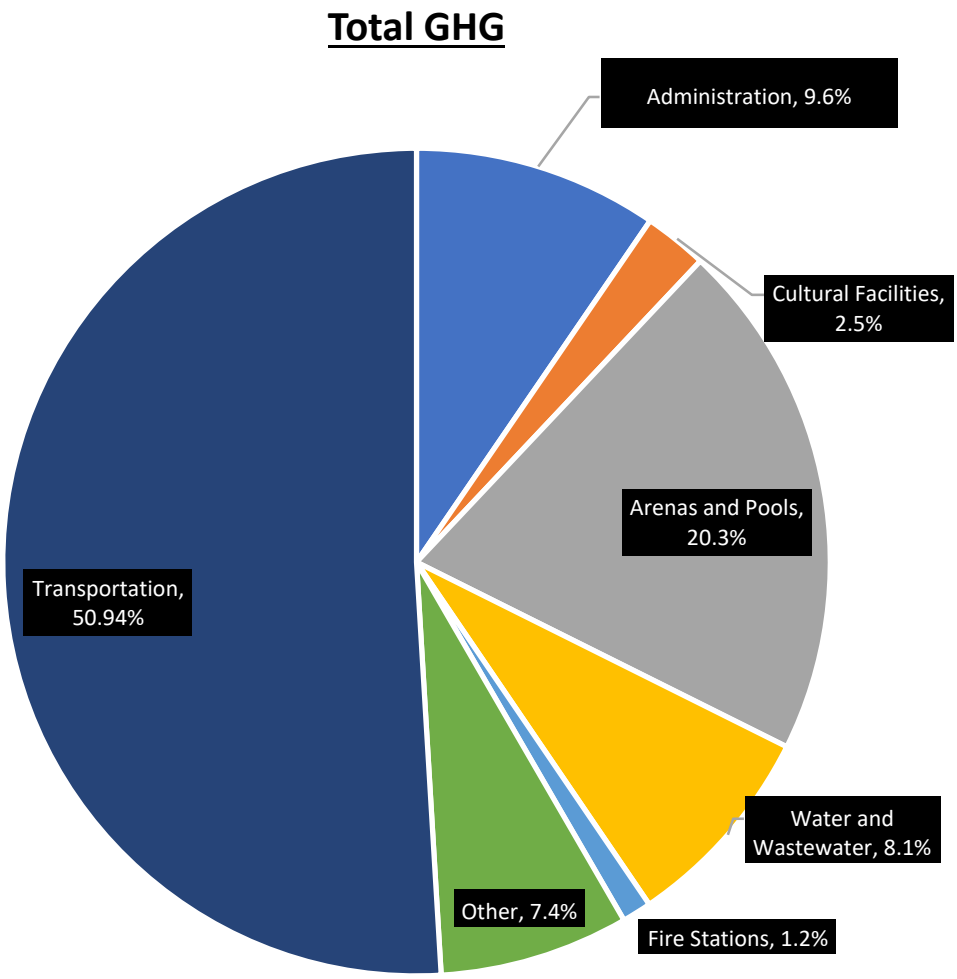


A complete inventory of all direct sources is still a necessary step towards the understanding and reductions of CO_2e created by the City and its community. We anticipate that such a study will be an important part of future updates to our Sustainability Plan. "Scope 3" sources such as waste and business travel accounting are still to be considered ("Scope 1" includes gas heating, refrigeration, and fleet vehicle usage. "Scope 2" is concerned with utility consumption)[19]. Taken as a whole, we find that the City was responsible for 94,000 tonnes CO_2e total, or 6.27 tCO_2e/Capita, for the year 2017. Knowing this, we will be able to evaluate our performance going forward and measure the success of our CEP 2018 as we monitor and compare our tCO_2e/capita in future years.

Based on the energy audits conducted, and billing and consumption data gathered by VIP Energy Services, Inc. (VIP Energy), we have been able to obtain estimates of the carbon footprint of each of our facilities and other community buildings.

[19] As defined by the World Resources Institute, GHG Protocol Corporate Accounting and Reporting Protocol. (ghgprotocol.org)

Figure 3-9 Kenora Municipal Emissions



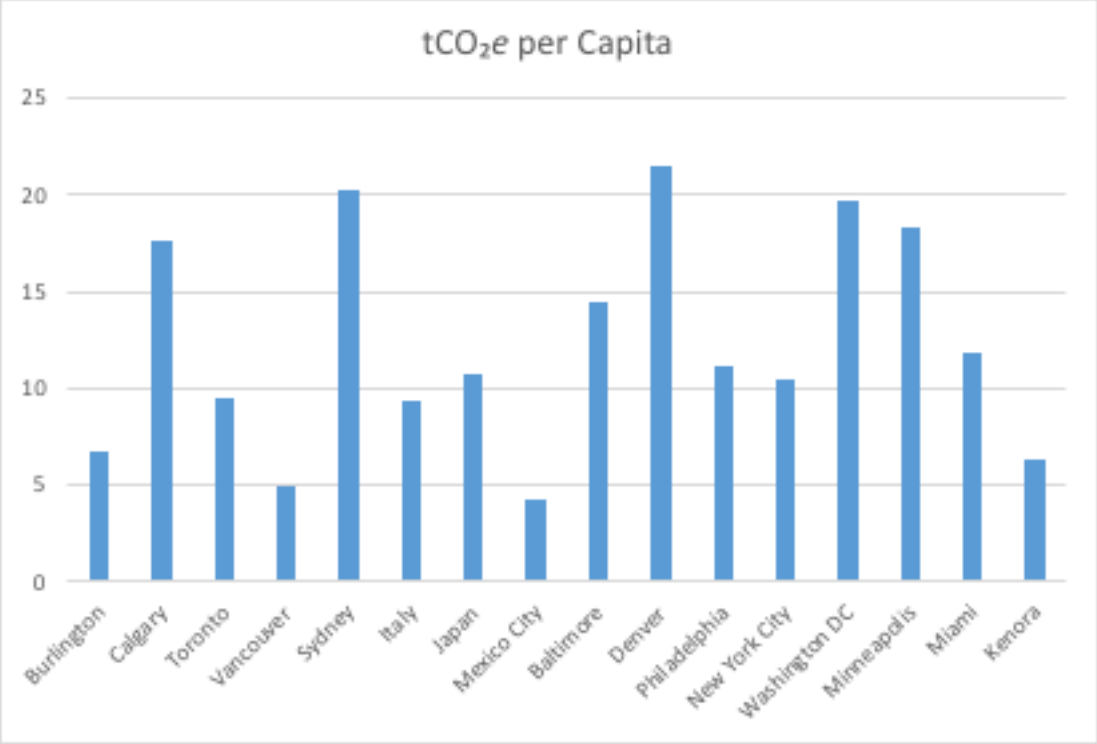
The data has shown that transportation and high energy consuming facilities like arenas, pools and fitness centers are the largest contributors to GHG production from City activities. Water treatment facilities also consume the majority of the electricity, but do not contribute to the same degree to the GHG totals. The large transportation amounts are in line with what has been seen in Ontario's distribution.

Over the past couple of years, the amount of GHG produced by the City have been decreasing. This coincides with both the fall in natural gas usage and the drop in electricity usage.

3.3 Comparison with Other Cities

Benchmarks provide representative values against which we can compare the City and its community's actual energy performance. Comparison with benchmarks of annual energy use per square metre of floor area, or cost per capita, will enable an assessment of energy efficiency to be made and remedial action to be taken. This provides an opportunity for the City. Ultimately, local governments and their communities are in the position to support the objectives of the Government of Ontario.

The following figure represents a comparison of cities from around the world on their carbon footprint. The data was collected by the World Bank for a research paper intended to discern the roles cities and urban areas have in worldwide GHG emissions. Levels are represented on a kg CO_2e per capita basis. The study showed that emission levels can vary greatly across the world and that larger cities tend to have a lower per capita impact on GHG emissions than previously thought.



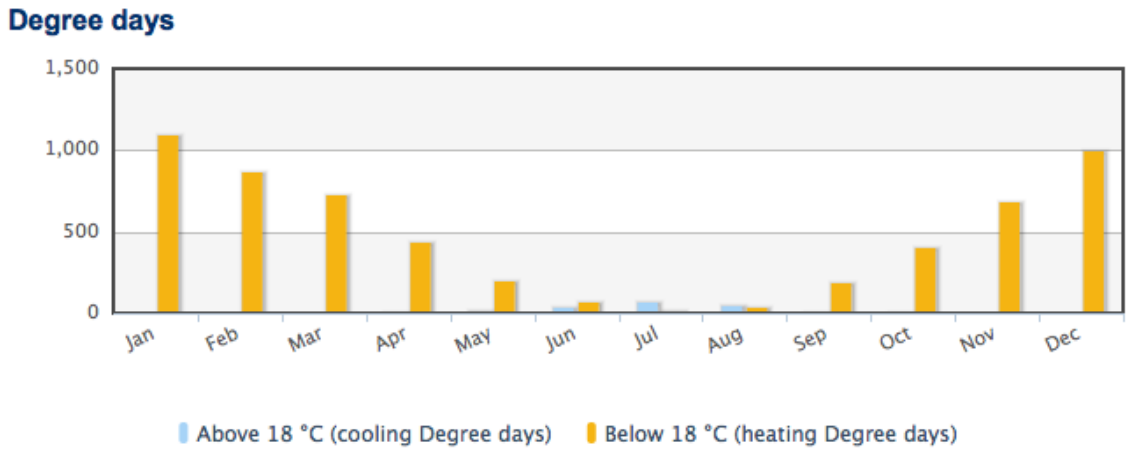
Kenora comes in at 6.27 tCO_2e/Capita, well below some of the larger cities cited above and around the average of other smaller municipalities within Ontario. While it is unexpected that the City would have a below average emissions per capita amount, the decreasing trend in energy consumption has helped in this regard. Also, a lower GHG content in electricity generation in

Ontario in comparison with many of the compared entities certainly contributes to the lower overall standing. In Canada, transportation contributes to approximately 30% of energy consumption. Comparing this to the 43% in the City and considering that transportation fuels contribute more GHG per *e*kWh than electricity or natural gas, it is reasonable to discern that opportunities certainly exist to reduce Kenora's overall GHG performance.

3.3.1 Climate

Benchmarking involves finding out where energy is being used and determining the main areas that can be improved. It also requires considering how and why energy is being used. Therefore, the above comparisons alone do not provide the whole picture if we want to understand how energy efficient a community is, either with regard to its design, operations, or the behaviour of its residents and employers. This is because the climate varies greatly across the provinces and territories. Of course, a northern Ontario community is going to use more energy to heat a building than a community in southern Ontario. Also, the size and relative breadth of the community dictates the amount of contribution to fuels as the distance that people have to drive also changes. Heating and cooling degree days are a measure of the degree to which buildings need heating or cooling to maintain a specified level of temperature comfort.

Figure 3-10 Kenora Heating/Cooling Degree Days (Source: Weather Network)



A summary of both the City's heating and cooling degree days by month as an indicator of climate is shown in the figure above. As illustrated, the City is predominately a heating environment with an annual average of approximately 5,748 heating degree days (referenced to an average outdoor temperature of 18 degrees Celsius) which indicated a high heating demand. This analysis is reinforced by the findings of ***Section 3.1:*** *Energy Consumption*, which showed that natural gas

combustion accounted a large percentage of all energy used. Without any natural gas electrical generation within the City, it can be assumed that the vast majority of this consumption was used in some form of heating processes.

Cooling degree days average approximately 168 days per year (referenced to an average outdoor temperature of 18 degrees Celsius), which indicates a small cooling demand. Historically, cooling would have been seen as a luxury. However, with the increased use of air conditioning throughout the affluent developed world, cooling load is becoming more significant and must be incorporated into energy planning.

The CEP puts high priority on minimizing the heat demand and creating an efficient, flexible approach to sourcing and distributing heat.

The City strives to analyze our consumption data and compare our performance to what other municipalities and provinces are doing. Advances in measurement and verification and general protocol are pushing the models and data that we generate to new levels of accuracy and detail. Linear regression and cumulative sum modeling are being investigated to improve statistical accuracy in our reports and in estimation of actual savings to ensure vendors are accountable to their guarantees.

3.3.2 Benchmarking Summary

The value of benchmarking and comparison is that it allows the City to understand the opportunities and the pitfalls of energy conservation and sustainability planning as experienced by other public agencies. Through this exposure, the City is able to focus on strategies that are both proven to be successful elsewhere and can be tailored to the unique nature of our community.

It is apparent that energy conservation is being considered and implemented in most municipalities across Ontario and Canada. While the Ontario government, in particular, has set guidelines for what they consider a ‘green’ municipality to be, there are opportunities for the City to mold these definitions into a strategy to achieve a sustainable future. Environmental strategies for green communities encompass both operational and policy improvements as well as environmental education. Many municipalities are expanding their focus on environmental issues and conservation and moving beyond energy consumption and recycling, addressing the

more complex issues of water management, heat island effect, and light pollution, to name a few.

As stressed in Kenora's 2014 Conservation and Demand Management Plan, ongoing professional development and training is an important factor in the success of the CEP 2018 to ensure that staff understand their role in the greater goal. The CEP 2018 and accompanying education should be a continuous process, a living document that is updated and changed as the needs of the community change, and as the City progresses to a more sustainable and efficient future.

It will be key for the City to share our experiences and successes as we carry out our CEP 2018, so that they may be used as a tool and beacon for other municipalities beginning the process. While realities of budget restrictions are an important factor for the City to consider in any planning activity, it is possible to achieve a green community while adhering to the financial constraints of a publicly-funded municipal system. It is clear that new technology and ideological changes have produced continued operational cost reductions while improving indoor comfort and environmental sustainability. In many cases, careful choices of investment in these cost-saving projects can fund themselves through the use of incentives and previously allocated energy funds. As long as the savings are reinvested, these improvements can continue for the foreseeable future, ensuring a sustainable process.

In terms of new builds, many organizations are now working within LEED™ standards to guide the design and construction of the new built environment. This is an important consideration for the City to ensure that new development is properly planned to achieve long-term sustainability. British Columbia has emerged as the Canadian leader in such efforts to make public buildings carbon neutral and provides an excellent resource in this area.

From the performance indicators set out by the Ontario Ministry of Energy, Northern Development and Mines, we have learned that for our CEP 2018 to be successful we must:

- Identify opportunities to form community partnerships for environmental education purposes.
- Expand on and plan for professional development.
- Support energy conservation practices.
- Assess community groups that could support environmental education now.
- Document the current level of participation by stakeholders and the outside community to identify opportunities and areas for improvement.

4 CITY ENERGY CONSERVATION MEASURES

4.1 The Start of the Journey: Energy Audits

Once the overall energy consumption is measured for any organization, the natural progression is to develop an in-depth understanding of the nature of utilities' consumption in order to focus on improvements by target systems and equipment that consume the most resources based on specific criteria. For the City, many of our facilities were audited by VIP Energy Services, Inc. in 2017. From these audits, Energy Conservation Measure (ECM) themes were created in order to allow for efficient and cost-effective implementation. A description of the opportunities found, as well as simple paybacks and available incentives, are shown in detail below. Once identified, these Energy Conservation Measures were organized by simple payback (after incentives) to create a short, medium and long-term investment strategy. The criteria used were less than 2 years (short), 2-5 years (medium) and greater than 5 years (long). As well, measures that require further investigation were also noted as To Be Determined (TBD). While simple payback is not the only criteria that should be considered when evaluating the ECM opportunities, it does provide some basic rationalization and a place to start. Ongoing capital planning will be implemented based on these audits in order to reduce or eliminate causes of negative performance. Long term strategies will include an ongoing program of energy audits and re-commissioning of these facilities both to track the progress of implemented conservation initiatives and to identify new areas of focus.

By identifying all accessible mechanical systems, we were able to breakdown rough consumption of all three major utilities: electrical, natural gas and water. The identification of these usage points allowed the City to create not only a detailed opportunity list of procedural and capital-intensive projects, but to also detect trends and themes of where major efforts should be focused.

In all, 52 opportunities were identified with an overall cost savings potential of approximately $201,000, and an estimated implementation cost of $1,520,000. This list was generated to assist in the creation of a plan to improve the energy efficiency of City facilities as well as reduce the on-going associated energy costs. In addition, it is important to note where incentives are available in order to ensure that ECM's are acted upon, as many of these programs are subject to change. In general, these audits showed that the greatest opportunities lie in the areas of simple envelope improvements, heating, lighting and operational processes. These areas will guide our focus as we plan conservation measures for the short, medium and long term.

4.2 Energy Conservation Measures Implemented

Prior to the completion of the CEP 2018, the City has already taken significant steps towards reducing its energy consumption. Such measures included building envelope upgrades, LED light replacements and improvements to process control and building automation systems. In terms of the short-term measures, most are operational and maintenance in nature.

4.3 Energy Conservation Measured Planned

While the City recognizes that we have already completed a substantial amount of work towards energy efficiency and conservation, there is still much to do in order to reach our sustainability goals. ***Section 3.1.1:*** *Electricity* detailed the impact that City facilities have within the commercial sector and ***Section 3.2***: *Carbon Footprint* used this energy data to show how the overall GHG emissions of those facilities impact the community. With this in mind, the City will put together the following short, medium and long-term strategies to act as a roadmap to our continued operational improvement. These goals are divided into 1-2 years, 2-5 years and greater than 5 years. This is a 'living' plan and there are many key items that can influence the plan and cause a change in priority or direction including: incentives changes, equipment failure and changes to capital investment funding. The ECM's are presented with an understanding that available capital investment funding is required to achieve their completion.

4.4 Energy Conservation Strategies

4.4.1 Short-Term Strategies:

Below is a list of the short-term identified targets and focus areas for the City over the next 1 - 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	Payback Assessment
Keewatin Library	Install Smart Thermostat in Main Library			$350	$200	$200	0.6		Short
Kenora Public Library	Install new weatherstripping on doors	695	402	$232	$200	$200	0.9	700	Short
City Hall	Upgradr weather stripping on the doors	720	369	$226	$200	$200	0.9	700	Short
Operations Centre	Tie washroom exhaust fans to occ sensors	6,526	N/A	$1,044	$1,000	$1,000	1.0	22	Short
Operations Centre	Weather stripping on the exterior doors	4,484	729	$936	$1,000	$1,000	1.1	1,393	Short
Operations Centre	Cogged belt on AHU1 and AHU2 instead of flat V-belt	838	N/A	$134	$150	$150	1.1	3	Short
Kenora Sportsplex	Install programmable thermostat on 3 unit heaters in the field	N/A	2,700	$810	$1,000	$1,000	1.2	5103	Short
Keewatin Memorial Arena	Exterior Wallpack LED retrofit	15615	N/A	$2,498	$4,000	$3,219	1.6	53	Short
Operations Centre	Functional Performance Test (FPT)	44,837	7,289	$9,361	$16,359	$11,359	1.7	13,929	Short
Kenora Sportsplex	Weather Stripping on exterior doors	N/A	753	$226	$400	$400	1.8	1424	Short
Sewage Treatment Plant	Exterior LED Lighting Retrofit	11,892	N/A	$1,189	$3,300	$2,111	1.8	40	Short
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	Short

4.4.1.1 Lighting Upgrades and Standards for New Construction and Renovations

Lighting is a substantial source of electrical energy used in municipal facilities and has been a focus of both previously implemented measures as well included in the list above. Lighting is such a high source of consumption due to many reasons including the age of the buildings and the pricing and availability of high efficiency alternatives at the time of construction. The City also underwent a significant streetlighting retrofit in 2015.

Traditionally, more emphasis was placed on initial capital rather than long-term operational costs. In future, the City will reduce the energy consumed by lighting systems by incorporating the following actions into a new standard for lighting systems in the City' facilities.

Proposed Target:

Implement new standards for lighting replacements and renovations that result in all new lighting installations being of either high efficiency or LED equivalents.

The City will take the following actions to achieve this target:

1. Where feasible, implement a replacement by attrition policy in all municipal buildings that replaces any defective lighting fixture with either a high efficient or LED equivalent. This should include the use of appropriate automatic or scheduled lighting controls.

2. Generate plans and budgets for future street lighting projects to be comprised of primarily LED fixtures.

3. Take advantage of IESO provided incentives to help fund these initiatives.

4.4.1.2 Improving Efficiency in the Use of Natural Gas

While overall energy usage of City facilities has been trending down, it's important to ensure that this trend continues. High heating demands have led to higher natural gas consumption than the provincial average in facilities, translating into greater emission levels, but also greater opportunities for savings. The best methods to combat these increases and bring natural gas consumption rates down is to improve the control of building heating systems (efficient building automation), thermal efficiency of buildings and reduce unnecessary heating.

Proposed Target:

Continue the annual reduction in natural gas consumption from municipal facilities by 2018. Natural gas data reported to the Ontario Ministry of Energy, Northern Development and Mines will serve as the metric by which this target is measured.

The City will take the following actions to achieve this target:

1. Implement maintenance procedures at all municipal buildings that include seasonal inspection, repair and replacement of doors and window seals as necessary.

2. Ensure all thermostats are upgraded to smart programmable models (NEST or equivalent) wherever feasible and provide training and guidance on acceptable scheduling and temperature setpoints. Implement routine checks to ensure these schedules are not being manually overridden.

3. Begin a systematic approach to upgrading the heating systems at high consumption facilities as identified through energy audits previously conducted.

4. Investigate the feasibility of using solar water heating to reduce the natural gas consumption of pool water heating.

5. Investigate the feasibility of installing heat pumps at municipal office buildings and small libraries.

6. Take advantage of incentive programs from Union Gas for retrofits and gas saving measures.

4.4.2 Medium-Term Conservation Strategies

The following details some of the medium-term targets and focus areas for the City over the next 2 - 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	Payback Assessment
Wellness Centre and Swimming Pool	Exterior Lighting Retrofit	5,943	0	$594	$1,560	$1,263	2.1	475	Medium
Water Treatment Plant	Weather Stripping for Doors and Loading Dock	5,270		$791	$2,000	$2,000	2.5	18	Medium
Operations Centre	Install occ sensors in Stores and OPG	1,969	N/A	$315	$800	$603	2.5	7	Medium
Keewatin Memorial Arena	Replace Motor on cold brine pump with premium eff.	9391	N/A	$1,503	$4,000	$3,061	2.7	32	Medium
Water Treatment Plant	Cogged Belt in Blower of AHU	234		$35	$100	$100	2.8	1	Medium
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	Medium
Kenora Sportsplex	Exterior Wallpack LED Retrofit	1995	N/A	$319	$1,000	$900	3.1	160	Medium
Keewatin Memorial Arena	Occ sensors on change rooms and washrooms	1792	N/A	$287	$900	$721	3.1	6	Medium
Wellness Centre and Swimming Pool	Retro-Commissioning	64,888	3,999	$11,382	$40,000	$33,511	3.2	8,077	Medium
Operations Centre	Energy Resouces & Awareness program	6,726	1,093	$1,404	$5,000	$5,000	3.6	2,089	Medium
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	Medium
Keewatin Memorial Arena	LED Retrofit for T8 and T12 fixtures	33145	N/A	$5,303	$21,000	$19,343	4.0	113	Medium
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	Medium
Kenora Sportsplex	Occ sensors on change rooms and washrooms	594	N/A	$95	$400	$341	4.2	48	Medium
City Hall	Energy Resource & Awareness Program	2,944	246	$545	$2,500	$2,500	4.6	475	Medium

4.4.2.1 Increase the Share of Public Transportation in the City's Modal Distribution

While transportation does not immediately come to mind when thinking of energy conservation, this sector consumes 31% of the City's total energy and contributes 49% of its GHG emissions. The City, encompassing both municipally and community-wide, will work to reduce reliance on this energy source by increasing sustainable forms of transportation through multi-modal infrastructure improvements to support cycling and walking, ensuring development is transit friendly and planning our communities to be complete and healthy.

Proposed Target:

Achieve a 5% modal split in transit and a 3% total increase in walking, biking or other mode of transport by 2024, as reported by the federal census data.

The city will take the following actions to achieve this target:

1. Continue to promote Municipal Corporate Policy HR-2-19 Vehicle Operation which refers to the corporate anti-idling policy as well as support anti-idling promotion throughout the community as a whole

2. Continue to support Urban Development as detailed in the Official Plan and promoting local work opportunities, ride sharing and reducing outbound commuting

3. Emphasize the importance of sustainable transportation measures, such as transit and active transportation

4. Consider feasibility of car share and cycling programs (both corporately and community-wide)

5. Support/encourage school-oriented programs to increase active transportation initiatives

6. Ensure new and reconstructed arterial and collector roads are built as *Complete Streets*[20] that are safe and accessible for pedestrians and cyclists of all ages where feasible

7. Explore opportunities to modernize the local transit system by improving bus shelters, ticketing systems, routes, and online accessibility

8. Ensure new development is transit friendly

9. Work within the region to lobby government for inter-region public transportation options

[20] A Complete Street is designed for all ages, abilities, and modes of travel. On Complete Streets, safe and comfortable access for pedestrians, bicycles, transit users and the mobility-impaired is not an afterthought, but an integral planning feature. http://completestreetsforcanada.ca/

4.4.2.2 Install VFD's in Water Handling Facilities

As mentioned and recognized in the energy audits performed at municipal water handling facilities, energy used in pumping water represents a large portion of the corporation's total energy use. When we consider that nearly-half of all electrical energy used by municipal facilities come from these types of facilities, it becomes imperative for us to focus our conservation efforts at reducing this high demand process. Older pumps and motors are typically over-designed for their general usage and therefore consume more energy than is required. By installing a variable frequency drive (VFD) the total demand and consumption of these pumps can be reduced by up to 20%, while maintaining the capability of meeting peak or full load conditions.

Proposed Targets:

a) *Investigate and install VFDs where feasible in all water handling facilities and pumping stations by 2024.*

b) *Reduce energy consumption at these facilities by 12% by 2024.*

Corporately, we will take the following actions to achieve these targets:

1. Initiate Detailed Engineering Studies (DES) to determine the feasibility, payback, and energy conservation levels of VFD installations at the sewage treatment facilities, as identified through energy audits as high conservation opportunities.

2. Pursue IESO funding for the DES's where applicable.

3. Implement the findings of the DES's where feasible and initiate measurement and verification practices to quantify the success of the measures.

4.4.2.3 Energy Audits, Retro-commissioning and New Building Commissioning

Programs like energy audits and commissioning practices are processes that should be on-going and are important tools in identifying deficiencies and increasing returns on investments in energy conservation. Operational improvements and monitoring are an important part of the solution while ensuring that conservation programs are implemented properly and monitored to maintain savings are pillars of any energy management program. Instituting a regular, on-going

routine of energy audits and retro-commissioning of large consumption facilities will help ensure that municipal facilities remain functioning in an energy-efficient manner.

Proposed Targets:

a) *Develop and institute an approved schedule of energy audits at each municipal facility. Energy audits will occur at a minimum of once every 5 years.*

b) *Develop and institute a scheduled program of re-commissioning existing building controls and major HVAC equipment at high consumption facilities.*

Corporately, we will take the following actions to achieve these targets:

1. Work with Council to plan, organize and budget for a schedule of energy audits at all municipal facilities.
2. Work with Council to plan, organize and budget for a schedule of re-commissioning activities at its high consumption facilities.
3. Educate staff and the community on the benefits of recurring energy audits and re-commissioning.
4. Support and include commissioning practices during new construction and renovations at City operated facilities.
5. Lobby provincial governments to extend incentive programs for energy audits and commissioning.
6. Develop budgets and schedules for implementing the findings of the energy audits.

4.4.3 Long-Term Conservation Strategies

The measures below show a longer-term payback (greater than 5 years) and are generally more capital intensive in nature requiring a broader budgeting focus. Often these types of ECM's are provided as an awareness tool for corporate staff and are noted for informational purposes to ensure that staff are aware of the potential should capital funding become available and to encourage energy considerations when this equipment is replaced.

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

4.4.3.1 Provide the Energy Needed for Projected Growth through Improved Energy Efficiencies

Target – Use efficiency to create at least all the energy needs to support the growth of the building inventory

According to Kenora's Official Plan, the community is entering a period where at least 460 new homes will be added by 2031. These will add approximately 58 *e*GWh annual energy consumption per year. Over the same time period, significant portions of the residential sectors will undergo renovations and upgrades, providing opportunities for increasing efficiencies. To support the new population, commercial, industrial and institutional buildings will also undergo significant expansion.

Proposed Target:

Use efficiency improvements to create at least all the energy needs to support the growth of the building inventory through 2031.

The first step is to target the existing building stock and take the following actions:

1. Target conservation programs to older building stock and encourage commercial and industrial sectors to participate in energy audits and retro-commissioning programs. Develop standards for recurring use of these programs over specific time periods, based on building age and energy intensity.

2. Develop lighting standards for renovations that include options for LEDs and other high-efficiency lighting types. Include operational standards such as light and motion sensors, and automatic timers.

3. Consider incentives or financing programs to accelerate meeting efficiency standards of new Ontario Building Codes.

4. Encourage building owners to improve the thermal efficiency of their facilities through measures such as increased insulation and weather stripping.

5. All major renovations will be expected to achieve at least a 20% energy efficiency increase from today's overall annual city-wide average of 44 *e*kWh/ft^2 starting from 2017. Moving forward, this target will be improved by a net 3% per year through at least 2031.

6. Encourage regional partners to adopt these new standards.

Next, we will focus on encouraging new building construction to embrace higher energy efficiency standards than are currently used in the Ontario Building Code by:

1. Encouraging builders to improve energy efficiency and sustainability of new buildings by utilizing third party programs such as LEED™ certification, BOMA BESt, or ENERGY STAR® for new homes, and celebrating these successes.

2. Develop policy for energy efficient guidelines and equipment specifications for new construction projects that reduce average energy efficiency by 1.5% per year for ongoing new construction from 2018 to 2031.

And finally, we will decrease consumption of appliances and electrical equipment by:

1. Increasing participation rates and awareness of recycling and replacement programs for refrigerators and electronics equipment.

2. Provide broader community education on the benefits of the ENERGY STAR® program, particularly when purchasing new appliances and electronics and the impact of phantom loads.

4.4.3.2 Building Envelope Upgrades – Reducing Thermal Losses

Thermal losses through building envelopes is generally a substantial area for energy savings. In some cases, as high as 20% of the total energy used to heat or cool a building is lost through the envelope. Upgrades to doors, windows, and insulation are some of the most common and effective means of decreasing the thermal losses of buildings. As well, high usage of natural gas in our facilities means that these losses directly translate into higher emission levels. The primary constraint on these projects is that they can be cost prohibitive, especially when done in a retrofit scenario. To improve the thermal efficiency of Municipal buildings, we will look to improve building envelopes in conjunction with facility-renewal projects and also seek out incentive funding where available to assist in achieving these targets.

Proposed Target:

Improve the thermal efficiency of existing building stock and increase standards for new construction building envelopes.

Corporately, we will take the following actions to achieve this target:

1. The City will make use of 3rd party programs such as LEED™ and BOMA BESt® in its new construction buildings which place emphasis on increasing the effectiveness of building envelopes.

2. Develop a program to identify and rectify any breaches to the building envelopes. This will assist with both energy savings and improving the useful life of both the building structure and the equipment inside.

3. Take steps to plan and implement a window replacement program for its older existing building stock, using information gathered through energy auditing to determine the highest priority facilities.

4. Investigate the feasibility of instituting a program of spray-foam insulation in ceiling and attic cavities in existing building stock, using information gathered through energy auditing to determine the highest priority facilities.

5. During any significant renovation to existing building stock, consideration will be given to the feasibility of combining insulation improvements with existing project plans, to reduce retrofit costs.

6. Implement such retrofit measures as deemed feasible to improve the building envelope including but not limited to; air curtains, automatic doors, reflective e-film window coverings, window roller shades, etc.

4.5 Operational Efficiency Improvements

Despite the need for additional capital investments, many of the identified municipal conservation opportunities can be put in place with simple operational changes. It is generally a preferable green and economic policy to save a watt, rather than to generate a watt; the cheapest watt of electricity is always the one not used. The following documents the many and varied measures taken to improve our energy efficiency through operational changes. These measures are not categorized under our capital-intensive strategies above, as these measures generally require low investment and are more of a philosophical change than specific measures. Many of these items were identified directly from the energy audits completed.

4.5.1 Green Purchasing

Green purchasing involves identifying, selecting and purchasing products (i.e. goods or services) with significantly less adverse environmental impacts than competing products. Further it involves considering the costs and environmental characteristics and performance of a product in all stages of its life-cycle, from product design, development and production/provision, through product use, to the ultimate handling (i.e. recovery, recycling, re-use and/or waste disposal) of whatever remains of the product at the end of its useful lifespan.

Ideally, while green purchasing considers multiple environmentally preferable aspects and associated reduced impacts of products through entire life-cycles, where possible and appropriate, it should target and give greatest preference to those products that are environmental leaders from a cumulative and full life-cycle perspective.

Green purchasing would need to be a grass roots initiative. Reports and requests for purchases should consider environmental issues and green alternatives. The City of Kenora is committed to increasing the proportion of recycled, recyclable, and other environmentally preferred products and services in our acquisitions. While maintaining this commitment, the need for quality and fiscal responsibility will be taken into consideration. Corporately, we have identified our community as being vitally dependent on the environment for our economic and social well-being. These initiatives will support our community's efforts and belief in promoting a sustainable lifestyle and minimizing our impact on the environment.

Three guiding principles to aid staff in enhancing the green purchasing initiative can be implemented:

1. When formulating contracts and tenders' specifications for goods and services, do so in a manner that allows for the recommendation of environmentally responsible and sustainable products, given full consideration of the operational and financial implications.

2. A product's full life-cycle environmental benefits and costs need to be considered over the product's service life (i.e. consider not only initial costs, but maintenance and replacement costs, product lifetime and disposal costs and waste stream).

3. Base purchasing decisions on accurate information about environmental performance.

4.5.2 Green Cleaning

Green cleaning policies reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment. Such policies are part of the LEED certification program and will be implemented throughout the municipality. Contained within ***Appendix B*** of this report is a sample template of the green cleaning policy to be used and tailored to each specific municipal facility. This policy will ensure that the health and safety of the buildings' occupants and maintenance personnel is a high priority while reducing the impact on the environment and maintaining cost effectiveness.

4.5.3 Electronics Recycling

The City of Kenora has previously committed to an electronics recycling program. We accept different types of electronics at the Transfer station for recycling. Ontario Electronic Stewardship helps the municipality to pick up the waste from the transfer station.

The following electronics are currently accepted:

- Television and monitor display devices
- Computers, both desktop and laptop, including accessories
- Desktop printers
- Audio video systems
- Home theatre
- Cellular devices

The program is free to the public and it is collected daily. The OES has a portal to submit reports requesting pickup and supplies (pallets, shrink wrap, cardboard boxes etc.). The program has proven very successful and in 2017, 63 tons of electronic waste was diverted from the landfill. The promotion of this program should be continued, as well as enhanced to identify and implement ways of expanding it.

4.5.4 Fuel Efficiency and Emission Reductions

Promoting fuel efficient or zero emission vehicles is another operational measure that can help to reduce emission generated within the municipality. City staff will work with private developers and investigate the feasibility of charging stations if electric fleet vehicles are adopted. Due to the lack of charging stations within the near vicinity of the City, this measure could help to bring more electric vehicles into Kenora, increasing public awareness and bringing additional tourists through the city centre. There are also many third-party not-for-profit companies that have developed programs to help municipalities and small businesses in installing charging stations.

The adoption of sustainable vehicle fleets by local private and institutional organizations can also be encouraged through local promotion and by using local examples to encourage the change. Adding preferred parking spaces for electric or hybrid vehicles will also positively influence the move to more sustainable vehicles.

4.5.5 Indoor Environment Quality

When occupants are comfortable and satisfied with their indoor environment, personal satisfaction with their surroundings is facilitated. A municipal building is one of the variables in the provision of public services that is wholly-within the control of the municipality, especially in such areas as air quality, acoustics, lighting, infection control, and supporting a healthy active lifestyle.

4.5.5.1 Air Quality

Many Canadian jurisdictions have specific legislation that deal with indoor air quality. These regulations are generally concerned with the amount of contaminants in the air and the amount of fresh air intake into a given area. These regulations are put in place by organizations such as ASHRAE[21] and Health Canada, amongst others. Indoor air quality is of concern for a variety of reasons, and occupants who work or live in facilities with poor indoor air quality can suffer from some or all of the following symptoms: headache; dryness and irritation of the eyes, nose and throat; fatigue; sinus congestion; coughing and sneezing; nausea and dizziness. These symptoms can be caused by a lack of or too much humidity, insufficient outdoor air intake, or indoor air contaminants. Contaminants such as CO_2, VOCs (Volatile Organic Compounds from cleaners,

[21] American Society of Heating, Refrigerating and Air-conditioning Engineers

solvents and disinfectants) and dust are the leading causes of poor indoor air quality. Air filters and proper maintenance practises are often the best safeguard against these contaminants and proper operational practises must be in place to ensure adequate fresh air is reaching the occupants. Staff will continue to work with its maintenance personnel to ensure that adequate fresh air intake levels are maintained at its facilities and that filters are both properly in place (to avoid unfiltered air from entering the space) and changed periodically. Note that timely maintenance practices of filter changes need to be maintained to reduce the risks of increasing pressure on supply fans, which would increase electrical consumption. As filters become blocked they restrict air flow.

4.5.5.2 The Environmental Advisory Committee

One of the key pillars of the Corporate sustainability efforts is the Environmental Advisory Committee. The City of Kenora's Environmental Advisory Committee (EAC) was established in 2009 (By-Law 16-2009; 97-2009) to provide support for the implementation of municipal environmental policies (No. OP-3-1) and to help Council encourage and enable its citizens, visitors and businesses to adopt lifestyles of low environmental impact. At the time of the EAC's creation, staff was actively endeavouring to foster a culture of environmental awareness and action by striving for continuous improvement in the environmental performance of all departments, services and activities.

The role of the EAC is to provide advice and direction to City Council on a wide range of environmental matters. Generally, the role of the Committee is to maximize opportunities to reduce, reuse and recycle materials, and identify opportunities for citizens, organizations, businesses and government to be good stewards of the environment.

Over the past nine years, the EAC has followed a wide range of issues, making recommendations to Council for action on items as diverse as engagement in the current Community Energy Planning (CEP) process; optimizing the timing of roadside verge clearing to minimize harm to nesting birds and wildlife; greening shorelines to prevent undue fertilizer and contaminants runoff into regional waterways; monitoring and diverting solid waste from landfill; advice on public engagement and consultation for major projects with environmental impacts; municipal planning for source water protection for municipal drinking water; public litter pick-up and waste reduction days and information campaigns; and more.

The committee, comprised of seven members of the public including industry partners, the Lake of the Woods District Property Owners' Association and representatives from the local school boards, works with City administration and staff in the Planning and Solid Waste divisions, meeting monthly to share and disseminate information to the public. While the committee operates strictly on an unpaid, voluntary basis with no budget or remuneration, it has become a dedicated and effective team, engaging a wide network of experts, decision-makers and the general public.

In terms of the CEP, the EAC can provide support in the public engagement and communications of the process, rationale for, and benefits of the CEP and its recommendations. For example, should the CEP recommend measures to improve residential or commercial energy efficiency, the EAC would be well-poised to work with the existing municipal communications framework to share with the public information about how homeowners and business owners might access efficiency programming for building renovation or how to go about energy efficiency improvements, in practice. If the CEP recommends a series of community-driven action projects, the EAC can champion such concepts and provide information to the public to encourage citizen buy-in.

The EAC also has the capacity to bring people together around a shared table. We can convene meetings where experts, funders, government personnel, and tradespeople can engage with the public, and together these parties can collaborate to successfully undertake plan recommendations, projects, or programs.

4.5.5.3 Supporting a Healthy, Active Lifestyle

A commitment has been made to the social health of residents through many programs, including an active waterfront, as well as providing adequate parks and playgrounds. Several policy initiatives to ensure the health and wellness of the community is proactively maintained and improved throughout its coming growth have also been developed.

One of the key pillars of the City of Kenora's Official Plan is working to provide a range of mobile transportation modes that are accessible for persons of all ages and abilities by connecting people and places through coordinated land use, urban design, and transportation planning efforts.

The objectives of this strategic effort are stated as:

- To develop and promote an efficient and safe multi-mode transportation system for all users
- To prioritize public streets, infrastructure, trails, and pathways to facilitate and increase community connectivity and active transportation
- To implement a linked network of safe and active transportation trails and pathways
- To minimize the loss of future opportunities for trails and pathway development through land acquisition at the time of development
- To design roads as complete streets, where possible, to allow pedestrians, cyclists, transit riders and motorists of all ages and abilities to interact and move safely along and across municipal streets

This promotion of more active modes of transportation will have a lasting, significant effect on reducing both energy consumption and GHG emissions as well as promoting a healthy lifestyle. Initiatives around Sustainable Development and Neighbourhood Design, which are designed to enhance the quality of life for '*present and future generations*', have also been embraced. More on these items can be found in the City of Kenora's Official Plan document.

4.6 Water Efficiency

As the self-described North American Premier Boating Destination, the City of Kenora is firmly rooted in the importance of conserving its precious water resources. This belief supports the notion of promoting sustainable water management to reduce or limit our demand and effect on water resources. There are several initiatives that can be taken to achieve this through operational changes and retrofit installations. Since large retrofits can be cost prohibitive, a passive retrofit strategy can be embraced. This means that as facilities and equipment require replacement or repair, water efficiency will be considered as an important decision-making priority. In this manner, large cost projects can be avoided while still incrementally improving its water use and conservation.

5 COMMUNITY ENERGY CONSERVATION MEASURES

In the previous section some of the more specific Corporate measures that have, or can be, undertaken were covered in detail. To be successful, the CEP must also consider the broad influence that our community as a whole has on our energy landscape. This section of the report will focus on community-wide elements (e.g. culture and perspective) which play crucial roles in how the City of Kenora consumes energy. While many of the items listed below are broad in scope and require significant community buy-in, leadership on behalf of municipal energy and sustainability efforts will go a long way to ensure that these targets can be achieved. While the following proposed measures are broader and more open to interpretation, these measures are equally important to the success of the CEP. In fact, actions taken by the community as a whole can have a much greater impact.

5.1 Energy Conservation Measures Implemented

In 2017, City staff began working with VIP Energy to form a team that would be responsible for planning, creating and executing this Community Energy Plan. Some of the steps taken are outlined below.

5.1.1 Workshops and Advisory Stakeholder Group

Staff, in cooperation with VIP Energy, has developed a roster of key CEP internal and external stakeholders to form a committee to provide ideas and feedback on the development process as well as the Community Energy Plan itself. To augment this process, a community open house and online survey were also created. To assist in garnering support and gathering ideas from the group, materials were developed to encourage open discussions among attendees. These forums consisted of:

- Project Kick-off and Stakeholders Workshop #1
- Internal Stakeholders Energy Audit Summary Workshop #2
- Community Open House
- Online Feedback Survey
- Key Energy User Meetings and Interviews
- Draft Plan Review and Stakeholders Workshop #2

The Key Energy User Meetings were designed to raise awareness of the CEP process as well as broaden our understanding of the energy use characteristics of some of the larger energy users in the community. Feedback was also acquired through a community open house as well as the interviews and online survey described above. Questions surrounding the energy conservation plans, constraints and needs were posed, as well as a request to receive their individual energy use data for inclusion in the CEP and Energy Map. Many of the Community Stakeholders were able to provide us with key information regarding the restraints and opportunities with regards to their own energy management and conservation programs.

Some of the items highlighted in the feedback we received include:

- Awareness of programs to assist with energy efficiency retrofits is low.
- Municipal efforts are viewed leading community endeavours in this regard. This means that there is a good opportunity for this CEP program to become a guiding light in terms of encouraging local businesses, residents and industries to follow along.
- The importance of raising awareness of key achievements within the community to build momentum.
- Emissions and their effect on the local community and economy is not well understood or embraced among the local community.

5.1.2 Energy Mapping

Energy mapping can provide valuable geographical information as to where the community is expanding, where high energy intensive activities are taking place, and can help to plan new development and energy infrastructure. The following Energy Maps show the energy intensity of the buildings within the City at a postal code granularity. These can be used to advise municipal staff when making decisions on zoning, infrastructure, growth planning, and energy conservation measures.

The Energy Maps begin with a macro view of Kenora. This shows not only where energy use is most intense, but also illustrates the energy intensity dispersal by postal code, adding granularity to the map and providing more detailed information as to where the majority of the energy is used, and conservation measures should be focused. The maps clearly show that the city centres have much higher intensities than the rural areas and focus on these sectors is crucial when

considering future projects. For reference, detailed local maps are contained in ***Appendix C*** to give a better understanding of the zoning of the areas displayed on the Energy Maps.

Figure 5-1 Kenora Electricity Map Key

LEGEND	
no available data	
no associated postal code	
0 – 250,000 kW	
250,000 – 500,000 kW	
500,000 – 750,000 kW	
750,000 – 1,000,000 kW	
1,000,000 – 1,250,000 kW	
1,250,000 – 1,500,000 kW	
1,500,000 – 1,750,000 kW	
1,750,000 – 2,000,000 kW	
2,000,000 – 2,250,000 kW	
2,250,000 – 2,500,000 kW	
2,500,000 – 2,750,000 kW	
2,750,000 – 3,000,000 kW	
3,000,000 – 3,250,000 kW	
3,250,000 – 3,500,000 kW	
3,500,000 – 3,750,000 kW	
3,750,000 – 4,000,000 kW	
4,000,000 – 4,250,000 kW	
4,250,000 – 4,500,000 kW	
4,500,000 – 4,750,000 kW	
4,750,000 – 5,000,000 kW	
> 5,000,000 kW	

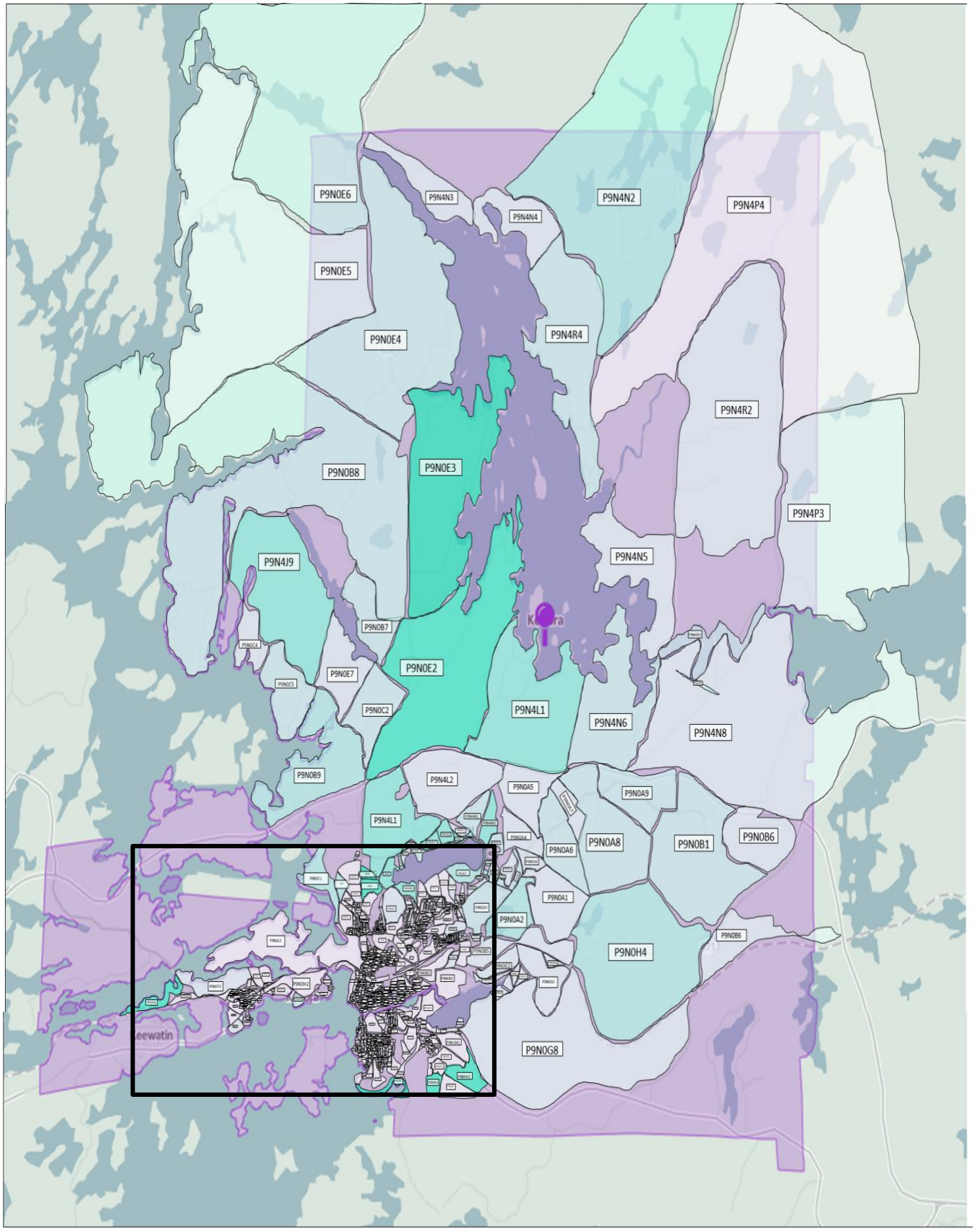


Figure 5-2 Kenora Electricity Map

Figure 5-3 Expanded Electricity Map

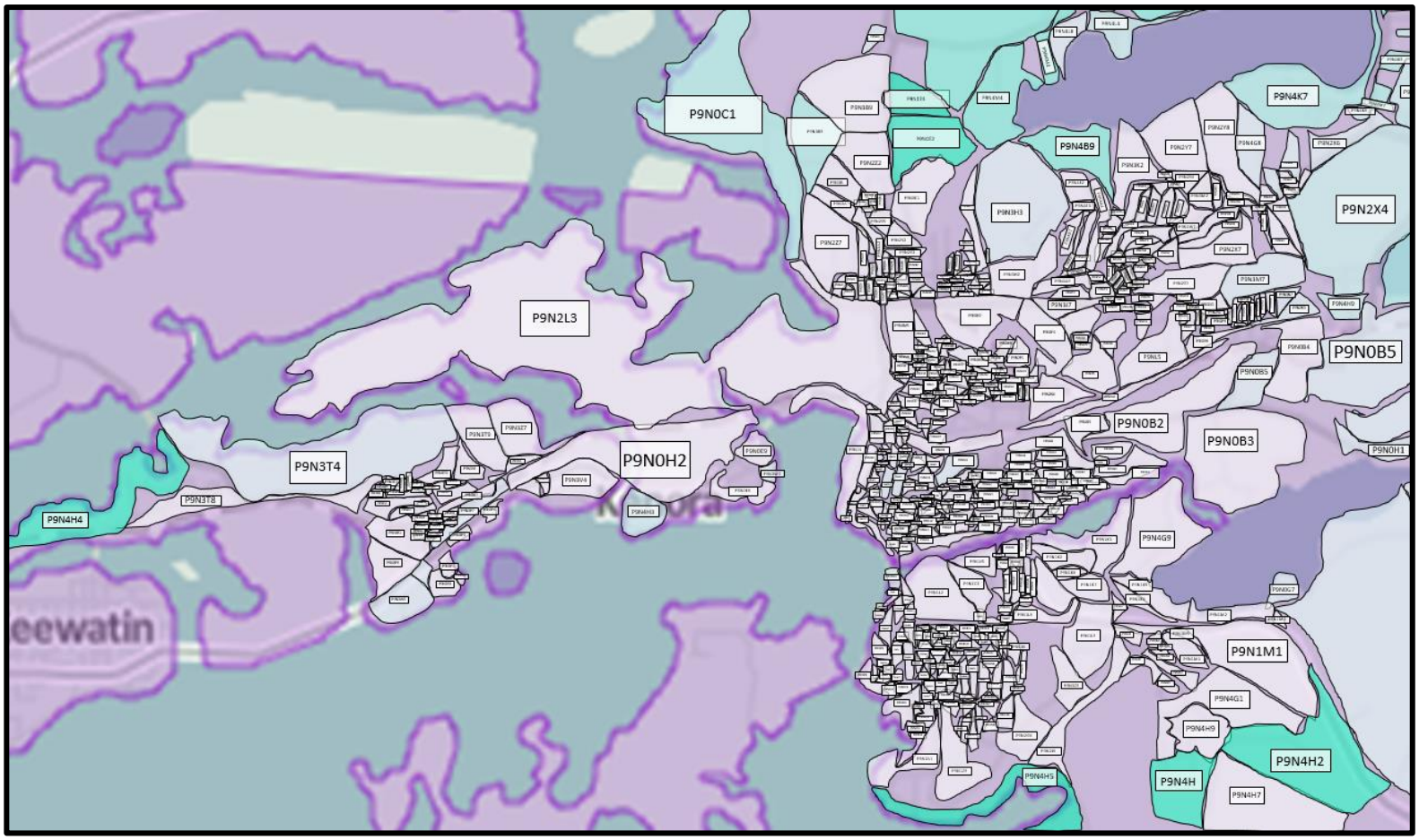


Figure 5-4 Natural Gas Map Key

LEGEND	
no available data	
no associated postal code	
0 -10,000 m^3	
10,000 – 20,000 m^3	
20,000 – 30,000 m^3	
30,000 – 40,000 m^3	
40,000 – 50,000 m^3	
50,000 – 60,000 m^3	
60,000 – 70,000 m^3	
70,000 – 80,000 m^3	
80,000 – 90,000 m^3	
90,000 – 100,000 m^3	
100,000 – 110,000 m^3	
110,000 – 120,000 m^3	
120,000 – 130,000 m^3	
130,000 – 140,000 m^3	
140,000 – 150,000 m^3	
150,000 – 160,000 m^3	
160,000 – 170,000 m^3	
170,000 – 180,000 m^3	
180,000 – 190,000 m^3	
190,000 – 200,000 m^3	
> 200,000 m^3	

Figure 5-5 Natural Gas Map

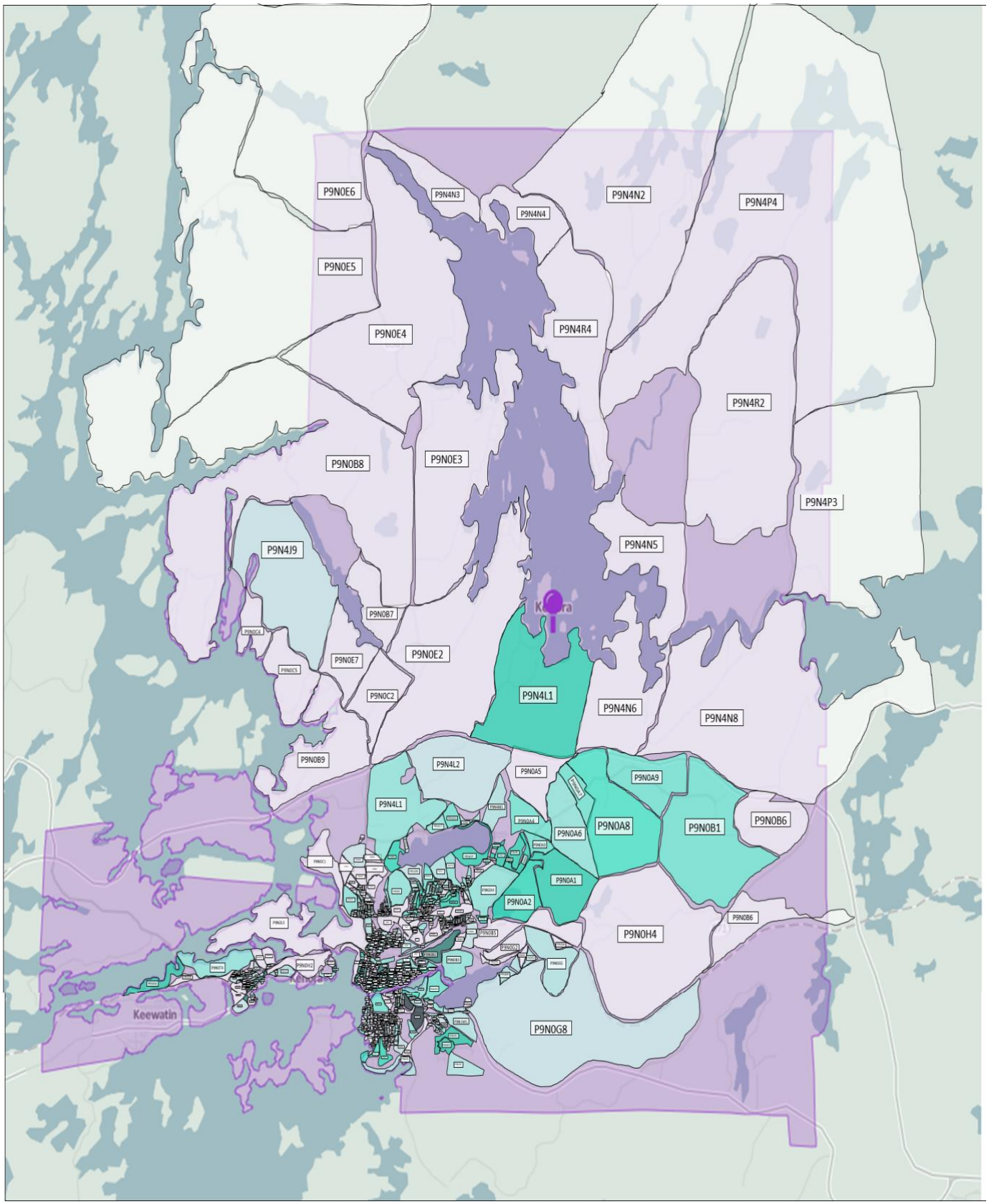
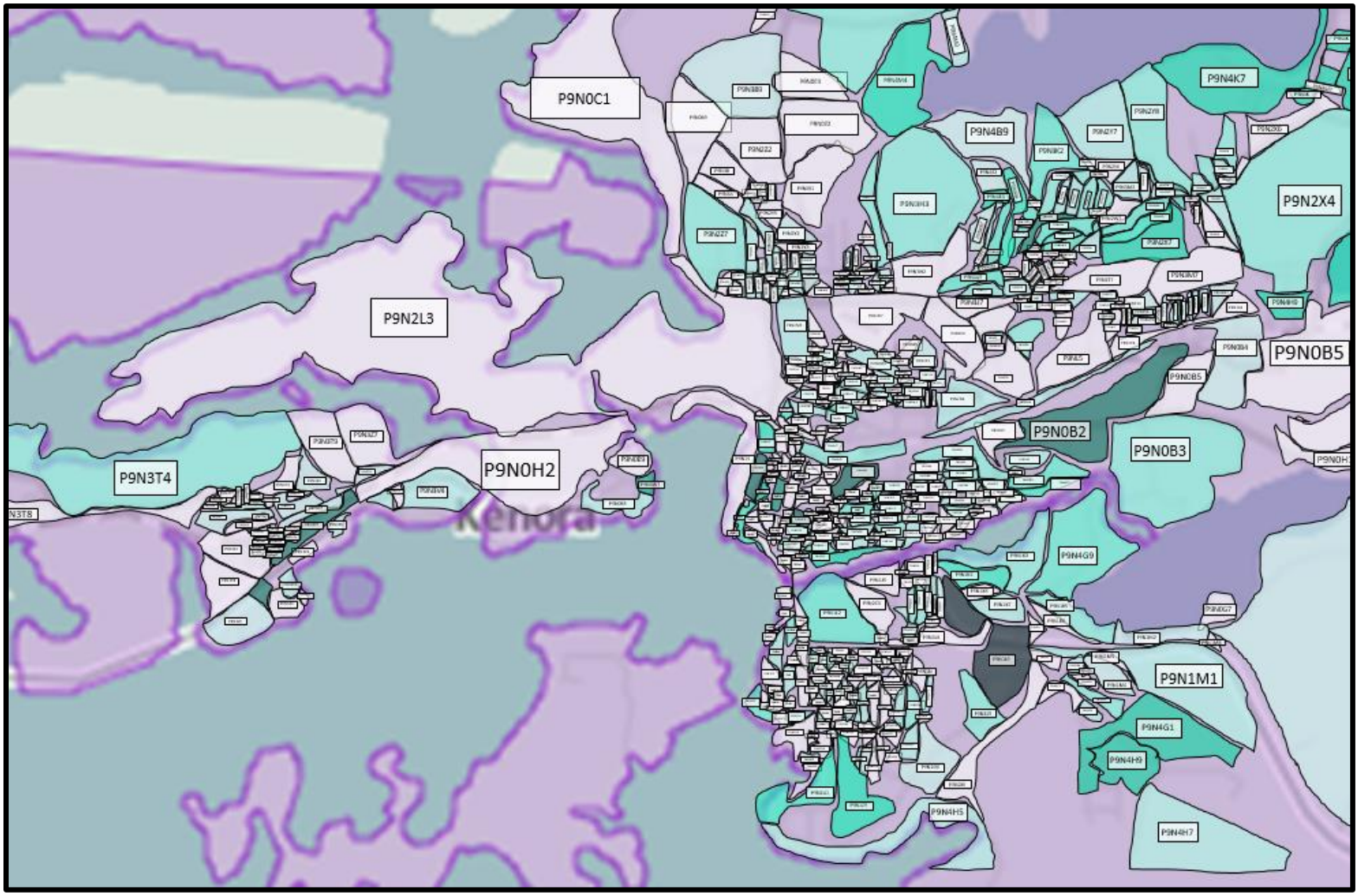


Figure 5-6 Expanded Natural Gas Map



5.1.3 Community Engagement

Based on the feedback received, a community awareness program is key to building awareness and support for both the CEP development process as well as energy conservation in general. These items include open houses, social media campaigns, informational handouts, materials for newspaper articles and other more general information pieces. Some of the highlights include:

- Energy and environmental messaging (social media, strategic public-facing marketing materials and use of messaging in the local media)
- Promotional information detailing the availability of funding for energy efficiency for local residents and businesses
- Attending meetings of influential community organizations such as the Chamber of Commerce
- Various visual marketing pieces including energy conservation related posters and news articles

This marketing program can be used to maintain momentum for both the CEP process as well as energy management as a whole and should be augmented by direct interaction with the public at events (where applicable and possible).

5.2 Energy Conservation Measures Planned

A community's ability to generate change within itself is largely dependent upon the amount of buy-in its residents have for an idea, cultural perspective or habit. To ensure that the community is promoting and actively working towards attaining its conservation and sustainability goals, City staff will undertake the following action items designed to positively influence the community's perception of conservation as well as the merits of efficiency and sustainability. They will allow for Kenora to continue to play a leading role in conservation efforts in the region and enhance its ability to attract investment and industry through measures that both benefit the environment and are economically viable.

5.2.1 Community Conservation Culture

Developing a conservation culture is a critical focus to be fostered within the community. This culture will lead meaningful behaviour changes from the residents of Kenora which will ensure that the full potential of conservation efforts can be achieved. While conservation is seen as being driven though technological improvements, efficient operation of equipment and processes can often lead to significant savings without major investment. The challenge lies in encouraging people to embrace this culture of conservation. Early adopters will always be a part of any new cultural movement, just as there will always be detractors on the other end of the spectrum. Getting those in the middle ground to shift towards positive action will be the key challenge to ensuring the success of this program in the greater community.

A leading-edge community engagement effort in energy initiatives (conservation, retro-fits, and efficiency programs) will be created in order to enhance implementation effectiveness and support a sustained quality of life in Kenora.

The community conservation culture will be created by:

1. Creating and maintaining a dedicated interactive online presence for community energy.

2. Leveraging available funding to promote conservation and demand management programs.

3. Help organizations (commercial, industrial and institutional) rationalize longer-term payback periods by identifying conservation opportunities and behaviour-based programs that can reduce energy consumption.

4. Work with local stakeholders on a public education campaign (public forums, Farmers Market tabling, etc.) to educate the community on the financial and environmental benefits of energy conservation.

5. Implement an energy conservation or climate change recognition program.

6. Use gamification, contests or reward programs to increase participation in conservation programs.

7. Educate people on the benefits of the ENERGY STAR® program, particularly when purchasing new appliances and electronics and the impact of phantom loads.

8. Continue to promote province wide initiatives like Earth Hour and recycling programs.

9. Support school programs to engage community on conservation initiatives.

10. Work with regional partners to expand conservation culture beyond our borders

5.2.2 Energy Efficiency

Improving energy efficiency is a key part of the CEP, as efficiency improvements are often the most cost-effective and easily implemented retrofits. In addition to the efficiency recommendations made in previous sections of this report, working collaboratively with the community and key stakeholders to create new standards of efficiency in both new and existing buildings will contribute to Kenora's overall economic competitiveness.

This will be achieved by:

1. Targeting conservation programs to older residential and commercial buildings, in areas identified as high consumption during the energy mapping process.

2. Seek out third-party programs and/or promote incentives or financing programs to assist residents to finance retrofits.

3. Lobby provincial governments to extend conservation programs.

4. Encourage building owners to benchmark energy usage of buildings and help develop an existing energy usage database for the community. This data can then be used to further improve the community's culture of conservation.

5. Continue to encourage building owners/managers to consider 3rd party energy efficiency programs such as LEED™ and BOMA BESt.

6. Encourage builders to improve energy efficiency and sustainability of new buildings beyond the Ontario Building Code, using third party programs.

7. Ensuring that all new commercial, industrial and institutional buildings consider energy and water efficiency improvements and conservation opportunities. This will apply to any facilities undergoing any major renovations.

8. Encourage regional partners to follow suit and adopt similar standards.

5.2.3 Energy Generation and Security

A strong energy infrastructure has many components, and security through redundancies and distributed generation are key elements. By expanding the amount of energy generated within the community, Kenora not only benefits from reduced operational costs, but also becomes more attractive to investments and industry by laying the groundwork for these emerging technologies. In addition to the need for increased local generation, decreasing the overall energy demand of the community is another area of concern. Growing demand levels will require increased expansion of the existing electrical infrastructure and may decrease the reliability of the grid.

Steps will be taken to increase the capacity for integrated community energy utility infrastructures through the following actions:

1. Encourage residential and commercial facilities to utilize solar water heating for pools and domestic hot water use by educating and providing support for these projects.

2. Preliminary investigations will be taken to determine the merits and environmental impacts of small-scale generation.

3. Provide education and support to industry and commercial facilities with high energy demand, as identified through the Energy Maps, on co-generation systems. These

systems are capable of making the most efficient use of input fuel by generating both electricity and converting waste heat into a useable energy source.

4. Work with local industry and businesses to reduce peak demand by implementing a demand management program that will work with stakeholders to encourage them to shift high demand process away room peak periods.

5. Take part in regional Energy Security Forums such as those regularly presented by the IESO. This will ensure that the City of Kenora has a detailed understanding of the potential opportunities and constraints associated with electricity supply in the Region.

Several other technologies exist that may be examined for their feasibility for integration into the Kenora's energy infrastructure, however the above-mentioned areas of focus are best suited to the City's geography and energy demands. Other technologies that may be considered include: additional deep-water lake cooling/heating (already in use at one municipal facility), wastewater micro-turbines and heat recovery, biofuel co-generation and landfill gas capture. These technologies have been designated as lower priority options due to both the building density and climate.

5.2.4 Land Use and Growth

Traditionally, energy planning is not a large part of community planning. However, the methods and considerations we use to plan our communities has a significant effect on the community's energy use. Some of these items are well captured in Kenora's Official Planning document.

Improvement in the energy efficiency of municipal and community building and architecture principles and the following actions will expand on these initiatives to help us build a complete and healthy community, where mixed-use areas support active transportation measures and a local transit system. Kenora will optimize our integrated community energy systems and efficiency opportunities in land use planning by:

1. Promoting pedestrian-friendly design through:

    a. Planning for convenient walking distances to transit and parks

b. Creating dedicated walkways and pathways/trails to link activity nodes (e.g. home to work)

c. Encouraging compact, efficient mixed-use areas that optimize redevelopment and integrate residential, office and retail commercial developments

2. Creating opportunities for energy conservation through:

a. Orienting new buildings to take advantage of solar gain

b. Retaining/planting and maintaining shade trees for summer cooling and winter shelter

c. Encouraging pedestrian and bicycle usage over vehicle travel

d. Encouraging the use of green infrastructure and systems (e.g. use of permeable surfaces, green facades, green/grass roofs and passive design landscaping, solar shading, use of recycled building and construction materials)

e. Enhancing the capacity of municipal staff to consider passive energy and sustainable building measures to conserve energy through the planning approvals process where feasible.

6 IMPLEMENTATION PLAN

The following table is a concise summary of the goals and objectives for the CEP 2018. Initiatives for each objective are identified with an indication of their priority, estimated implementation timing, what resources will be required, and who will take the lead.

Initiative	Priority	Timing	Lead	Resources
Target: Lighting Upgrades and Standards for New Construction				
1. Where feasible, implement a replacement by attrition policy in all municipal buildings that replaces any defective lighting fixture with either a high efficient or LED equivalent.	High	Short-Term	City	Staff resources; funding required
2. Take advantage of IESO provided incentives to help fund facility retrofit and operational improvement initiatives.	High	Short-Term	City, Synergy North, Hydro One	Staff resources
Target: Lighting Upgrades and Standards for New Construction				
1. Implement maintenance procedures at all municipal buildings that include inspection, repair and replacement of doors and window seals on a scheduled basis.	High	Short-Term	City	Staff resources
2. Ensure all thermostats are upgraded to programmable models wherever feasible and provide training and guidance on acceptable scheduling and temperature setpoints. Implement routine checks to ensure these schedules are not being manually overridden.	High	Short-Term	City	Staff resources
3. Begin a systematic approach to upgrading the heating systems at high consumption facilities as identified through energy audits previously conducted.	LOW	Long-Term	City, Union Gas	Staff resources; funding required
4. Investigate the feasibility of using solar water heating to reduce the natural gas consumption of pool water heating.	Medium	Medium-Term	City, Union Gas, External Consultants	Staff resources

5. Take advantage of incentive programs from Union Gas for retrofits and gas saving measures.	High	Short-Term	City, Union Gas	Staff resources
Target: Lighting Upgrades and Standards for New Construction				
1. Continue to support Urban Development as detailed in the Official Plan by promoting local work opportunities and reducing outbound commuting.	Medium	Medium-Term	City, community partners	Current resources
2. Emphasize the importance of sustainable transportation measures, such as transit and active transportation.	Medium	Medium-Term	City, community partners	Staff resources
3. Consider feasibility of car share and bike programs.	Medium	Medium-Term	City	Staff resources
4. Support/encourage school-oriented programs to increase active transportation initiatives.	High	Medium-Term	City, community partners	Staff resources
5. Ensure new and reconstructed arterial and collector roads are built as *Complete Streets* that are safe and accessible for pedestrians and cyclists of all ages where feasible	High	Medium-Term	City	Staff resources; potential funding required
6. Ensure new development is transit friendly.	High	Medium-Term	City	Staff resources
Target: Lighting Upgrades and Standards for New Construction				
1. Initiate Detailed Engineering Studies (DES) to determine the feasibility, payback, and energy conservation levels of VFD installations at the water treatment facilities, beginning with those already identified through energy audits as high conservation opportunities.	High	Medium-Term	City, Hydro One, External Consultants	Requires funding and external resources
2. Pursue IESO funding for the DES's.	High	Medium-Term	City, Synergy North, Hydro One	Staff resources
3. Implement the findings of the DES's where feasible and initiate measurement and verification practices to quantify the success of the measures.	Medium	Medium-Term	City	Requires funding and external resources

Target: Energy Audits, Retro-commissioning and New Building Commissioning				
1. Work with Council to plan, organize and budget for a schedule of energy audits at all City facilities.	High	Medium-Term	City	Staff resources
2. Educate staff and the community on the benefits of recurring energy audits.	LOW	Medium-Term	City, Synergy North, Hydro One, Union Gas	Staff resources and external resources
3. Support and include commissioning practices during new construction and renovations at City operated facilities.	LOW	Medium-Term	City	Staff resources, requires funding and external resources
4. Lobby provincial governments to extend incentive programs for energy audits and commissioning.	LOW	Medium-Term	City, Synergy North, Hydro One, Union Gas	Staff resources
5. Develop budgets and schedules for implementing the findings of the energy audits.	Medium	Medium-Term	City, Synergy North, Hydro One, Union Gas	Staff Resources, funding required
Target: Provide the Energy Needed for Projected Growth through Improved Energy Efficiencies				
1. Target conservation programs to older building stock and encourage commercial and industrial sectors to participate in energy audits and retro-commissioning programs. Develop standards for recurring use of these programs over specific time periods, based on building age and energy intensity.	Medium	Long-Term	City, Synergy North, Hydro One, Union Gas	Staff resources, requires funding and external resources
2. Develop lighting standards for renovations that include options for LEDs and other high-efficiency lighting types. Include operational standards such as light and motion sensors, and automatic timers.	High	Long-Term	City, community partners	Staff resources
3. Consider incentives or financing programs to accelerate meeting efficiency standards of new Ontario Building Codes.	LOW	Long-Term	City	Staff Resources,

				funding required
4. Encourage building owners to improve the thermal efficiency of their facilities through measures such as increased insulation and weather stripping. Develop window replacement and maintenance program, including window sealing and caulking.	Medium	Long-Term	City, Synergy North, Hydro One, Union Gas	Staff resources
5. All major renovations will be expected to achieve at least a 20% energy efficiency increase from today's city-wide average starting from 2018. This target will be improved by a net 3% per year through at least 2031.	High	Long-Term	City, Synergy North, Hydro One, Union Gas	Staff resources and external resources
6. Encouraging builders to improve energy efficiency and sustainability of new buildings by utilizing third party programs such as LEED™ certification, BOMA BESt, or ENERGY STAR® for new homes, and celebrating these successes.	High	Long-Term	City, Synergy North, Hydro One, Union Gas	Staff resources and external resources
7. Develop policy for energy efficient guidelines and equipment specifications for new municipal construction projects that improve average energy efficiency by 1.5% per year for ongoing new construction from 2017 to 2031.	High	Long-Term	City, Synergy North, Hydro One, Union Gas	Staff resources and external resources
8. Increasing participation rates and awareness of recycling and replacement programs for refrigerators and electronics equipment.	Medium	Long-Term	City, community partners	Staff resources and external resources
9. Educate the community on the benefits of the ENERGY STAR® program, particularly when purchasing new appliances and electronics and the impact of phantom loads.	Medium	Long-Term	City, community partners	Staff resources and external resources
Target: Retrofit All Municipal Buildings and Streetlights with High Efficiency Lighting Systems				
1. Use information gathered through energy auditing to plan and budget for scheduled replacement of major lighting systems.	High	Long-Term	City, Synergy North, Hydro One	Staff resources

2. Work with consultants and industry representatives to determine the most cost-effective energy efficient options on a continuing basis.	LOW	Long-Term	City, External Consultants	Staff resources and external resources
3. Pursue lighting retrofit incentives from IESO and lobby for the renewal of such programs.	Medium	Long-Term	City, Synergy North, Hydro One	Staff resources
4. Begin a staged implementation of this plan with the aim of all lighting being retrofitted by 2031.	Medium	Long-Term	City	Staff resources, funding required
Target: Building Envelope Upgrades				
1. Make use of 3rd party programs such as LEED™ and BOMA BESt® in its new construction buildings which place emphasis on increasing the effectiveness of building envelopes	Medium	Long-Term	City, Synergy North, Hydro One, Union Gas	Staff resources
2. Take steps to plan and implement a window replacement program for its older existing building stock, using information gathered through energy auditing to determine the highest priority facilities.	Medium	Long-Term	City, Synergy North, Hydro One, Union Gas	Staff resources
3. Investigate the feasibility of instituting a program of spray-foam insulation in ceiling cavities of existing building stock, using information gathered through energy auditing to determine the highest priority facilities.	LOW	Long-Term	City, External Consultants	Staff resources, funding may be required
4. During any significant renovation to existing building stock consideration will be given to the feasibility of combining insulation improvements with existing project plans, so as to reduce retrofit costs.	High	Long-Term	City	Staff resources, funding may be required
5. Implement such retrofit measures as deemed feasible to improve the building envelope including but not limited to; air curtains, automatic doors, reflective e-film window coverings, window roller shades, etc.	High	Long-Term	City	Staff resources, requires funding and external resources

Community Focused Measures				
Community Conservation Culture				
1. Creating a dedicated interactive community online presence on community energy conservation.	Medium	Short-Term	City, External Consultants, Synergy North, Hydro One, Union Gas	Staff resources, funding required
2. Leveraging available funding to promote conservation and demand management programs.	High	Medium-Term	City	Staff resources
3. Help organizations (commercial, industrial and institutional) rationalize longer term payback periods by identifying conservation opportunities and behaviour-based programs that can reduce energy consumption.	Medium	Medium-Term	City, community partners	Staff resources
4. Work with local stakeholders to educate the community on the financial and environmental benefits of energy conservation.	Medium	Medium-Term	City, community partners	Staff resources
5. Implement an energy or climate change recognition program.	High	Short-Term	City, community partners	Staff resources
6. Use gamification, contests or reward programs to increase participation in conservation programs.	LOW	Medium-Term	City, community partners	Staff resources
7. Educate people on the benefits of the ENERGY STAR® program, particularly when purchasing new appliances and electronics and the impact of phantom loads.	Medium	Medium-Term	City, community partners	Staff resources
8. Continue to promote province wide initiatives like Earth Hour and recycling programs.	LOW	Medium-Term	City, community partners	Staff resources
9. Supporting school programs to engage community on conservation initiatives.	LOW	Medium-Term	City, community partners	Staff resources

Energy Efficiency				
1. Targeting conservation programs to older residential and commercial buildings, in areas identified as high consumption through the energy mapping process.	High	Short-Term	City, community partners	Staff resources
2. Consider incentives or financing programs to assist residents to finance retrofits.	LOW	Medium-Term	City	Staff resources, funding required
3. Lobby provincial governments to extend conservation programs.	Medium	Medium-Term	City	Staff resources
4. Encourage building owners to benchmark energy usage of buildings and help develop an existing energy usage database for the community. This data could then be used to further improve the community's culture of conservation.	Medium	Medium-Term	City, community partners	Staff resources, funding may be required
5. Continuing to encourage building owners/managers to consider 3rd party energy efficiency programs such as LEED™ and BOMA BESt.	High	Long-Term	City, community partners	Staff resources
6. Encourage builders to improve energy efficiency and sustainability of new buildings beyond Ontario Building Code, using these 3rd party programs.	High	Long-Term	City, community partners	Staff resources
7. Ensuring that all new commercial, industrial and institutional buildings are evaluated for energy and water efficiency improvements and conservation opportunities. This will apply to any such facilities undergoing any major renovations.	Medium	Long-Term	City, External Consultants	Staff resources, funding required
Energy Generation and Security				
1. Encourage residential and commercial facilities to utilize solar water heating for pools and domestic hot water use through education.	Medium	Short-Term	City, External Consultants	Staff resources, funding required

2. Provide education and support to industry and commercial facilities with high energy demand, as identified through the Energy Maps, on co-generation systems. These systems are capable of making the most efficient use of input fuel by generating both electricity and converting waste heat into a useable energy source.	High	Medium-Term	City	Staff resources
3. Work with local industry and businesses to reduce peak demand by implementing a demand management program that will work with stakeholders to encourage them to shift high demand process away room peak periods.	Medium	Long-Term	City, Synergy North, Hydro One	Staff resources, funding may be required
Land Use and Growth				
1. Promoting pedestrian friendly design.	High	Medium-Term	City	Staff resources
2. Encouraging compact, efficient mixed-use areas that optimize redevelopment and integrate residential, office and retail commercial developments.	Medium	Medium-Term	City, community partners	Staff resources
3. Creating opportunities for energy conservation through orienting new buildings to take advantage of solar gain, retain/plant and maintain shade trees for summer cooling and winter shelter.	High	Medium-Term	City, community partners	Staff resources, funding may be required
4. Encourage the use of green infrastructure and systems (e.g. use of permeable surfaces, green facades, green/grass roofs and passive design landscaping, solar shading, use of recycled building and construction materials).	High	Medium-Term	City, Synergy North, Hydro One	Staff resources, funding may be required
5. Enhancing the capacity of municipal staff to consider passive energy and sustainable building measures to conserve energy through the planning approvals process where feasible.	Medium	Medium-Term	City	Staff resources

6.1 Monitoring and Reporting

Energy monitoring and tracking is a key pillar of any energy management program. The current reporting methods reveal the annual consumption of energy as well as the costs associated with the purchase of these utilities. By regularly and routinely monitoring the energy use from year to year, staff can track the results of the energy conservation efforts.

Information from municipal reporting and utility provided data has highlighted key performance indicators that provide us with a baseline of energy consumption and costs both within the municipal asset portfolio and in the community as a whole. This baseline is beneficial to establishing a strategy for conservation initiatives and will also serve as a method of measuring our success when new consumption and costs are compared with the baseline.

The tracking of our utilities also allows for us to engage the community by highlighting conservation successes, including reductions in greenhouse gas emissions. Targets have been set for each objective as previously noted and performance measures and indicators will be used for reporting and monitoring progress. The actions will be reviewed and reported on annually. This CEP 2018 will be reviewed and updated in 2023.

6.2 Governance

The CEP 2018 assumes an active approach to community energy management. As highlighted above, the City has a leadership role to play in energy conservation, energy efficient operations and the coordination of planned activities. The success of the plan will be driven by the community stakeholders, in close co-operation with municipal operations. Without community involvement, the stated goals and objectives within this CEP 2018 document would not be achieved.

The structure of the team guiding the implementation of the CEP 2018 will consist of an Advisory Committee to provide guidance on implementing the CEP and Plan. Current infrastructure, personnel and committees already in place will also be used to ensure the efficient and timely execution of our goals and plans.

The Advisory Committee will be comprised primarily by members of the initial stakeholder groups to ensure continuity throughout the CEP. The parameters of the committee will be to monitor and report on the progress of the CEP plans, while also providing guidance and communication

between stakeholders. The Committee will also share the successes and challenges of the CEP with regional neighbors while also soliciting information and experiences from them. This will allow the committee to continue its leadership role by acting as a resource for other communities and as an advocate for a culture of conservation in the surrounding areas. Additionally, the committee will act as representative for Kenora in the context of regional planning and ensure that the values of the CEP are communicated and represented in this process.

The Advisory Committee will ideally be comprised of representatives from the City, Hydro One, Synergy North and Union Gas. It will be responsible for developing the implementation plans and processes necessary to achieving the goals of the CEP. The budget for the CEP implementation will be managed corporately. The Committee will have three important areas of focus: Municipal Energy Conservation Measures, Municipal Operational Efficiency Improvements, and Community Energy Conservation Measures. Membership of the groups responsible for these areas will be determined based on the skills required for each team, as determined by the Advisory Committee. Additional consulting expertise may be required to help support implementation.

6.3 Regional Engagement

Members of the Advisory Committee will be expected to help in spreading the information within this CEP with neighboring regional municipalities and townships. In this way a greater awareness of our culture of conservation can be promoted within the surrounding areas. An understanding that all communities in the area will be similarly focused on energy conservation, reduction, local generation and efficiency improvements will allow for integrated efforts. This can help to expand transit projects, further encourage renewable energy projects and plan and implement larger scale projects as well as lobby for greater funding for such endeavours.

Appendix A – Energy Data

City of Kenora Facilities 2015 Energy							
Building Name	City	Address	Total Floor Area (ft2)	Total Electricity Consumption (kWh) (kWh)	Total Natural Gas Consumption (m3)	GHG Emissions (kg)	Energy Intensity (ekWh/ft2)
City Hall	Kenora	1 Main Street South	12,106	205,047	16,537	39,470	31
Discovery Center	kenora	900 Lakeview Drive	3,000	138,603		5,546	46
Harbourfront Tent	Kenora	22 Bernier Drive	17,270	51,678		2,068	3
Jaffray Mellick Garage (Sunset trail riders)	Kenora	241 Rabbit Lake Road	5,970	9,915	19,125	36,556	36
Jaffray Mellick Office Building	Kenora	243 Rabbit Lake Rd	2,013	16,562		663	8
Jaffray Mellick Adminstrative wing	Kenora	18 Bunny St	6,600	6,413	37,076	70,354	61
Kenora Sportsplex	Kenora	18 Bunny St	23,100	25,653	11,163	22,132	6
Keewatin Fire Hall	Kenora	1008 Ottawa Street	1,810	65,370	15,520	31,958	127
Keewatin ice rink	Kenora	930 Front street	27,210	696,240	52,364	126,857	46
Keewatin Library (Seniors)	Kenora	221 Main Street	4,572	21,300	4,817	9,960	16
Kenora Library	Kenora	24 Main street South	4,940	130,640	20,465	43,919	70
Kenora Police Station	Kenora	1125 HWY 17 E	9,698	117,727	26,378	54,582	41
Kenora Recreation adminstrative area	Kenora	18 Mike Richards Way	12,592	333,552	23,281	57,362	46
Kenora Recreation Swimming Pool	Kenora	18 Mike Richards Way	14,445	382,637	35,226	81,909	52
Kenora Recreation Thistle Arena	Kenora	18 Mike Richards Way	32,484	860,475	79,219	184,202	52
Kenora Recreation Wellness Centre	Kenora	18 Mike Richards Way	26,280	696,136	64,096	149,035	52
Lake of the wood Cemetery office	Kenora	714 Ninth St N	600	76,324		3,054	127
Lake Of the Woods Museum	Kenora	300 Main street South	13,896	176,483	18,419	41,884	27
Museum annex	Kenora	300 Main street South	1,500	21,081	6,533	13,195	60
Operation Building (Adminstrative)	Kenora	60 Fourteenth St N	37,000	266,525	44,118	94,074	20
Operation Building Maintenance	Kenora	60 Fourteenth St N	12,795	92,167	15,471	32,938	20
Operation building Storage Garage	Kenora	60 Fourteenth St N	32,000	230,508	38,156	81,362	20
Parkade	kenora	Matheson St	17,000	20,965		839	1
Pavillion	Kenora	22 Bernier Drive	1,613	72,479		2,900	45
Sewage Treatment Plant	Kenora	18 Sewage Plant Rd	-	3,009,000		120,393	-
Transfer station	Kenora	401 Melick Avenue	1,171	76,324		3,054	65
Water Treatment Plant	Kenora	9 Seventh Street South	19,000	1,942,000	14,486	105,088	110

Appendix B – Green Cleaning Template

This policy example meets the requirements LEED v4 O+M EQ Prerequisite Green Cleaning Policy Option 1. The contents of this policy, including but not limited to the policy scope and goals, roles and responsibilities, standard operating procedures, implementation strategies, performance measurement and schedule for reassessment, and quality assurance, will vary by project based on the building's circumstances. Be sure to customize this policy example, tailoring it to your project's specifics. It will be reviewed as a part of your project's documentation submission.

Green Cleaning Policy for Building A

Effective date: May 1, 2012

i. Scope

This policy applies to all cleaning procedures, cleaning material purchases, cleaning equipment purchases, and cleaning services that occur inside and on the building site and grounds for Building A. Specifically, this policy covers the following:

Cleaning strategies for:
- Hard floor and carpet cleaning and maintenance
- Protection of vulnerable occupants during cleaning
- Disinfectant and sanitizer selection and use
- Safe storage and handlings of cleaning chemicals, including spill management

Performance metrics and strategy development:
- Reductions in water use, energy use, and chemical toxicity
- Green cleaning products purchasing
- Green cleaning equipment purchasing

Staffing and training plans:
- Staffing requirements and contingency for staffing shortages
- Timing and frequency of staff training

ii. Goals

This policy will be fully implemented starting on the effective date.

Category	Goal	Performance measurement unit
Cleaning products and materials purchases	85% meet sustainability criteria	Cost
Cleaning equipment purchases	100% meet sustainability criteria	Number of equipment items
Cleaning equipment inventory	40% of equipment in the project inventory will meet the applicable sustainability criteria	Number of equipment items in the overall inventory for the project
Toxic chemical usage (applies to all cleaning chemicals, including those not addressed by EQc Green Cleaning – Products and Materials)	Toxic chemicals will only be used in situations where products meeting the requirements of EQ Credit Green Cleaning – Products and Materials are unable to sufficiently clean the area, the area cannot be replaced (such as a floor tile), and represents a hazard to human health	Number of uses

iii. Roles and Responsibilities

The responsible party for this policy is John Smith, the Property Manager. He is responsible for ensuring that this policy is executed and that any contracted cleaning vendors under management's control are aware of and fully trained on the procedures outlined in this policy. Further, the Property Manager is responsible for sharing this policy with the building tenant representatives and encouraging policy adoption accordingly. He is responsible for reviewing this policy for any significant changes on the interval specified in the quality assurance section. If at any time updates are required to this policy, he will ensure that the appropriate individuals are informed of the updates.

iv. Procedures and strategies for implementation

Hard floor and carpet cleaning and maintenance

- Hard floors, including tile, concrete, and wood surfaces, will be cleaned once a week with only sustainable cleaning products. No stripping or coatings will be applied to hard floor surfaces.
- Carpets will be vacuumed daily with vacuum cleaners that meet the sustainability criteria listed later in this policy.
- One per month, the carpets will be inspected for stains and other damages. If feasible, the necessary areas will be spot cleaned with sustainable carpet cleaning materials. If damaged, the carpet tiles will be replaced.
- When carpet extraction equipment must be used, methods to reduce chemical usage will be implemented.

Protection of vulnerable occupants during cleaning

- Vulnerable occupants include women who are pregnant, children, elderly occupants, and individuals with asthma, allergies, or other sensitivities.
- As much as possible, only sustainable cleaning products will be used. Please refer to the goals and tracking sections of this policy for additional information.
- Any cleaning that involves the use of carpet cleaners, or if at any point the use of a non-sustainable cleaning product is required, this cleaning will be performed after regular business hours.

Disinfectant and sanitizer selection and use

- Only hand soaps and hand sanitizers that meet the at least one of the sustainability criteria listed under the purchasing guidelines will be considered to meet the requirements of this policy.
- Hand sanitizers will be placed throughout the building for the use of occupants
- Only disinfectants meeting the purchasing sustainability criteria listed below will be considered to meet the requirements of this policy. Disinfectants will be kept locked in the janitorial closets and may only be used by the cleaning staff.
- Cleaning staff will be required to follow all dilution strategies for disinfectants.

Safe storage and handlings of cleaning chemicals, including spill management

- Cleaning chemicals will be stored in the janitor closets to prevent access for other occupants.
- Cleaning staff will receive training on the various hazards of different toxic chemicals and how to address spills.
- Spills will be cleaned and handled according to the manufacturer safety data sheets provided by the manufacturer.
- All spills will be handled carefully. As soon a spill of a non-sustainable product occurs, the responsible party must be notified. If the spill occurs in an area to which typical building occupants have access, the area will be roped off and building occupants will be informed to stay clear of the area.

- Material safety data sheets for all of the cleaning chemicals used in the building will be retained and hazard information will be highlighted. This information will be clearly displayed in all janitor closets.

Strategies for reducing the toxicity of the chemicals used for laundry, ware washing, and other cleaning activities

- Cleaning staff and building occupants will be supplied with safe cleaning chemicals that meet the sustainability criteria described in the purchasing guidelines listed below.
- Dish soaps and laundry detergent meeting the EPA Design for the Environment will be supplied for ware washing and laundry.
- For surface cleaning, ionized water cleaning devices (using only water) will be used as much as possible.

Strategies for conserving energy, water, and chemicals used for cleaning

- Manual-powered equipment and cleaning strategies will be used whenever possible to reduce the energy and water used by powered equipment and typical cleaning strategies.
- Cold water will be used for any necessary disposal to reduce energy used to heat hot water.
- The filters in vacuums and other applicable equipment will be changed frequently to enable air flow and reduce the energy consumption of the equipment.
- When cleaning chemicals are necessary, the operating procedures for chemical dilution will be followed to ensure that the minimum amount of cleaning chemicals necessary is used.

Strategies for promoting hand hygiene

- All restrooms will be equipped with hands-free soap dispensers, faucets, hand dryers, and towel dispensers.
- Hand sanitizers meeting UL EcoLogo 2783 standard for Instant Hand Antiseptics (formerly Environmental Choice CCD 170) will be placed throughout the building.

Tracking plan for staffing and overall performance

- Regular APPA audits will be conducted to evaluate cleanliness. As a part of the audits, the auditors will interview cleaning staff to ensure that the cleaning and hard floor and carpet maintenance system is being consistently used.
- The audits will be conducted once every sixth months and will be led by the responsible party for this policy. The responsible party is responsible for recording the results of the audits in the management records, following up with any cleaning staff to provide additional training and/or guidance and recording these actions.
- All cleaning staff are required to check in each day when they arrive at work. The responsible party will retain these records to ensure that the building is sufficiently staffed with trained professionals.
- The responsible party will log all training that is provided to the cleaning staff and will ensure that the training plans described above are met.
- When new staff come on board, the responsible party will record the initial training and orientation provided to the staff.

Tracking plan for water, energy, and toxic chemical usage

- Every time a toxic chemical is used, it must be reported to the responsible party. The responsible party will record which chemical was used, where it was applied, and the reason for its use. This information will be used to track against the goal for using toxic chemicals only when strictly necessary.
- All vacuum filters will be replaced on a regular basis. The responsible party will record maintenance performed on all cleaning equipment, including filter replacement, to ensure that they are regularly replaced to reduce energy usage.

Tracking plan for cleaning product and cleaning equipment purchases

- All cleaning product and cleaning equipment purchases, made by either by the cleaning vendor for use in the building or made by the building management, will be recorded in the purchasing log.
- On a quarterly basis, the responsible party will review all purchases and compare against the policy goals. If the policy goals are not being met, the responsible party will take corrective action, typically in the form of providing education to the individuals in charge of procurement on the goals and sustainability criteria outlined in this policy.

Staffing and training plans

- To sufficiently clean the building requires at least one hour of cleaning per day for each 5,000 square feet. As this building is 100,000 square feet, it requires a minimum 20 hours of cleaning time per day. The cleaning staff typically works 5 hours per day; therefore a cleaning staff of at least 4 people daily. Typically 5 to 6 people are maintained on the cleaning staff.
- In the event of staffing shortages (only 3 staff are available from the regular vendor), the building maintains a contact with a backup cleaning vendor who can supply additional staff.
- Requirements for maintenance personnel.
- All cleaning staff, including backup personnel, are required to receive at least 8 hours of training per year. The responsible party will record the training attended by each staff member.
- Trainings are held once a month and are one hour long. Topics vary each month, and cover standard operating procedures for cleaning different surfaces, proper toxic chemical usage and spill management, hazards of toxic chemicals, cleaning to protect vulnerable occupants, cleaning equipment maintenance, and conservation of energy and water usage during cleaning.
- The responsible party coordinates and hosts all of the trainings.

v. Purchasing guidelines

Sustainability Criteria for Cleaning Products and Materials

Cleaning products must meet one or more of the following standards [or a local equivalent for projects outside the U.S.]:

- Green Seal GS-37, for general-purpose, bathroom, glass and carpet cleaners used for industrial and institutional purposes;
- UL EcoLogo 2792 (formerly CCD 110), for cleaning and degreasing compounds;
- UL EcoLogo 2759 (formerly CCD 146), for hard-surface cleaners;
- UL EcoLogo 2795 (formerly CCD 148), for carpet and upholstery care;
- Green Seal GS-40, for industrial and institutional floor care products;
- UL EcoLogo 2777 (formerly CCD 147) , for hard-floor care;
- EPA Design for the Environment Program's Standard for Safer Cleaning Products; and/or
- Cleaning devices that use only ionized water or electrolyzed water and have third-party-verified performance data equivalent to the other standards mentioned above (if the device is marketed for antimicrobial cleaning, performance data must demonstrate antimicrobial performance comparable to EPA Office of Pollution Prevention and Toxics and Design for the Environment requirements, as appropriate for use patterns and marketing claims).

Disinfectants, metal polish, or other products not addressed by the above standards must meet one or more of the following standards [or a local equivalent for projects outside the U.S.]:

- UL EcoLogo 2798 (formerly CCD 112), for digestion additives for cleaning and odor control;
- UL EcoLogo 2791 (formerly CCD 113), for drain or grease trap additives;
- UL EcoLogo 2796 (formerly CCD 115/107), for odor control additives;
- Green Seal GS-52/53, for specialty cleaning products;
- California Code of Regulations maximum allowable VOC levels for the specific product category;
- EPA Design for the Environment Program's standard for safer cleaning products; and/or

- Cleaning devices that use only ionized water or electrolyzed water and have third-party-verified performance data equivalent to the other standards mentioned above (if the device is marketed for antimicrobial cleaning, performance data must demonstrate antimicrobial performance comparable to EPA Office of Pollution Prevention and Toxics and Design for the Environment requirements, as appropriate for use patterns and marketing claims).

Disposable janitorial paper products and trash bags must meet the minimum requirements of one or more of the following programs [or a local equivalent for projects outside the U.S.]:

- EPA comprehensive procurement guidelines, for janitorial paper;
- Green Seal GS-01, for tissue paper, paper towels and napkins;
- UL EcoLogo 175 Sanitary Paper Products, for toilet tissue and hand towels
- Janitorial paper products derived from rapidly renewable resources or made from tree-free fibers;
- FSC certification, for fiber procurement;
- EPA comprehensive procurement guidelines, for plastic trash can liners; and/or
- California integrated waste management requirements, for plastic trash can liners (California Code of Regulations Title 14, Chapter 4, Article 5, or SABRC 42290-42297 Recycled Content Plastic Trash Bag Program).

Hand soaps and hand sanitizers must meet one or more of the following standards [or a local equivalent for projects outside the U.S.]:

- no antimicrobial agents (other than as a preservative) except where required by health codes and other regulations (e.g., food service and health care requirements);
- Green Seal GS-41, for industrial and institutional hand cleaners;
- UL EcoLogo 2784 (formerly CCD 104), for hand cleaners and hand soaps;
- UL EcoLogo 2783 (formerly CCD 170), for hand sanitizers;
- EPA Design for the Environment Program's standard for safer cleaning products.

[For projects outside the U.S., a local equivalent is any Type 1 eco-labeling program as defined by ISO 14024: 1999 developed by a member of the Global Ecolabelling Network may be used in lieu of Green Seal or UL standards.]

Sustainability Criteria for Cleaning Equipment

All powered equipment must have the following features:

- safeguards, such as rollers or rubber bumpers, to avoid damage to building surfaces;
- ergonomic design to minimize vibration, noise, and user fatigue, as reported in the user manual in accordance with ISO 5349-1 for arm vibrations, ISO 2631–1 for vibration to the whole body, and ISO 11201 for sound pressure at operator's ear
- as applicable, environmentally preferable batteries (e.g., gel, absorbent glass mat, lithium-ion) except in applications requiring deep discharge and heavy loads where performance or battery life is reduced by the use of sealed batteries.

Vacuum cleaners must be certified by the Carpet and Rug Institute Seal of Approval/Green Label Vacuum Program and operate with a maximum sound level of 70 dBA or less in accordance with ISO 11201.

Carpet extraction equipment, for restorative deep cleaning, must be certified by the Carpet and Rug Institute's Seal of Approval Deep Cleaning Extractors and Seal of Approval Deep Cleaning Systems program.

Powered floor maintenance equipment must be equipped with such as vacuums, guards, or other devices for capturing fine particulates and must operate with a maximum sound level of 70 dBA, in accordance with ISO 11201.

Propane-powered floor equipment must have high-efficiency, low-emissions engines with catalytic converters and mufflers that meet the California Air Resources Board or EPA standards for the specific engine size and operate with a sound level of 90 dBA or less, in accordance with ISO 11201.

Automated scrubbing machines must be equipped with variable-speed feed pumps and either (1) on-board chemical metering to optimize the use of cleaning fluids or (2) dilution control systems for chemical refilling. Alternatively, scrubbing machines may use tap water only, with no added cleaning products.

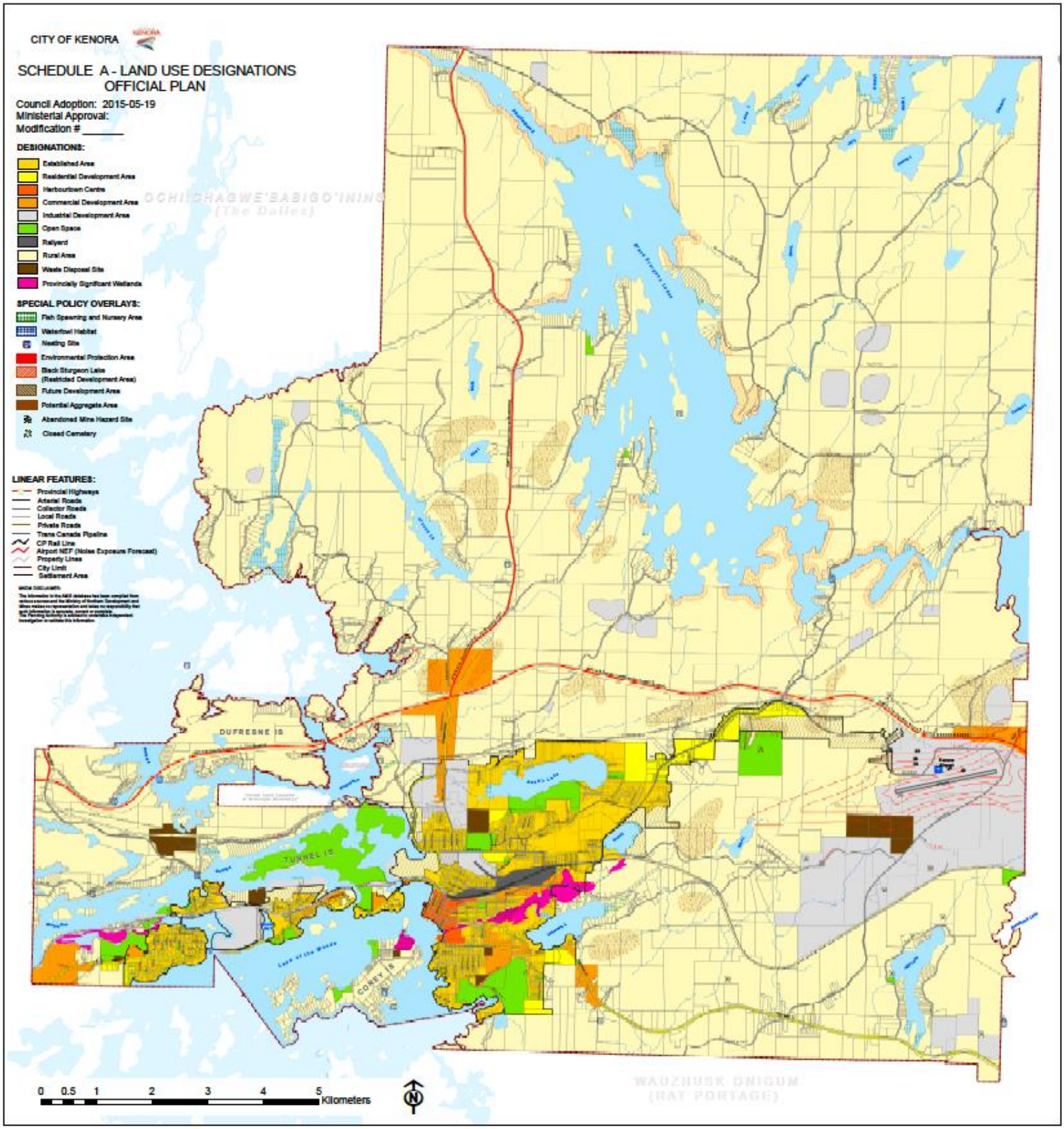
vi. Quality Assurance/Quality Control Processes

The responsible party will evaluate the green cleaning policy on a quarterly basis to evaluate progress towards the implementation goals. If any cleaning product or equipment purchases are not being recorded properly, the responsible party will inform the appropriate individuals to ensure that activities are recorded moving forward. The responsible party will evaluate the results of the cleaning audits to determine whether the building is being sufficiently cleaned and whether the standard cleaning procedures are being properly executed. As necessary, the responsible party will revise the green cleaning policy to include additional cleaning strategies or modify existing cleaning strategies.

In addition, if any implementation goals are not being met, the responsible party will investigate the situation and will work with the individuals purchasing the materials and equipment or using the equipment. The responsible party will evaluate whether updates are necessary to the in order to achieve the implementation goals.

Any revisions that are made to the policy will be incorporated into the next training cycle for the cleaning staff.

Appendix C – City Maps (From the Kenora Official Plan)



Appendix D – Key Stakeholders

Project funding support provided by the Government of Ontario.

The City would also like to thank the members of the Stakeholder Advisory Group who provided input and guidance to the development of the Community Energy Plan over several months. Members of the Stakeholder Advisory Group included:

- Keewatin-Patricia District School Board
- Kenora Catholic District School Board
- Kenora Forest Products Limited
- Weyerhaeuser Kenora Timberstrand®
- Kenora and District Chamber of Commerce
- Kenora Hydro
- Hydro One Limited
- Ne-Chee Friendship Centre
- Lake of the Woods District Hospital
- Union Gas Limited
- FIREFLY
- Ministry of Environment, Conservation and Parks
- Ministry of Energy, Northern Development and Mines

Glossary

Acronyms

AHU:	Air Handling Unit
BAS:	Building Automation System
BHR:	Blowdown Heat Recovery
CD:	Cold Deck
CDD:	Cooling Degree Days
CFM:	Cubic Feet per Minute
DDC:	Direct Digital Control
DES	Detailed Engineering Study
DHW:	Domestic Hot Water
DWH:	Domestic Water Heater
EMIS:	Energy Management Information System
EMS:	Energy Management Strategy
FIT:	Feed-in Tariff
GHP:	Geothermal Heat Pump
HD:	Hot Deck
HDD:	Heating Degree Days
HOEP:	Hourly Ontario Electricity Price
HVAC:	Heating Ventilation and Air Conditioning
HWH:	Hot Water Heating
HX:	Heat Exchanger
kW:	Kilowatt (demand)
kWh:	Kilowatt-hour (consumption)
LDC:	Local Distribution Company
M&V:	Monitoring and Verification
MAT:	Mixed Air Temperature
MSDHP:	Multi-split Ductless Heat Pump
OAT:	Outside Air Temperature
PF:	Power Factor
PM:	Preventative Maintenance
RAH:	Return Air Humidity
RAT:	Return Air Temperature
RH:	Relative Humidity
SA:	Supply Air
SAT:	Supply Air Temperature
SCADA:	Supervisory Control and Data Acquisition
SP:	Set point
tCO2e:	Tonnes of Carbon Dioxide Emissions Equivalent
VFD:	Variable Frequency Drive