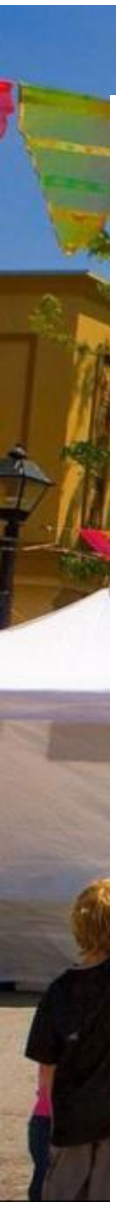

ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN 2019 UPDATE

Prepared in compliance with O. Reg. 507/18, requiring Ontario's BPS (broader public sector) to prepare an updated energy conservation and demand management plan every 5 years. Approved by senior management.

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ORILLIA

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Introduction

The City of Orillia's first Energy Conservation and Demand Management (CDM) Plan was created in 2014 in compliance with Ontario Regulation 397/11, the *Green Energy Act 2009.* The 2014 Plan presented baseline electricity and natural gas data from 2011 and outlined a number of overarching strategies to enhance the City's energy conservation and efficiency efforts.

In compliance with Ontario Regulation 507/18, *Electricity Act 1998,* an update to the City's CDM Plan has been developed utilizing 2018 electricity and natural gas data.

Since completing the first Plan in 2014, the City has pursued a variety of projects and actions to reduce energy consumption and enhance the sustainability of operations. This Plan will compare 2011 and 2018 consumption and trends, review past projects, as well as present future plans and opportunities for energy plans.

Strategic Direction

The City's last CDM Plan was guided by a 2011 Strategic Plan, with a vision for the City of Orillia to be "a healthy progressive community that respects people and promotes growth in a sustainable environment". Since then, the City has conducted a new Strategic Plan that strengthens the City's environmental commitments.

Orillia's City Council and senior leadership has endorsed City staff's efforts to develop long-term strategic plans that focus on the City's sustainability and climate change action. The City's strategic plan includes a strategic theme 'Healthy Environment' that focuses on improving the City's environmental sustainability with the objective to become a leading municipality in:

1) Addressing climate change, and
2) Environmental initiatives that will reduce Orillia's environmental footprint.

Integral to these plans will be a robust energy management program and the prioritization of energy efficiency measures.

Energy Management Principles

The City of Orillia's energy management practices will focus on opportunities for energy efficiency, the integration of renewable energy generation, and low-emissions opportunities for the City's assets, including facilities, fleet and asset management.

The main benefits to the City include:

- Reducing greenhouse gas (GHG) emissions related to energy use, thereby enhancing environmental performance.
- Reducing energy use also reduced energy costs, such as rising rates and carbon payments.
- Durable and efficient assets ensure high performance equipment is prioritized, thereby reducing increased maintenance and labour costs.
- Acting as a leader and steward for environmental action.

As the City pursues energy planning and climate change action planning, a consistent approach will be employed:

- Analyze energy sources and data.
- Standardize and categorize facilities by type and size, identify outliers, and create performance indicators to compare.
- Set objectives and targets.
- Create an action plan with plans, projects and policies that align with objectives and support meeting targets.
- Monitor progress and evaluate performance to ensure effectiveness, evolve and change plan to enhance.

Goals and Objectives

The City's recent Strategic Plan has prioritized sustainability and climate change action, both of which are supported by a strong energy management plan.

Orillia's Vision:

"Orillia is progressive and sustainable, offering an exceptional quality of life, vibrant culture, beautiful waterfront and a compassionate, welcoming and inclusive community".

The Priority for Healthy Environment states:

"Continue the City's commitment to environmental stewardship by increasing waste diversion, reducing our environmental footprint, enhancing urban greenery, ensuring clean water and promoting safe water management practices. This will help to address concerns regarding climate challenges, as well as the desire to position Orillia as a leading municipality in addressing climate change. This goal has implications in both services the City undertakes and the infrastructure investments it makes".

Therefore, the City's goal is to position Orillia as a leading municipality in energy management practices in the following areas:

- New facility construction, including design and procurement.

- Efficient asset procurement, including fleet and equipment.
- Pro-active maintenance and cleaning of assets, to ensure efficient operations and longer lifespans.
- Facility retrofits, retro-commissioning and re-commissioning.
- Occupant and operator training, education and awareness.

Based on the aforementioned goals and strategies, the City's energy management objectives for the next five years will be to reduce facilities' overall energy intensity (ekWh/sq ft) by 10%.

Energy Performance Trends – 2011-2018

Facility Trends

Over the seven years between 2011 and 2018, changes occurred that influenced the facilities included in the City's energy management process:

- Facility sales, transfers and/or closures:
  - Central School Building – 19,741 sq. ft. – sold.
  - CN Station – Chamber of Commerce – 6,297 sq. ft. – sold.
  - Jerry Udell Field Washroom & Concession Building – 700 sq. ft. – closed for public use and demolished (new facility planned).
  - Sir Samuel Steele Building – 12,669 sq. ft. – utility accounts transferred to tenant responsibility.
- New facility construction:
  - Orillia Public Library – completed in 2013 – 46,995 sq. ft.

These changes result in total square feet changing from 461,574 square feet in 2011 to 473,536 in 2018, a net increase in 2.59%.

Heating and Cooling Degree Days

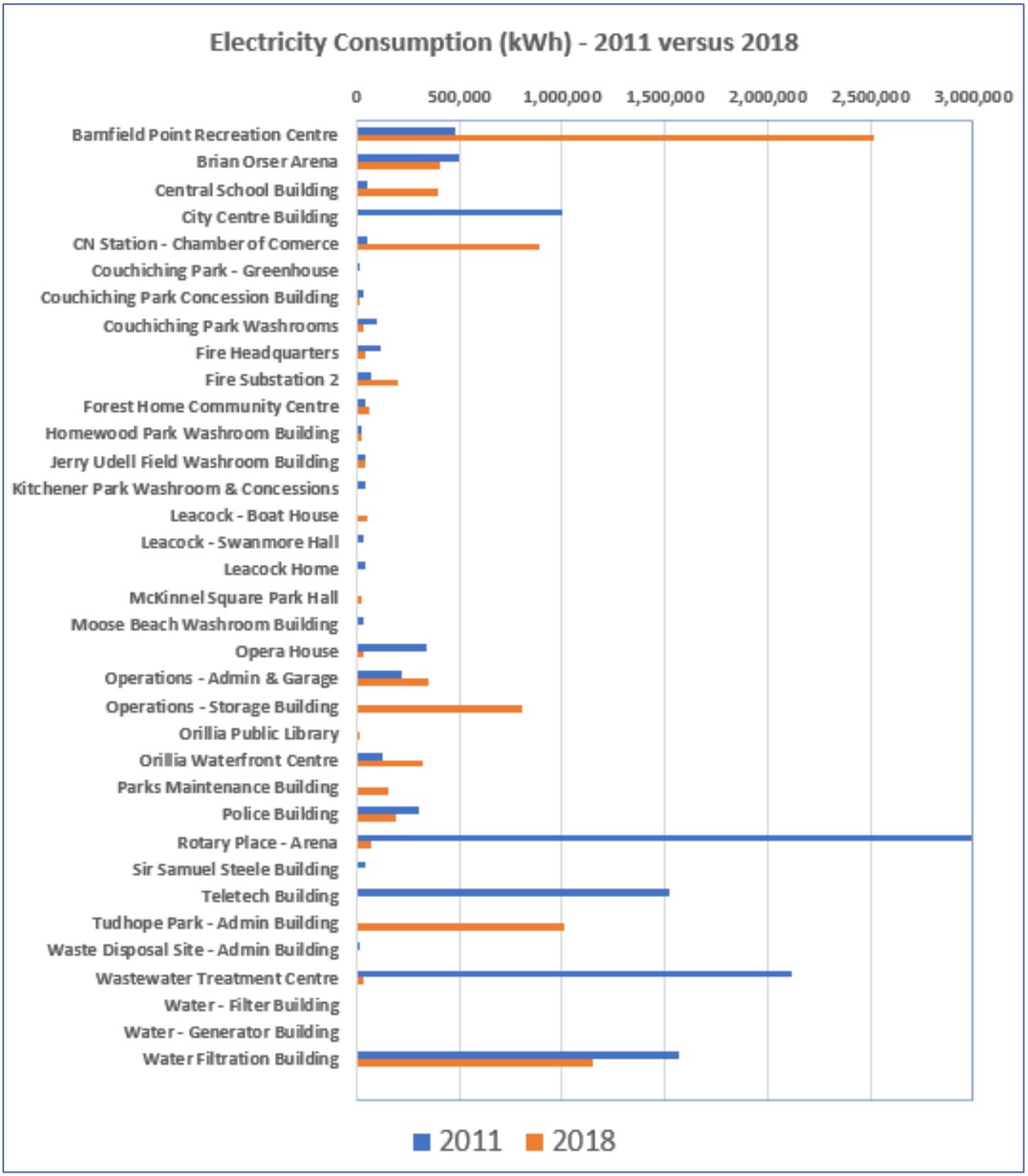
Heating degree days below 18 degrees Celsius in Orillia increased between 2011 and 2018, from 4,325 to 4,516, an increase in 4.42%. This change in climate would prompt an increase in heating needs, primary for natural gas, and electricity to a lesser extent.

Cooling degree days above 18 degrees Celsius in Orillia increased between 2011 and 2018, from 425 to 516, an increase in 21.41%. This change in climate would prompt an increase in cooling needs for electricity.

These factors are to be considered in reviewing the change in energy use between 2011 and 2018.

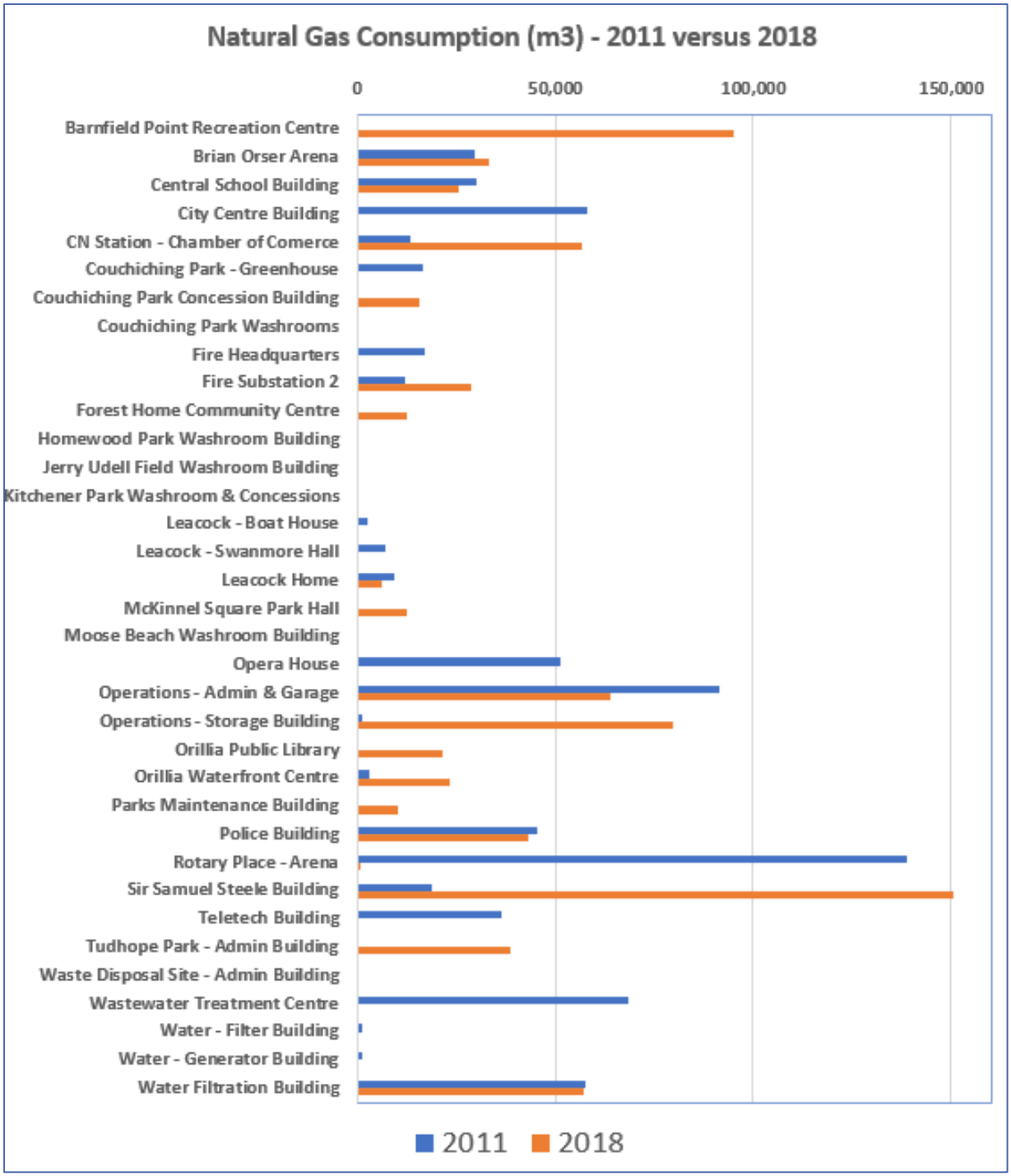
Key Performance Indicator – Electricity Consumption

Overall, electricity consumption increased by a marginal amount of 0.9%, from 11,964,615 to 11,974,950 kilowatt hours (kWh). This is a positive outcome given total square feet of facilities increased, as did cooling degree days that impact electricity demands.



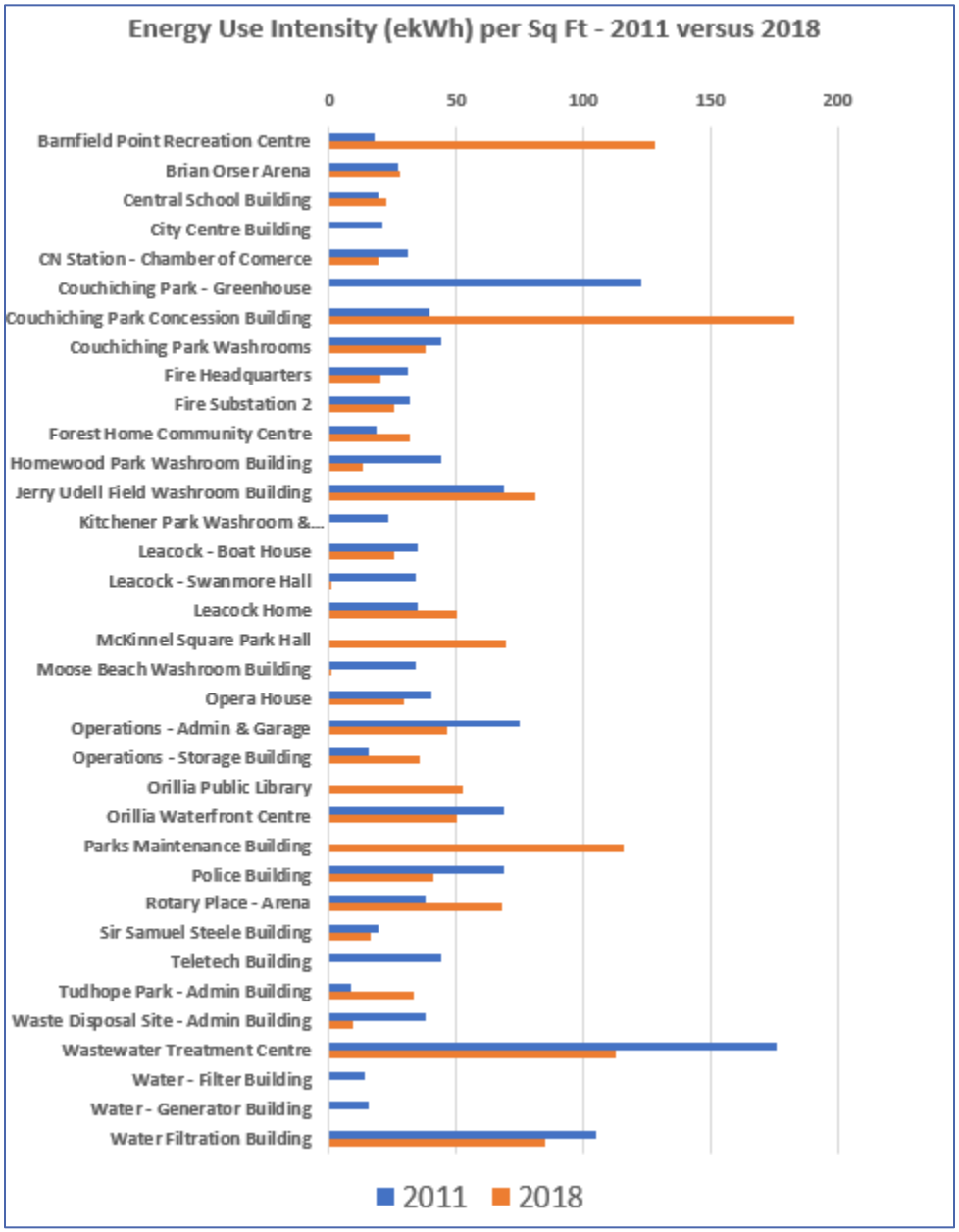
Key Performance Indicator – Natural Gas Consumption

Overall, natural gas consumption increased by 9.04% from 711,650 to 775,959 cubic meters (m^3). This is an expected outcome, given the increase in total square feet of facilities increased (including the new Library), as well as the increase in heating degree days that impact natural gas demands.



Key Performance Indicator – Energy Use Intensity

The energy intensity of a facility – calculated by combining electricity and natural gas use into a common factor of 'equivalent kilowatt hour' – allows for the comparison of various facilities' energy consumption. Comparing ekWh per square feet can facilitate benchmarking of a facility versus the industry standards and best practices. Depending on the function of a facility, energy use intensities (EUIs) are lower for administrative and storage facilities where heating and cooling demands are relatively lower, and higher for process-based facilities such as wastewater, water and recreation facilities, where electricity and natural gas demands are higher.



Key Performance Indicator – Greenhouse Gas Emissions

Greenhouse gas emissions decreased from 2,518,476 kilograms of equivalent carbon dioxide (kg eCO2) in 2011 to 1,739,011 kg eCO2 in 2018, an overall decrease of 30.95%. Despite the increase in natural gas consumption, electricity use remained virtually level. Due to the closure of Ontario's coal plants between 2011 and 2018, the electricity grid emissions factor fell from 0.098 kg eCO2 in 2011 to 0.0295 in 2018. This demonstrates the positive impact of electrification to reduce the carbon intensity of Ontario-based operations.

Energy Conservation Measures

Energy conservation measures have been implemented since the City's first energy plan and further measures are proposed to enhance the City's energy management and conservation plans.

Rooftop Solar Photovoltaic (PV) Projects

In 2013, the City of Orillia signed 25-year rooftop leases with Orillia Power Corporation through the Province's then Feed-In-Tariff program. This allowed for the City to support the growth of renewable energy while receiving a small revenue from the rooftop leases. Solar panels are installed on the rooftops of: Rotary Place (500 kW), Barnfield Point Recreation Centre (100 kW), and TeleTech/Nordia (250 kW).

These projects produce an estimated 850,000 kWh per year of emissions-free electricity.

Orillia Public Library – New Construction

The Orillia Public Library opened in 2012 and was awarded with LEED Silver certification, New Construction and Major Renovations, by the Canada Green Building Council. Through design and construction that was energy efficient and environmentally responsible, the following features were utilized and implemented:

- Green construction materials and techniques, sourced as locally as possible. Floor materials, furniture and fixtures are all low VOC and adhere to strictest environmental standards.
- Maximizing use of natural light to reduce electrical lighting needs (windows and building design). Electricity use for lighting was designed to be 50% lower than that typically used in other libraries.
- Energy efficient building envelop and equipment, including radiant heating and cooling to reduce the use of motors and allow for zone temperature control.
- Windows and doors designed for low heat loss and low solar heat gain.

- Water conservation using low flow fixtures, using recycled rainwater and two green roofs. Estimated 70% reduction in potable water consumption over conventional buildings.
- Promotion of alternate transportation.

Port of Orillia Waterfront Centre – New Construction

The Port of Orillia Waterfront Centre opened in the spring of 2017. The single-storey building includes administrative offices, washrooms, showers, and a large multi-purpose community space.

The facility was the first building to use glulam and cross-laminated timbers (CLT) as a structural element in Ontario. Due to design efficiencies, the structure was erected in a single day, saving considerable time, energy and costs over conventional construction methods. Furthermore, the timber structure doubles as an interior design element, further savings the time and energy of interior finishes.

These features resulted in the reception of an award from the Wood Design & Building Awards in 2017.

Orillia Recreation Centre – Rooftop Solar PV Ready

The City of Orillia worked with a local community group – Orillia Community Energy – to evaluate the feasibility of installing solar PV on the rooftop of the recently opened Orillia Recreation Centre.

A proposed 125 to 150 kilowatt project would occupy approximately 11,000 square feet of the rooftop and generate 150,000 kilowatt hours (kWh) of clean electricity per year. A combination of funding opportunities and sources would be necessary to see the project through in the future.

City of Orillia Facilities – Energy Efficient Lighting

In 2020-21, five City properties underwent facility-wide LED lighting retrofit projects. Estimated annual lighting costs are projected to decrease by 100,000 to 133,300 kilowatt hours (kWh), or $15,000 to $20,000 annually combined across the facilities. This would represent a greater than 50% reduction in electricity charges attributed to lighting. In addition, reduced electricity costs, maintenance and repairs costs will be saved by moving to LED lighting.

City of Orillia Streetlighting – Energy Efficient Lighting

In 2020, approximately 3,300 lights in the City's extensive streetlight network were converted from HPS lamps to LED lamps to improve energy conservation, save costs on electricity, as well as improve the lifespan and maintenance impacts of having a durable and long-lasting LED light network. Smart Lighting Controls were included to maximize energy savings, reduce maintenance costs, and minimize light pollution. The Smart Controls also allowed for the streetlight network to be "future-proof" and allow for additional Smart City applications later on.

At a capital cost of $2,400,000, annual operating costs are expected to be significantly reduced, offsetting the expenditure with an estimated payback of less than six years (including the Smart Lighting Controls costs). A 40 - 70% potential savings in energy costs have been reported through similar upgrade projects. Reduced electricity costs, maintenance and repair costs, as well as administrative costs on an annual basis will be saved by moving to LED lighting.

Furthermore, the City is expected to receive an estimated rebate of $300,000 to support the viability of the project.

Future Initiatives

The City's energy conservation initiatives will be guided by the goal of positioning Orillia as a leading municipality in energy management practices.

An overarching initiative that will greatly enhance the City's energy management practices is the City's corporate and community climate change action plan. This undertaking will evaluate the City's energy consumption and demands, and introduce concepts such as energy mapping, to evaluate conservation opportunities and implement an ongoing energy management program for the City.

Key focus areas include:

- New facility construction, including design and procurement (*e.g., energy efficient design, evaluating integrated renewable energy opportunities, low energy, and low carbon equipment alternatives*).
- Facility retrofits, retro-commissioning and re-commissioning *(e.g., targeting facilities with high energy intensities and poorly operating systems to improve operations).*
- Efficient asset procurement, including fleet and equipment (*e.g., incorporating energy and climate considerations into procurement decisions).*

- Pro-active maintenance and cleaning of assets, to ensure efficient operations and longer lifespans *(e.g., preventative maintenance programs to ensure asset operations and durability is optimized).*
- Occupant and operator training, education and awareness *(e.g., incorporating sustainability and energy management in current and future staff responsibilities, staff awareness and training of energy conservation opportunities).*
- Funding opportunities to enhance project viability *(e.g., grant and incentive sources, developing internal funding mechanisms).*