Town of Parry Sound

5-Year Conservation and Demand Management Plan – 2019 Update

Authored by Forrest Pengra, Manager of Infrastructure and Technology

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The following document is a summary of energy usage for the period of 2010 through 2018 and corporate plan to reduce energy usage, green house gas emissions and operating costs.

Contents

Introduction

The Town of Parry Sound, situated on the shores of Georgian Bay, has a strong affinity with nature and with trails winding through Town, beautiful views are always within reach. Nature surrounds the Town and its survival drives the region through tourism. Living in paradise comes with a certain amount of social/environmental responsibility. Residents and visitors of Parry Sound have expectations that the Town is working in the best interest of the environment and rate payers. This has partially helped to steer the present course. In recent years a number of facilities have been rebuilt, renovated, or retrofit as to take advantage of emerging technologies in the areas of energy management and reduction. Through several building initiatives the Town has reduced its energy intensity, which is both great for the environment and the reduction of operating costs.

The vision of the Town of Parry Sound is to move from being an energy user to an energy leader. To complete this transformation, it is important for the Town to have a thorough understanding of its energy usage as well as areas for improvement. It is the Town's preference to be more efficient in addition to reducing operating costs for energy consumption and usage.

Past and Present State

In 2014, the Town of Parry Sound assessed corporate energy consumption of Town owned/operated facilities, as per Ontario Regulation 397/11. This included a baseline assessment of historic energy consumption of all energy types. The baseline extends back from the last quarter of 2009 to the end of 2018. This information has allowed the Town to have intelligent conversations on past and present energy usage as well as to chart a path forward for a more enlightened future.

Energy audits were conducted in 2014 by the CHEK group, a partner of Lakeland Power. The audits remain relevant in 2019. The audits have been a driver for numerous energy efficiency projects. They identified efficiency upgrades, estimated costs, funding opportunities and an estimated return on investment (ROI). In late 2018, the original study was reviewed and estimated project costs, funding and ROI were updated to present day values. Government incentives for energy projects can fluctuate greatly from year to year.

In January of 2019, the Green Energy Act of 2009 was repealed. Various parts of the conservation and energy efficiency initiatives were migrated to the Electricity Act of 1998. Ontario Regulation 397/11 was replaced with Ontario Regulation 507/18. This document, the 5-year Conservation Demand Management Plan, is part of the Broader Public Sector reporting requirement, along with annual energy reporting for select facility types. While the reporting guidelines are very limited in scope, the Town took the initiative to build energy baselines for all Town owned facilities for all fuel types. Without doing so, planning and energy reduction strategies have no basis for potential viability.

The Town of Parry Sound has worked diligently and has undertaken numerous projects to upgrade facilities. While much of this work was completed as the lifecycle of the facility deemed necessary, a by-product of renovations / reconstruction projects was greater energy efficiency. As increased energy efficiency has become the status quo, the path forward is often one that is natively of greater energy efficiency. As an example, during a lighting replacement project, one would never replace metal halide lighting with metal halide; they would replace with LED as the price is the same or less with a significantly less operating cost from both a usage and maintenance perspective. Energy projects are handled on a year by year, budget by budget basis. They are typically handed departmentally, within due course as aligned by a capital replacement plan, either formal or informal.

While presently there is no guiding directive within the Town's Strategic Plan related to environment, conservation or energy reduction it is a philosophy most have adapted. This is in part due to doing the 'right thing' environmentally speaking but also for reduced energy consumption, including operating costs. While energy efficiency projects must be justifiable from a business case standpoint, frequently it's a simple consideration.

Past Action(s) - Since 2014 CDM

Below is a summary of the energy reduction projects the Town has undertaken since the 2014 Conservation and Demand Management Plan. The list includes estimated energy and GHG savings.

Street Lighting LED Retrofit

- Energy reduction 520,000kWh/yr
- GHG's Saved: 18.5 Metric Tons/yr

Water Treatment Plant (Lighting Replacements)

- Energy reduction 10,000kWh / 4.5kW demand
- GHG's Saved: 360 kg/yr

Operations Building - Phase I (Lighting Replacements)

- Energy reduction 27,009kWh / 6.6kW demand
- GHG's Saved: 1 Metric Ton/yr

Fire Hall (Lighting Replacements)

- Energy reduction 10,000kWh / 5.5kW demand
- GHG's Saved: 360 kg/yr

Kinsmen Park Arena (Lighting Replacement)

- Energy reduction 21,000kWh / 7.1kW demand
- GHG's Saved: 750 kg/yr

Bobby Orr Community Centre (Lighting Replacement)

- Energy reduction 30,000kWh / 6.15kW demand
- GHG's Saved: 1 Metric Tons/yr

Energy Information Management

Leveraging the system and data created for the initial Demand Management Plan in 2014 as well as annual reporting requirements, the Town has continued to build a robust and large database. This baseline information has been used as a basis for efficiency upgrade justifications, project design and even to identify errors in billing.

This database houses billing information for all facilities that utilize electricity, natural gas and propane. Within the database there is an entry for every monthly bill the Town has received since

2010 for each utility type. As time has carried on, the process for acquiring and entering this information into the database has changed. As of 2019, all utilities, apart from Georgian Bay Propane, have a bulk data download/transfer option. This option expedites the process and decreases the potential for human error with data-entry.

Annual bills are categorized by type and billing year and are then associated to a single facility based on a unique facility identification number. This aggregation is important as it is required to fully understand a building's energy performance across all utility/fuel types. Further, this is also required for annual energy reporting to the Ministry of Energy, Northern Development and Mines as per the Electricity Act of 1998 (formerly Ontario Reg. 397/11). By having numerous years to compare, the Town can identify trends in usage, changes in costs, or even changes in building performance.

Energy Usage and Emissions

Energy usage can be categorized into management types, controllable and uncontrollable. Controllable energy usage includes items for which usage can be increased or decreased without significant sacrifice or risk. Examples of this include human behavior patterns such as turning off lights when a room is not occupied, reducing heat, time shifting of business processes, among many others. Uncontrollable energy usage includes things that could result in great risk, costs or even loss by altering typical operating parameters (time, levels, etc.…). Examples of this include water/wastewater processing, ice-pad cooling, signal and street lighting, and a few others. These business processes must always remain functional and are integral to business continuity. However, the importance of these processes should still be considered within energy assessments as often they are the most significant users. In many cases energy efficiency projects for these high use/availability infrastructure items can yield significant reductions through upgrades. The key consideration when assessing this area of energy consumption is proper planning and communication. These management constraints often dictate how or if energy reduction strategies are possible.

Energy usage, cost and potential for savings are not always easy to analyze. Energy usage in its most simplistic form is quite easy to assess through historic energy bills, metering, or sub-metering. Complexity increases when costs are being assessed for times of high demand (kW), time of use premiums (peak vs. non-peak billing), years of unusually high usage for seemingly no reason, estimated bills (natural gas), and others. For most assessments, reviewing aggregated/summed annual energy use (in kWh) is more than enough to provide an accurate baseline of a facility's performance as it relates to usage and cost.

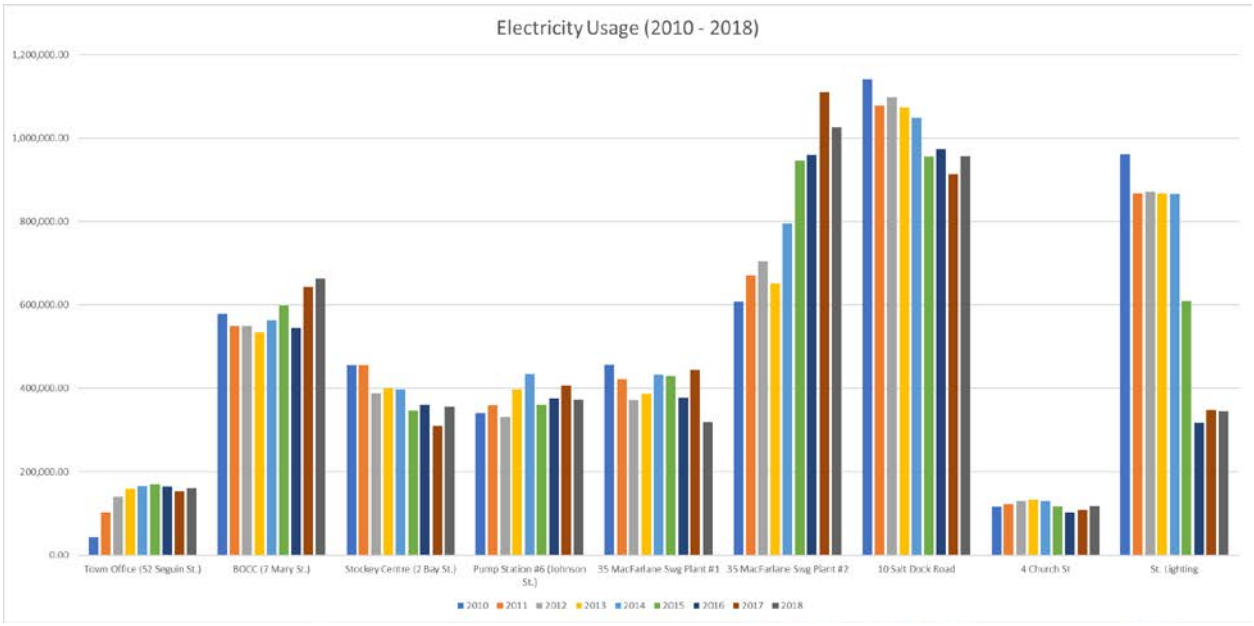

Figure 1 - Electricity Usage (large usage facilities)

There are significant challenges when assessing electricity costs. While energy rates have been falling since 2008 the Global Adjustment (GA) has been rapidly increasing. Since 2010/11 the GA has surpassed the actual cost of electricity, significantly. The global adjustment is the component of the bill that corresponds to the cost of building new electricity infrastructure in the province, maintaining existing resources, as well as providing conservation and demand management programs ([1]). Through political will and lobbying, the majority of the Global Adjustment cost has been shifted to Class B customers, instead of distribution including residential and Class A customers (>500kW energy users). There are numerous reasons for this but they are far beyond the scope of this plan. Due to these circumstances, it is expected electricity prices will continue to rise for the foreseeable future. These situations often lead organizations to look for unique/ingenious ways to curb energy use and reduce costs. Projects to address this often involve distributed generation, peak shaving, battery banking, and others.

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

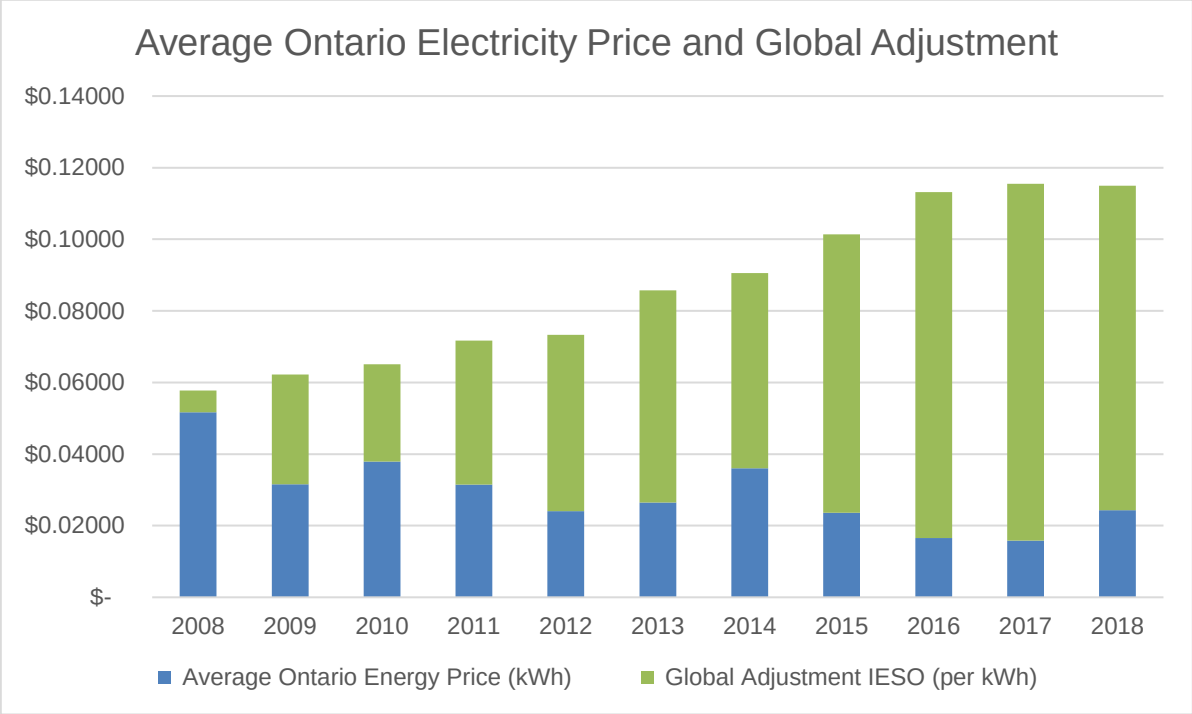

Figure 2 - **IESO Average HOEP plus GA**

Two other fuel types used by the Town include natural gas and propane. These commodities have been far more stable. In fact, since 2010 the cost of natural gas has decreased by approximately 22%. However, the Town's total usage has increased by approximately 10-13%. Through analysis it appears the increases can be attributed to environmental/weather trends, changes in business process as well as facility upgrades. The latter can be demonstrated by the >600% reduction in propane consumption at Town facilities due to a shift to natural gas. Regarding environmental effects, the Town's natural gas/propane usage directly correlates to outdoor temperatures as it is primarily used for heating. A colder or more drawn-out winter will result in higher usage volumes of these fuels.

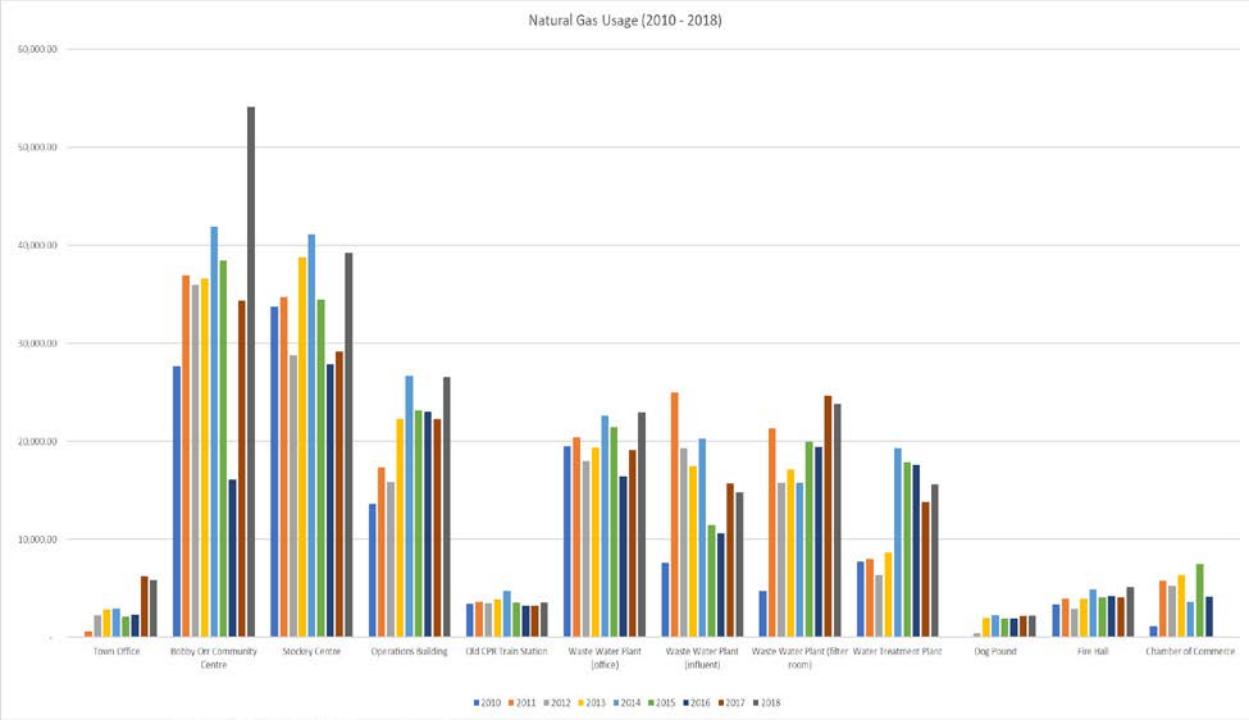

Figure 3 - Natural Gas Usage (large usage facilities)

Previous (2014 CDM) Energy Goals

In 2014, Ontario Regulation 397/11 required that municipalities set energy reduction targets. Based on limited baseline information and with several priority projects in the works the Town of Parry Sound Council agreed to a total energy reduction goal of 5% within 5 years. Computing successful reduction is challenging considering numerous projects have been completed throughout the 5-year period, not all at once. As such, baseline usage was a moving target, whereby multiple year averaging becomes very important.

Since 2014 the Town has reduced electricity consumption by approximately 7-10%. Reductions can be visualized in the numerous graphs and charts throughout this plan. Major reduction projects include streetlight upgrades and facility lighting replacements. These reductions have resulted in significant savings through cost avoidance. It is estimated the Town is presently saving $200,000 - 220,000/year by having completed energy efficiency upgrades[2]. These savings are based on energy reduction as well as cost avoidance due to increased electricity costs.

[2] This is based on differences in energy usage (base case usage – efficient case usage) relative to energy costs over time. Streetlight costs are not billed the same as typical usage and are approximately 2x the cost (example - $0.38709/kWh for street lights VS $0.197/kWh for other accounts).

There are several things to consider when evaluating energy reduction success. The first and foremost is actual energy reduction for the sake of conservation. The second consideration is largely financial. Given that the Town is a financially constrained municipality it is important to consider if investment in energy efficiency projects allow the Town to save money, above and beyond what is being invested. It could be argued that the Town has been successful in both categories.

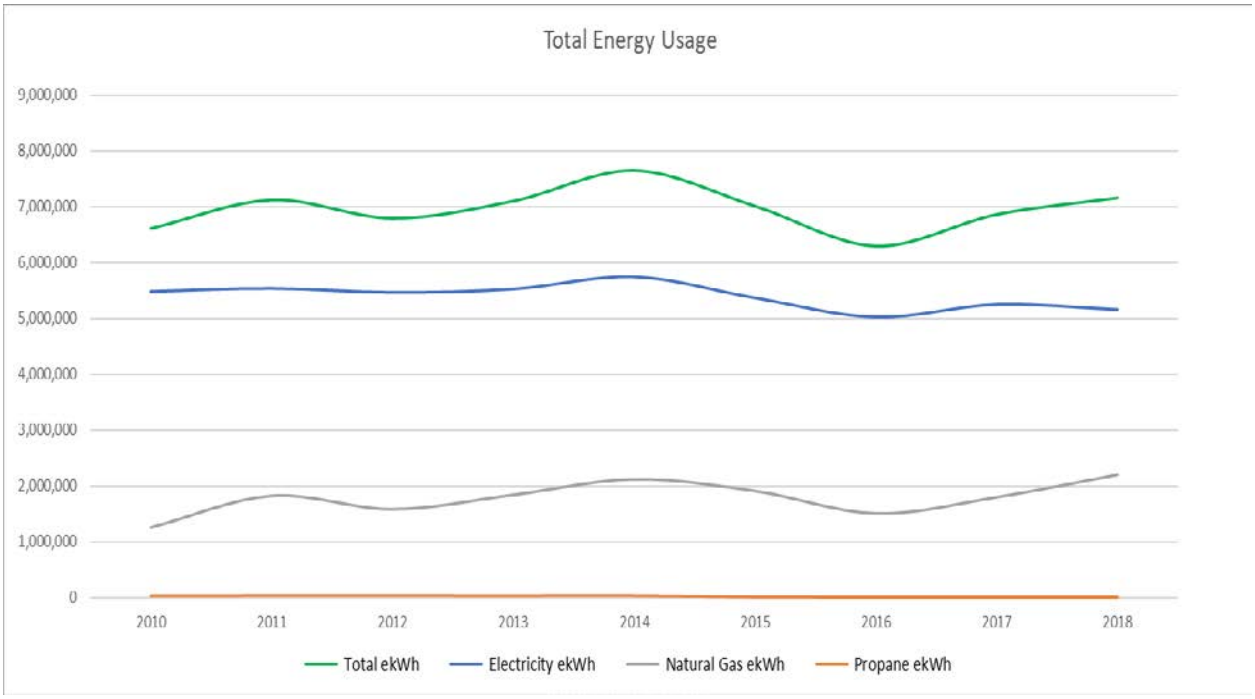

Figure 4 - Total Energy Usage (ekWh)

Energy Supply Source and Volumes

To operate, the Town of Parry Sound relies on several energy types from suppliers. For electrical needs within Town limits, electricity is purchased from Lakeland Energy, of which the Town is a shareholder; for electrical consumption at facilities outside Town limits electricity is purchased from Hydro One. Natural gas is purchased from Union Gas and propane is purchase from Georgian Bay Propane, a local supplier.

Year	Propane Usage (L)	Propane Cost	$/L	Electricity Usage (kWh)	Electricity Cost	$/kWh	Nat. Gas Usage (m3)	Natural Gas Cost	$/m3
2010	5,179.40	$4,127.78	$0.80	5,481,808.08	$686,536.97	$0.13	122,439.27	$61,499.20	$0.50
2011	5,757.00	$5,060.73	$0.88	5,537,436.24	$761,389.84	$0.14	177,489.15	$96,014.34	$0.54
2012	5,817.00	$4,502.80	$0.77	5,465,530.55	$867,894.73	$0.16	154,203.48	$68,862.12	$0.45
2013	5,516.70	$4,249.15	$0.77	5,525,840.69	$884,456.06	$0.16	179,130.97	$65,232.84	$0.36
2014	5,698.10	$5,344.69	$0.94	5,747,146.00	$1,007,723.57	$0.18	206,302.29	$83,937.40	$0.41
2015	1,947.60	$1,544.47	$0.79	5,366,717.33	$1,025,906.82	$0.19	185,876.85	$6,346.29	$0.03
2016	726.60	$464.62	$0.64	5,020,891.05	$1,016,217.55	$0.20	146,905.98	$49,934.47	$0.34
2017	705.90	$538.46	$0.76	5,249,117.79	$1,098,581.94	$0.21	175,128.44	$76,557.72	$0.44
2018	615.90	$477.98	$0.78	5,155,884.49	$1,015,691.98	$0.20	213,977.01	$88,000.78	$0.41

Figure 5 - Usage summary all fuel types for cost and volume (Hydro One and Lakeland have been combined)

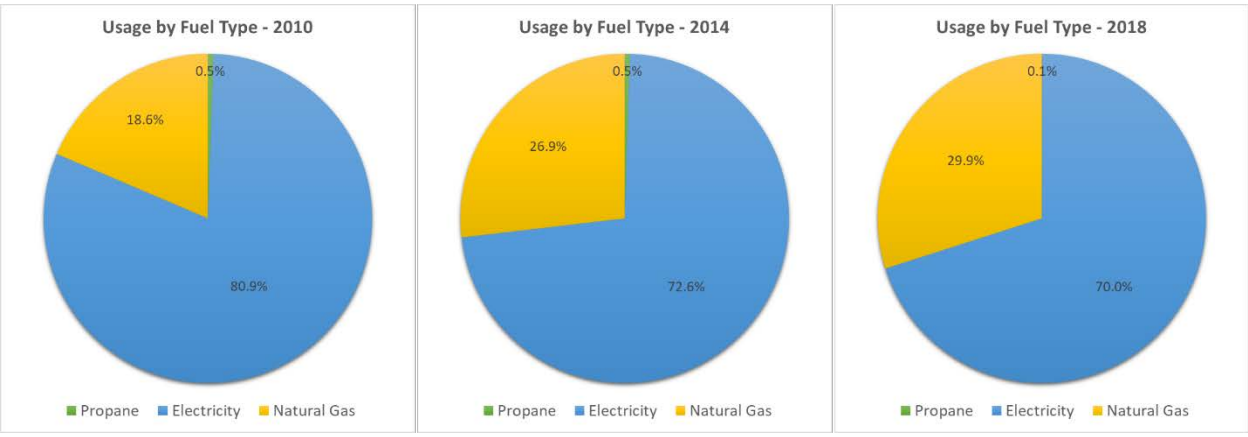

Figure 6 - Fuel types usage by percentages (2010, 2014, 2018)

Green House Gas (GHG) Emissions

There are numerous rationalizations for energy reduction including cost savings, increased longevity, reduced servicing and maintenance of infrastructure. Reduced green house gas emissions are often overlooked but are a direct benefit of reduced consumption and fuel switching.

There are numerous factors to consider when assessing a municipality's impact on green house gas emissions. Factors include what fuel types are being used for facilities, fuels used by fleet, amount of use, source, etc.… Further, there are numerous green house gases to be aware of. Environment Canada tracks 7 types released by human activity: carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, perfluorocarbons, hydrofluorocarbons and nitrogen trifluoride ([3]). Each of these exist in varying levels within the atmosphere creating a thick blanket trapping heat within the atmosphere. This trapped heat is increasing average global temperatures. In April of 2019, a report came out that indicates that temperatures in Canada are increasing at nearly 2x the global rate ([4]).

Changes in policy and fuel source can greatly affect the amount of GHG's emitted. Beginning in 2012 electricity fuel sources changed significantly in Ontario, as all coal fired power plants were to begin decommissioning. This concluded in 2014. By decommissioning coal fired plants, Ontario reduced electrically sourced GHG's by >250%. The graphs below demonstrate the Town's largest GHG containing fuel switched from electricity to natural gas. The pie charts below demonstrate the shift away from coal; previously 69.2% of the Town's GHG emissions were due to electricity, following the discontinuation of coal power, the Town's largest GHG contributor became natural gas.

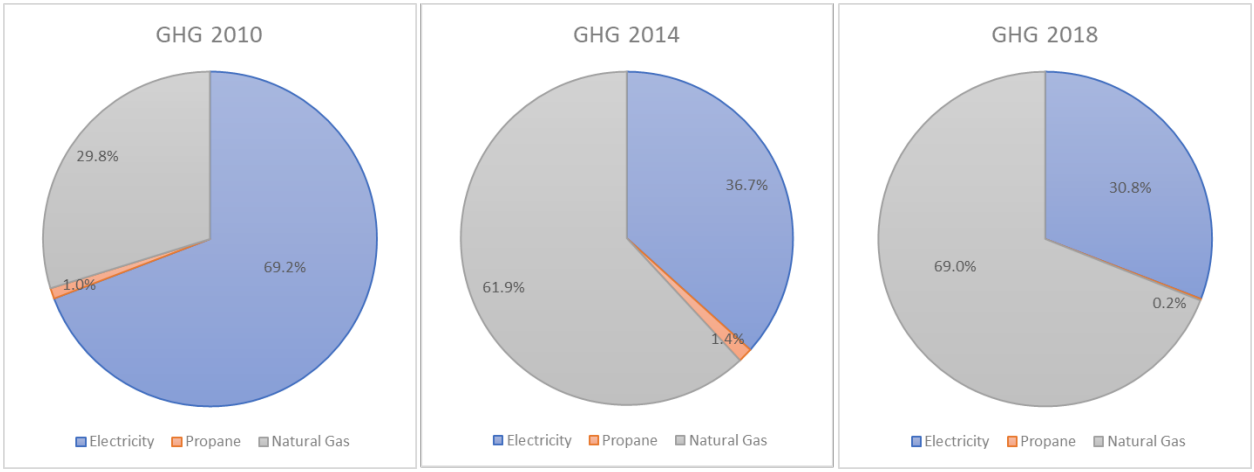

Figure 7 - Percentage of GHG's by energy type

[3] https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html
[4] https://changingclimate.ca/CCCR2019

The Town of Parry Sound's fleet is a significant producer of green house gases. Based on fuel records, it is estimated the Town consumes 107,000 litres of diesel and gasoline in a given year. This equates to approximately 270 metric tons of green house gases being emitted. Reductions in this area of emissions are largely dictated by the availability of suitable vehicles in the marketplace and financial viability.

The Town's GHG footprint with all facilities aggregated and fuel types normalized has been calculated to be approximately 540 metric tons annually. When fleet is factored in, the Town's total GHG footprint comes to 830 metric tons annually. This must be further assessed and worked to reduce through future capital projects, reduction strategies and education.

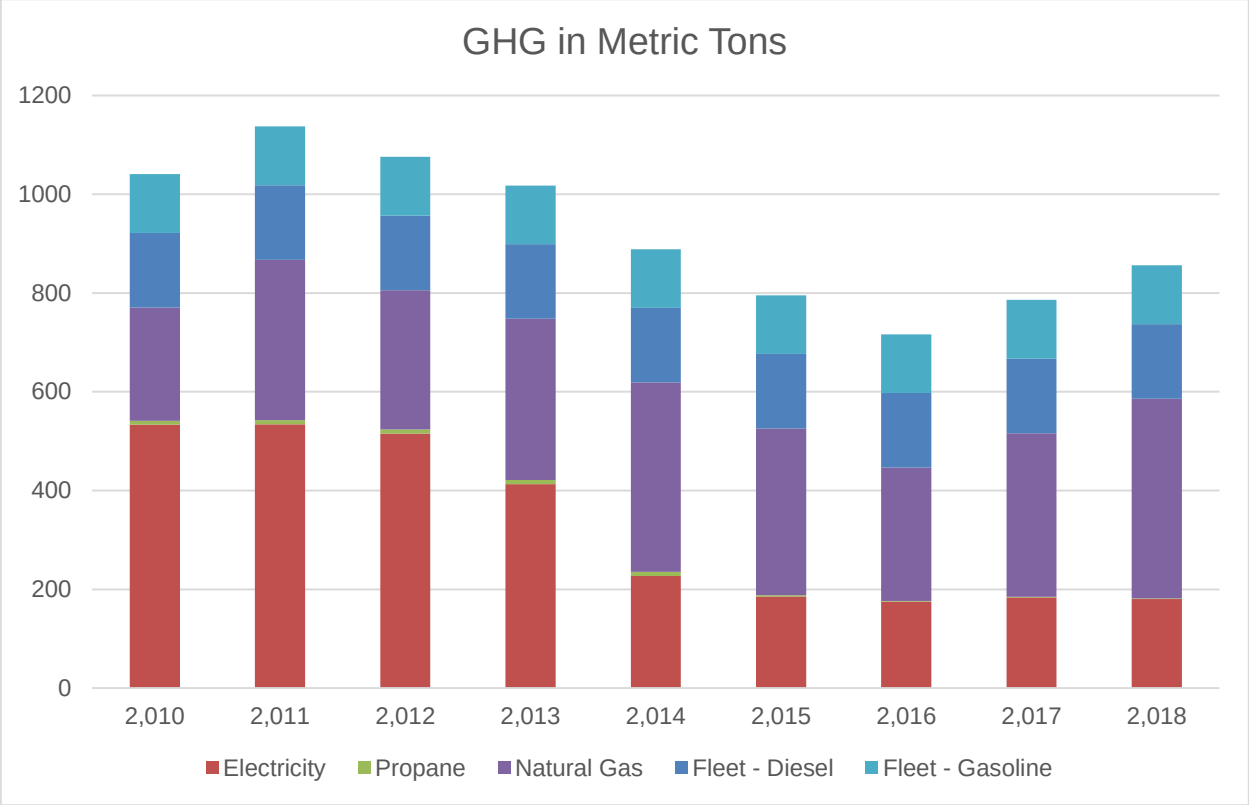

Figure 8 - GHG in Tons by fuel type

Energy Production

The Town is investigating distributed generation opportunities for partnership with Lakeland Power and Bracebridge Generation for photovoltaic (solar). Presently an MOU is in place to manage relationships for these types of projects. The first is a 650kW DC solar field with site preparation for up to 1.2MW on the former landfill site. The second is the potential for a larger solar field on the property adjacent to the North Sector Water Tower in the Municipality of McDougall. Both sites will provide significant opportunity for the Town to decrease electricity costs and will provide additional resiliency to the local grid.

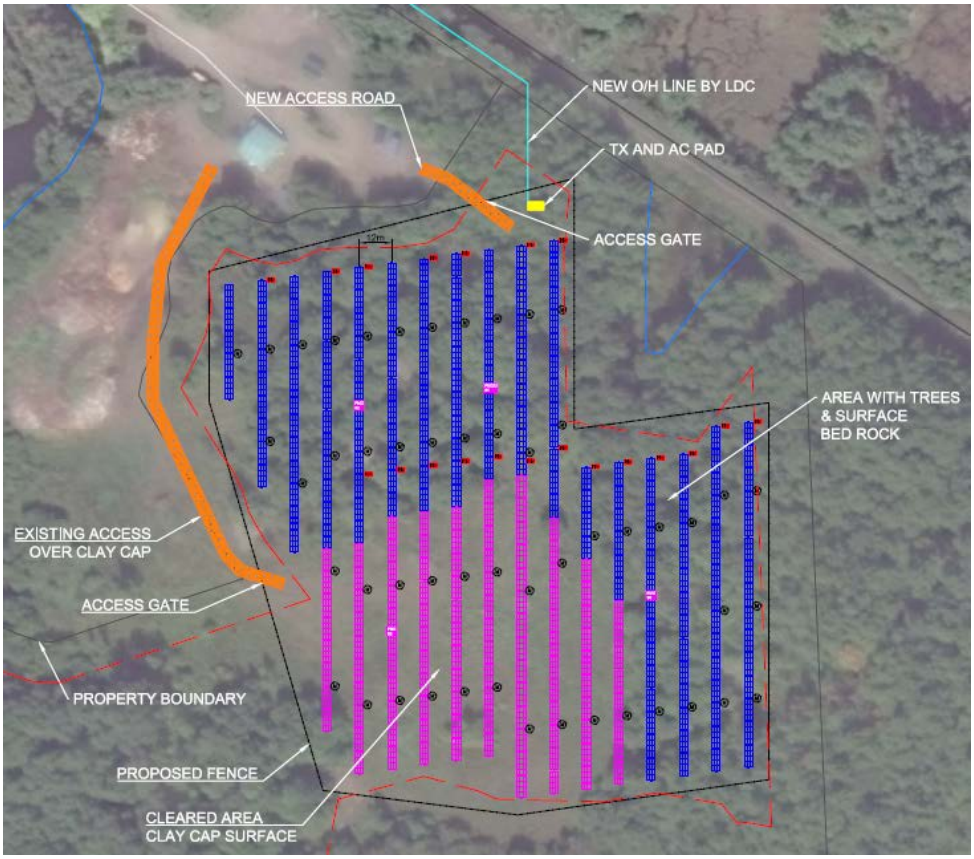

Figure 9 - Former landfill site (proposed layout)

Additionally, as previously outlined in the 2014 CDM, the Town Office utilizes ground source heat pumps, Carrier AquaZone PSD006-070 models. Each unit is rated for 3:1 heat energy extraction. This means for each unit of energy input to the system, 3 units are extracted from the ground. It is estimated that approximately 40,000kWh/144gJ are "produced" annually (as calculated by Wayne Hartwell, EESP, Local Authority Services - AMO).

Energy Intensity / Facility Efficiency:

In regard to determining energy efficiency, calculations can be made by dividing the ekWh (equivalent kilowatt hours) by the area of the building (square feet). This is often referred to as the energy intensity of a building. These calculations demonstrate on a building by building basis, which are more efficient, and which are less, all the while taking into account all utility types (electricity, natural gas, propane, etc...). While building type plays heavily in the comparison, it does provide a baseline when comparing similar usage types (i.e. pumping station vs. pumping station OR office building vs. office building). In the figure below, wastewater and water works have been removed since their usage will be substantially higher on a square footage basis, skewing the results for less energy intensive facilities; further to that, for wastewater, a number of pumping stations do not have a building and only consist of wells and pumps. When analyzing energy intensity, it is important to compare buildings of similar usage. However, regardless of

usage type, the lower the numbers (equivalent kilowatt hours per square foot) the better. The graph below includes non-utility (water and sewer) related buildings. Comparing industrial type buildings with business type space does not provide an accurate comparison.

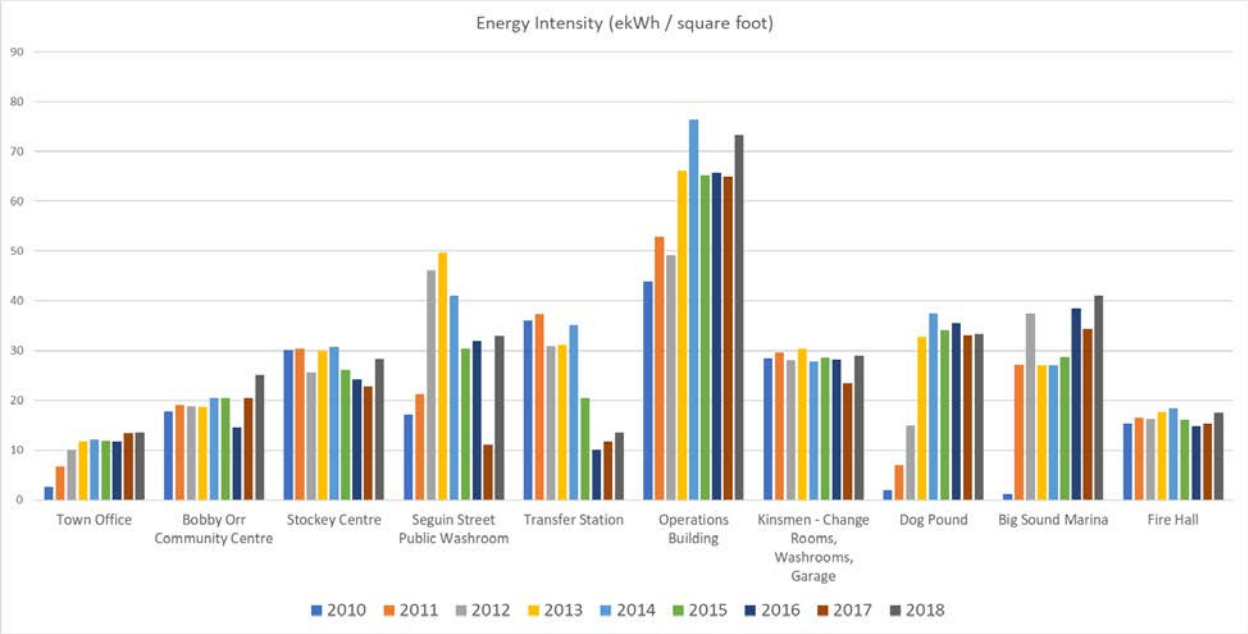

Figure 10 - Energy Intensity per Square Foot

Energy Planning

Energy planning for the next five years presents certain challenges for the Town of Parry Sound. These challenges include shifting energy sources, increased utility costs, and financial constraints related to energy efficiency upgrades. Understanding energy usage and consumption is a difficult task given the widely dynamic nature of the Town's business types and buildings, including usage type, age, and condition. Beginning in 2014, the Town gathered, recorded and assessed energy usage information using guidelines developed for Ontario Regulation 397/11. The annual reporting portion of the regulation does very little in terms of understanding how buildings operate from an energy standpoint; this is where long term reporting becomes essential. As one can see from the numerous graphs contained in this report, annual consumption can vary greatly, depending on weather and other contributing factors.

Presently, the Parry Sound area is energy constrained. Most electricity consumed in Parry Sound comes from the south through Parry Sound Transformer Station (TS), save for the energy produced at the Cascade Generation Station. Parry Sound TS is presently at capacity, thereby limiting available energy for future economic development initiatives. The Independent Electricity Systems Operator (IESO) has identified this as an area of concern and has focused attention on

resolving this issue. Several proposals have been floated to defer or outright eliminate the requirements for expanding Parry Sound TS. The expected upgrade would cost upward of $30 million dollars. While it is yet to be determined, options for deferring the upgrade include distributed generation (solar or wind), pumped-storage hydropower (PSH), and battery banking. These options may in fact be better solutions and address some of the issues around resiliency, which is particularly important as Parry Sound is powered by a single line feeder.

In July 2019, a major project was announced by Natural Resources Canada (NRCAN) and Lakeland Holdings. The project known as SPEEDIER (Smart, Proactive, Enabled, Energy Distribution, Intelligently, Efficiently, Responsive), is a demonstration project focused on creating a microgrid within the Town of Parry Sound. It will use operational technology (OT) as a means of managing a grid for redundancy, flexibility and resiliency. Utilizing distributed generation (solar) and connected technologies the project is expected to address issues around electricity availability during time of significant demand. Power requirements are to be managed through smart controls located within partners residences and places of business. This includes hot water tanks, electric vehicle chargers and battery storage. The project is a global effort as partners include NRCAN, Bracebridge Generation, Lakeland Holding/Power, Opus One, MaRS, Hydro Ottawa, Savage Data Systems, the IESO, AMP, Georgian College, the Town of Parry Sound and others.

Current Energy Concerns

Presently, the electricity industries are buzzing with change. Canada-wide coal is being phased out in favour of cleaner alternatives. Much of this is possible due to emerging technologies, advancing renewables and changes in transportation. With these changes come some market unpredictability for demand and uptake. Despite this, Canada has begun to transition to a low-carbon economy.

While how energy will be used in Ontario remains rather uncertain, the costs are anything but. Ontario's 2017 Long Term Energy Plan (LTEP) estimates that electricity rates will continue to rise by approximately 65% through to 2035[5]. The uncertain aspect to this however is how Global Adjustment will continue to be factored into electricity costs. This is particularly true in regard to class B customers and the continued reduction in energy costs, continued aging of infrastructure, and increased distributed generation initiatives. In 2018, this adjustment made up approximately 75% of the Town's electricity bill. The model for how GA is calculated will have to be reviewed as the pool of those paying the majority of it continues to shrink.

Should rates continue to rise as expected, all opportunities for electrical energy reduction must be considered. Further consideration must be given to additional opportunities for distributed generation (solar, wind and pump storage).

According to the National Energy Board, natural gas prices are expected to be fairly consistent through 2025. From 2025 through 2040 a gradual increase is expected[6]. The rates have declined

[5] https://www.ontario.ca/document/2017-long-term-energy-plan-discussion-guide/ltep-2017
[6] https://www.neb-one.gc.ca/nrg/ntgrtd/ftr/2018/index-eng.html

significantly throughout the last decade due to large increases in production/surplus. These estimates are subject to change and are also subject to market variability and pricing south of the border.

Propane has become such an insignificant fuel for the Town that discussing market trending is largely unnecessary. However, for posterity the following is an update on the state of the market. According to the Conference Board of Canada (December 2018 report) propane use is on the rise and is estimated to increase by 20% by 2025. The uptick in use is in part due to fuel switching but is also driven by non-energy uses (petrochemical feed stock)[7]. Depending upon the type of fuel switching occurring this could be a very good thing for Parry Sound, as it could result in reduced GHG's (if going from oil heating to propane). Nationally prices are forecast to increase slightly but again are subject to market volatility due to higher market prices and volumes.

Balancing costs and emissions

Energy usage as it relates to cost and emissions must both be considered. Doing so is rather complicated as it is possible to reduce energy costs through fuel switching, only to result in increased green house gas emissions. An example of this includes fuel switching from electrical to natural gas heating. Choosing what is right for the organization will dictate the path forward and should be considered on a project by project basis. Facility upgrades are easier to justify if there is a corresponding business case for reduced operating costs. To fully understand this, one must understand that the intent of the original Ontario Regulation 397/11 was to report on both utility usage and GHG emissions. The priority of this legislation was to decrease emissions, not to reduce operating costs, despite the two often coinciding.

All municipal infrastructure projects that include changes to lighting, heating or building envelope should go through a process of review to determine if efficiency gains can be made. This should be a cornerstone of the Asset Management Plan relating to sustainability. All major infrastructure projects must emphasize building performance, balancing costs and eventual return on investment.

In some cases, facilities likely will not be considered for efficiency upgrades due to them being leased facilities, seasonal facilities, or very low usage facilities with disproportionately high energy intensity. Additionally, the Town owns certain facilities where retrofitting would cost far more than any potential net savings; some of these facilities are low utilization pumping stations, cemeteries, and various storage sheds. These facilities will only be considered for upgrades with their natural replacement cycle.

Fuel Switching (Buildings and Fleet)

Fuel switching is both an advantage and a challenge when considering future facility or fleet upgrades. To consider fuel switching one must have a good understanding of their facility, fleet and their corresponding infrastructure. Further considerations must be made regarding the Town's

[7] https://propane.ca/wp-content/uploads/2018/12/CPA_Propane_Market_Study_OVERVIEW_CBoC_EN_2018.pdf

capital asset management plan. Thought must be given to determine if existing technologies can be practically implemented in a financially viable manner.

Changes in vehicle fuel types will play a role at the Town in the coming years. Annually the number of electric (EV) and hybrid-electric (EHV) vehicles coming to market is increasing exponentially. While municipalities typically aren't early adopters to new technology, eventually they will be required to 'buy-in' as petroleum will be phased out for passenger vehicles. In fact, presently speaking, there are many suitable vehicles available for light-duty requirements. In the coming 5-10 years, there will be an increasing number of medium and heavy-duty vehicles entering the marketplace. These will eventually make their way into the Town of Parry Sound's fleet.

As these vehicles are adopted there will be additional aspects to consider including infrastructure upgrades for charging stations, changes in maintenance, vehicle storage and others. Bringing electric vehicles into service will increase the Town's electricity usage. These will be significant increases and will be reflected in the annual energy reporting and will also be noticeable from a financial standpoint. However, these costs would not be new, they will be shifted from existing fuel types (gasoline and diesel). Annual energy usage reporting would demonstrate increased emissions of GHG's for locations where charging stations are located. This is a good thing as presently GHG's are not officially reported upon for fleet. It is expected that a 100% shift to EV's would result in an 86% reduction (230 metric tons) in GHGs on an annual basis from a corporate fleet basis.

It is anticipated in the coming years there will be further pushes and incentives (political and commercial) for fuel switching. As such, it is advisable to pursue future funding opportunities for both the replacement of the fleet and the associated infrastructure required to do so.

Fuel switching for buildings should also be investigated. While currently most large municipally owned buildings are heated with natural gas several are not. Operationally speaking financial gains can be seen for switching from electricity to natural gas or even propane. However, GHG emissions should be considered, as while natural gas may be a quarter of the cost of electricity (per BTU), the emissions are five times higher.

Getting Involved

In June of 2019, Town Council joined the Federation of Canadian Municipalities (FCM) and the ICLEI - Local Governments for Sustainability Partners for Climate Protection Program (PCP). This commitment binds the Town to a 10-year plan to reduce green house gas emissions to 30% less than 2005 levels by 2030. The PCP lays out a 5-milestone framework for accomplishing this including:

1. Create a GHG emissions inventory and forecast
2. Set an emissions reductions target
3. Develop a local action plan
4. Implement the local action plan or a set of activities

5. Monitor progress and report results

The Town has further committed to work regionally with area municipalities as well as other community groups including the Georgian Bay Biosphere Reserve (GBBR) to be more effective and wide reaching. It is expected that collaboration will reduce efforts and costs to work through the framework over the next 10 years.

Preferred State

Energy Usage Goals

Since the initial release of the Town's Energy Conservation and Demand Management plan in late 2014 much has been completed and significant energy reductions realized. As relevant as the topic was in 2014 energy conservation and reduction is even more so in 2019. As forecast by both the 2010 and 2013 Long-Term Energy Plans for Ontario, energy rates have continued to rise. The future outlook is not great either. In 2017 Ontario released its latest Long-Term Energy Plan. The plan focused on class A and residential customers without significant discussion of class B.

Due to various initiatives at the provincial level, electricity rates for Class A and residential customers have decreased. To finance those reductions Class B customers will have increased rates for the foreseeable future. Given the inevitable increase in energy costs, reduction strategies continue to be a priority. While saving energy for the purposes of reducing Green House Gases (GHG's) should be a consideration, the actual cost of energy must be considered, particularly for small municipalities with constrained financial realities.

While in the last five years the Town has completed a significant number of projects more can be done. The primary difference between 2014 and 2019 is that many of the low hanging fruit projects have been completed. This means further reductions will (a) require additional effort and (b) additional costs (administrative, engineering or others) but also (c) some of these more difficult or costly improvements may save significant amounts of energy. Some of the remaining initiatives may in fact have a higher rate of return than those completed in the past, particularly so when current energy costs are considered.

Beyond energy conservation, as of late 2017 the Town has begun investigating distributed green energy generation. At the time of this document's writing, the Town has formalized a relationship with Lakeland/Bracebridge Generation for the creation of a large scale photovoltaic (solar) farm. This multi-phased project is first intended to strategically offset the energy use of several facilities but will ultimately result in offsetting 100% of the Town's electricity usage with green energy through photovoltaic and hydro electric energy production.

Proposed Action(s) and Financial Requirements

Below are a series of proposed goals and objectives for the Town to complete. All are attainable and realistic over a five-year period.

Leadership

- Be a regional leader in conservation and demand management.
- Work with and communicate with other organizations within the region.
- Share and collaborate to build upon the limited scope of a municipal specific plan to include the broader area (other municipalities and community groups/organizations)

Education

- Educating Town of Parry Sound staff on methods for conservation
  - Lighting
  - Heating
  - Reduce → Reuse → Recycle
- Create a Sustainability Working Group – represented by all departments within the Town
  - Work to build sustainability checklists for major Corporate initiatives (building, renovating, etc.)
- Educating the public on energy conservation using social media and direct to resources/programs available for conservation within the community

Building automation and smart device controls

Determine suitability of smart thermostats and automation opportunities to reduce energy consumption in off-hours or when workspaces are vacant.

- Smart thermostats for centralized heating systems
  - Energy reduction: TBD
  - Project Cost: TBD
- Smart thermostats for baseboard heaters
  - Energy reduction: 10,000+kWh
  - GHG's Saved: 360 kg/yr
  - Project Cost: $3,500
  - Expected return: <2yr (actual return depends on existing behaviors)
- Proximity/occupancy sensors for lighting (Stockey Centre, WTP, WWTP, Operations)
  - Energy reduction: TBD
  - Project Cost: TBD

Photovoltaic generation site(s)

- Creation of a large scale photovoltaic (solar) field on the old landfill site and/or the property surrounding the North Water Tower
- The pilot project is expected to generate 650kW DC to offset the energy consumed by the wastewater treatment plant
- The multi-phased project is ultimately expected to generate between 6 and 20 MW of power
- The energy produced will directly offset corporate energy usage – (virtual) net metering
- The project will be done in partnership with Lakeland Power and Bracebridge Generation. The project will be entirely funded by Lakeland. The Town will in turn receive discounted energy (estimated to be between 20-30+%).

Water Treatment Plant

- Install two 60HP Variable Frequency Drives (VFD's) on the 60HP multi-stage blowers (currently throttled at 50% of their air intake, presently they run at 100% but are baffled)
  - Energy reduction: 80,000kWh / 15kW
  - GHG's Saved: 2.8 Metric Tons/yr
  - Project Cost: $15,000
  - Expected return: <1yr

Wastewater Treatment Plant

- Upgrade from inefficient traditional blowers to modern magnetic levitating blowers by Sulzer for significant gains in efficiency. Performing these efficiency upgrades alone would account for a decrease in corporate energy usage by nearly 10%. Initial estimates were provided by Sulzer and are based upon an estimated, very conservative, 30% efficiency improvement. Much greater efficiencies may be realized. For more firm estimates on potential savings further studies/pre-engineering will need to be performed.
  - Replace (2) 50hp traditional blowers with (1) magnetic levitating blower 100hp for the digesters
    - Energy reduction: 192,720kWh
    - GHG's Saved: 6.8 Metric Tons/yr
    - Project Cost: $146,456
    - Expected return: <4yrs
  - Replace (1) 40hp traditional blowers with (1) magnetic levitating blower 100hp for aeration
    - Energy reduction: 113,880kWh
    - GHG's Saved: 4.0 Metric Tons/yr
    - Project Cost: $162,224
    - Expected return: <7yrs
  - Replace (2) 50hp traditional blowers with (1) magnetic levitating blower 100hp for activated sludge
    - Energy reduction: 192,720kWh

- GHG's Saved: 6.8 Metric Tons/yr
- Project Cost: $146,456
- Expected return: <4yrs

Parking lot lighting

- Convert remaining street & parking-lot lighting from HPS/MH to LED
  - Kinsmen Park (6)
    - Replace 6 150w MH lamps with 60w LED
    - Energy reduction: 4,000kWh
    - GHG's Saved: 142 kg/yr
    - Project Cost: $5,000
    - Expected return: <7yrs
  - Charles W. Stockey Centre (8)
    - Replace eight 400w MH lamps with 150w LED
    - Energy reduction: 10,000kWh
    - GHG's Saved: 360 kg/yr
    - Project Cost: $6,000
    - Expected return: <3yrs

Street Lighting Upgrades

Research smart controls for connected, real-time, management of street lighting infrastructure.

- Possible to reduce street lighting electricity consumption by an additional 25+%
    - Energy reduction: 80,000 – 100,000kWh
    - GHG's Saved: 2.8 – 3.6 Metric Tons/yr
    - Project Cost: TBD
    - Expected return: TBD
- Opens the door to SMART community initiatives using the Internet of Things (IOT), such as real time traffic monitoring, emergency and school zone notification, proximity sensing dimming, acoustic sensing, among others using existing infrastructure

Charles W. Stockey Centre for the Performing Arts

- Building lighting replacements (all rooms except for the performance hall):
  - Energy reduction: 40,000kWh / 19.65kW demand
  - GHG's Saved: 1.4 Metric Tons/yr
  - Project Cost: $12,000
  - Expected return: <2yrs
- Performance Hall Lighting Upgrade
  - Energy reduction: TBD kWh / TBD kW demand
  - Project Cost: TBD

    - Expected return: TBD
- Lighting replacements in display cases
    - Energy reduction: ~4,000kWh
    - GHG's Saved: 142 kg/yr
    - Project Cost: TBD
    - Expected return: TBD

Bobby Orr Community Centre (T8 Lighting)

- Replacing traditional T8 fluorescent bulbs with LED bulbs
    - Energy reduction: 45,000kWh
    - GHG's Saved: 1.6 Metric Tons/yr
    - Project Cost: $15,000
    - Expected return: <2yrs

Operations Building - Phase II (T8 Lighting)

- Continue with lighting retrofits and replace existing T8 fluorescent tubes with LED
        - Energy reduction: 2,700kWh / 0.67kW demand
        - GHG's Saved: 96 kg/yr
        - Project Cost: $3,000
        - Expected return: 3yrs

Study for fuel switching in Corporate fleet

Study the potential for fuel switching in corporate fleet vehicles to go from fossil fuels to electricity, hybrid-electric, or potentially other fuel sources. Doing this will significantly reduce the Town's GHG footprint

- Study for cars, SUV's and light duty trucks
- Study for heavy duty and commercial vehicles (plows, heavy equipment, etc.…)

Electric Vehicle Charging Stations

Identify Town owned locations where vehicle charging stations should be installed. Work with Lakeland Holdings to identify funding opportunities and potential revenue options for charging.

Moving from Present State to a Preferred State

Identifying the need to change states is by far the largest hurdle to overcome. This identification places a certain amount of responsibility and assumes an organization is ready to move in a forward direction, toward change. In order to move in this direction budgets must be established.

Budgeting

Annually, projects will be reviewed and budgeted for accordingly. Given the nature and cost of the proposed projects, the scheduling of any upgrades will be at the discretion of the facility managers, their Directors and potentially Council. Projects will be completed as possible throughout the 5-year implementation period.

Completing some of the proposed projects may be dependent upon what funding and financing options are available. Many of the upgrades listed above will qualify for government grant dollars through SaveOnEnergy and/or similar programs.

The Corporation of the Town of Parry Sound intends to complete all of the proposed projects by the end of 2024. That said, certain mitigating factors may play into the ability to complete these projects including, but not limited to, budgetary constraints, funding availability, other priorities. Further, future programs may expedite or expand what is possible.

Corporate Mandates

It is the Corporation of the Town of Parry Sound's intent to decrease electricity and natural gas usage by 3% (207,000 ekWh) by 2024. This equates to reducing annual electricity consumption by approximately 155,000kWh and reducing natural gas usage by approximately 5,300m^3 annually. Through a combination of the above listed projects, as well as training and education, this should be a realistic and attainable goal. Additional reductions may be possible should the Town proceed with some of the more significant infrastructure upgrades (ex. Wastewater Treatment Plant blower upgrades). Further analysis will be required before those projects can be included in reduction targets. To complete any of these objectives will take a concerted effort and commitment by both Council and Staff, including budget and resources. Doing so will require the inclusion of sustainability, energy and environmental considerations into corporate infrastructure replacement plans. Council may need to determine whether their primary goals are specific to energy savings by way of cost avoidance, green house gas reductions or combinations therein (when possible).

In addition to completing tangible, measurable goals, the Corporation of the Town of Parry Sound is committed to be a regional energy leader. Putting words into action through area cooperation, education, commitment to sustainable practices as well as infrastructure improvements. The Town recognizes the important role municipal government plays in shaping communities from a social and environmental perspective. The Town shall lead and be a shining example, proving being environmentally responsible is in fact good governance.

Terminology / Reference

ROI – Return on Investment

Simple Payback – The point at which an asset is paid off based on savings

ekWh – This term stands for "equivalent kilowatt hours". It is a unit used as a standardized, common denominator value for all energy types (Electricity, natural gas, propane, etc...). The equivalencies are as follows:

Table 1 - GHG and Energy Coefficients Table[8]

Utility	Measure	Year	ekWh	GJ Coefficient	kGHG Coefficient
Electricity	kWh	2011	1.0000000	0.0036000	0.098040
		2012			0.096096
		2013[9]			0.076012
		2014			0.040011
		2015			0.035011
		2016			0.035548
Natural Gas	Cubic meter	-	10.6277770	0.0382600	1.8906270
Natural Gas	Giga Joule	-	277.7777800	1.0000000	49.4152370
Natural Gas	ekWh	-	1.0000000	0.0036000	0.1778940
Propane	Litre	-	7.0305550	0.0253100	1.5409840
Fuel Oil 1 & 2	Litre	-	10.7777770	0.0388000	2.7351560
Fuel Oil 4 & 6	Litre	-	11.8055550	0.0425000	3.1450370
Coal	Metric Tonne	-	7063.8889450	25.4300000	2280.2000
Wood	Metric Tonne	-	5000.0000400	18.0000000	860.49000

[8] Data provided by the Ministry of Energy, Northern Development and Mines
[9] Signifies the start of decommissioning of coal in Ontario

Appendix A – Facility Categories

Unit	Sub Unit	Location
Corporation	Corporation	Hillcrest Cemetery (Maintenance Garage)
		Hillcrest Cemetery (Mausoleum)
		James Street Outlets
		Sylvan Acres Cemetery (Pump House)
		Sylvan Acres Cemetery (Storage Shed)
		Town Office
		Big Sound Marina
		Town Dock - Washrooms, Showers, Office
Emergency Services	Emergency Services	Dog Pound
		Fire Hall
Leased	CN Station	Chamber of Commerce (Formerly)
		Parry Sound Snowmobile District (Formerly)
	CP Station	Festival of the Sound
Lighting	Lighting	Bobby Orr Community Centre - Parking Lot
		Flasher Lights
		Louisa Street - Street Lights
		Street Lighting (Town Wide)
		Tennis Court Lighting
		Traffic Lights – Bowes Street / Albert Street
		Traffic Lights - Bowes Street / Forest Street
		Traffic Lights - Bowes Street / Home Depot
		Traffic Lights - Bowes Street / Pine Drive
		Traffic Lights - Bowes Street / River Street

		Traffic Lights - Church Street at Rosetta
		Traffic Lights - Church Street at Seguin Street
		Traffic Lights - Church Street / Isabella Street
		Traffic Lights – Mall Drive / Joseph Street
		Traffic Lights - Miller Street / Seguin Street
		Traffic Lights - Seguin Street / James Street
Public Works	Corporation	Seguin Street Public Washroom
	Operations	Operations Building
		Transfer Station
	Sewer	Pump Station 01
		Pump Station 02
		Pump Station 03
		Pump Station 04
		Pump Station 05
		Pump Station 06
		Pump Station 07
		Pump Station 08
		Pump Station 09
		Pump Station 10
		Pump Station 11
		Pump Station 12
		Pump Station 13
		Pump Station 14
		Pump Station 15
		Pump Station at 82 Joseph Street

		Wastewater Plant (filter room)
		Wastewater Plant (influent)
		Wastewater Plant (office)
		Wastewater Plant (Other)
	Water	North Sector Water Tower
		Bowes Water Tower
		Seguin River Bridge Water Main Heat Trace
		Water Booster Station
		Water Filling Station
		Water Treatment Plant
Recreational	Recreational	Bobby Orr Community Centre
		Forestry Tower - Look Out
		Forestry Tower - Out Buildings
		Kinsmen Park - Change Rooms, Washrooms, Garage
		Kinsmen Park - Storage Shed
		Old Fire Hall (Formerly)
		Stockey Centre
		Waubuno Beach - Beach House, Washrooms, Showers

Appendix B – Facility Audits

Appendix C – Annual Usage (Ontario Reg. 397/11)