



Greater Peterborough Area Climate Change Action Plan

**Township of Asphodel-Norwood
Partners for Climate Protection Milestone 4 & 5 Report
Corporate Sector Implementation, Monitoring and Reporting Results**

September 2019

Section 1: Introduction

The effects of climate change are projected to intensify over the next decade. Peterborough County's annual average temperature is projected to rise 2.1°C to 4.2°C above current levels (Appendix 1). A changing climate will exasperate extreme weather events as the following risks will become more prevalent:

- Heightened frequency of severe rainfalls and wind storms
- Mean winter temperatures in 2030 to rise from -7°C to -4.9°C
- A 20% rise in 10-year storm rain events projected by 2030
- Days above 30°C to increase to 23 days from 6 days by 2030
- Chance of freezing rain events 40% more probable in winter

*Refer to for more information: https://www.peterborough.ca/en/city-hall/resources/Documents/Climate-Science-Report_Peterborough_Sep17-2018.pdf

In 2018, the United Nation's Intergovernmental Panel on Climate Change (IPCC) released a special report urging mitigation of greenhouse gas (GHG) emissions to limit global average temperature increase to only 1.5°C from the current 1°C of global warming. The IPCC recommends that a decrease in GHG emissions of 45 percent from 1990 levels by 2030 is necessary to prevent the worst implications of climate change. At present national commitment levels, a 3°C rise in global heating is forecasted by the year 2100.

The good news is that climate change can still be managed that restrains the worst effects, but immediate action is critical. Municipalities have within their authority the ability to influence positive climate stewardship among its operations and the communities they serve. By leading by example, municipalities can demonstrate this affirmative approach to climate actions by curtailing GHG emissions from all corporate facilities and assets. By ratcheting down all GHG emissions originating from corporate assets will reduce Asphodel-Norwood's overall contribution as a source of climate change.

Section 2: Overview

Background

In 2012, the City and County of Peterborough, the eight member Townships, Curve Lake First Nation, and Hiawatha First Nation adopted the Greater Peterborough Area Integrated Community Sustainability Plan, coined Sustainability Peterborough Plan. Within this Plan, climate change was identified as one of the eleven key theme areas.

In 2014, each of the twelve Greater Peterborough Area (GPA) member communities came together to develop a Climate Change Action Plan (CCAP), designed to reduce local contributions to climate change while preparing the community for future changes. They joined a network of more than 250 other communities across Canada to address climate change through

participation in the Federation of Canadian Municipalities’ Partners for Climate Protection (PCP) program. The PCP program aims at reducing GHG emissions from both municipal/First Nation operations (“corporate” emissions) and the community at large (“community” emissions). The program uses a five-milestone (Table 1) framework:

Table 1. Partners for Climate Protection Milestone Framework

	Milestone Description	Status
Milestone 1	Create a greenhouse gas emissions inventory & forecast	completed 2015
Milestone 2	Setting an emissions reductions target	completed 2016
Milestone 3	Developing a local action plan/CCAP	completed 2016
Milestone 4	Implementing the local action plan	underway 2019
Milestone 5	Monitoring progress & reporting results	underway 2019

Milestone 1 – Asphodel-Norwood GHG Emissions Inventory and Forecast

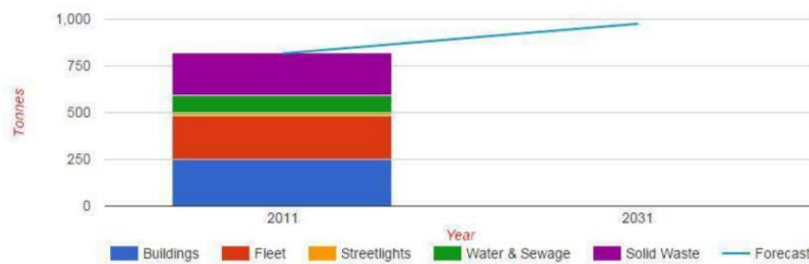
The CCAP established a 2011 GHG emission baseline (Table 2). As outlined in the Milestone 1 report (<https://sustainablepeterborough.ca/wp-content/uploads/2015/11/CCAP-Township-of-Asphodel-Norwood-PCP-Milestone-1-Report-FINAL.compressed.pdf>), the total Corporate Sector emissions for the Township of Asphodel-Norwood was 818 tonnes of carbon dioxide equivalent (tCO₂ e).

Table 2. Asphodel-Norwood Milestone 1 GHG Emission Sources

Sector	Emissions (tCO ₂ e)	Source	Emissions (tCO ₂ e)
Buildings	249	Natural Gas	161
Fleet	234	Electricity	185
Water & Sewage	93	Gasoline	41
Streetlighting	17	Diesel	193
Solid Waste	225	Propane	0
Total	818	Fuel Oil	13
		Solid Waste	225
		Total	818

A business-as-usual (BAU) forecast is an estimate of annual GHG emissions projected into the future with population growth, if the Township continues to operate exactly as it did in 2011 (i.e. if nothing is done to reduce emissions). The BAU forecast for corporate operations is based on annual growth rates derived from official population projections. It was assumed that municipal operations would increase with population growth – this aligns with standard PCP methodology for creating BAUs. Emissions from corporate operations is projected to increase to 976 tCO₂ e per year by 2031, compared to 818 tCO₂ e per year in 2011. This BAU projection is presented below in Figure 1.

Figure 1. Asphodel-Norwood Baseline Emissions



Milestone 2 – Setting an Emissions Reduction Target

In 2016, Asphodel-Norwood completed Milestone 2 that established a GHG emissions reduction target. A corporate sector GHG emissions reduction target of 28 percent was established using 2011 as the baseline year. This reduction target is equivalent to removing 158 tCO₂ e from municipal operations by 2031, compared to their 2011 baseline level of 818 tCO₂ e emitted per year.

Milestone 3 – Developing a Local Action Plan/CCAP

One of the key requirements of the completion of Milestone 3 was the adoption of both the Corporate Sector and Community Sector emissions reductions targets and the Action Plan by the respective Council. On November 8, 2016, the Council of the Township of Asphodel-Norwood passed Motion 560/16:

“That the Council of the Township of Asphodel-Norwood receives this report regarding the Township of Asphodel-Norwood’s Climate Change Action Plan for information;

And further that the Council of the Township of Asphodel-Norwood adopt the Draft Greater Peterborough Area Climate Change Action Plan;

And further that the Council of the Township of Asphodel-Norwood adopt the Community Sector and Corporate (Municipal) Sector emission reduction targets of 25% and 28% respectively, and associate local action plan.”

The CCAP outlined nine overarching strategies to remove 158 tCO₂ e from municipal operations by 2031. Planning, tracking, and evaluating the actions and projects that reduce the GHG emissions is required to understand and monitor progress against its GHG emission commitment target. Evaluating corporate mitigation successes ultimately enables policymakers to decide what initiatives or new strategies could be enacted to limit further emissions.

The CCAP was developed to outline the potential actions to assist the Township in achieving its emissions reduction targets. Further details on specific strategies are provided in the Milestone 2 and 3 Report <https://sustainablepeterborough.ca/wp-content/uploads/2016/11/Chapter-3-Asphodel-Norwood-Community-and-Climate-Change-Action-Plans-FINAL.pdf>.

Section 3: Milestone 4 – Implementation of the CCAP

The implementation of climate change mitigation and adaptation strategies is a continual process in the effort to reduce GHG emissions from corporate assets. Since 2011, Asphodel-Norwood has striven to incorporate many of the nine strategies outlined in the CCAP. In 2019, the township submitted its *Energy Conservation and Demand Management Plan 2019-2023* document to the Ontario government compliant with O. Reg. 397/11 (previously known as 397/11) which delineated completed actions as well as recommitting the township to energy conservation and GHG reduction (Appendix 1).

The following (Table 3) presents completed corporate actions that the municipality has achieved to date.

Table 3. Completed and Ongoing Corporate Mitigation and Adaptation Actions

CCAP Corporate Strategy	Action Description	Year	Quantifiable GHG Saved (tCO ₂ e)
Strategy 5: Utilize renewable energy	Council approved two community ground mount solar projects	2013	
Strategy 4: Replace mechanical equipment with high efficiency models	Variable-frequency drives installed at pumping stations	2014	
Strategy 6: Develop and implement a Green Fleet Strategy and replacement schedule	Replaced public works truck with a fuel-efficient model	2015	
Strategy 9: Waste diversion initiatives	Implemented mattress recycling program at landfill	2015	
Strategy 8: Improve energy efficiency of the streetlighting system	Replaced all street lights with LED.	2015	
Strategy 4: Replace mechanical equipment with high efficiency models	Community Centre mechanical upgrades	2015	3 tCO ₂ e (73721 kWh saved)
Strategy 4: Implement exterior LED lighting retrofit program	Updated Christmas Streetlight ornaments to LED lights	2016	
Strategy 3: Install EV charging stations for public use	Installation of two community-based electric vehicle charging stations at the Foodland market store	2016	
Strategy 9: Waste diversion initiatives	Implemented bi-monthly billing for water/sewer to reduce paper and resource consumption	2016	
Strategy 4: Install programmable occupancy sensors in facilities.	Motion detected lights installed in supporting rooms at the Municipal Town Hall	2017	

Strategy 4: Implement exterior LED lighting retrofit program	LED retrofit replaced Parking Lot and Exterior Lighting at the Community Centre	2017	0.5 tCO ₂ e (26297 kWh saved)
Strategy 5: Utilize renewable energy sources	In partnership with Peterborough Utilities Inc. installed a rooftop solar project on Community Centre (250 kW)	2017	
Strategy 4: Implement exterior LED lighting retrofit program	All Town Hall lighting was retrofitted to LED	2017	
Strategy 9: Reduce office waste	Purchased <i>City Reporter</i> software to support paperless park inspections	2017	
Strategy 4: Replace mechanical equipment with high efficiency models	Electrical and natural gas equipment at Water Treatment plant upgrades	2017	
Strategy 4: Implement interior LED lighting retrofit program	700+ lights at the Community Centre replaced with LED lights	2018	0.6 tCO ₂ e (33700 kWh saved)
Strategy 4: Replace windows and doors with higher efficiency models	All windows and window coverings replaced at the Asphodel-Norwood Town Hall	2018	
Strategy 6: Transition to lower emission more fuel-efficient vehicle	Asphodel-Norwood Fire Department replaced main rescue vehicle with a smaller, more efficient unit	2018	
Strategy 9: Waste diversion initiatives	Implemented a Clear Bag Program and reduced weekly residential collection from 3 bags to 2 bags	2018	
Strategy 4: Replace mechanical equipment with high efficiency models	High efficiency air conditioner installed at Norwood Library branch	2018	
Strategy 9: Waste diversion initiatives	Transfer Station implemented a textile and beer, liquor, wine bottle/can collection depot	2018	
Strategy 9: Waste diversion initiatives	Introduced Lifetime Dog Tags to decrease waste associated with label production	2018	
Strategy 9: Reduce office waste	Purchased <i>MESH</i> software to support paperless road patrols	2018	
Strategy 9: Reduce office waste	Purchased <i>City Reporter</i> software to support paperless facility inspections	2018	
Strategy 1: Monitor incentive/grant opportunities	Seeking to continually take advantage of grants to implement new corporate strategies	On going	
Strategy 1: Regular equipment service scheduling	All furnaces and air conditioners inspected continually to ensure maximum efficiency	On going	
Strategy 1: Employee training	Regular training schedule implemented for all employees to help with fostering energy reduction culture	On going	

Section 4: Milestone 5 – Monitoring Progress & Reporting Results

This progress report used 2018 data provided by Asphodel-Norwood to ascertain how the municipality is achieving its mitigation goals with respect to its CCAP.

Corporate Emission Reduction Progress in 2018

The corporate review revealed that Asphodel-Norwood declined by 20 percent below the baseline (Table 5) and decreased by 161 tCO₂ e from all its emission sources as illustrated in Figure 2.

Table 5. Township Greenhouse Gas Emission Source from 2011 to 2018

Emission Source	2011 GHG (tCO ₂ e)	2018 GHG (tCO ₂ e)	Percent Difference
Buildings (Electricity, natural gas, propane, and fuel 1&2)	251	189	-25%
Streetlights (Electricity)	16	3	-88%
Transportation (Diesel & gasoline)	233	262	12%
Waste (Organic matter emissions)	225	184	-18%
Water Treatment (Electricity)	92	19	-79%
Totals	817	656	-20%

Figure 2. 2018 GHG Emissions Compared with BAU and CCAP Target

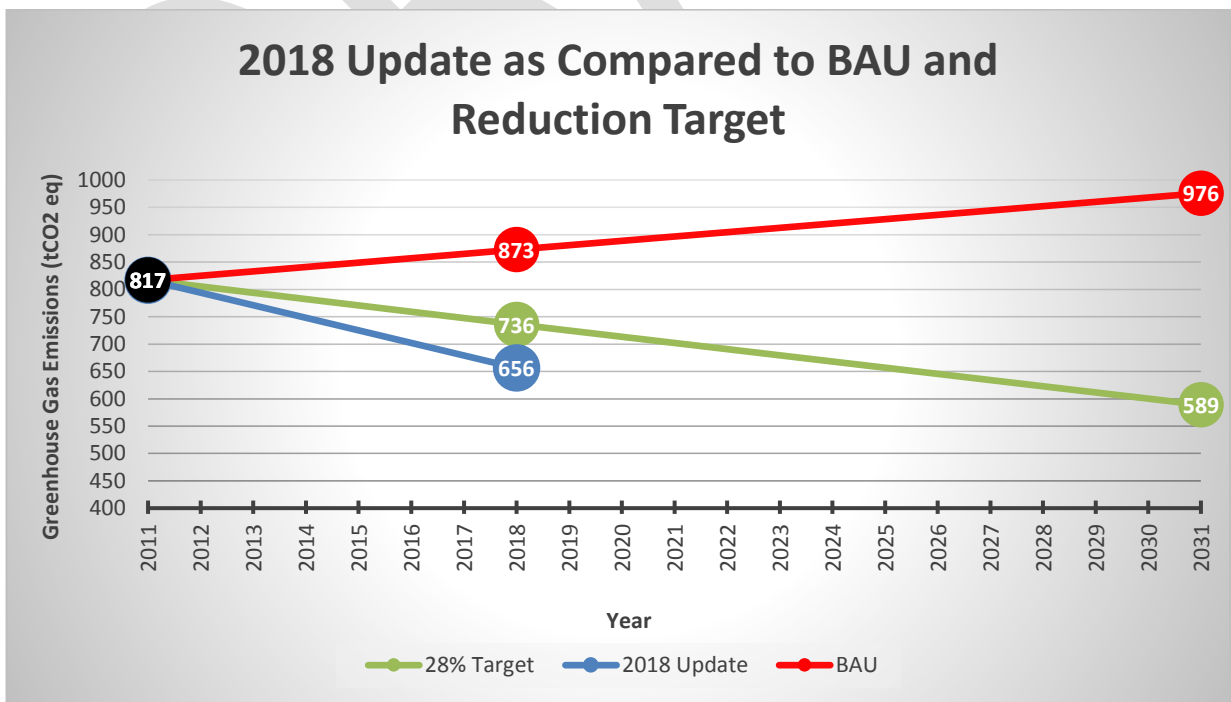


Figure 2. The Business-as-usual (BAU) emission projections as compared to the Reduction Target goal is outlined till 2031. 656 tCO₂e is the current emission attributed to Asphodel-Norwood in 2018.

This decrease is due to two factors beyond the specified corporate strategies addressed in the CCAP. The primary reason being the sizable reduction of GHG associated with electricity generation. This decline in electricity emissions is directly connected to the closure of all of Ontario’s coal powerplants starting in 2013 that decarbonized the electrical grid. This resulted in a fivefold decrease in associated GHGs linked to Ontario electricity production since 2011, as illustrated in Table 6.

Table 6. Ontario Electricity Associated GHG Emissions

Year	Emission Factor (kgCO₂ e)
2011	0.098040
2014	0.040011
2016	0.035548
2017	0.017298

The shuttering of coal powerplants has made the entire electrical grid throughout the province a much greener option today than the one found in the baseline year. However, it should be noted that the Ontario grid still maintains natural gas fired powerplants in its energy mix that are significant contributors of GHG emissions (IESO, 2019). More natural gas powerplants are scheduled to come online over the coming years to offset refurbishments of Ontario’s nuclear powerplants. This will result in the emission factors outlined in Table 6 to rebound and thereby negatively effect the gains found in electricity’s decarbonization. Ultimately, corporate electricity emissions will increase in the following years until the restoration of Ontario’s nuclear capacity is reinstated.

In addition to the decarbonization of the grid, Asphodel-Norwood has been proactive in implementing many energy saving measures that has contributed to a reduction in GHG emissions. These actions include substantial lighting retrofits, high efficiency window installations, and upgrading of mechanical equipment (Table 3).

The second factor is attributed to the closure of the landfill in 2012 that resulted in the transfer of all waste generated in the township to the City of Peterborough’s landfill. The sizable GHG reduction is a consequence of differing landfill practices between the City of Peterborough’s managed methane capture system and the unmanaged landfill in Asphodel-Norwood without methane collection capabilities. As a result, all future GHG emissions that are associated with waste in Asphodel-Norwood will be lower due to the capture of methane at the City of Peterborough landfill.

However, even though the municipality no longer directly controls its own landfill, this report maintains the position that the transfer of waste outside of township boundaries is akin to carbon leakage and must remain a corporate responsibility. Since the shuttering of a landfill is not a climate change action strategy described in the CCAP then the emissions must remain associated with the corporation. Asphodel-Norwood township council can enact waste

strategies that target waste reduction or implement diversion policies of township residents prior to shipment to the City of Peterborough’s landfill. It is because of this policy control that Asphodel-Norwood will thereby continue to have community and corporate emissions connected to waste. Furthermore, by retaining waste in the corporate ledger will allow for comparability with the baseline year and this update report, permitting a better overall evaluation of waste strategies.

Corporate Consumption Analysis and Discussion

Assessing energy and fuel consumption rates for all emission sources in Asphodel-Norwood may reveal connections outlined within the corporate mitigation strategies found in the CCAP. Table 7 outlines the individual contribution from each energy source to its associated sector.

Table 7. Asphodel-Norwood Consumption Data per Sector

2011 Consumption	Natural Gas (m3)	Electricity (kWh)	Propane (L)	Heating Oil 1&2 (L)	Gasoline (L)	Diesel (L)
Buildings	75,001	858,087	3,251	4,675		
Water	10,114	667,675				
Streetlights		153,211				
Vehicles					17,632	71,251
Totals	85,115	1,678,973	3,251	4,675	17,632	71,251
2018 Consumption	Natural Gas (m3)	Electricity (kWh)	Propane (L)	Heating Oil 1&2 (L)	Gasoline (L)	Diesel (L)
Buildings	87,832	844,831	5,159	7,619		
Water	3,752	705,922				
Streetlights		80,657				
Vehicles					21,066	66,516
Totals	91,584	1,631,410	5,159	7,619	21,066	66,516

Sector Strategies: All Corporate Facilities

Figure 3. Electricity Consumption

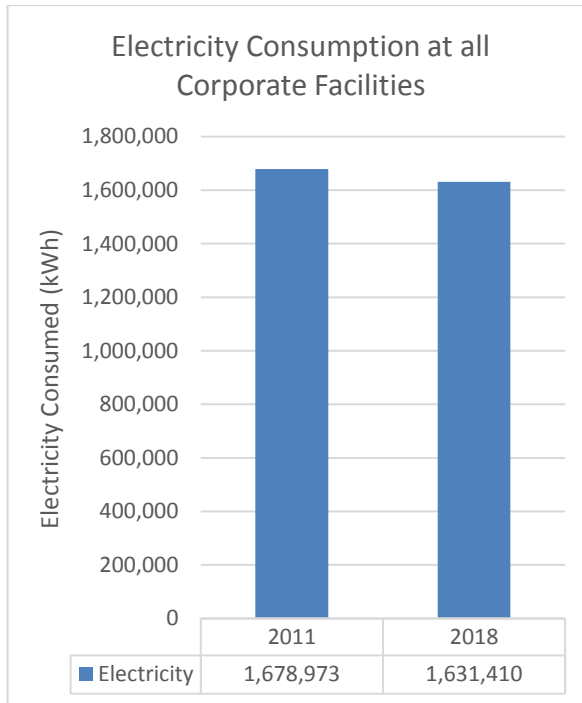
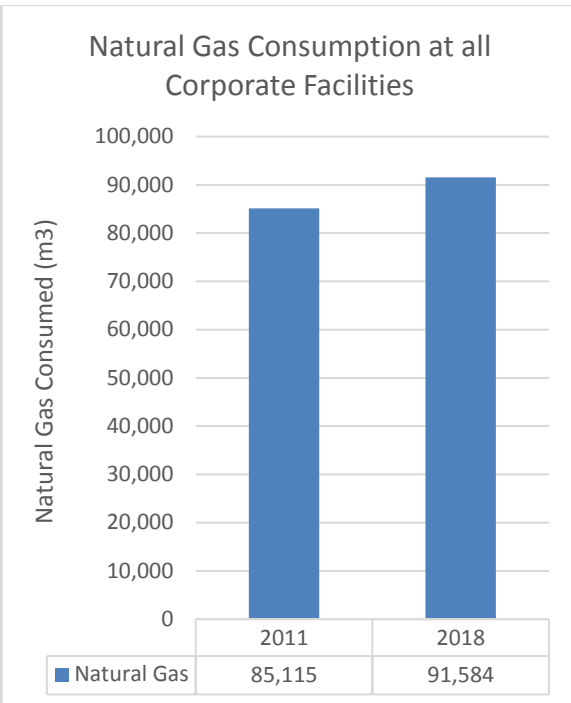


Figure 4. Natural Gas Consumption

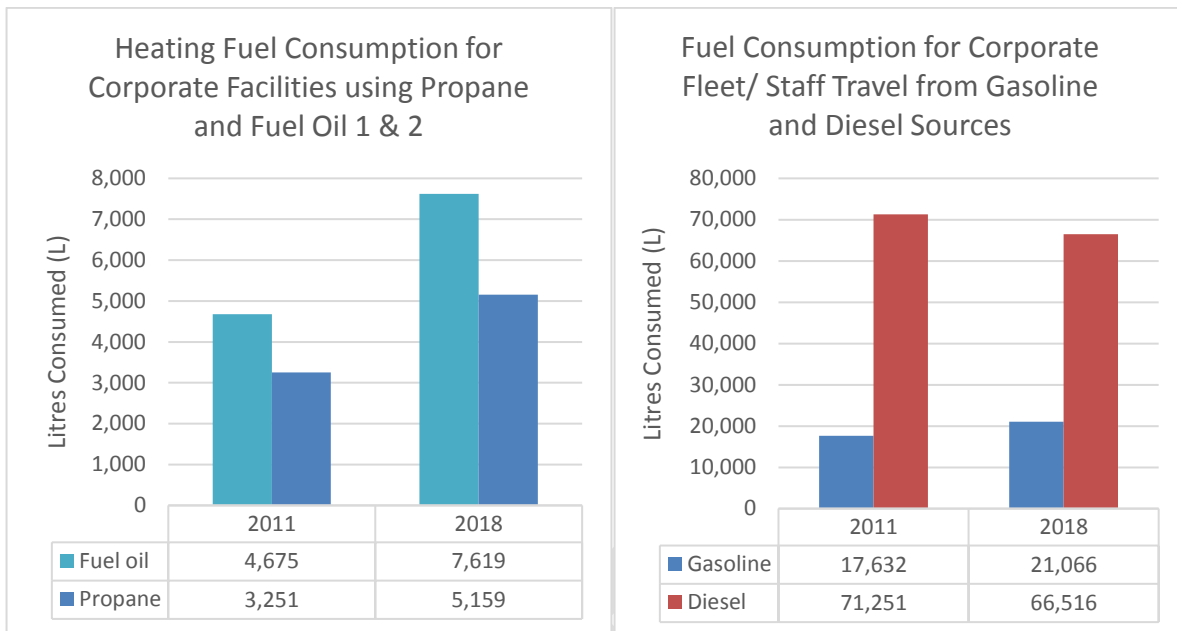


Analyzing electricity consumption (Figure 3) from all corporate facilities between 2011 and 2018 was found to have a 3 percent decrease in electricity usage. This reduction in consumption can be attributed to variety of actions undertaken by Asphodel-Norwood in its effort to abide by its corporate CCAP. Motion detected LED lighting was installed in supporting rooms at the Municipal Town Hall that reduced the extent of electricity being used through LED retrofits as well as eliminating overall energy use *vis-a-vis* the motion sensors. The community centre was retrofitted with 700 LED lights in 2018, further reducing electricity usage. Also, the township streetlights were converted to LED further reducing the overall electricity demand.

Natural gas (Figure 4) was found to have an 8 percent increase overall. This can be attributed to the water treatment plant being converted from electricity to natural gas and the addition of more residential housing in the township requiring a greater demand on the treatment plant.

Figure 5. Space Heating Fuel Consumption

Figure 6. Fleet + Staff Travel Fuel Consumption



Evaluating heating oil 1 & 2 reveals a 63 percent increase in heating fuel consumption and propane had a 59 percent increase in usage during this review period (Figure 5). No corporate facilities switched heating fuels that included propane or fuel 1 & 2 to explain the increase in consumption. However, an observed increase in use at the Westwood Firehall/Heritage Centre has been noted as a reason for prolonged heating at that facility. Refer to details provided in Appendix 1.

Sector Strategies: Corporate Fleet and Staff Travel

Lastly, the corporate fleet and staff travel (Figure 6) was found to have a 7 percent decrease in diesel usage as opposed to a 19 percent increase in gasoline consumption. Diesel usage was lowered due to the replacement of a public works vehicle and upgrading the main fire rescue vehicle to a smaller, more fuel-efficient one.

A variety of reasons may explain the increase in gasoline usage with one being that snow removal was previously contracted out but is now undertaken by the municipality. As well, staff travel was not included in the 2011 baseline transportation figures as compared to this review, thereby increasing the overall gasoline consumption.

Sector Strategies: Streetlights

Streetlights had a noticeable decrease in electricity usage of 90 percent since 2011 (Figure 7) because of planned energy efficiency retrofit program in 2015 and 2017 outlined in Strategy 4 and 8 in the CCAP. This resulted in all streetlighting and parking lot lights being converted to LED fixtures.

Figure 7. Electricity Consumption

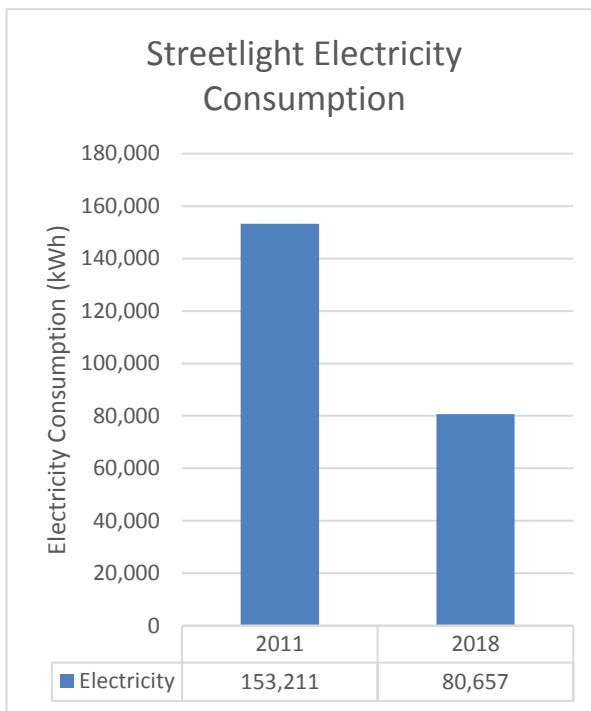
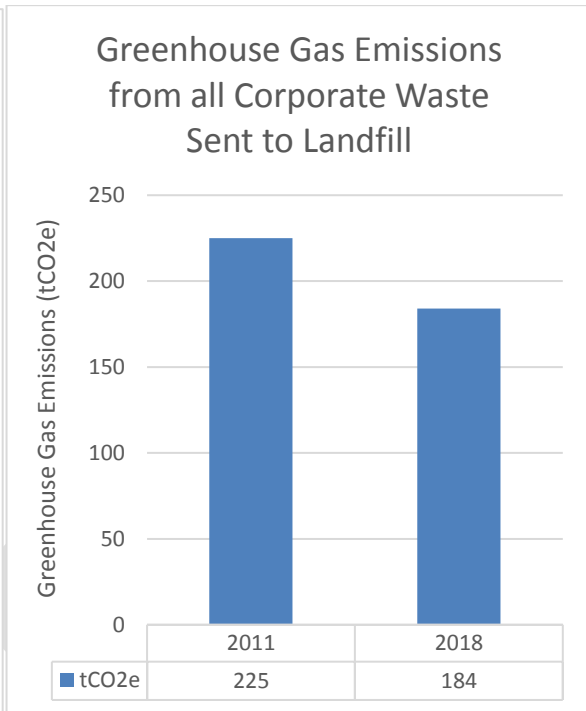


Figure 8. Waste GHG Emissions



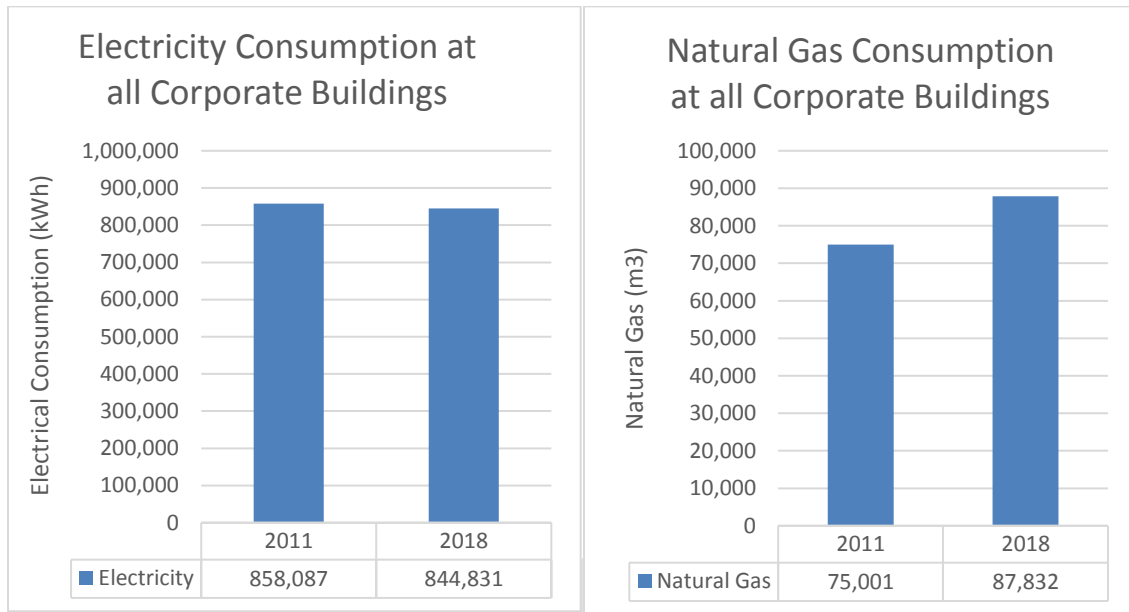
Sector Strategies: Corporate and Community Waste

All waste that is composed of organic material (i.e. food, leaf & yard, paper/cardboard, etc.) sent to landfill decreased by 41 tCO₂ e of emissions (Figure 8). This decrease in emissions is due to the methane capture system at the Benefort Road Landfill as opposed to the former unmanaged landfill located in Asphodel-Norwood. Additionally, a waste audit conducted by county waste management officials recalibrated the previous assumptions of what entered the waste stream. Those assumptions were applied to the waste composition ratios as they were the best models available to ascertain greenhouse gas emissions generated by waste.

Sector Strategies: Corporate Buildings

Electricity consumption of corporate buildings decreased by 2 percent (Figure 9) while natural gas rose by 17% (Figure 10). During this review period there was no identified change in the corporate building footage to explain the increase in natural gas usage.

Figure 9. Building Electricity Consumption **Figure 10. Building Natural Gas Consumption**



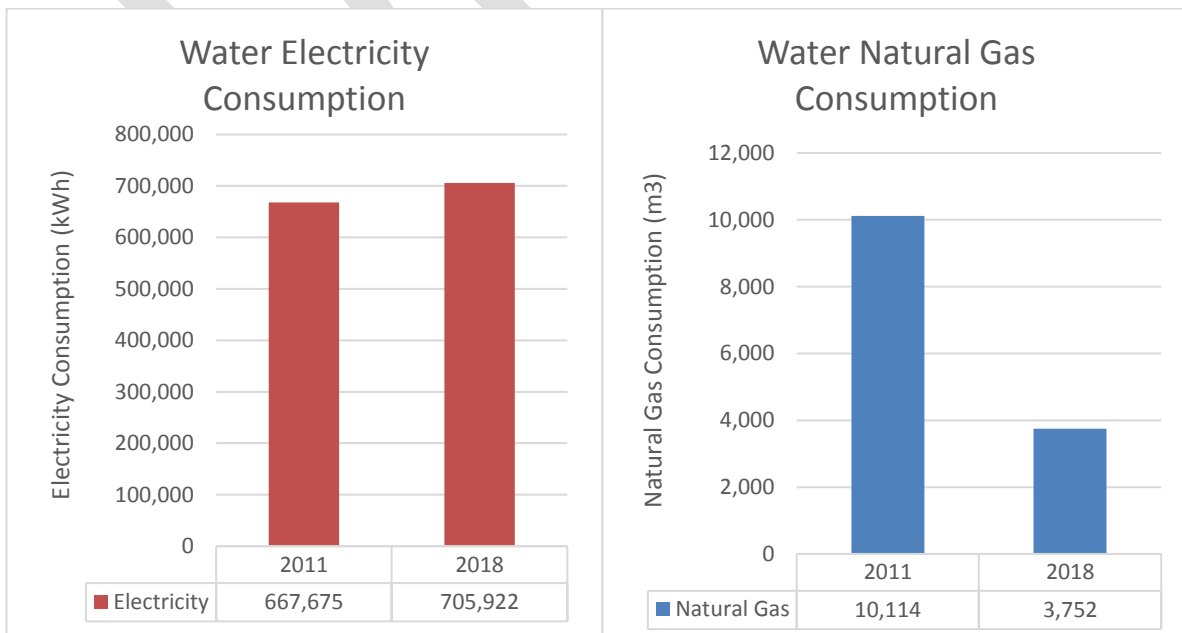
Sector Strategies: Water

The water infrastructure in Asphodel-Norwood saw a rise in electricity of 6 percent (Figure 11) and a decrease in natural gas of 63 percent (Figure 12) during the review period. The expansion of use could be attributed to the addition of 180 new buildings in the township that would require more electricity to pump water.

Regarding the drop in natural gas, a permanent operator now manages the water treatment facility as compared to previous contractors who maintained the plant periodically in the past. The permanent operator strives to lower energy use and increase efficiency at the water treatment facility.

Figure 11. Electricity Consumption

Figure 12. Natural Gas Consumption



Future Corporate Actions

The following is a renewed timeline for Milestone 3's corporate actions as of this report. The timeframe has been adjusted to omit long-term action due to that range nearing the 2031 target.

To date many actions have been completed but designated as permanently ongoing until 2031 to ensure continuing advancement towards energy consumption and GHG reduction targets. As well, some strategies have been consolidated to include other actions since the original CCAP was established in 2016. An example being the township's individual procurement policies Strategies 3 – Green New Buildings and Strategy 6 – Green Fleet Strategy which have been combined into one all encompassing Procurement Policy.

Table 8. Projected Timeline for Corporate Mitigation Actions

Township of Asphodel-Norwood Corporate Action Plan	Timeframe			
	Completed	Ongoing	Short (1-5 years)	Medium (6-10 years)
Buildings				
Strategy 1: Institutionalize energy efficiency and low carbon thinking into the organization				
Implement employee training for energy efficiency	X	X		
Establish a policy to consider highest energy efficiency as part of procurement requirements and evaluation	X			
Monitor incentive programs offered through utilities and other third-party funding source to be leveraged for implementing energy efficiency improvements	X	X		
Strategy 2: Enhance Operational efficiency of existing buildings				
Develop and deliver an equipment preventative maintenance program on an ongoing basis	X	X		
Continue to implement energy management plan and update regularly (every 5 years)	X	X		
Implement building/facility assessment tool/process to explore opportunities to improve efficiency (e.g. annual walk-throughs)	X	X		
Conduct building re-commissioning to optimize building operations		X		
Implement/continue to deliver an equipment preventative maintenance program on an ongoing basis	X	X		
Strategy 3: Build municipal facilities to ensure high environmental performance				
Ensure that the Procurement Policy requires new municipal buildings and major renovations be built to high environmental standards	X			
Install electric vehicle charging facilities for public	X			
Strategy 4: Improve environmental performance of existing municipal facilities				
Conduct energy audits/assessments of each facility to identify opportunities to improve energy efficiency	X	X		

Continue implementation of interior and exterior LED lighting retrofit program in facilities where feasible	X	X		
Install programmable thermostats and occupancy sensors in all facilities where feasible	X	X		
Replace appliances with Energy STAR rated appliances as needed	X	X		
Upgrade insulation/building envelope while conducting other essential building work (where feasible)	X	X		
Continue to replace windows and doors with high efficiency according to replacement schedule/need	X	X		
Replace mechanical equipment with high efficiency according to replacement schedule / need	X	X		
Strategy 5: Utilize renewable energy sources				
Continue to seek and implement opportunities for solar voltaic panels and other renewable energy options at all municipal facilities	X	X		
Fleet				
Strategy 6: Transition the municipal fleet to be more efficient and less carbon emitting				
Ensure that the Procurement Policy consists of a replacement schedule that considers the following: a) right sizing vehicle/ appropriate vehicle class through replacement schedule b) transitioning to low emission and alternative fuel vehicles c) use of anti-idling technology d) fuel and vehicle performance monitoring	X			
Implement an operator training and education program	X	X		
Formalize and continue with preventative maintenance program for vehicles and equipment	X	X		
Water & Sewage				
Strategy 7: Enhance operational efficiency of the water services system				
Upgrade remaining mechanical equipment as per replacement schedule	X	X		
Review and optimize pumps and blowers			X	
Continue to deliver preventative maintenance program	X	X		
Continue to deliver operator training and education program	X	X		
Continue to monitor and track energy performance	X	X		
Solid Waste				
Strategy 9: Reduce the amount of organic waste generated through municipal operations				
Continue to participate in the office waste reduction and diversion initiatives		X	X	
Continue to collect organic waste from Township offices and manage in backyard composters			X	
Conduct a corporate waste audit to understand waste composition and identify opportunities for improvement		X		
Develop/formalize a corporate waste diversion target and strategy			X	
Develop and implement a green event program	X	X		

Decision-making Process

Developing and implementing climate actions is well entrenched in Asphodel-Norwood because of the Township Council Resolution Motion 560/16. This resolution has led to the operationalization by senior management and staff in carrying out actions. Township staff plan and implement specific actions which are dependent on the municipal budgetary cycle, external incentives and grants, regional leadership and best practices, and end-of-life replacement scheduling. All these factors dictate the level of climate action realization within the township.

Asset Management

In 2017, the province passed Ontario Regulation 588/17, requiring municipalities to develop and adopt a Strategic Asset Management Plan (AMP) by July 1, 2019. The AMPs require climate change to be considered for all assets. The inclusion of energy-related factors in the AMP would promote energy conservation as a priority in the municipal budget and longer-term financial planning. The AMP must be reviewed every five years.

Conclusion

With the adoption of the Climate Change Action Plan in December 2016, the Township of Asphodel-Norwood committed to reducing their corporate sector GHG emissions by 28 percent below 2011 baseline levels by 2031.

Asphodel-Norwood has completed several energy and GHG conservation projects that have been undertaken and completed since 2013. Actions included replacing interior light fixtures with LEDs, upgrading facility building automation systems, mechanical improvements, installation of EV charging stations, and converting all streetlighting to LED fixtures, to name a few.

However, many opportunities for further energy conservation and GHG emissions reduction remain. Through proactive monitoring of energy consumption and forward-thinking facility renovations together with building service equipment upgrades, fuel switching vehicles, will further reduce Asphodel-Norwood's corporate sector GHG emissions.

Works Cited

ICLEI-Canada. (2018). Future Climatic Projections: City of Peterborough. Retrieved from: https://www.peterborough.ca/en/city-hall/resources/Documents/ICLEI-climateinfographic_updated_sep17.pdf

IESO. (2019). *2018 Electricity Data*. Retrieved from: <http://www.ieso.ca/en/Corporate-IESO/Media/Year-End-Data>

IPCC. (2018). *Global Warming of 1.5°C*. Retrieved from: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Headline-statements.pdf

Sustainable Peterborough. (2015). Greater Peterborough Area: Climate Change Action Plans.

University of Waterloo. (2015). *The Changing Climate of Waterloo Region*. <https://uwaterloo.ca/climate-centre/sites/ca.climate-centre/files/uploads/files/climate-infographic.pdf>

DRAFT

Appendix 1

Future Climate Projections

Appendix 2

Energy Conservation and Demand Management Plan 2019-2023

DRAFT