sustainable Peterborough

Greater Peterborough Area Climate Change Action Plan

Chapter 3 – Township of Asphodel-Norwood's Community and Corporate Climate Change Action Plans

September 30, 2016

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Local Governments for Sustainability

The Township of Asphodel-Norwood
2357 County Road 45
P.O. Box 29
Norwood, ON
K0L 2V0

November 17, 2016 Via Email

Melanie Kawalec
Sustainability Manager
City of Peterborough
500 George St.
Peterborough, ON K9H 3R9

Re: Asphodel-Norwood's Climate Change Action Plan

Ms. Kawalec:

During a regular Council meeting on November 8th, 2016 the Council of the Township of Asphodel-Norwood passed the following motion;

560/16 Moved by: Councillor Lynch
Seconded by: Councillor Vanderhorst
"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.
Carried

The Council of the Township of Asphodel-Norwood has adopted the Draft Climate Change Action Plan and are looking forward to seeing the updated data to compare current activity to the 2011 benchmark data.

Respectfully,

Candice White
CAO/Clerk/Treasurer

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Section 1: Introduction and Overview

Greater Peterborough Area Climate Change Action Plan

In 2014, the Greater Peterborough Area's (GPA) member communities joined more than 250 other communities across Canada to address climate change through participation in the Partners for Climate Protection (PCP) program aimed at reducing GHG emissions from both municipal/First Nation corporate operations and community sources.

As part of the PCP program, the Climate Change Action Plan sets a course to reduce local contributions to climate change and prepare communities for present and expected changes that will occur as a result of climate change. This plan represents an integrated approach to dealing with some of the most important issues related to the sustainability of our diverse region. The overall objective of the CCAP is to reduce our greenhouse gas emissions through a reduction in fossil fuel use and lowering our energy consumption, and to better prepare for our changing climate. The Plan identifies strategies, actions, and emission reduction targets that fit with and address the needs of each municipality and First Nation within the GPA. This regionally coordinated approach will ensure that we act together to safeguard the health of our residents and ensure the stability of our local economic and natural resources against impacts related to climate change.

Climate Change Vision

In 2010, the GPA embarked on an exciting journey – the development of an Integrated Community Sustainability Plan, coined *Sustainable Peterborough*. Within the Sustainable Peterborough Plan, climate change was identified as one of the eleven key theme areas of focus. Each community of the GPA is working together to collectively achieve the following vision, as originally identified as the climate change goal in the Sustainable Peterborough Plan:

We will reduce our contributions to climate change while increasing our ability to adapt to climate change conditions.

Asphodel Norwood's Community and Corporate Action Plans

Chapter 3 of the CCAP includes Asphodel-Norwood's Community (Section 2) and Corporate (Section 3) Action Plans. Both of these build on the overarching components outlined in the main CCAP, but provide greater detail specific to Asphodel-Norwood. They both include the following:

- *Where are we now* – a brief discussion of community and corporate baseline GHG emissions.
- *Where do we want to go* – GHG emissions reductions targets for the community and corporation.
- *How are we going to get there* – actions that the community and corporation will take to achieve its emissions reduction targets.

Section 2: Community Action Plan

Where are we now?

In 2011, 32,421 tonnes of CO_2e were emitted by the Township of Asphodel-Norwood community, including agricultural operations. Based on the projected growth for the Township of Asphodel-Norwood, community emissions are expected to grow to 38,343 tonnes CO_2e by 2031 if nothing is done to reduce GHG emissions. For further details on the Asphodel-Norwood's baseline community emissions (PCP Milestone 1), please see the Appendix attached to this chapter entitled *Asphodel-Norwood Corporate and Community Emissions Inventory*.

Where do we want to go?

The Asphodel-Norwood community is aiming to achieve a 25% reduction in its GHG emissions from the 2011 baseline by 2031. This is equivalent to 8,169 less tonnes of CO_2e emitted per year by 2031, which would put the Township's community emissions at 24,252 tonnes of CO_2e per year by 2031 compared to the current 32,421 tonnes per year.

How are we going to get there?

The following tables detail the strategies and actions that Asphodel-Norwood will use to achieve its community GHG emissions reduction target. . Further detail on each strategy is provided in the main *Climate Change Action Plan* document.

Our Homes

Strategy H1: Help existing homes become more energy and water efficient and be more adaptable to climate risks		
Primary Action	Mitigation impact: direct	Adaptation impact: direct
	Develop and implement a comprehensive multi-year deep energy retrofit program focused on existing households to achieve efficiency gains of at least 30% to 50% depending on the age and type of building.	
Primary Action Assumptions	Implement retrofits in 60% of the residential housing stock by 2031.	
GHG Emission Reduction Potential	2,101 tonnes of CO_2e/per year	

Strategy H2: Build new homes to be more efficient and have a smaller environmental footprint		
Primary Action	Mitigation impact: direct	Adaptation impact: direct
	Implement gradual improvement in new building stock efficiency aimed at achieving near net-zero or equivalent (0.14 to 0.24 GJ/m2) in all new buildings by 2031.	
Primary Action Assumptions	Results in full electrification of energy end uses.	
Supporting Actions/ Policies	**Supporting Policies** • 'Solar Ready' Official Plan Updates	
GHG Emission Reduction Potential	534 tonnes of CO_2e/per year	

Strategy H3: Reduce the amount of waste generated by residents that contribute to greenhouse gas emissions	
	Mitigation impact: direct Adaptation impact: none
Primary Action	Explore feasibility of capturing energy from waste (e.g. anaerobic digestion) to manage organic material and to reduce emissions of methane gas (County and City partnership).
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Implement a "less waste challenge" to encourage reduction in waste generation, with a particular focus on food waste • Review efficiency of waste collection program and implement changes to reinforce diversion programs and reduce collection truck emissions
Greenhouse Gas Emission Reduction Potential	90 tonnes of CO_2e/per year

Our Workplaces and Schools

Strategy W1: Improve energy and water efficiency of existing buildings and business operations	
	Mitigation impact: direct Adaptation impact: indirect
Primary Action	Work with utilities (PDI, Hydro One, Enbridge as appropriate) to deliver a coordinated deep energy retrofit program to industrial, commercial, and institutional organizations.
Primary Action Assumptions	Implement retrofits in 80% of commercial & institutional buildings, and 100% of industrial facilities by 2031.
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Encourage local businesses to participate in energy benchmarking through the use of Energy Star Portfolio Manager provided through Natural Resources Canada • Work with the Building Owners and Managers Association (BOMA) to expand their Operator Training program to the Greater Peterborough Area (County and City partnership)
GHG Emission Reduction Potential	817 tonnes of CO_2e/per year

Strategy W2: Build new buildings to be more efficient and have a smaller environmental impact	
	Mitigation impact: direct Adaptation impact: direct
Primary Action	Implement gradual improvement in efficiency of industrial, commercial, and institutional buildings.
Primary Action Assumptions	• Commercial & Institutional: full electrification, and uses 30% less energy • Industrial: full electrification, and uses 60% less energy
GHG Emission Reduction Potential	259 tonnes of CO_2e/per year

Strategy W3: Facilitate climate change friendly business operations and practices		
	Mitigation impact: indirect	Adaptation impact: direct
Primary Action	Support Sustainable Peterborough Business Initiative to build a toolkit for Greater Peterborough Area businesses to assist with climate change impact analysis and business continuity planning for extreme weather.	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Engage with businesses and institutions to implement corporate sustainability initiatives aimed at reducing greenhouse gas emissions (County and City partnership) • Work with institutions and businesses to support implementation of food waste reduction and/or diversion (County and City partnership)	
GHG Emission Reduction Potential	Impact on GHG emissions nominal	

Strategy W4: Support local economic resilience and growth of the local green economy		
	Mitigation impact: indirect	Adaptation impact: indirect
Primary Action	Support Peterborough GreenUP as a "one-stop shop" for businesses to learn about and advance sustainability through the Green Business Peterborough Program.	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Explore opportunity and locations to establish a local eco business zone or "Partners in Project Green" program to share resources amongst businesses and encourage green industries (County and City partnership) • Support the Greater Peterborough Chamber Of Commerce to establish a business leadership and mentorship program to support energy and climate leadership amongst businesses as part of the Peterborough Business Excellence Awards	
GHG Emission Reduction Potential	Impact on GHG emissions nominal	

Strategy W5: Facilitate low carbon energy generation and local energy security		
	Mitigation impact: direct	Adaptation impact: direct
Primary Action	Conduct a regional study to explore the potential to implement local renewable energy generation and storage (institutional, commercial, industrial, and residential).	
Primary Action Assumptions	Solar PVs are to generate 5% of the electricity demand in IC&I and residential buildings, while 6% of the natural gas consumed in all buildings are to come from renewable sources by 2031.	
GHG Emission Reduction Potential	311 tonnes of CO_2e/per year	

On the Move

Strategy M1: Build an active transportation network and support active transportation		
	Mitigation impact: direct	Adaptation impact: none
Primary Action	Reduce vehicle trips and foster greater walking and cycling mode share through a coordination of efforts.	
Primary Action Assumptions	Active transportation in the County is expected to focus on recreational opportunities and a nominal shift in modal split is expected. Development of the Active Transportation Master Plan is currently underway.	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Develop a Complete Streets Policy and Guidelines, including consistent sidewalk requirements and guidance on paved shoulders/cycle lanes	
GHG Emission Reduction Potential	Impact on GHG emissions nominal	

Strategy M2: Facilitate alternatives to single-occupant vehicle use to reduce frequency of personal vehicle use		
	Mitigation impact: direct	Adaptation impact: none
Primary Action	Explore feasibility of a carpool lot network (formal and informal spaces) (in partnership with the County and other Townships).	
Primary Action Assumptions	Carpooling, or travel as a passenger in a vehicle, to increase by 3% by 2031.	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Work with businesses and schools to implement preferred parking for carpoolers	
GHG Emission Reduction Potential	152 tonnes of CO_2e/per year	

Strategy M3: Make public transportation more appealing to increase its usage		
	Mitigation impact: direct	Adaptation impact: none
Primary Action	Explore feasibility and joint County-Townships delivery of County Transit services or alternative methods of public transportation as part of next County Transportation Master Plan Update.	
Primary Action Assumptions	Feasibility to be determined after next Transportation Master Plan Update	
GHG Emission Reduction Potential	Non-quantifiable with available information	

Strategy M4: Help transition vehicles to use cleaner and lower greenhouse gas emitting fuel sources		
	Mitigation impact: direct	Adaptation impact: none
Primary Action	Support a shift in vehicle technology to Electric Vehicles (EVs).	
Primary Action Assumptions	12% of all vehicles on the road in 2031 are to be EVs.	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Install electric vehicle charging stations for public usage • Support local organizations to work with local businesses to transition	

Strategy M4: Help transition vehicles to use cleaner and lower greenhouse gas emitting fuel sources	
	corporate fleets to EV
GHG Emission Reduction Potential	4,667 tonnes of CO_2e/per year

Our Food

Strategy F1: Support localization of the food system	
	Mitigation impact: indirect Adaptation impact: indirect
Primary Action	Undertake a community food system assessment to better understand local food production and movement within the GPA.
Supporting Actions/ Policies	**Supporting Policies** • Update Official Plan policies to support urban agriculture and the growing, processing and distribution of locally-produced food for all residents **Supporting Actions & Initiatives** • Continue to expand the network of community gardens throughout the Greater Peterborough Area and engage the broader community in the value of gardening • Support local organizations to provide community skill sharing programs to increase awareness among community members on how to grow, process, and store food • Support local organizations in training, facilitating access to land and promoting successful entrepreneurship of new farmers and food business to increase the production and processing, distribution and retailing of local food
GHG Emission Reduction Potential	Impact on GHG emissions nominal

Strategy F2: Encourage purchasing of locally produced food	
	Mitigation impact: indirect Adaptation impact: indirect
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Support local organizations to promote the marketing of locally-produced food through initiatives such as the Purple Onion Festival and Local Food Month • Expand and promote the Farmers Market Network across the Greater Peterborough Area • Support and encourage farm gate sale of produce
GHG Emission Reduction Potential	Impact on GHG emissions nominal

Strategy F3: Reduce the amount of wasted food		
	Mitigation impact: direct	Adaptation impact: none
Primary Action	Implement a residential awareness campaign to encourage elimination of wasted food in the home, workplaces, and schools.	
Primary Action Assumptions	Reduce the proportion of wasted food in the waste stream by 11% by 2031.	
GHG Emission Reduction Potential	9 tonnes of CO_2e/per year	

Our Land

Strategy L1: Strengthen land use policy and the development review process to better support climate change mitigation and adaptation		
	Mitigation impact: indirect	Adaptation impact: direct
Primary Action	Establish a multidisciplinary review team to assess provincial and local land use planning legislation and tools and make recommendations to decision-makers on how to best implement an ecosystem-based approach to the development application process (partnership amongst all communities).	
Supporting Actions/ Policies	**Supporting Policies** • Integrate climate change policies into Official Plans • Continue to implement land use policy that supports building complete communities that are mixed-use, compact, and higher density to achieve intensification targets outlined in the Provincial Growth Plan **Supporting Actions & Initiatives** • Sustainability metrics tool to predict, measure and report the sustainability performance (including GHG emissions) of proposed developments focusing on the built environment, mobility, natural environment, and infrastructure and buildings (e.g. Richmond Hill/Vaughan/Brampton) • Continue/enhance education opportunities on the need for increased housing density and implications related to climate change at all points of contact with decision-makers, stakeholders, and the public	
GHG Emission Reduction Potential	Non-quantifiable with available information	

Strategy L2: Identify climate change risks and prepare for potential impacts		
	Mitigation impact: none	Adaptation impact: direct
Primary Action	Conduct a Greater Peterborough Area-wide vulnerability assessment of expected climate change impacts (including drought and lake levels) (coordinated amongst all communities).	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Adopt the Low Impact Development Stormwater Management Planning and Design Guide (CVC/TRCA) for landscape-based stormwater management planning and low impact development stormwater	

Strategy L2: Identify climate change risks and prepare for potential impacts	
	management practices
GHG Emission Reduction Potential	None

Strategy L3: Protect and enhance natural assets	
	Mitigation impact: indirect Adaptation impact: direct
Primary Action	Develop and implement a Natural Heritage System Plan (City and County with Townships).
Supporting Actions/ Policies	**Supporting Policies** • Place restrictions on cutting down trees on private property and/or a tree replacement policy • Update Official Plan policies to require greater buffers around wetlands to protect them from surrounding land uses **Supporting Actions & Initiatives** • Support and promote local Conservation Authorities' tree planting programs to encourage planting trees on public and private property • Support local Conservation Authorities to deliver planting and restoration projects at strategic high priority areas with climate ready species
GHG Emission Reduction Potential	Non-quantifiable with available information

Strategy L4: Facilitate best management practices for low emission farming and climate change adaptation	
	Mitigation impact: indirect Adaptation impact: direct
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Promote usage of Agriculture and Agri-Food Canada's no-cost Holos GHG emissions modeling tool to assist farmers in assessing their GHG emissions and exploring various farm management scenarios • Support [local agricultural organizations] to host local agricultural forums and training sessions to engage with farmers on how to implement climate change mitigation and adaptation related best management practices • Support [local agricultural organizations] to promote local participation in the Canada-Ontario Environmental Farm Program to encourage farmers to increase knowledge, conduct assessments, and develop and implement Environmental Farm Plans for their farms
GHG Emission Reduction Potential	3,259 tonnes of CO_2e/per year[1]

[1] Total reduction potential per year based on uptake of anaerobic digesters (biogas), enteric fermentation reduction, changing manure management practices, and adopting best practices for soil management.

Our People

Strategy P1: Prepare for the health impacts associated with a changing climate		
	Mitigation impact: none	Adaptation impact: direct
Primary Action	Conduct a local community vulnerability assessment of public health impacts from climate change to identify climate risks on vulnerable populations (in partnership with all communities).	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Establish a protocol for extreme weather alerts and flooding updates	
GHG Emission Reduction Potential	None	

Strategy P2: Foster a culture of climate change awareness		
	Mitigation impact: indirect	Adaptation impact: indirect
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Support Sustainable Peterborough and other local organizations in hosting regular events focused on climate change (speaker series, annual event, etc.) • Support Sustainable Peterborough in seeking buy-in and endorsement/support for the shared vision and goals of Community Climate Change Action Plan from existing groups and organizations in the Greater Peterborough Area • Support Sustainable Peterborough to host a community, youth, adult, and senior climate change champion through the annual Sustainable Peterborough Awards	
GHG Emission Reduction Potential	Impact on GHG emissions nominal	

Strategy P3: Encourage civic engagement around climate change		
	Mitigation impact: indirect	Adaptation impact: indirect
Primary Action	Develop a charter and guidelines (engagement strategy) to foster meaningful community engagement in climate change issues and environmental stewardship (partnership amongst all communities).	
Supporting Actions/ Policies	**Supporting Actions & Initiatives** • Support Sustainable Peterborough to establish a youth advisory committee on climate change to empower youth to take action on climate change	
GHG Emission Reduction Potential	Impact on GHG emissions nominal	

Decarbonization of the Electric Grid

Since the baseline year of 2011, the Province of Ontario has taken steps to reduce the GHG emissions associated with the electrical grid. For example, it closed all of its coal-fired power plants. This in turn will result in significant GHG Emission Reduction Potential for the Asphodel-Norwood community, totalling 1,892 tonnes of CO_2e/per year.

Section 3: Corporate Action Plan

Where are we now?

In 2011, 592 tonnes of CO_2e were emitted by the Township of Asphodel-Norwood's corporate operations. The business-as-usual forecast for the corporate operations is based on annual growth rates derived from official population projections. Emissions from corporate operations are projected to increase to 706 tCO_2e per year by 2031 if the Township continued to operate as it did in the baseline year without taking any actions to reduce GHG emissions. For further details on the Asphodel-Norwood's baseline corporate emissions (PCP Milestone 1), please see the Appendix attached to this chapter entitled *Asphodel-Norwood Corporate and Community Emissions Inventory*.

Where do we want to go?

Asphodel-Norwood is aiming to achieve a 28% reduction in its corporate GHG emissions from the 2011 baseline by 2031. This is equivalent to 158 less tonnes of CO_2e emitted per year by 2031, which would put the Township's corporate emissions at 434 tonnes of CO_2e per year by 2031 compared to the current 592 tonnes per year.

How are we going to get there?

The following table details the strategies and actions that Asphodel-Norwood will use to achieve its corporate GHG emissions reduction target.

Township of Asphodel-Norwood Corporate Action Plan	**Timeframe**			
	Underway or Complete	Short (1-4 years)	Med (5-9 years)	Long (10+ years)
Buildings				
Strategy 1: Institutionalize energy efficiency and low carbon thinking into the organization				
Implement employee training for energy efficiency		X	X	X
Establish a policy to consider highest energy efficiency as part of procurement requirements and evaluation		X		
Monitor incentive programs offered through electricity and natural gas providers to be leveraged for implementing energy efficiency improvements		X	X	X
GHG Emission Reduction Potential: In-direct GHG reductions				
Strategy 2: Enhance operational efficiency of existing buildings				
Continue to deliver an equipment preventative maintenance program on an ongoing basis	X	X	X	X
Continue to implement energy management plan and update regularly (every five years)	X	X	X	X
Implement building/facility assessment tool/process to explore opportunities to improve efficiency (e.g. annual walk-throughs)		X		
Conduct building re-commissioning to optimize operations		X	X	X
Implement/continue to deliver an equipment preventative maintenance program on an ongoing basis	X	X	X	X
GHG Emission Reduction Potential: 11 tonnes of CO_2e/per year				

Strategy 3: Build municipal facilities to ensure high environmental performance				
Establish a Green New Building Policy to require new municipal buildings and major renovations be built to high environmental standards		X		
Install electric vehicle charging stations at new facilities for public use if feasible		X	X	X
GHG Emission Reduction Potential: 22 tonnes of CO_2e/per year				
Strategy 4: Improve environmental performance of existing municipal facilities				
Conduct energy audits/assessments of each facility to identify opportunities to improve energy efficiency		X		
Install programmable thermostats and occupancy sensors in all facilities where feasible		X	X	
Implement an interior and exterior LED lighting retrofit program in remaining all facilities where feasible	X	X	X	X
Replace appliances with Energy STAR rated appliances as needed	X	X	X	X
Continue to upgrade insulation/building envelope while conducting other essential building work (where feasible)	X	X	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	X
GHG Emission Reduction Potential: 47 tonnes of CO_2e/per year				
Strategy 5: Utilize renewable energy sources				
Continue to seek and implementing opportunities for solar photovoltaic panels and other renewable energy options at all municipal facilities	X	X	X	X
GHG Emission Reduction Potential: 5 tonnes of CO_2e/per year				
Fleet				
Strategy 6: Transition the municipal fleet to be more efficient and less carbon emitting				
Develop and implement a Green Fleet Strategy and replacement schedule • Right sizing vehicle/appropriate vehicle class (fit-for purpose vehicles) through replacement schedule • Transitioning to low emission and alternative fuel vehicles (e.g. clean diesel, advanced natural gas, ethanol, or hybrid) • Use of anti-idling technology • Fuel and vehicle performance monitoring		X	X	X
Implement an operator training and education program (e.g. eco driving and anti-idling)		X	X	X
Formalize and continue with preventative maintenance program for vehicles and equipment	X	X	X	X
GHG Emission Reduction Potential: 67 tonnes of CO_2e/per year				

Water & Sewage				
Strategy 7: Enhance operational efficiency of the water services system				
Upgrade remaining mechanical equipment as per replacement schedule	X	X	X	X
Review and optimize pumps and blowers		X		
Continue to deliver preventative maintenance program	X	X	X	X
Continue to deliver operator training and education program	X	X	X	X
Continue to monitor and track energy performance	X	X	X	X
GHG Emission Reduction Potential: 14 tonnes of CO_2e/per year				
Streetlighting				
Strategy 8: Improve energy efficiency of the streetlighting system				
Implement LED street lighting and parking lot lighting replacement program	X			
GHG Emission Reduction Potential: 8 tonnes of CO_2e/per year				
Solid Waste				
Strategy 9: Reduce the amount of organic waste generated through municipal operations				
Continue to participant in the office waste reduction and diversion initiatives	X	X	X	X
Continue to collect organic waste from Township offices and manage in backyard composters	X	X	X	X
Conduct a corporate waste audit to understand waste composition and identify opportunities for improvement		X	X	
Develop/formalize a corporate waste diversion target and strategy		X		
Develop and implement a corporate green procurement policy		X		
Develop and implement a green event policy		X		
GHG Emission Reduction Potential: Nominal				

Decarbonization of Electricity Grid

Since the baseline year of 2011, the Province of Ontario has taken steps to reduce the GHG emissions associated with the electrical grid. For example, it closed all of its coal-fired power plants. This in turn will result in significant GHG Emission Reduction Potential for Asphodel-Norwood's corporate emissions, totalling 98 tonnes of CO_2e/per year.

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Peterborough Area Climate Change Action Plan

Township of Asphodel-Norwood – Corporate and Community Emissions Inventory

Partners for Climate Protection Milestone 1

November 17, 2015

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1 Introduction and Overview

Greater Peterborough Area Climate Change Action Plan

Sustainable Peterborough is developing a Climate Change Action Plan (CCAP) for the Greater Peterborough Area to reduce local contributions to climate change and prepare the community for present and expected changes that will occur as a result of our changing climate. This Plan represents an integrated approach to dealing with some of the most important issues related to the sustainability of this diverse region. The overall objective of the CCAP is to reduce greenhouse gas (GHG) emissions, reduce the use of fossil fuels, lower energy consumption, and adapt to changing climate.

The Plan will identify goals, actions, and emission reduction targets that fit with and address the needs of each municipality and First Nation within the Greater Peterborough Area. This report summarizes the baseline greenhouse gas emissions for the Township of Asphodel-Norwood, both from corporate operations and from community sources to satisfy Milestone 1 of the Partners for Climate Protection (PCP) Program.

Partners for Climate Protection Program

The PCP program is a network of Canadian local governments that have made a commitment to reduce GHG emissions and act on climate change. Administered by the Federation of Canadian Municipalities, the program has over 225 local and regional governments participating. The City of Peterborough joined the program in December 2000. The County of Peterborough and the eight Townships have all joined in 2014 and 2015.

The Climate Change Action Plan is following the PCP's five-milestone framework for the reduction of greenhouse gas emissions (i.e. climate mitigation). The five-milestone framework is a performance-based model used to guide communities to reduce GHG emissions. Once a milestone is completed, the community – typically led by the local municipality – submits their material to the PCP program for a technical review and approval. To prepare the Climate Change Action Plan, the following 5 milestones will be completed:

1. Establish a GHG inventory and forecast
2. Set emission reduction targets
3. Develop Climate Change Action Plans
4. Implement the local action plans
5. Monitor progress and report on results

Milestone 1 – GHG Inventory and Forecast

A greenhouse gas inventory brings together data on community and municipal sources of greenhouse gas emissions to estimate emissions for a given year. For the Greater Peterborough Area Climate Action Plan, 2011 has been selected as the baseline year. Establishing a baseline is a useful tool to identified areas for improvement, inform development of a GHG reduction action plan, estimate cost savings from reductions, and serve as a reference point to track improvements. Associated with the baseline GHG inventory is also a forecast that projects future emissions based on assumptions about population, economic growth and fuel mix.

Two separate GHG inventories and forecasts have been created for the Township of Asphodel-Norwood: one for municipal corporate operations and one for community sources. The inventories consist of the following sources of GHG emissions.

Corporate Operations Inventory	Community Inventory
• Buildings • Streetlighting • Water and sewage treatment • Municipal fleet • Solid waste	• Residential • Commercial and institutional • Industrial • Transportation • Solid waste

Details of each inventory are provided in Sections 2 and 3 of this report.

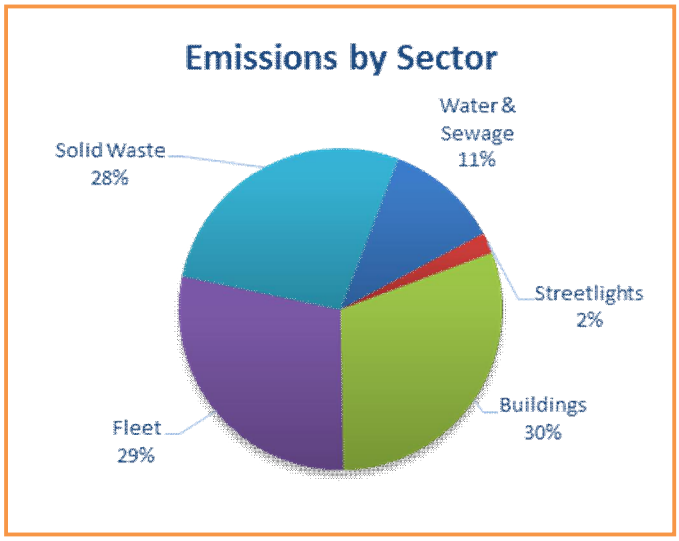
2 Township of Asphodel-Norwood Corporate Emission Inventory

The Corporate inventory tracks emissions from municipal operations. The criteria for including emissions in the corporate inventory relies on the concept of *operational control*, and requires the municipality to report all emissions from operations over which it has control.

Township of Asphodel-Norwood Corporate Emissions Inventory

In 2011, 818 tonnes of CO2e were emitted by the Township of Asphodel-Norwood's corporate operations. Breakdowns of emissions by sector and source are presented visually in Figure 1 and summarized in Figure 2 below.

Fig 1. Township of Asphodel-Norwood's Corporate Emissions by Sector and Source



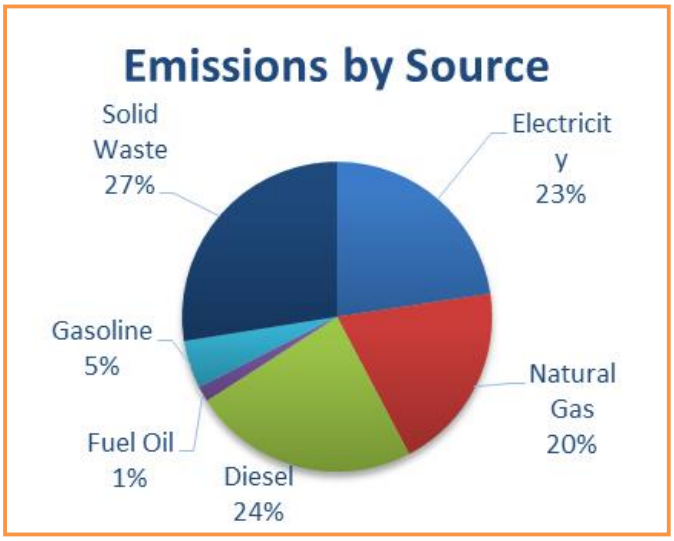


Fig 2. Township of Asphodel-Norwood Corporate Tonnes CO2e by Sector and Source

Sector	Emissions (tCO2e)
Buildings	249
Fleet	234
Water & Sewage	93
Streetlighting	17
Solid Waste	225
Total	**818**

Source	Emissions (tCO2e)
Natural Gas	161
Electricity	185
Gasoline	41
Diesel	193
Propane	0
Fuel Oil	13
Solid Waste	225
Total	**818**

Corporate Operations Data Summary

Energy consumption for **Buildings, Streetlighting** and **Water and Sewage** were determined using actual billed electricity and natural gas consumption for those sectors provided by Asphodel-Norwood. Fuel Oil is also based on actual consumption data from the municipality. Information on transportation fuel consumption for corporate **Fleet** was only available as total expenditures for each fuel type – quantities purchased were estimated using historical fuel pricing data.

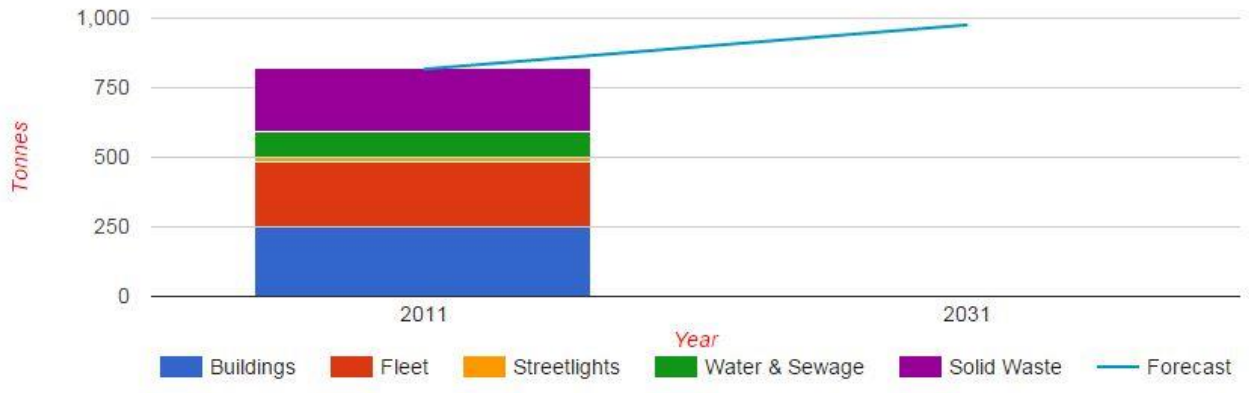
Solid Waste emissions are estimated using data on waste stream composition and volume and landfill management data for the landfill active in Asphodel-Norwood in 2011 – this data was obtained from the town.

All **emissions coefficients** are derived from Canada's *National Inventory Report*, in line with PCP methodologies, and electricity emissions factors reflect the carbon intensity of Ontario's electricity grid for 2011.

Business-As-Usual Forecast for the Township of Asphodel-Norwood Corporate Operations

A business-as-usual (BAU) forecast is an estimate of annual GHG emissions into the future considered projected population growth if the Township continues to operate exactly is it did in 2011 (i.e. if nothing is done to reduce emissions). The BAU forecast for the 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 tCO2e per year by 2031, compared to 818 tCO2e per year in 2011. This BAU projection is presented in Figure 3 below.

Fig 3. Township of Asphodel-Norwood Corporate BAU Forecast – 2011-2031



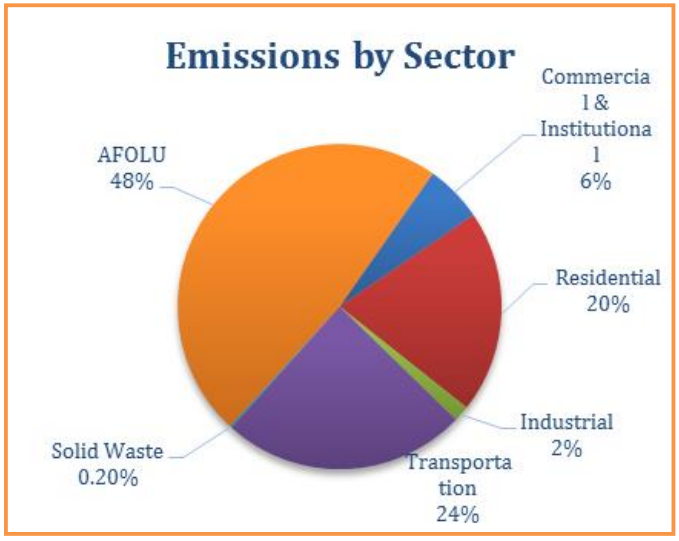
3 Community Emission Inventory

The Community inventory tracks emissions from all community sources, including electricity use and heating in homes and businesses, transportation, waste generation, and agricultural production. The municipality may or may not have a direct influence over any of these emissions.

Township of Asphodel-Norwood Community Emissions Inventory

In 2011, 32,980 tonnes of CO2e were emitted by the Township of Asphodel-Norwood community. Breakdowns of emissions by sector and source are presented visually in Figure 4 and summarized in Figure 5 below.

Fig 4. Township of Asphodel-Norwood Community Emissions by Sector and Source



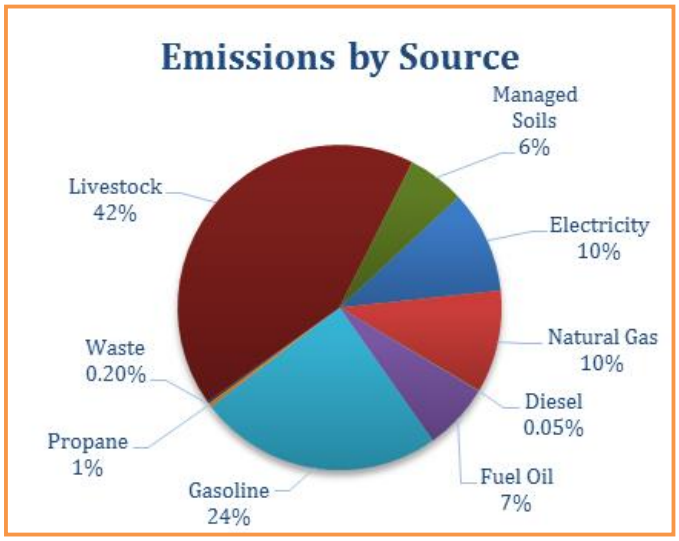


Fig 5. Township of Asphodel-Norwood Community Tonnes CO2e by Sector and Source

Sector	Emissions (tCO2e)
Residential	6,680
Commercial and Institutional	1,885
Industrial	524
Transportation	8,026
Waste	65
Agriculture Forestry and Other Land Uses	15,800
Total	**32,980**

(Note: totals are not equal due to rounding)

Source	Emissions (tCO2e)
Natural Gas	3,381
Electricity	3,384
Gasoline	8,009
Diesel	17
Propane	126
Fuel Oil	2,199
Solid Waste	65
Livestock	13,920
Managed Soils	1,880
Total	**32,981**

Community Data Summary

For emissions from stationary energy (residential, commercial and institutional, and industrial), where possible energy consumption was based on actual metered energy consumption data provided by local utilities. **Electricity** consumption data was provided by Peterborough Utilities Group and HydroOne, **Natural Gas**

consumption data was provided by Enbridge.

For **Fuel Oil** and **Propane,** no real consumption data could be acquired. As a result, consumption was estimated by taking the number of households not heated with Natural Gas and allocating those to electric heating, propane, and heat oil respectively based on Natural Resources Canada (NRCAN) averages for heating fuel type for Ontario and information about the structure of the heating fuel market in Peterborough County. Once households had been allocated to each fuel type, total consumptions were estimated using average consumption rates for those fuel types by household for Ontario. No estimates of Fuel Oil and Propane consumption for non-residential categories could be determined.

Estimates for **Transportation** fuel consumption were based on a resident activity/ vehicle kilometers travelled (VKT) model where total VKT's were estimated using household surveys of daily trip length conducted by Transportation Tomorrow. Once a model of VKT's was derived, fuel consumption was estimated by allocating kilometers across a vehicle mix derived from actual vehicle registration data provided by the Clean Air Partnership, and average fuel consumption rates for those vehicle types derived from NRCAN. The result was a model of Gasoline, Diesel, and Propane consumption for the Transportation sector. Because the transportation model is based on resident activity surveys, it does not include emissions from the commercial sector or non-automobile emissions (water travel and air travel), these are areas for future improvement.

Solid Waste emissions were estimated by taking the quantity of waste collected at the Peterborough City and County Waste Management Facility (PCCWMF) from Asphodel-Norwood, and estimates for the waste stream and gas collection performance from PCCWMF. The proportion of Asphodel-Norwood's waste that went to the local landfill is not counted here in order to avoid double counting with the corporate inventory.

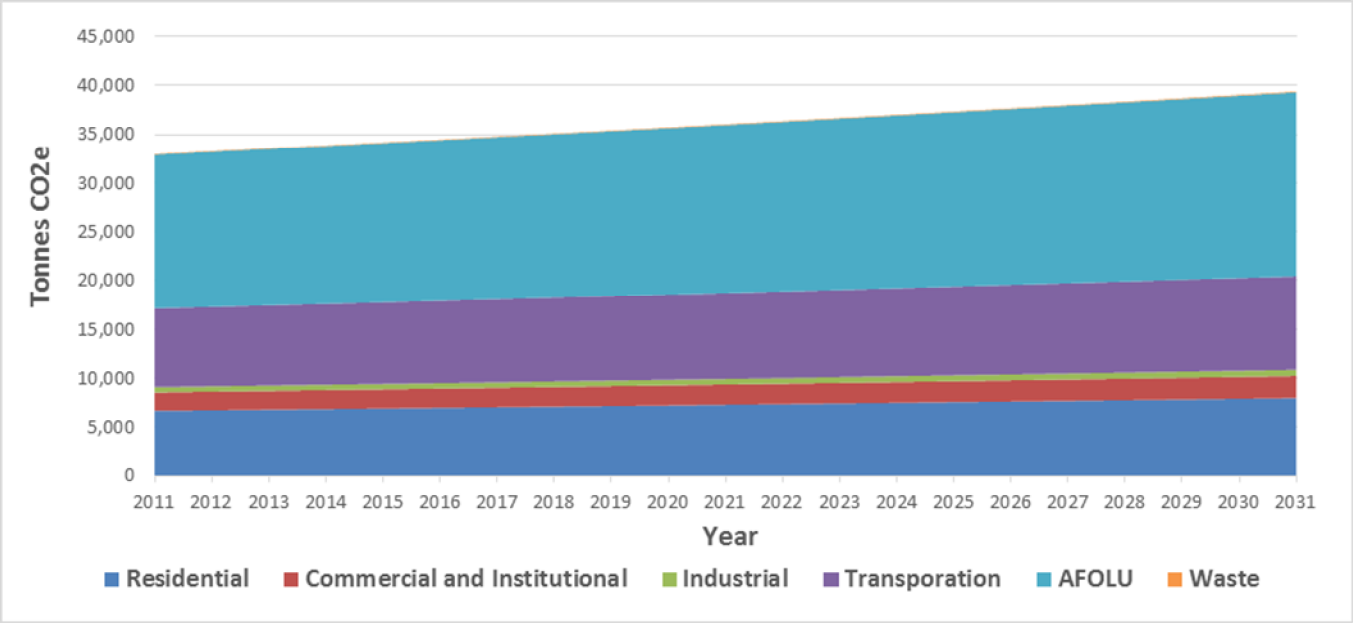
Due to the rural nature of the project area for the GPA CCAP, a model of emissions from **Agriculture, Forestry, and Other Land Uses (AFOLU)** has been created. Because data on land use change was not available for 20 years prior to the baseline year, no estimates for emissions from land use change have been reported here, however in future inventories it is anticipated that such estimates will be able to be created based on the baseline statistics for land use created for this project.

Emissions from **Managed Soils, Enteric Fermentation, and Manure Management** are based on a number of sources. Activity data for the sector are based on Statistics Canada data on the composition of livestock and crops in Asphodel-Norwood's agricultural sector. Emissions factors for animal types, manure management systems, and crops are based on estimates derived from Canada's National Inventory Report. Efforts have been made to be as comprehensive as possible, however, in some cases data to estimate emissions from certain sources was unavailable. Future improvements could be made with the help of more complete data, however, it is believed that all major emissions sources have been identified. In particular, estimates of emissions from enteric fermentation and manure management have a high degree of confidence.

Business-As-Usual Forecast for the Township of Asphodel-Norwood Community

A business-as-usual (BAU) forecast is an estimate of annual GHG emissions into the future considered projected population growth if the Township continues to operate exactly is it did in 2011 (i.e. if nothing is done to reduce emissions). The Community BAU forecasts are based on annual growth rates derived from official population projections in the Growth Plan. In line with PCP protocol methodologies, emissions for residential and transportation sectors were assumed to increase with population growth, while commercial, institutional, and industrial emissions were assumed to increase with projected employment growth. Based on the projected growth for the Township of Asphodel-Norwood, community emissions are expected to grow to 39,384 tonnes CO2e by 2031. This BAU projection is presented in Figure 6 below.

Fig 6. Township of Asphodel-Norwood Community BAU Forecast – 2011-2031



4 Next Steps

Completion of the Milestone 1 baseline inventories is the first step in the Greater Peterborough Area Climate Change Action Plan. Next steps involve identifying opportunities to reduce GHG emissions based on the inventories and prepared itemized action plans with estimated GHG reductions and costs and establishing reduction targets. Actions identified in the action plans will be done in collaboration with the eleven other local governments in the Greater Peterborough Area to explore efficiencies and cumulative impacts. Ideas for actions will be based on best practice research, public input, and ongoing meetings with 80+ community organizations and stakeholders.