Greater Peterborough Area Climate Change Action Plan

City of Peterborough
Partners for Climate Protection Milestone 4 & 5 Report
Community Sector Implementation, Monitoring and Reporting Results

November 2019

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Section 1: Introduction

The effects of climate change are projected to intensify over the next decade. In the Greater Peterborough Area (GPA) annual average temperature is projected to rise 2.1ºC to 4.2ºC above current levels (Appendix A). A changing climate will exasperate extreme weather events as the following risks will become more prevalent:

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

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 the global average temperature increase to only 1.5ºC from the current 1ºC 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 3ºC 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 community action is critical. Residents and businesses can influence 95 percent of a community's GHG emissions through direct action and positive climate stewardship. Modifying one's home to restrict energy consumption through home retrofits, upgrading appliances, and replacing non-efficient furnace/boilers are possible avenues. Changing personal behaviour to limit unnecessary GHG emissions connected to driving, eating, and waste produced can also drastically reduce a community's collective emissions. Businesses too can seek to limit energy use and GHGs through transforming operations and striving towards sustainable business practices. When residents and businesses commit together in a concerted effort to no longer be a significant contributing source to climate change, then community-wide GHG emissions will decline.

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 – City of Peterborough Community 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-City-of-Peterborough-PCP-Milestone-1-Report-UPDATED-Nov-32016.pdf), the total Community Sector emissions for the City of Peterborough was 349,736 tonnes of carbon dioxide equivalent (tCO_2e).

Table 2. City of Peterborough Community Milestone 1 GHG Emission Sources

Sector	Emissions (tCO2e)
Residential	137,482
Commercial and Institutional	69,900
Industrial	36,863
Transportation	105,498
Waste	0
Total	**349,736**

Source	Emissions (tCO2e)
Natural Gas	183,939
Electricity	53,939
Gasoline	100,184
Diesel	5,298
Propane	839
Fuel Oil	6,136
Total	**349,736**

(Note: totals are not equal due to rounding)

A business-as-usual (BAU) forecast is an estimate of annual GHG emissions projected into the future without the mitigation of any community emissions. The BAU forecast for the community at large is based on annual growth rates derived from official population projections. It was assumed that the community associated emissions would increase with population growth – this aligns with standard PCP methodology for creating BAUs. Projected emissions from the community are slated to increase to 389,587 tCO_2 e per year by 2031, compared to 349,736 tCO_2e per year in 2011.

Milestone 2 – Setting an Emissions Reduction Target

In 2016, Peterborough completed Milestone 2 that established a GHG emissions reduction target. A community sector GHG emissions reduction target of 30 percent was developed using 2011 as the baseline year. This reduction target is equivalent to removing 104,923 tCO_2 e from the community by 2031, lowering the total emissions generated to 244,820 tCO_2 e.

Milestone 3 – Developing a Local Action Plan/CCAP

One of the main 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 December 12, 2016, City Council passed Motion CSD16-031:

"That the revised Greater Peterborough Area Climate Change Action Plan be adopted and that the City's portion be implemented as budgets permit; and

That the City of Peterborough's Community Sector and Corporate Sector greenhouse gas emission reduction targets of 30% and 30% respectively and associated local action plans, be adopted and implemented as budgets permit."

The CCAP outlined twenty-one overarching strategies to remove 104,923 tCO_2 e from community linked emissions within the City of Peterborough by 2031. Planning, tracking, and evaluating the actions and projects that reduce GHG emissions are required to understand and monitor progress against its GHG emission commitment target. Evaluating community focused 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 City in achieving community 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-1-City-of-Peterborough-Climate-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 community-wide GHG emissions from residential, commercial, industrial, and transportation. Since 2011, Peterborough has striven to incorporate many of the twenty-one strategies outlined in the community CCAP. These strategies are focused on six themes: *Our Homes*, *Our Workplaces and Schools*, *On the Move*, *Our Food, Our Land*, and *Our People*.

The following (Table 3) presents completed community-oriented actions that the municipality has fostered to date.

Table 3. Completed and Ongoing Community Mitigation and Adaptation Actions

CCAP Community Strategy	Action Description	Year
Strategy H1: Help homes become more adaptable	*GreenUP* and *Peterborough Distribution Inc.* offer a rebate for rain barrels to reduce the reliance on energy-intensive treated water for Peterborough residents. From 2011 to 2018, 1,060 rain barrels (190L and 220L) have sold.	2011

Strategy P3: Encourage civic engagement around climate change	*ECO-Schools Canada* teaches K-12 students about environmental practices around waste minimization, energy conservation, and stewardship. The following Peterborough schools have adopted the program: • Holy Cross Catholic Secondary 2011-2018 • Monsignor O'Donaghue Catholic Elementary 2010-2014 • St. Alphonsus Catholic Elementary 2012-2017 • St. Patrick Catholic Elementary 2013-2018 • St. Paul Catholic Elementary 2012 • St. Catherine Catholic Elementary 2016-2017 • St. Peter Catholic Secondary 2018	2011
Strategy F1: Support localization of the food system	*Nourish,* a community food organization that supports growing and local food advocacy established 35 new community gardens in the City. At five locations, fruit trees have been planted to increase the diversity of food produced. This brings the total to 50 community gardens spread throughout Peterborough as of 2018.	2011
Strategy W1: Help homes become more water-efficient	Low flow toilet rebate program initiated to reduce 30% of excess water use from old inefficient models.	2012
Strategy P2: Foster climate change awareness through programming	*GreenUp* supports nature-based programs that connect children to nature and highlights how climate change will disrupt these inter-connected systems.	2013
Strategy F1: Support local organizations raising awareness about the food system	*GreenUp* offers all local schools' access to Ecology Park to teach students about food production and healthy eating habits.	2013
Strategy M1: Support Active Transportation	Transportation survey determined that active travel to work increased overall to 10.2%, surpassing the target of 8% by 2031. • Cycling rose to 3.5% from 1.3% in 2011 • Walking increased to 6.7% from 4.5% in 2011	2016
Strategy H1: Help homes become more adaptable	The *Flood Reduction Subsidy Program* was created to help private properties prevent flooding by adding a backflow valve or sump-pit pump at high flood risk neighbourhoods. It also included subsidies to fix downspouts and other roof drainage issues to limit household flooding risks.	2016

Strategy L3: Enhance natural assets Strategy H1: Help homes become more adaptable	*GreenUp* developed the Sustainable Urban Neighbourhoods (SUN) program that advances sustainable urban renewal and climate actions in older neighbourhoods. SUN works with municipal staff, residents, and other partners to identify local priorities and opportunities to expand climate action, which includes: • Planted twelve pollinator gardens (>2km^2) • Planted two food gardens • Installed four rain gardens and distributed 26 rain barrels that diverted 148,200 L of water out of the stormwater system • Planted # trees (tCO_2 e stored) • Installed eleven composters that diverted 3,421L of waste from the landfill • Established six bat houses and one owl box	2017
Strategy M4: Help transition to low carbon vehicles	A total of 14 electric charging stations (Level 2 and 3) have been installed throughout the city to support electric vehicle ridership for both residents and commuters.	XXX
Strategy W4: Support green economy development	*Green Economy Canada,* in partnership with *GreenUp* and *Sustainable Peterborough,* is developing a low carbon economic hub to support businesses and organizations in reducing GHG emissions from their operations. The Hub is scheduled to be open by late 2020 to early 2021.	2018
Strategy M1: Build an active transportation network	Since 2012, active transportation infrastructure has been built to promote zero-carbon lifestyle alternatives from vehicle use. • 12 km of new sidewalks built • 23 km of new cycling trails and lanes	2018
Strategy P1: Prepare for health impacts	*Peterborough Public Health* unit is in the planning stages for a survey and forum in 2019 that will inform community vulnerabilities to climate change.	2018
Strategy M1: Build an active transportation network	*GreenUp* coordinates the Active School Travel program at three city schools. This program enables children to arrive at school without the need for car drop-offs through enhanced walking and cycling routes to designated schools.	2018
Strategy M3: Increase public transit usage	Public transit ridership increased by 18% in 2018 and estimates that over 11 million vehicle-kilometres of travel has been avoided. Thereby eliminating 2,000 tCO_2e entering the atmosphere.	2018

Strategy L2: Prepare for potential climate change risks	*Otonabee Region Conservation Authority* conducted flood mapping of Curtis Creek and Meade Creek, which prepares residents and municipalities for flood events. Flood prone areas have been identified that will help first responders plan alternative emergency routes. Also, the flood maps assist the City during land development and zoning processes, which will limit future property damages and risk of loss of life.	2018
Strategy M3: Increase public transit ridership	In [xxxx], the transportation department increased peak service on four routes to enhance ridership during rush hour <*what year was this done*>	xxxx
Strategy L3: Protect and enhance natural assets	Otonabee Region Conservation Authority planted 5,000 trees in the City between 2011-2018 that stored 65 tCO_2e.	2018
Strategy M3: Increase public transit ridership	A real-time bus stop arrival system is in the development stage and will be available in 2019.	2018

Section 4: Milestone 5 – Monitoring Progress & Reporting Results

Methodology

This progress report used 2018 community data gathered from a variety of sources to assess the rate of change from the baseline regarding energy and vehicle fuel consumption to ascertain GHG emissions. High levels of community data precision were achieved by acquiring actual customer information that was aggregated to the community scale. No personal information connecting individuals or businesses to the data collected was provided as postal codes were used to protect privacy.

- Electricity data was attained from Peterborough Distribution Inc. (PDI), which analyzed kilowatt-hours (kWh) consumed by customers to determine electricity consumption rates.

- Natural gas was calculated using data provided by Enbridge Gas Inc., which evaluated cubic metres (m^3) of gas used for heating.

- Propane and heating oil 1 & 2 data could not be acquired. Assumptions were made after discussion with Natural Resources Canada staff regarding the lack of current provincial data for both heating sources. Ultimately, leading to low accuracy in consumption values in this report.

- Transportation emission data were generated by calculating vehicle class and engine fuel type from information provided by the Ontario Ministry of Transportation. Vehicle odometer totals (kilometres driven) were not obtainable due to data quality restrictions. The *Canadian Vehicle Survey 2009 Summary Report* and *Canadian Vehicle Survey 2015 Data Set* was used to generate the following average annual kilometres driven per vehicle class and fuel type:

    - Car – gas/diesel 15,336 km/year
    - Light-duty truck – gas/diesel 18,938 km/year
    - Heavy-duty truck – gas/diesel 67,513 km/year

  Fuel efficiency ratings were also obtained from the 2009 summary report. Lastly, an assumption was made that presumed that all vehicles in Peterborough drove the average km for each vehicle class. This assumption does not take into consideration behavioural changes by drivers, such as taking public transit, cycling, carpooling, or walking to their destination. This limitation in data should be considered when evaluating the GHG emissions generated from vehicles.

  <u>To Note:</u>

- Waste was not included in the community report due to it being allocated as a corporate responsibility of the City of Peterborough. For the record, 44,640 tonnes of garbage were landfilled that originated from residents and businesses in 2018. Following the revised County Waste Management Department household waste audit conducted in 2017-2018 revealed the average content of garbage surveyed to be:

    - 35% of food scraps
    - 2% of garden/plant matter
    - 11% of paper/cardboard
    - 5% of wood products
    - 6% of textiles

  Finally, the Peterborough City/County Landfill methane gas capture system is assumed to collect 75 percent of fugitive emissions. Unfortunately, no data is available to support this assumption even after contact with waste management staff to ascertain the methane recovery rate. A total of 15,066 tCO_2e was generated from the community portion of waste sent to landfill.

Reporting Results

The community review revealed that the City of Peterborough GHG emissions increased by 27 percent above the baseline (Table 4), adding 445,135 tCO_2e into the atmosphere from all community sources, as illustrated in Figure 1.

Table 4. Community Greenhouse Gas Emission Sources from 2011 to 2018

Emission Source	2011 GHG (tCO_2e)	2018 GHG (tCO_2e)	Percent Difference
Residential (Electricity, natural gas, propane, fuel 1&2)	137,482	123,643	-10%
Commercial (Electricity & natural gas)	69,900	90,855	29%
Industry (Electricity & natural gas)	36,863	35,320	-4%
Transportation (Diesel & gasoline)	105,498	195,317	85%
Totals	**349,736**	**445,135**	**27%**

Figure 1. 2018 GHG Emissions Compared with BAU and CCAP Target

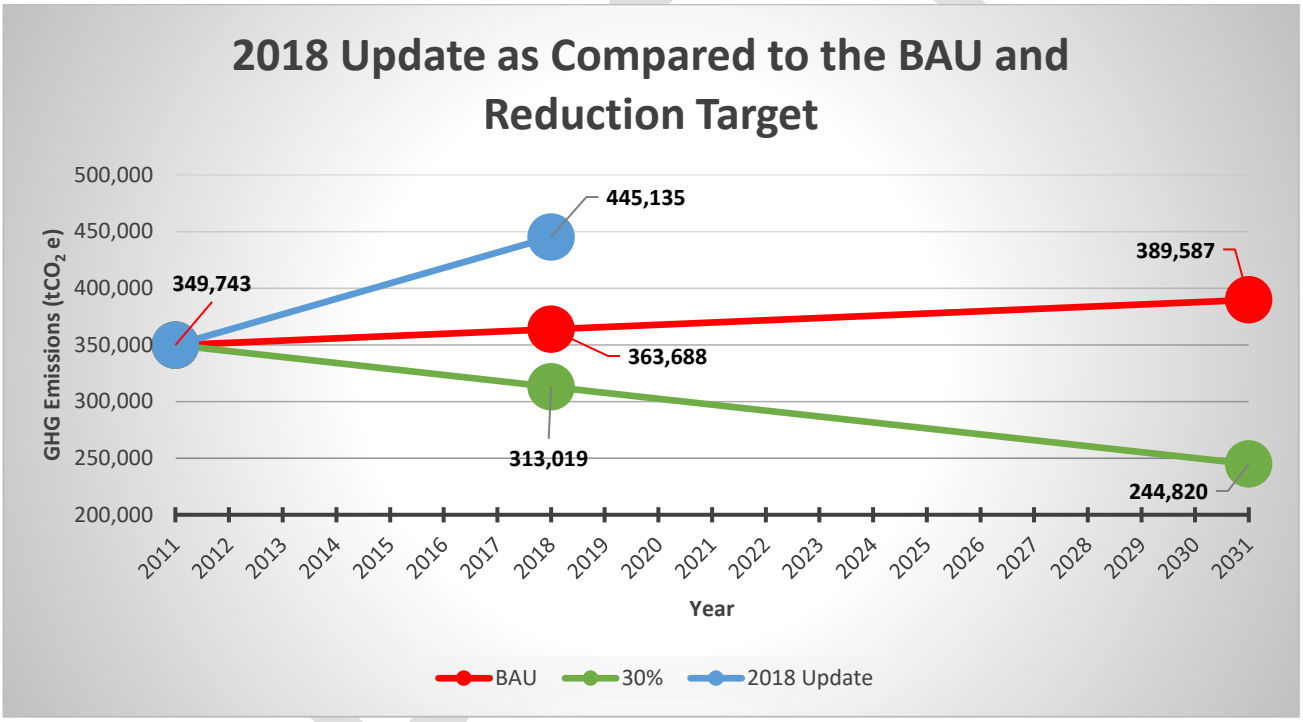


Figure 1. The Business-as-usual (BAU) emission forecasts as compared to the Reduction Target goal projected to 2031. 445,135 tCO_2e is the current emission attributed to the community in 2018.

Community Consumption Analysis and Discussion

Assessing energy and fuel consumption rates for all emission sources in Peterborough may reveal connections outlined within the community mitigation strategies found in the CCAP. Table 5 describes the individual contribution from each energy source to its associated sector.

Table 5. City of Peterborough Community Consumption Data per Sector

2011 Consumption	Electricity (kWh)	Natural Gas (m^3)	Propane (L)	Heating Oil (L)	Gasoline (L)	Diesel (L)
Residential	275,258,036	2,002,501	531,050	2,214,186		
Commercial	105,728,368	1,184,186				
Industry	105,728,368	512,802				
Vehicles					111,018,165	71,625,905
Totals	**486,714,772**	**3,699,489**	**531,050**	**2,214,186**	**111,018,165**	**71,625,905**
2018 Consumption	**Electricity (kWh)**	**Natural Gas (m^3)**	**Propane (L)**	**Heating Oil (L)**	**Gasoline (L)**	**Diesel (L)**
Residential	276,035,691	62,264,047	26,500	110,709		
Commercial	107,745,706	46,112,690				
Industry	307,752,706	2,542,809				
Vehicles					91,922,225	24,312,716
Totals	**691,534,103**	**110,919,546**	**26,500**	**110,709**	**91,922,225**	**24,312,716**

Sector: Community Buildings

Electricity

Figure 2. Electricity Consumption

Analyzing the total electricity consumption (Figure 2) from all community buildings (residential, commercial, and industrial) between 2011 and 2018 found a 151 percent increase in overall use. This primary upsurge in usage can be attributed to the expanded industrial demand for electricity in 2018. Residential and commercial usage grew slightly over this review period.

The residential electrical consumption rate marginally rose 0.25 percent community-wide. This limited increase may indicate that residential electricity initiatives designed to lessen usage have had some impact on neutralizing consumption rates. The local distribution company, Peterborough Distribution Inc. (PDI), supported many residential efforts to decrease customer electricity use, as seen in **Table 6.** A combined energy savings of 4,596,896 kWh between 2011-2014 is associated with PDI's community programs in the City of Peterborough. Excessive residential electricity use appears to have been stymied even though the City of Peterborough

experienced population growth of 2.9 percent or 2,451 new residents between 2011 to 2017 (StatsCan, 2019).

Table 6. PDI Residential Electricity Initiatives 2011-2014

Program	Community Participation (number of households)	Energy Saved (kWh)	GHG Avoided (tCO_2 e)
Appliance Retirement	762	844,718	15
Appliance Exchange	155	83,913	1
HVAC Incentives	2,263	2,797,291	48
Conservation Coupon Booklet (lighting, ceiling fans, motion detectors/dimmer switches, weatherstripping, power bars, clotheslines, and programmable thermostats	55,508	870,974	15

In 2018, 6,858 commercial businesses operated as compared to 4,350 in 2011, indicating a business growth of 36 percent (PKED, 2019). The substantial addition of 2,508 companies in the Peterborough economy was predominately found in businesses employing 1 to 4 workers and in indeterminate businesses (workforce of contracted workers, family members, and unincorporated businesses). This growth in companies correlated to a commercial electricity use of 2 percent, as seen in Figure 3. To keep electricity consumption to a minimum, PDI assisted businesses through programs designed to support building retrofits, lighting upgrades, and energy audits (**Table 7**). A total of 17,099,949 kWh was identified as being saved from 2011-2014.

Table 7. PDI Commercial Electricity Initiatives 2011-2014

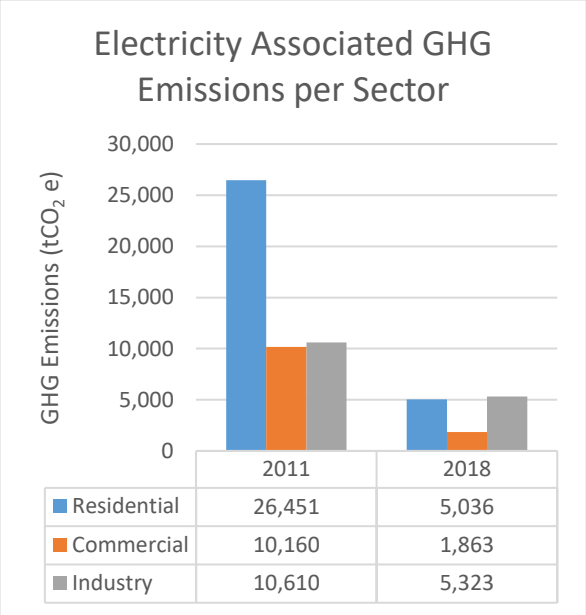
Program	Business Participation (number of businesses)	Energy Saved (kWh)	GHG Avoided (tCO_2 e)
Building Retrofits	170	13,698,392	237
Lighting Installations	542	3,390,071	59
Energy Audits	11	11,486	0.25

Lastly, the industrial sector witnessed a loss of 19 businesses since 2011, with a total of 117 manufacturing/heavy industrial companies being registered in 2018 (PKED, 2019). However, even a decline of 14 percent in businesses did not correlate with a drop in electricity demand and instead rose markedly by 190 percent (Figure 3). This report does not have an explanation for the significant rise in usage, but it may be due to higher manufacturing demand during energy-intensive processes. PDI did assist the industrial sector in curbing energy demand through hiring energy managers and selecting very energy-intensive businesses for building retrofits (Table 8).

Table 8. PDI Industrial Electricity Initiatives 2011-2014

Program	Business Participation (number of businesses)	Energy Saved (kWh)	GHG Avoided (tCO_2 e)
Energy Managers	4	2,383,594	41
Building Retrofits	2	3,297,609	57

Figure 3: Electricity Associated Emissions



Reflecting upon the GHG emissions associated with electricity reveals sector-wide drops in emissions (Figure 3). Residential, commercial, and industrial emissions decreased by 80 percent, 82 percent, and 47 percent, respectively, over this review period.

The reduction of electricity GHG linked emissions is directly related to the closure of all of Ontario's coal powerplants starting in 2013 that decarbonized the electrical grid. A fivefold decrease in associated GHGs linked to Ontario's electricity production since 2011, as illustrated in Table 9. 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 to 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 affect the gains found in electricity's decarbonization. Ultimately, community electricity emissions will increase in the following years until the restoration of Ontario's nuclear capacity is reinstated.

Table 9. Electricity Associated GHG Emissions

Year	Emission Factor ($kgCO_2$ e)
2011	0.098040
2014	0.040011
2016	0.035548
2017	0.017298

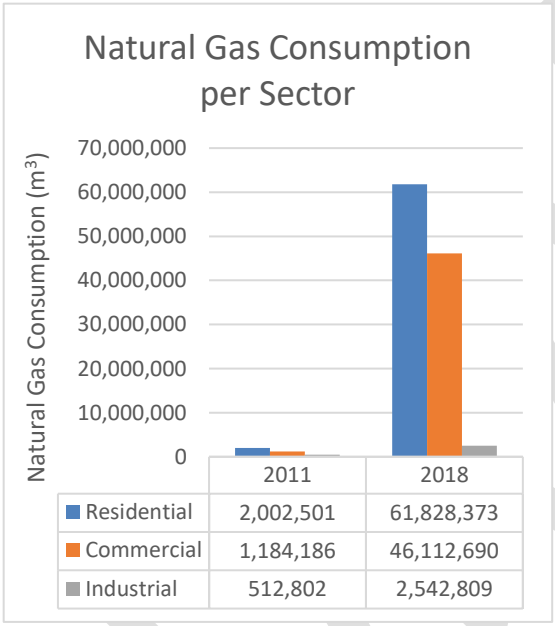
This report presumes that all 2011 data is correct, but it does acknowledge that the 2011 commercial and industrial electricity numbers are identical. There was no way to validate the data from 2011 because the raw data was never provided, and the original consultant is no longer available for comment.

Natural Gas

The total natural gas consumption for all community sectors enlarged sizably by 2,898 percent and utilized 110,919,546 m^3 of gas (Figure 4). This enormous growth in natural gas is directly due to the expansion of Enbridge Inc. gas lines into the city between 2012-2013 (AECON, 2008). Natural gas is considered to have supplanted all other forms of space heating (electricity, propane, and heating oil) to explain the growth in gas. The GHG emissions linked with natural gas rose lock-step with consumption at a rate of 3,277 percent and emitting 237,250 tCO_2 e in 2018 (Figure 5).

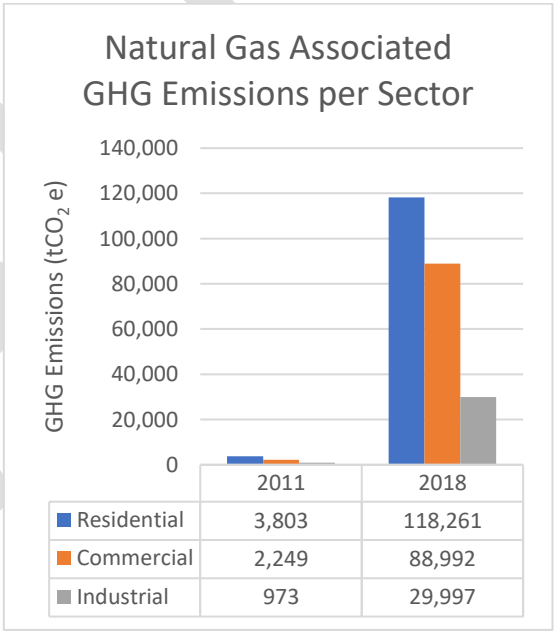
Enbridge Inc. does operate a rebate and energy savings program but did not have direct community figures for Peterborough. Thereby this report was not able to ascertain the level of involvement by the community in programs like Smart thermostats rebates, re-insulation and weatherstripping of homes through Enbridge.

Figure 4. Natural Gas Consumption



	2011	2018
Residential	2,002,501	61,828,373
Commercial	1,184,186	46,112,690
Industrial	512,802	2,542,809

Figure 5. Natural Gas GHG Emissions



	2011	2018
Residential	3,803	118,261
Commercial	2,249	88,992
Industrial	973	29,997

Propane & Heating Oil

The natural gas expansion suggests that a significant reduction in propane and heating oil is likely to have occurred during this review period. This report did not have access to propane or heating oil records but can intuit that these space heating sources were substituted for natural gas. A 95 percent reduction is assumed to have taken place for both heating fuels in all residential units to explain the substantial rise in natural gas (Figure 6).

With consumption plummeting, GHG emissions also fell for both fuels to 41 tCO_2 e and 305 tCO_2 e, respectively (Figure 7).

Figure 6. Propane/ Heating Oil Consumption

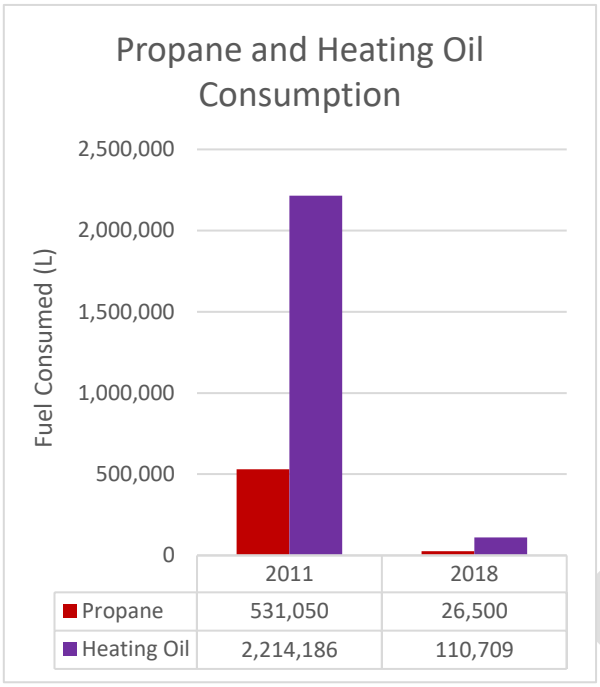
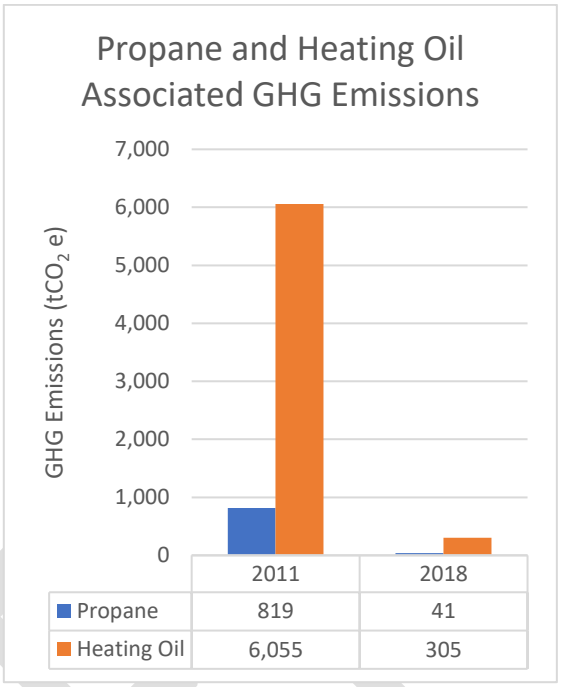


Figure 7. Propane/ Heating Oil GHG Emissions

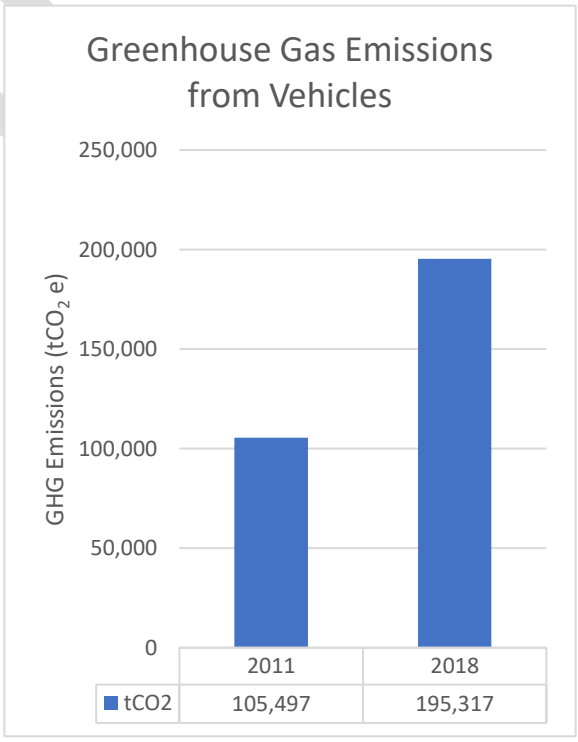


Sector: Community Travel

Community vehicle GHG emissions were found to increase by 27 percent over the baseline year to 195,317 tCO_2e (Figure 8).

Diverging methods in collecting vehicle emissions data occurred between the baseline and this report which may explain the significant rise in GHGs. For clarification, the 2011 baseline did not include vehicle numbers, which limits comparison in determining if more cars, light trucks, or heavy trucks were registered in the City of Peterborough. As well the 2011 baseline utilized an estimated odometer (kilometers-driven) model to generated GHGs that was not directly congruent with how this report captured vehicle emissions. This left vehicle GHG emissions generated as the only metric to evaluate between the baseline and review period.

Figure 8. Transportation GHG Emissions



In the 2016 methodology, commercial vehicle data could not be obtained, which restricted the full scope of its transportation emissions. This review successfully acquired commercial vehicle data composed of heavy trucks and light trucks. An additional 2,751 vehicles (906 diesel heavy trucks, 37 gasoline heavy trucks, 961 diesel light trucks, and 847 gasoline light trucks) representing 5,023 tCO_2e are considered to be used as commercial vehicles. Simple comparisons between the baseline and this update report cannot be made owing to this

enhanced dataset. Commercial vehicles were indeed present in the city in 2011, but without re-researching and capturing commercial fleet numbers, they will need to be omitted to compare successfully.

This exclusion of the commercial fleet will not greatly reduce community vehicle emissions due to the majority of emissions emanating from personal vehicle use. The City of Peterborough and other community actors should continue to focus on getting residents to switch to different modes of transport to reduce associated emissions. For the record, there were 60,269 vehicles, private and commercial, registered within the City of Peterborough in 2018 (Table 10).

Table 10. City of Peterborough Vehicle Survey

Vehicle Type	Engine Type	Number of Vehicles in 2011	Number of Vehicles in 2018	GHG Emissions (tCO_2e) 2011	GHG Emissions (tCO_2e) 2018
Car	Gasoline	24,448	48,945	111,640	172,790
Car	Diesel	737	792	2,560	957
Car	Electric	N/A	158	-	-
Light Truck	Gasoline	26,518	8,470	121,157	23,967
Light Truck	Diesel	1,727	961	6,105	1,303
Heavy Truck	Gasoline	90	37	514	26
Heavy Truck	Diesel	2,813	906	9,847	1,307
Total		**56,333**	**60,269**	**251,825**	**200,350**

In 2017, six electric charging stations (four Level 2 and two Level 3) were installed in the city through the assistance of the municipal government to support local drivers' ability to transition to electric vehicles (Table 11). In addition to the City mounted electric vehicle chargers, private enterprises have installed eight stations for public use. These actions have supported the 158 households who have purchased electric vehicles for commuting within the City as well as for electric vehicles passing through Peterborough on route to other destinations.

Table 11. City Supported Electric Vehicle Charging Stations in 2018

Station Location	Total Sessions	Total kWh
Peterborough - King St Parking Garage	624	6,031
Peterborough - King St Parking Garage	893	7,097
Peterborough - Lansdowne Mall	1,161	4,823
Peterborough - Lansdowne Mall	1,728	27,053
Peterborough - Memorial Arena	264	3,325
Peterborough - River Park & Zoo	343	2,292
Total	**5,013**	**50,621**

Future Community Actions

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

Table 12. Projected Timeline for Community Mitigation Actions

City of Peterborough Community Action Plan	Timeframe			
	Ongoing	Short (1-5 years)	Medium (6-10 years)	Potential Future Actions
Our Homes				
Strategy H1: Help existing homes become more energy and water efficient and be more adaptable to risks				
Develop and implement a comprehensive multi-year deep energy retrofit program focused on existing households to achieve efficiency gains of at least 30%-50% depending on the age and type of building				
Strategy H2: Build new homes to be more efficient and have a smaller environmental footprint				
Implement gradual improvement in new building stock efficiency aimed at achieving near net-zero (0.14 to 0.24 GJ/m2) in all new buildings by 2031				
Strategy H3: Reduce the amount of waste generated by residents that contribute to GHG emissions				
Explore the feasibility of capturing energy from waste to manage organic material and to reduce methane gas				
Our Workplaces and Schools				
Strategy W1: Improve energy and water efficiency of existing buildings and business operations				
Work with utilities to deliver a coordinated deep energy retrofit program to industrial, commercial and institutional organization				
Strategy W2: Build new buildings to be more efficient and have a smaller environmental footprint				
Implement gradual improvement in efficiency of industrial, commercial, and institutional buildings				
Strategy W3: Facilitate climate change friendly business operations and practices				
Support Sustainable Peterborough Business Initiative to build a toolkit for the GPA businesses to assist with climate change impact analysis and business continuity planning for extreme weather				
Strategy W4: Support local economic resilience and growth of the local green economy				
Support GreenUp to learn about and advance sustainability through the Green Business Peterborough Program				
Strategy W5: Facilitate low carbon energy generation and local energy security				

Conduct a regional study to explore the potential to implement local renewable energy generation and storage				
On the Move				
Strategy M1: Build an active transportation network and support active transportation				
Reduce vehicle trips and foster greater walking and cycling mode share				
Strategy M2: Facilitate alternatives to single-occupant vehicle use to reduce frequency of personal vehicle use				
Explore feasibility of a carpool lot network				
Strategy M3: Make public transportation more appealing to increase usage				
Expand public transit service in the City as per the City of Peterborough Public Transit Operations Review.				
Strategy M4: Help transition vehicles to use cleaner and lower GHG emitting fuel sources				
Support shift in-vehicle technology towards electric vehicles				
Our Food				
Strategy F1: Support localization of the food system				
Undertake a community food system assessment to understand local food production and movement within the GPA better				
Strategy F2: Encourage purchasing of locally produced food				
Support local organizations to promote local foods				
Strategy F3: Reduce the amount of wasted food				
Implement a residential awareness campaign to encourage the elimination of wasted food in homes, workplaces, and schools				
Our Land				
Strategy L1: Strengthen land use policy and development review process to better support climate change mitigation and adaptation				
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 as an ecosystem-based approach to the development applications process				
Strategy L2: Identify climate change risks and prepare for potential impacts				
Conduct GPA comprehensive vulnerability assessment of expected climate change impacts				
Strategy L3: Protect and enhance natural assets				
Develop and implement a Natural Heritage System Plan (City and County with Townships).				
Our People				
Strategy P1: Prepare for the health impacts associated with a changing climate				
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).				
Strategy P2: Foster a culture of climate change awareness				

Support Sustainable Peterborough in seeking buy-in and endorsement/support for the shared vision and goals of the community Climate Change Action Plan from existing groups and organizations in the Greater Peterborough Area				
Strategy P3: Encourage civic engagement around climate change				
Develop a charter and guidelines (engagement strategy) to foster meaningful community engagement in climate change issues and environmental stewardship (partnership amongst all communities).				

Decision-making Process & Engagement

Mitigating community emissions and preparing for adaptation was enshrined by Peterborough City Council in Motion CSD16-031. This motion has led to the operationalization by senior management and staff in carrying out and supporting community climate initiatives.

In May 2019, the Peterborough Environmental Advisory Committee was established to be an official citizen-led panel to provide input and critique environmental and climate change actions initiated by the City.

Community climate engagement is also found through Sustainable Peterborough's Annual Report Cards, public presentations, and Annual Awards Gala, allowing community members to participate in climate discussions. Other local organizations have engaged with residents and businesses to obtain needed community input, create buy-in, and enhancing participation for climate-related projects. Further collaboration with the City of Peterborough and community stakeholders is required to develop programs or support initiatives to foster community change.

Recommendations

This report endorses that more action needs to be taken in the community sector to markedly reduce GHG emissions from all sources in the City of Peterborough. The municipality has the power to stimulate community-wide mitigation actions by supporting community members in transitioning to low carbon lifestyles. The City can influence and become a champion to help residents and businesses through a variety of strategies listed in the CCAP as well as through other internally developed departmental plans.

Foremost, GHG emissions will be forever linked to home heating in Peterborough with natural gas succeeding over low-carbon electrical heat as the primary form for space heating. This report recommends that the municipality continues supporting home retrofit programs, such as re-insulating exterior walls, replacing windows/doors, and sealing cracks, to make natural gas heating more effective. The City of Peterborough can enable more home retrofits by disseminating the benefits of renovations to homeowners as well as promoting Enbridge's *Winterproofing Program* to increase home upgrades.

Next, the continued effort in improving the public transit network to become a viable option for more residents. Increasing ridership through more frequent buses during rush hour, smaller community buses serving low-density neighbourhoods, or teaming up with businesses to offer reduced employee transit passes. Many more possible strategies exist regarding transportation and taking proactive measures now to limit overall vehicle emissions is strongly suggested.

Last, the City of Peterborough should assist commercial and industrial businesses in reducing energy use to decarbonize this community source of emissions. Continuing the partnership with PDI to provide a variety of energy programs for businesses is advised. Other avenues that the City can take is to support the launch of Green Economy Canada's Peterborough Hub that is being developed that will work with the business community to reduce emissions. Also, hiring a community energy manager that is assigned to work with local businesses to find ways to lower their energy use or funding energy audits for all local businesses are other possible paths for success. By working to support Peterborough companies transition to a low carbon economy, the City will be able to reduce GHG emissions and foster a more competitive local economy.

Conclusion

With the adoption of the Climate Change Action Plan on December 2016, the City of Peterborough committed to reducing its community sector GHG emissions by 30 percent below the 2011 baseline levels by 2031. However, the City of Peterborough is not on track to achieve the outlined reduction goal. Electricity consumption was found to increase but associated GHG emissions reduced due to the decarbonization of the Ontario electrical grid. Natural gas spiked because of the extension of gas lines to the City in the early 2010s which aggravated community emissions. As a result, propane and heating oil were displaced by the introduction of natural gas causing both heating fuels to sizably drop in usage and GHG emissions. Finally, greenhouse gases from transportation rose since 2011 and is the leading source of emissions from the community.

To avert further amplification of community emissions, the municipality, businesses, and residents must make concerted efforts today. Without wholehearted determination to reverse the emissions trend, the community will remain a contributing source to global climate change. Responsibility to change personal behaviour, thereby reorienting oneself to the new climate paradigm, falls on the shoulders of every resident in Peterborough.

With 2031 fast approaching, renewed effort to foster community GHG emission reductions throughout the community at large is needed to be undertaken with leadership coming from community agencies, businesses, service clubs together with municipal staff to meet their 30 percent GHG emissions reduction by 2031.

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Appendix A

Future Climate Projections

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