



Peterborough Area Climate Change Action Plan
City of Peterborough Corporate and Community Emissions Inventory
Partners for Climate Protection Milestone 1
October 27, 2015

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 City of Peterborough, 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 identify 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 City of Peterborough: 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
<ul style="list-style-type: none"> • Buildings • Streetlighting • Water and sewage treatment • Municipal fleet • Solid waste 	<ul style="list-style-type: none"> • Residential • Commercial and institutional • Industrial • Transportation • Solid waste

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

2 City of Peterborough 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.

City of Peterborough Corporate Emissions Inventory

In 2011, 15,129 tonnes of CO₂e were emitted by the City of Peterborough's corporate operations. Breakdowns of emissions by sector and source are presented visually in Figure 1 and summarized in Figure 2 below.

Fig 1. City of Peterborough Corporate Emissions by Sector and Source

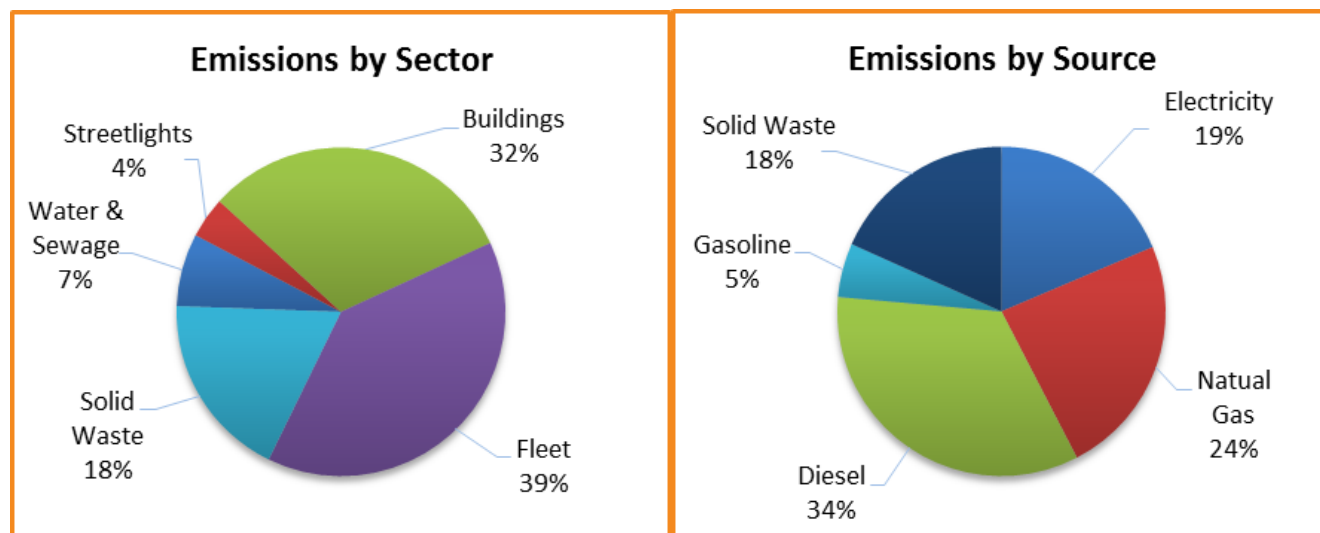


Fig 2. City of Peterborough Corporate Tonnes CO₂e by Sector and Source

Sector	Emissions (tCO ₂ e)	Source	Emissions (tCO ₂ e)
Buildings	4,747	Natural Gas	3,599
Fleet	5,920	Electricity	2,816
Water & Sewage	1,085	Gasoline	801
Streetlighting	608	Diesel	5,144
Solid Waste	2,769	Propane	0
Total	15,129	Fuel Oil	0
		Solid Waste	2,769
		Total	15,129

Corporate Operations Data Summary

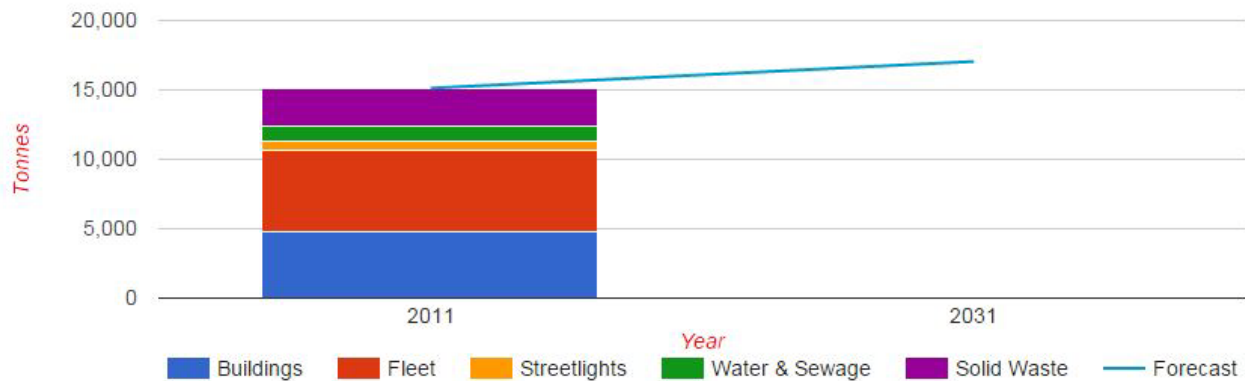
Energy consumption for **Buildings** and **Water and Sewage** were determined using actual billed electricity and natural gas consumption for those sectors provided by the City of Peterborough. No propane or fuel oil are used in the City of Peterborough's municipal buildings. Energy use for **Streetlighting** is also taken from real consumption data. **Fleet** emissions were calculated using actual fuel consumption data derived from municipal records.

Solid Waste emissions are different from the other sectors in that they are not produced by the consumption of energy but instead reflect the impact of methane released through the decomposition of organic matter in landfills. Emissions from this sector were calculated based on total waste deposited in landfill, as well as waste stream estimates derived from municipal records. Estimates of landfill gas capture system performance were based on data from municipal sources as well as estimates of average performance for gas capture systems.

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. No significant assumptions were required to complete the corporate inventory, as actual consumption data was available for all sectors and fuel types.

Business-As-Usual Forecast for City of Peterborough Corporate Operations

A business-as-usual (BAU) forecast is an estimate of annual GHG emissions into the future considered projected population growth if the City continues to operate exactly as 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 are projected to increase to 17,051 tCO₂e per year by 2031, compared to 15,129 tCO₂e per year in 2011. This BAU projection is presented in Figure 3 below.

Fig 3. City of Peterborough 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.

City of Peterborough Community Emissions Inventory

In 2011, 283,061 tonnes of CO₂e were emitted by the City of Peterborough community. Breakdowns of emissions by sector and source are presented visually in Figure 4 and summarized in Figure 5 below.

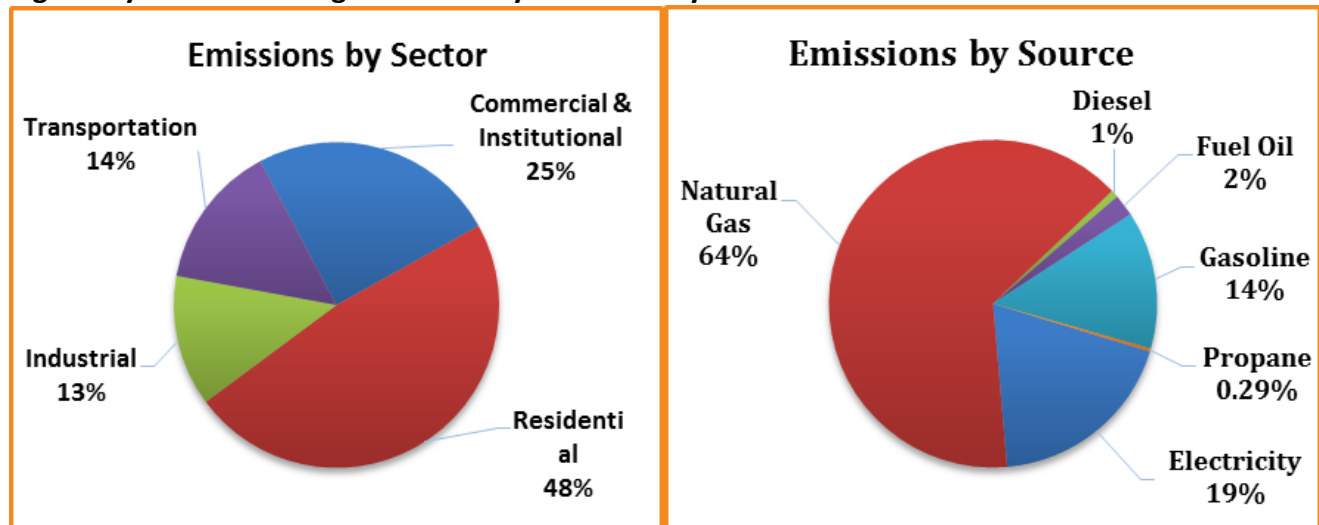
Fig 4. City of Peterborough Community Emissions by Sector and Source

Fig 5. City of Peterborough Community Tonnes CO₂e by Sector and Source

Sector	Emissions (tCO ₂ e)	Source	Emissions (tCO ₂ e)
Residential	135,690	Natural Gas	182,038
Commercial and Institutional	69,900	Electricity	53,539
Industrial	36,863	Gasoline	38,563
Transportation	40,608	Diesel	2,039
Waste	0	Propane	823
Total	283,061	Fuel Oil	6,056
		Total	283,058

(Note: totals are not equal due to rounding)

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, **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. 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.

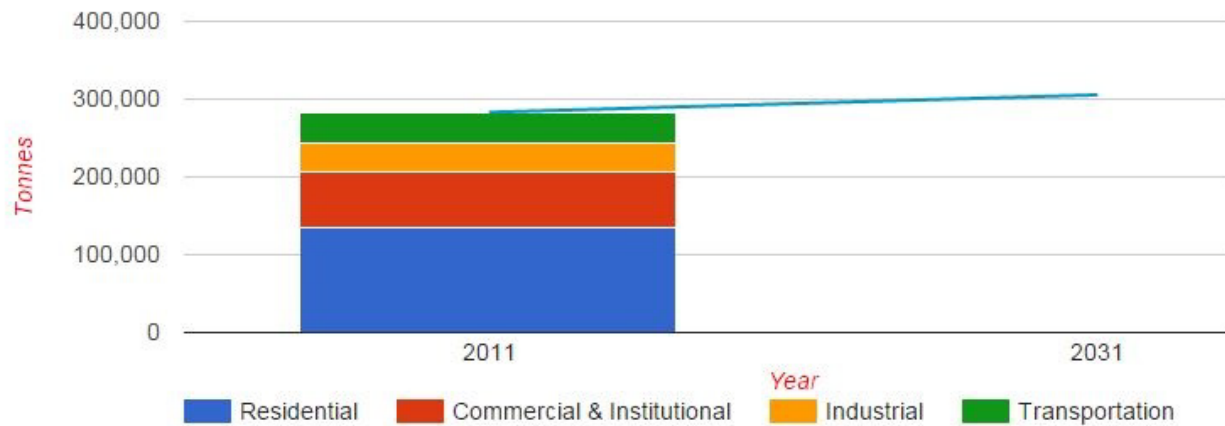
Estimates for **Transportation** fuel consumption were based on a resident activity/ vehicle kilometers travelled (VKT) model where total VKT's were estimated using household surveys of daily trip length conducted by Transportation Tomorrow. Once a model of VKT's was derived, fuel consumption was estimated 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.

Since **solid waste** emissions for the City of Peterborough Waste Management facility have been allocated to the corporate inventory they have not been included in the community inventory.

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

Business-As-Usual Forecast for City of Peterborough Community

A business-as-usual (BAU) forecast is an estimate of annual GHG emissions into the future considered projected population growth if the City continues to operate exactly as 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 City of Peterborough, community emissions are expected to grow to 305,489 tonnes CO₂e by 2031. This BAU projection is presented in Figure 6 below.

Fig 6. City of Peterborough 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 80+ community organizations and stakeholders.