Our change

Peterborough Area Climate Change Action Plan
Township of Cavan-Monaghan – Corporate and Community Emissions Inventory
Partners for Climate Protection Milestone 1
November 17, 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 Township of Cavan-Monaghan 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 Cavan-Monaghan: 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 Cavan-Monaghan 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 Cavan-Monaghan Corporate Emissions Inventory

In 2011, 668 tonnes of CO_2e were emitted by the Township of Cavan-Monaghan'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 Cavan-Monaghan Corporate Emissions by Sector and Source
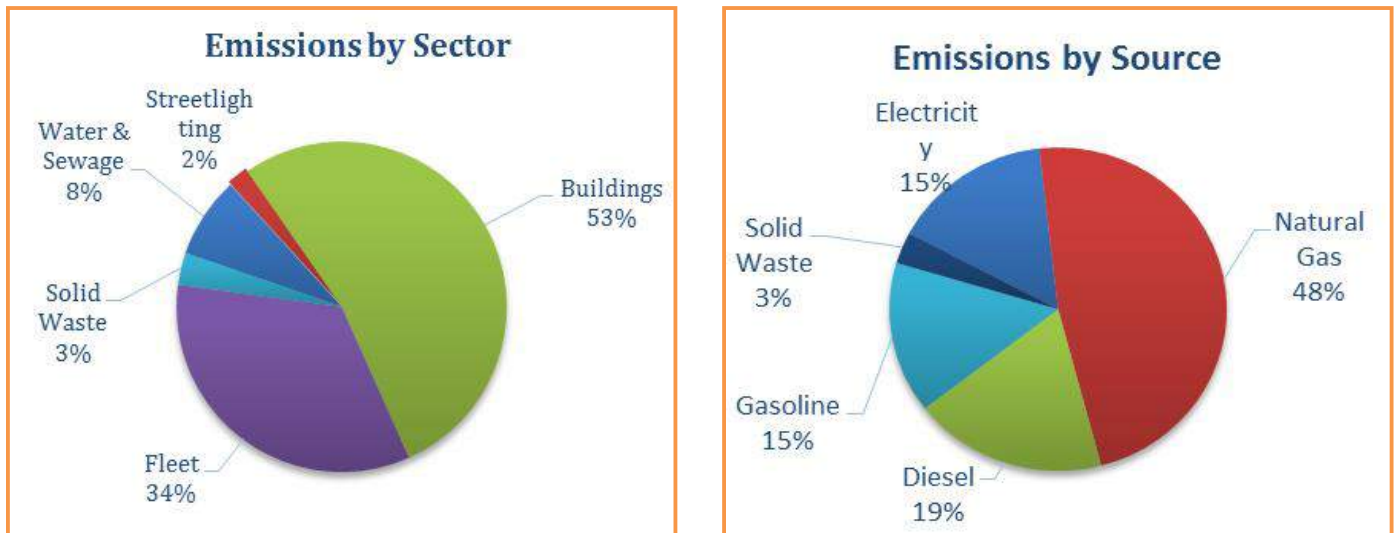
Fig 2. Township of Cavan-Monaghan Corporate Tonnes CO2e by Sector and Source

Sector	Emissions (tCO2e)
Buildings	354
Fleet	226
Water & Sewage	53
Streetlighting	14
Solid Waste	21
Total	**668**

Source	Emissions (tCO2e)
Natural Gas	318
Electricity	103
Gasoline	101
Diesel	124
Propane	0
Fuel Oil	0
Solid Waste	21
Total	**667**

(Note: totals are not equal due to rounding)

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 Cavan-Monaghan. No propane or fuel oil are used in the Cavan-Monaghan's municipal buildings. Energy use for **Streetlighting** is estimated based on the annual consumption for the number and type of lighting that Cavan-Monaghan operates. **Fleet** emissions were calculated using actual fuel consumption data derived from municipal records – these were broken down by vehicle.

Solid Waste emissions are estimated based on modelling of annual waste produced in corporate facilities. Composition of waste stream is assumed to be in line with average waste stream composition for Canada.

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 Township of Cavan-Monaghan 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 796 tCO2e per year by 2031, compared to 668 tCO2e per year in 2011. This BAU projection is presented in Figure 3 below.

Fig 3. Township of Cavan-Monaghan Corporate BAU Forecast – 2011-2031
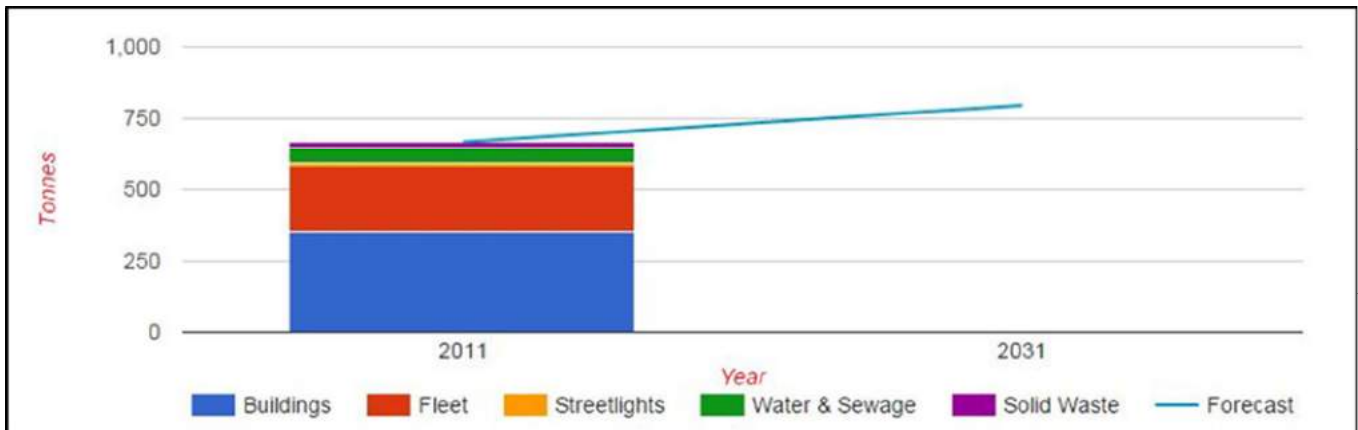
3   Community Emission Inventory

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 Cavan-Monaghan Community Emissions Inventory

In 2011, 55,395 tonnes of CO_2e were emitted by the Township of Cavan-Monaghan community. Breakdowns of emissions by sector and source are presented visually in Figure 4 and summarized in Figure 5 below.

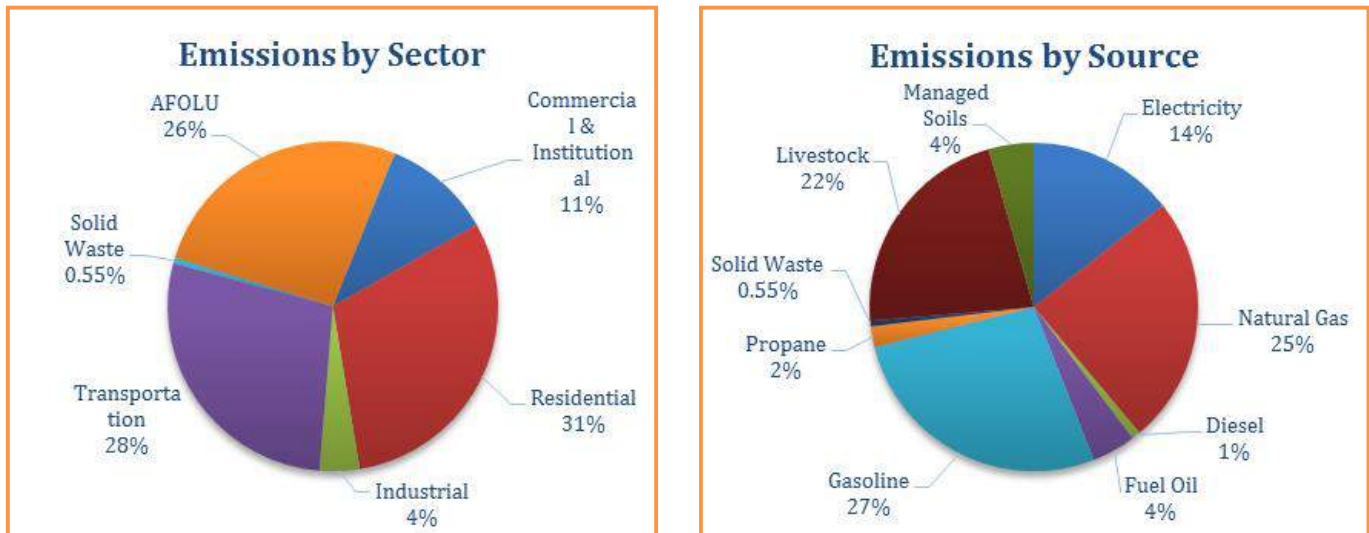**Fig 4. Township of Cavan-Monaghan Community Emissions by Sector and Source**

Fig 5. Township of Cavan-Monaghan Community Tonnes CO2e by Sector and Source

Sector	Emissions (tCO2e)
Residential	16,966
Commercial and Institutional	5,907
Industrial	2,158
Transportation	15,463
Waste	305
Agriculture Forestry and Other Land Uses	14,596
Total	**55,395**

(Note: totals are not equal due to rounding)

Source	Emissions (tCO2e)
Natural Gas	13,570
Electricity	7,981
Gasoline	14,966
Diesel	473
Propane	1,140
Fuel Oil	2,395
Solid Waste	305
Livestock	12,129
Managed Soils	2,467
Total	**55,426**

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 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. 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 the Township of Cavan-Monaghan, and estimates for the waste stream and gas collection performance from PCCWMF.

Because of 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 combination of Statistics Canada data on the composition of livestock and crops in the Township of Cavan-Monaghan'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

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possible, however, in some cases data to estimate emissions from certain sources was unavailable. Future improvements could be made with better 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 Township of Cavan-Monaghan 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 Cavan-Monaghan, community emissions are expected to grow to 66,083 tonnes CO2e by 2031. This BAU projection is presented in Figure 6 below.

Fig 6. Township of Cavan-Monaghan Community BAU Forecast – 2011-2031
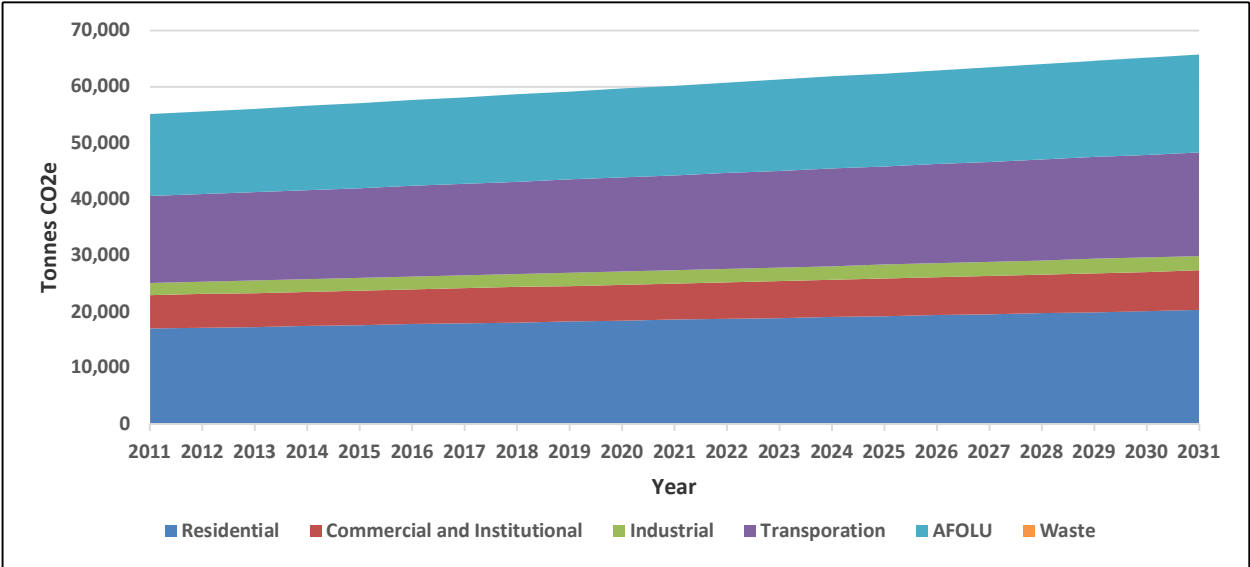
4   Next Steps

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.