

TOWN OF AJAX COMMUNITY GREENHOUSE GAS INVENTORY AND TRENDS 2015

SEPTEMBER 2017



Prepared by:
Danielle Agar, MES; Jade Schofield, MSc
Operations and Environmental Services
Town of Ajax

This document is available in alternative accessible formats upon request by contacting 905-619-2529, ext. 3347, or email accessibility@ajax.ca

CONTENTS

Executive Summary.....	5
1.0 Background.....	6
1.1 Climate Change Mitigation and Adaptation	6
1.2 Ajax and Climate Change	6
1.3 Emissions Reduction Targets	7
1.4 Data Collection	7
1.5 GHG Inventory Inclusions & Exclusions.....	8
1.5.1 Residential	8
1.5.2 Industrial, Commercial and Institutional (IC&I).....	8
1.5.3 Transportation	8
1.5.4 Waste	8
1.6 2005 Baseline GHG Inventory Overview.....	9
2.0 Community Inventory, Trends, and Forecast.....	10
2.1 Community Summary	10
2.2 Trends by Sector	16
2.2.1 Summary.....	16
2.2.2 Residential	18
2.2.3 Institutional, Commercial, and Industrial (IC&I).....	19
2.2.4 Transportation	20
2.2.5 Waste	22
3.0 Progress Summary 2013-2015	23
3.1 Community Engagement	25
4.0 Next Steps and Recommendations	38
5.0 Conclusion	38
Appendix A: Glossary.....	39
Appendix B: Sources of Data.....	40

TABLES

Table 1. 2005 GHG Emissions by Sector	9
Table 2. Summary of Energy Consumption, Energy Cost, and GHG Emissions	10
Table 3. Percentage Energy Use and GHG Emissions by Sector	12
Table 4. Percentage Energy Use, Energy Cost, and GHG Emissions by Source	14
Table 5. Absolute and Per Capita GHG Emissions by Sector	16
Table 6. Residential Energy Consumption, Energy Cost, and GHG Emissions.....	18
Table 7. IC&I Energy Consumption, Energy Cost, and GHG Emissions.....	19
Table 8. Transportation Energy Consumption, Energy Cost, and eCO ₂ Emissions	21
Table 9. Waste to Landfill and eCO ₂ Emissions.....	22
Table 10. Community Local Action Plan – Air	28
Table 11. Community Local Action Plan – Energy.....	30
Table 12. Community Local Action Plan - Transportation	34
Table 13. Community Local Action Plan – Waste	36

FIGURES

Figure 1. Absolute and per capita GHG emissions per sector	5
Figure 2. 2005 Greenhouse Gas Emissions by Sector.....	9
Figure 3. Absolute and Per Capita GHG Emissions with BAU Forecast	11
Figure 4. GHG Emissions and Energy Consumption.....	12
Figure 5. 2015 Energy Consumption by Sector	13
Figure 6. 2015 GHG Emissions by Sector.....	13
Figure 7. 2015 Energy Consumption by Source	14
Figure 8. 2015 Energy Cost by Source.....	15
Figure 9. 2015 GHG Emissions by Source.....	15
Figure 10. Absolute GHG Emissions by Sector and Total per Capita Trend Line	17
Figure 11. Per Capita GHG Emissions by Sector	17
Figure 12. Residential GHG Emissions Trends.....	19
Figure 13. IC&I GHG Emission Trends.....	20
Figure 14. Transportation GHG Emission Trends.....	21
Figure 15. Waste GHG Emission Trends	22
Figure 16. DRT Pulse Rapid Transit	23
Figure 17. Tesla Power Wall at Veridian	24
Figure 18. Integration of pedestrian and bicycle lanes	24
Figure 19. Photovoltaic solar panels at the Ajax Operations Centre.....	24
Figure 20. Green Living Guide	25
Figure 21. Anti-idling signage.....	26
Figure 22. Get Ajax Moving	26
Figure 23. Durham Partners in Project Green	27
Figure 24. Family Volunteering to Plant Trees	27

EXECUTIVE SUMMARY

In 2011, the Town of Ajax joined the Partners for Climate Protection (PCP). This is a program that is supported by the Federation of Canadian Municipalities (FCM) and ICLEI-Local Governments for Sustainability, and consists of municipal governments that have made a commitment to reducing greenhouse gases (GHGs). Based on an inventory completed in the 2005 baseline year, the Town of Ajax has set targets to reduce GHGs by 6% within the community, and 20% within the corporation by 2020.

In order to measure the Town's progress in reaching these targets, data was collected on the residential, industrial, commercial & institutional, transportation, and community waste sectors.

In 2015, the Ajax community produced 443,189 t eCO₂. This represents a 15% decrease since 2005. This reduction is significant, despite growth in the Town's population of 33.2% from 2005 to 2015. On a per capita basis, GHG emissions declined from 5.9 t eCO₂ per capita in 2005 to 3.7 t eCO₂ per capita in 2015.

This inventory suggests that the Town has met the 6% GHG emissions reduction target. It is recommended that the Town's Community Local Action plan (2013) be updated to highlight future projects and programs, as well as consider setting long-term reduction targets that allow for ongoing GHG emission reduction beyond 2050.

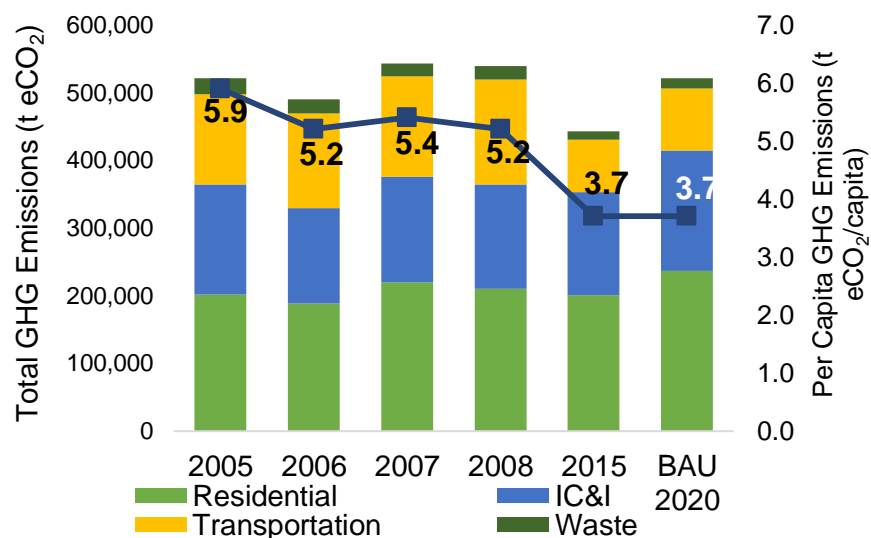


Figure 1. Absolute and per capita GHG emissions per sector

1.0 BACKGROUND

1.1 Climate Change Mitigation and Adaptation

There are two ways in which the impacts of climate change can be reduced: mitigation and adaptation.

Climate Change Mitigation includes actions that reduce GHG's, which in turn lowers the intensity of climate change and the impacts that it has on us. In other words, it's a way of **protecting the climate from us**. An example of mitigation is the phase-out of coal-generated electricity.

Climate Change Adaptation includes actions put in place to help **protect us from the impacts of climate change**. An example of adaptation is the installation of higher capacity storm water culverts.

Climate change mitigation and the reduction of emissions is fundamental in preventing further damage and detrimental impacts on human activity. Studies suggest that the threshold for irreversible impacts is if the global temperature increases more than 2°C. In 2015, the United Nations Framework Convention on Climate Change (UNFCCC) met in Paris (COP 21) where it was agreed that the rise in global temperatures must be limited to no more than 1.5°C. Canada is currently responsible for 1.95% of total global GHG emissions. In 2015, Canada set a target to reduce absolute GHG emissions by 30% in 2030, compared to the baseline year of 2005 (Environment and Climate Change Canada, 2017). This would mean a reduction from 732 megatonnes of eCO₂ in 2014 to 523 megatonnes of eCO₂ by 2030.¹

1.2 Ajax and Climate Change

In 2011, the Town of Ajax joined the Partners for Climate Protection (PCP). This is a program that is supported by the Federation of Canadian Municipalities (FCM) and ICLEI-Local Governments for Sustainability. The PCP program is a network of Canadian municipal

¹ Environment and Climate Change Canada (2017) Canadian Environmental Sustainability Indicators: Progress towards Canada's Greenhouse Gas Emissions Reduction Target. www.ec.gc.ca/indicateurs-indicators

governments that have committed to reducing greenhouse gases (GHGs) and acting on climate change.

Using a five-Milestone framework, PCP is able to provide recognition to municipalities that have committed to reducing their greenhouse gas emissions. These five milestones of this program are:

- ❖ Create a GHG Emissions Inventory and Forecast
- ❖ Set GHG Emissions Reduction Targets
- ❖ Develop a Plan to reduce GHG Emissions
- ❖ Implement the Plan
- ❖ Monitor Progress and Report Results

1.3 Emissions Reduction Targets

The Town of Ajax has set targets to reduce GHGs by:

- ❖ 6% within the community by 2020,
- ❖ 20% within the corporation by 2020,

These targets were based on the greenhouse gas emissions baseline year 2005.

1.4 Data Collection

In order to establish the community GHG emissions inventory, data on fuel, energy, and waste from all sectors was gathered. Energy consumption data was gathered from the residential, industrial, commercial and institutional (IC&I), and transportation sectors, as well as waste generation and disposal information.

The following energy providers supplied the energy data specifically for Ajax:

- Residential and IC&I sector electricity usage and prices – Veridian Connections PUC
- Residential and IC&I sector natural gas usage and prices – Enbridge GAS
- Transportation sector data- - Transportation Tomorrow Survey (2011), which includes information on population characteristics related to vehicle use.
- Waste sector data was provided by Durham Region.

Emissions coefficients were applied for each source of energy to calculate the resulting GHG emissions. Annual emissions are expressed in absolute terms and are not corrected for weather or population growth. However, emissions are also expressed on a per capita basis for trend analysis.

Collected data was analyzed using the ICLEI PCP Milestone Tool set to 2015.

1.5 GHG Inventory Inclusions & Exclusions

1.5.1 Residential

The residential sector includes electricity and natural gas consumption data from single-family and semi-detached homes. This sector excludes multi-residential high- and low-rise buildings. Condominiums and apartments are generally on single meters and are regarded by the electricity local distribution companies (LDC's) as commercial accounts and cannot be readily segregated from other IC&I customers.

1.5.2 Industrial, Commercial and Institutional (IC&I)

The IC&I sector includes institutions (government, schools, hospitals, churches, museums, and other public buildings), office buildings, retail establishments, and industrial facilities. For reasons discussed in the previous section, it also includes condominiums and apartment buildings.

1.5.3 Transportation

The transportation sector includes trips to and from Ajax, based on the median number of trips made by Ajax residents. This excludes rail, marine, and air transportation. Freight transportation data was added, based on an estimation of the total annual vehicle kilometres travelled (VKT) by freight vehicles. It was assumed that freight vehicles are responsible for 8.9% of total annual VKTs in Ajax. To calculate costs associated with the transportation sector, the average fuel price from 2015 in the Toronto East category was used.

1.5.4 Waste

The community waste sector includes waste collected by Durham Region from residents, institutions, and businesses. It also includes waste collected by private companies, institutions, and businesses, excluding industrial waste and construction waste.

1.6 2005 Baseline GHG Inventory Overview

The 2005 baseline inventory shows that the community generated a total of 521,250 t eCO₂ in that year. The residential sector was associated with the highest GHG emissions, followed by the IC&I sector, the transportation sector, and the waste sector (see Figure 2 and Table 1).

Table 1. 2005 GHG Emissions by Sector

Sector	GHG Emissions (t eCO ₂)
Residential	201,329
Industrial, Commercial, and Institutional (IC&I)	163,176
Transportation	133,577
Community Waste	23,168
Total	521,250

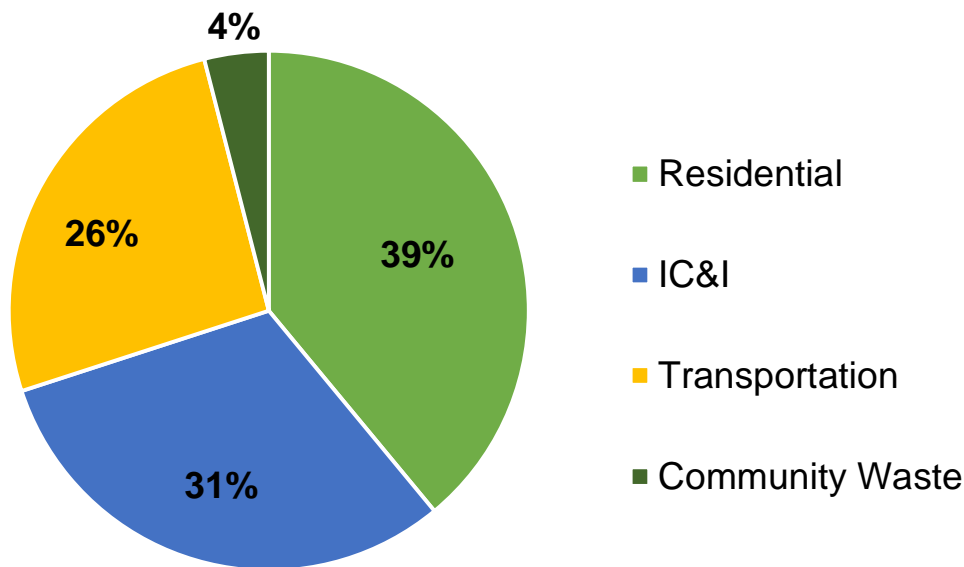


Figure 2. 2005 Greenhouse Gas Emissions by Sector

2.0 COMMUNITY INVENTORY, TRENDS, AND FORECAST

2.1 Community Summary

Ajax's population has grown by 33.2%, from 89,015 in 2005 to 118,600 in 2015. The population is forecasted to grow by 56.7% from the baseline year to 139,504 by 2020.

Table 2 summarizes the annual energy consumption, energy cost, and GHG emissions on an absolute and per capita basis.

Table 2. Summary of Energy Consumption, Energy Cost, and GHG Emissions

	2005	2006	2007	2008	2015	BAU 2020
Energy Use (GJ)	8,728,952	8,497,736	9,052,404	8,935,756	15,209,108	17,885,911
Per Capita Energy (GJ/Capita)	98.1	90.6	90.6	86.0	128.2	128.2
Energy Costs (\$'000)	\$129,619	\$179,147	\$183,590	\$196,961	\$432,771	\$508,939
Per Capita Energy Costs (\$/Capita)	\$1,456.1	\$1,911	\$1,838	\$1,896	\$3,649	\$3,649
GHG Emissions (t eCO ₂)	521,250	489,760	543,348	538,836	443,189	521,304
Per Capita GHG Emissions (t eCO ₂ /Capita)	5.8	5.22	5.44	5.19	3.74	3.74

From 2005 to 2015, GHG emissions have decreased by 15% on an absolute basis and have decreased by 35.5% on a per capita basis. From 2005 to 2015, the per capita GHG emissions have decreased from 5.8 t/capita to 3.7 t/capita.

Energy consumption has increased by 74.2% on an absolute basis and increased by 30.7% on a per capita basis. From 2005 to 2015, total energy costs have increased by 233.9%.

Figure 3 shows the absolute and per capita GHG emissions from 2005 to 2015, with a business-as-usual (BAU) forecast for 2020. This BAU forecast assumes no further efforts to reduce energy consumption such that the per capita GHG emissions remain the same as in 2015. This results in an increase in GHG emissions of 78,115 tonnes (t) or 17.6%.

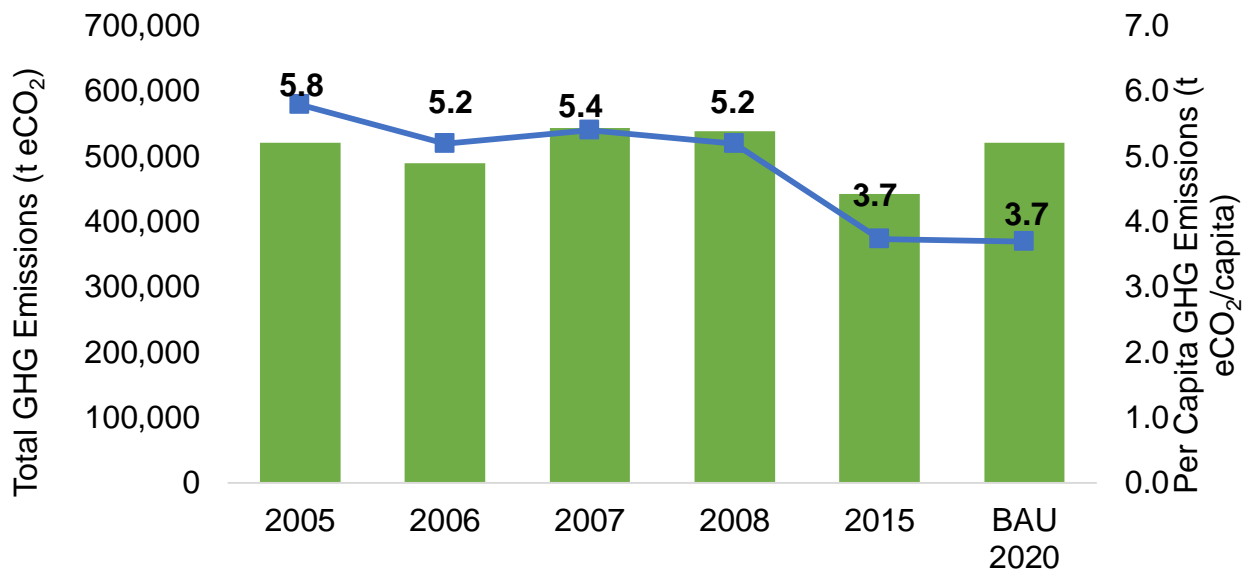


Figure 3. Absolute and Per Capita GHG Emissions with BAU Forecast

Figure 4 shows the relationship between GHG emissions in t eCO₂ (green line) and energy consumption (blue line), in gigajoules (GJ). From 2005 to 2015, energy consumption has increased by 74.2%, and GHG emissions have decreased by 15%.

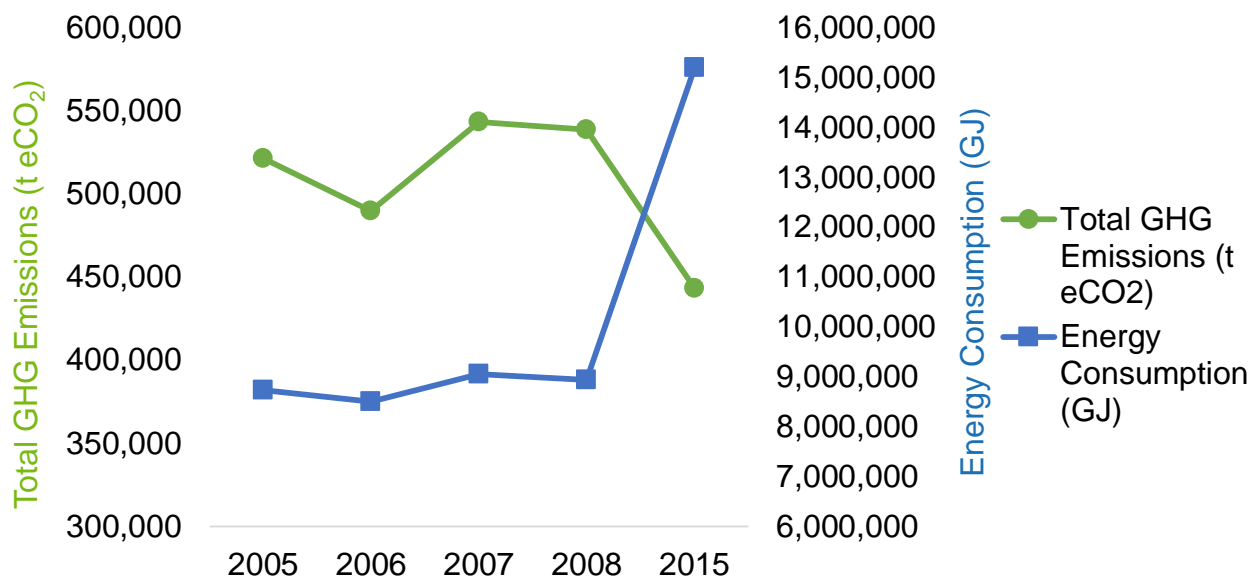


Figure 4. GHG Emissions and Energy Consumption

Table 3 provides a percentage breakdown of energy consumption and GHG emissions by sector.

Table 3. Percentage Energy Use and GHG Emissions by Sector

Sector	Energy Use (%)		GHG Emissions (%)	
	2005	2015	2005	2015
Residential	44	42	39	45
Industrial		16		11
Commercial & Institutional	34	34	31	23
Transportation	22	8	26	18
Community Waste	-	-	4	3

Figures 5 and 6 provide a breakdown of energy consumption and GHG emissions by sector, respectively.

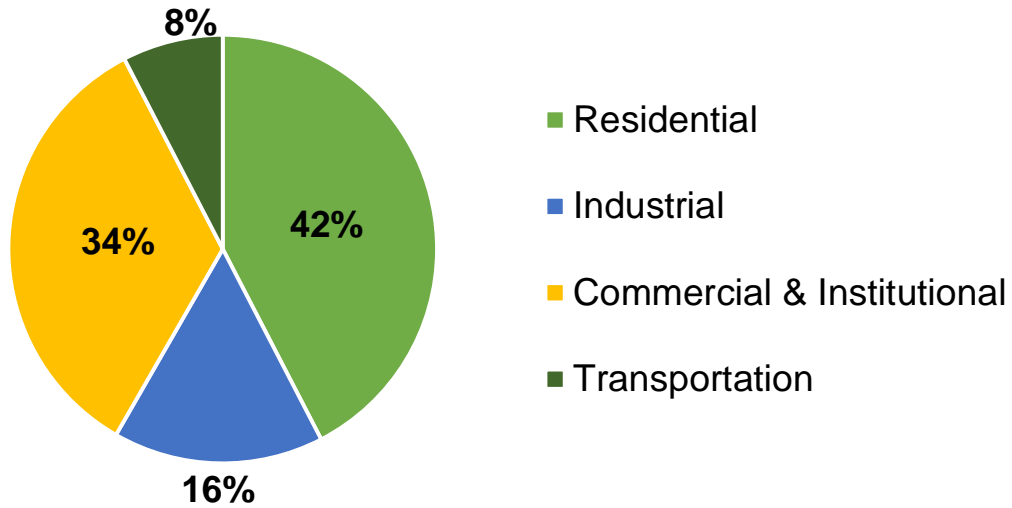


Figure 5. 2015 Energy Consumption by Sector

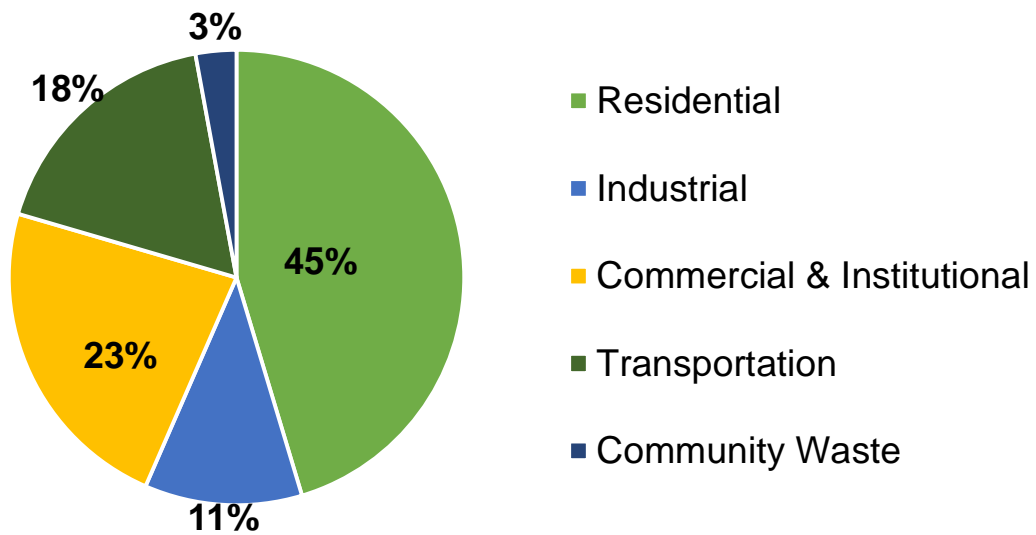


Figure 6. 2015 GHG Emissions by Sector

Table 4 provides a breakdown of energy consumption, energy cost, and GHG emissions by source, expressed in percentages. Electricity represents the largest source of energy consumption, while Natural Gas represents the largest source of GHG emissions.

Table 4. Percentage Energy Use, Energy Cost, and GHG Emissions by Source

Source	Energy Use (%)	Energy Cost (%)	GHG Emissions (%)
Natural Gas	32.4	6.6	54.97
Electricity	60.0	86.1	24.57
Gasoline	5.3	5.2	12.05
Diesel	2.2	2.0	5.4
Fuel Oil	-	-	-
Propane	0.1	0.04	0.15%
Community Waste	-	-	2.85

Figures 7, 8, and 9 provide a breakdown of energy consumption, energy cost, and GHG emissions by source.

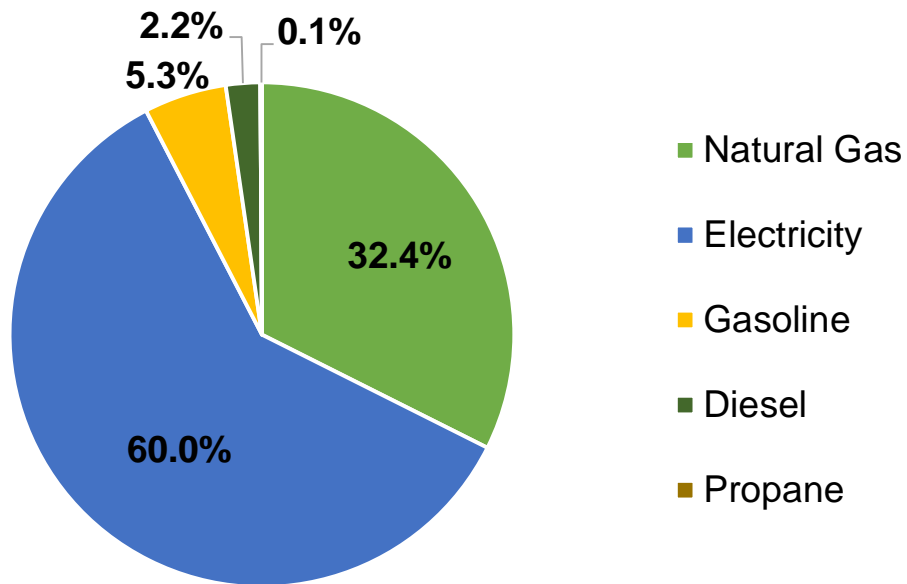


Figure 7. 2015 Energy Consumption by Source

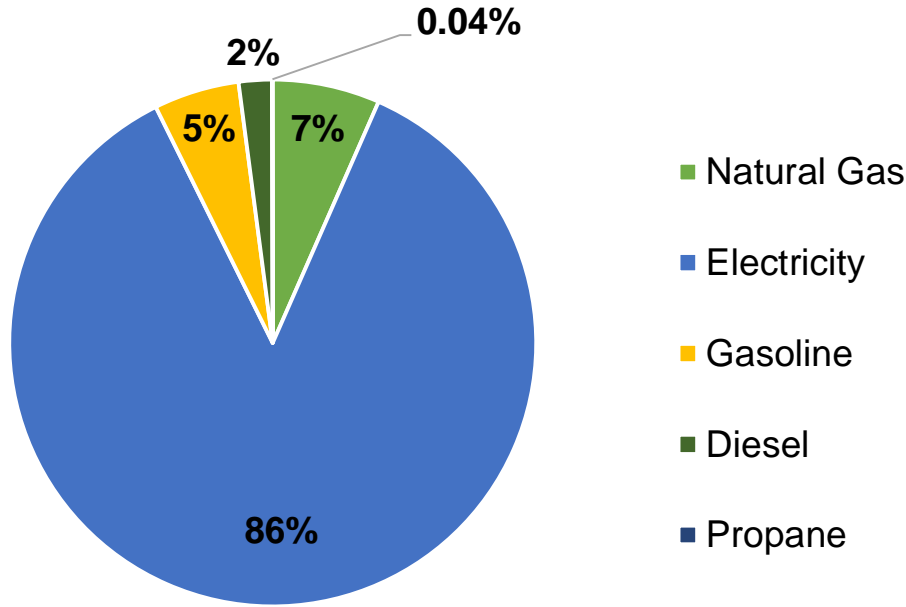


Figure 8. 2015 Energy Cost by Source

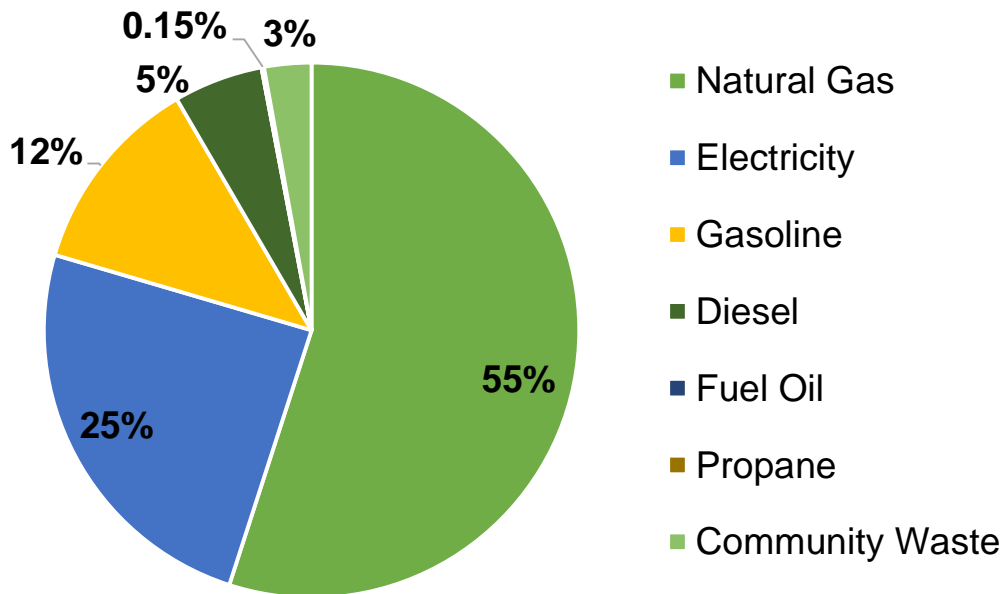


Figure 9. 2015 GHG Emissions by Source

2.2 Trends by Sector

2.2.1 Summary

Table 5 provides a summary of the GHG emissions by sector on both an absolute and per capita basis, from 2005 to 2015 and the 2020 BAU forecast.

Table 5. Absolute and Per Capita GHG Emissions by Sector

	2005	2006	2007	2008	2015	2020 BAU
Residential	201,329	188,690	219,959	210,225	201,052	236,489
Residential Per Capita	2.26	2.01	2.20	2.02	1.70	1.70
IC&I	163,176	140,700	155,305	154,415	151,482	178,182
IC&I Per Capita	1.83	1.50	1.55	1.49	1.28	1.28
Transportation	133,577	139,457	148,503	154,406	78,002	91750
Transportation Per Capita	1.50	1.49	1.49	1.49	0.66	0.66
Waste	23,168	20,914	19,581	19,791	12,653	14883
Waste Per Capita	0.26	0.22	0.20	0.19	0.11	0.11
Total GHG Emissions	521,250	489,760	543,348	538,836	443189	521,303
Total Per Capita	5.9	5.2	5.4	5.2	3.74	3.74

Figure 10 shows the absolute changes by sector (stacked bars) and the overall per capita trend line (dark blue line). Figure 11 shows the per capita GHG emissions for each sector from 2005 to 2015.

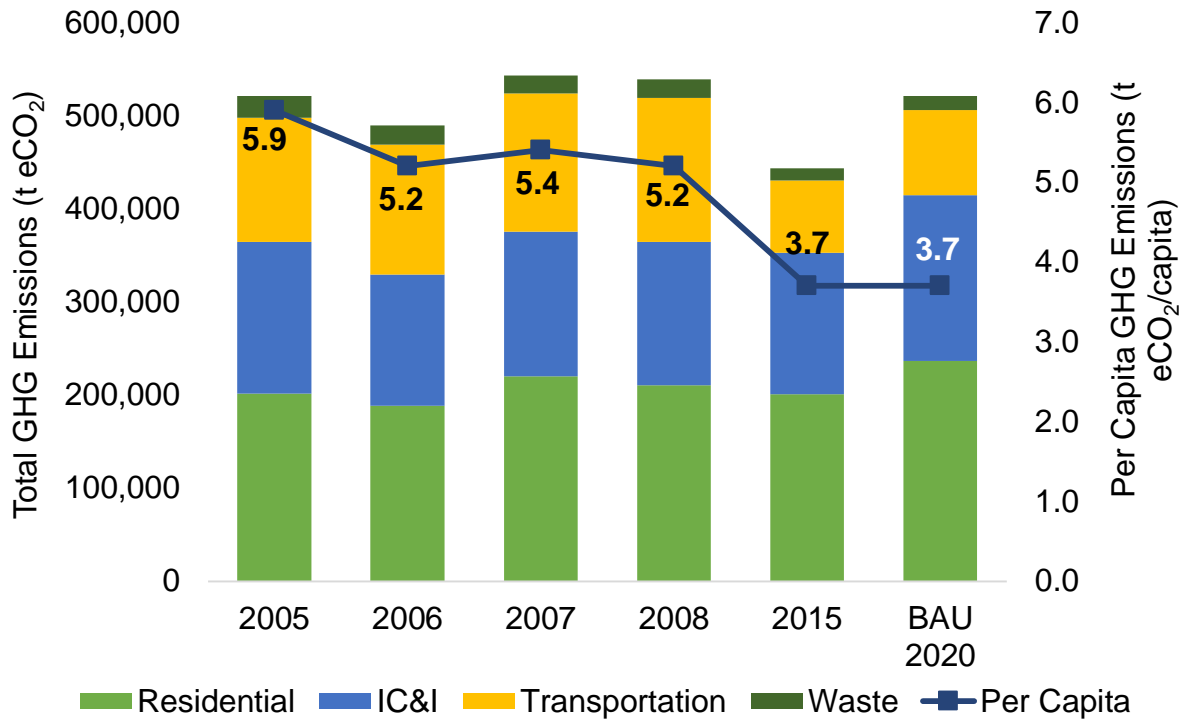


Figure 10. Absolute GHG Emissions by Sector and Total per Capita Trend Line

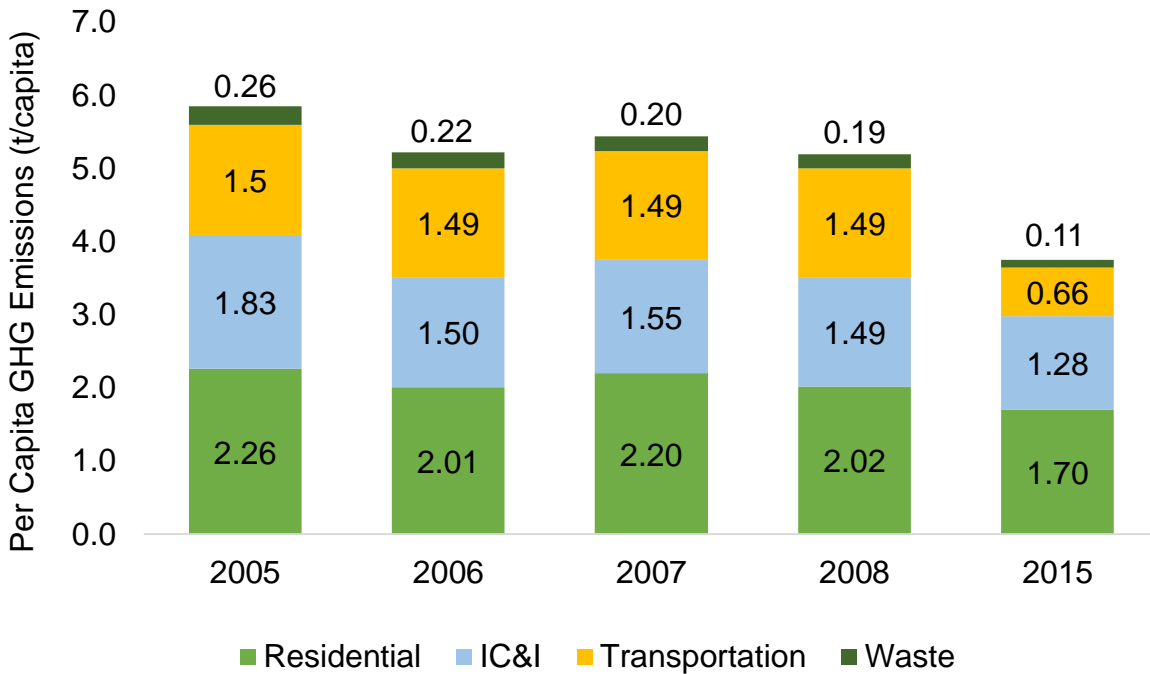


Figure 11. Per Capita GHG Emissions by Sector

2.2.2 Residential

The residential sector includes all single-family and semi-detached homes.

The residential sector accounted for 45.4% of total community GHG emissions in 2015. Table 5 shows the residential energy consumption, energy cost, and GHG emissions on an absolute and per capita basis.

From 2005 to 2015, the population grew by 33.2% and the number of households increased by 27%.

Table 6. Residential Energy Consumption, Energy Cost, and GHG Emissions

	2005	2006	2007	2008	2015	BAU 2020
Energy Use (GJ)	3,808,895	3,722,303	4,114,183	3,921,691	6,443,718	7,577,812
Per Capita Energy (GJ/Capita)	42.8	39.7	41.2	37.8	54.3	54.3
Energy Costs (\$'000)	\$67,831	\$69,799	\$71,841	\$71,565	\$165,599	\$194,744
Per Capita Energy Costs (\$/Capita)	\$762	\$744	\$719	\$689	\$1,397	\$1,396
GHG Emissions (t eCO ₂)	201,329	188,690	219,959	210,225	201,052	236,489
Per Capita GHG Emissions (t eCO ₂ /Capita)	2.26	2.01	2.20	2.02	1.7	1.7

Figure 12 shows the residential GHG emissions trends. The bars illustrate the trend on an absolute basis and the blue line provides the trend on a per capita basis. The annual residential GHG emissions are forecasted to increase to 236,489 t eCO₂ from 2015 to 2020 if no action is taken.

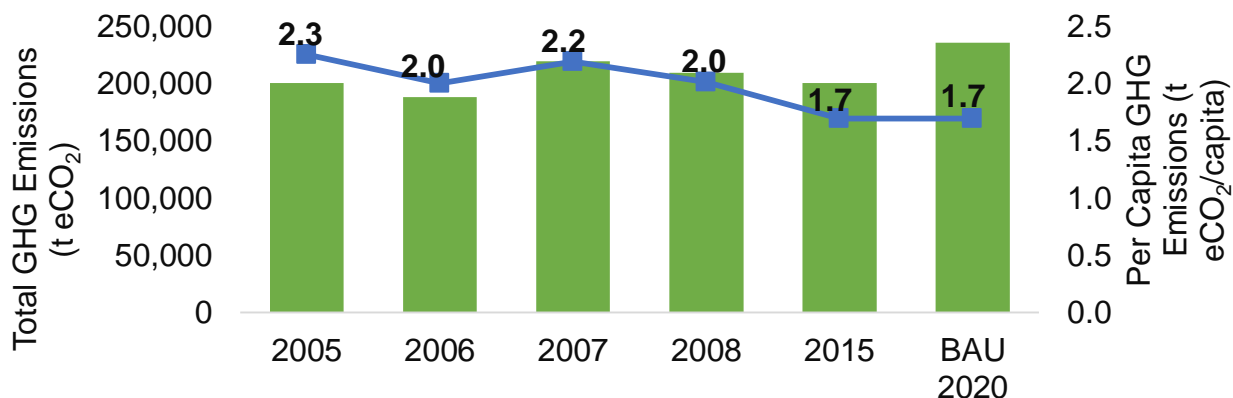


Figure 12. Residential GHG Emissions Trends

2.2.3 Institutional, Commercial, and Industrial (IC&I)

In 2015, this sector generated 34% of total community GHG emissions. Table 7 shows the energy consumption, energy cost, and GHG emissions for this sector on an absolute and per capita basis.

Table 7. IC&I Energy Consumption, Energy Cost, and GHG Emissions

	2005	2006	2007	2008	2015	BAU 2020
Energy Use (GJ)	2,980,353	2,750,355	2,781,733	2,771,907	7,604,063	8,942,378
Per Capita Energy (GJ/Capita)	33.5	29.3	27.8	26.7	64.1	64.1
Energy Costs (\$'000)	\$61,788	\$56,160	\$53,184	\$54,490	\$267,173	\$314,195
Per Capita Energy Costs (\$/Capita)	\$694	\$599	\$532	\$525	\$2,253	\$2,252
GHG Emissions (t eCO ₂)	163,176	140,700	155,305	154,415	151,482	178,182
Per Capita GHG Emissions (t eCO ₂ /Capita)	1.83	1.50	1.55	1.49	1.28	1.28

Figure 13 shows the IC&I eCO₂ trends. The bars show the trend on an absolute basis and the line provides the trend on a per capita basis. The bars for 2015 and BAU 2020 are separated

into individual sections for industrial GHG emissions (shown in orange) and commercial & institutional GHG emissions (shown in yellow). The BAU 2020 forecast assumes that this sector will grow, relative to anticipated population growth. If no action is taken, the annual GHG emissions from this sector are expected to increase by approximately 26,700 t or 17.6% by 2020.

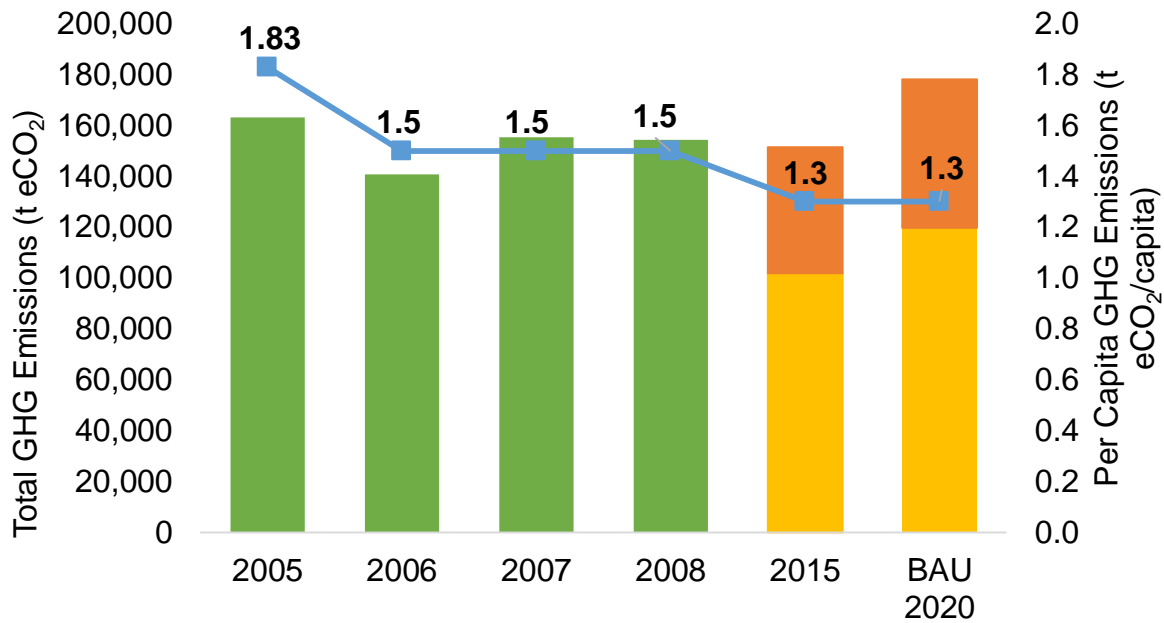


Figure 13. IC&I GHG Emission Trends

2.2.4 Transportation

From 2005 to 2015, the GHG emissions associated with the transportation sector decreased by 42%, and the per capita energy use went from 21.8 GJ per capita to 9.8 GJ per capita.

Table 8 shows the transportation energy consumption, energy cost, and GHG emissions on an absolute and per capita basis.

Table 8. Transportation Energy Consumption, Energy Cost, and eCO₂ Emissions

	2005	2006	2007	2008	2015	BAU 2020
Energy Use (GJ)	1,939,704	2,025,078	2,156,449	2,242,159	1,161,327	1,365,720
Per Capita Energy (GJ/Capita)	21.8	21.6	21.6	21.6	9.80	9.8
Energy Costs (\$'000)	\$48,528	\$53,314	\$58,565	\$70,906	\$34,199	\$40,218
Per Capita Energy Costs (\$/Capita)	\$545	\$568	\$586	\$683	\$288	\$288
GHG Emissions (t eCO ₂)	133,577	139,457	148,503	154,406	78,002	91,750
Per Capita GHG Emissions (t eCO ₂ /Capita)	1.50	1.49	1.49	1.49	0.66	0.66

Figure 14 shows the transportation GHG emission trends. The bars show the trend on an absolute basis and the blue line provides the trend on a per capita basis. It is assumed that this sector will grow relative to anticipated population growth as demonstrated by the current trend. The transportation GHG emissions are forecasted to increase by over 13,700 t from 2015 to 2020, corresponding to a 17.6% rise if no mitigation efforts are put in place.

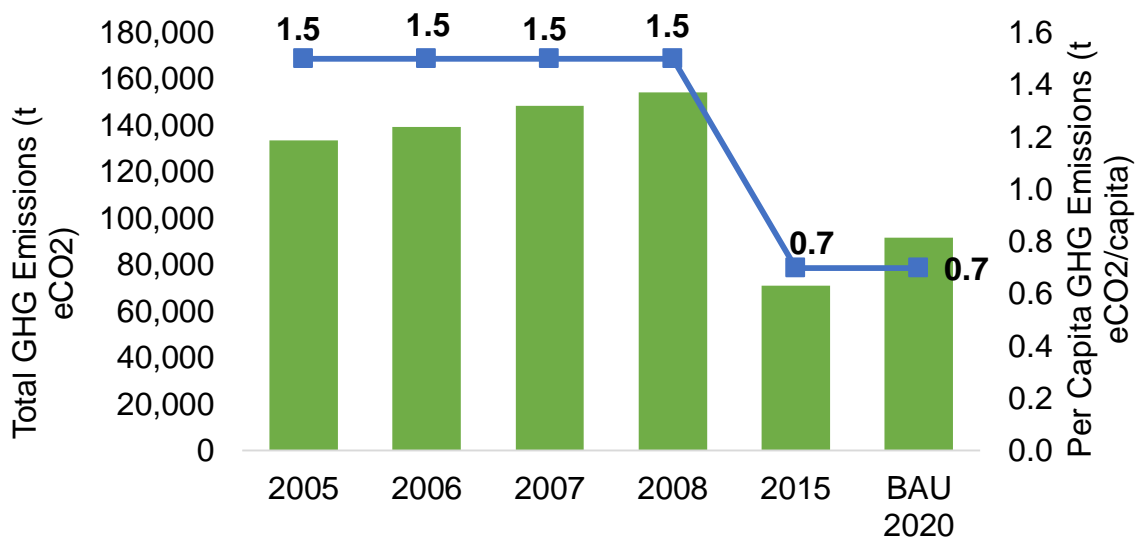


Figure 14. Transportation GHG Emission Trends

2.2.5 Waste

From 2005 to 2015, annual greenhouse gas emissions from the waste sector have decreased by over 10,000 t eCO₂. In addition, the amount of waste sent to landfill has decreased by over 67%. Table 9 shows the amount of waste to landfill and GHG emissions on an absolute and per capita basis.

Table 9. Waste to Landfill and eCO₂ Emissions

	2005	2006	2007	2008	2015	BAU 2020
Waste to Landfill (t)	48,096	43,417	40,649	41,085	15,425	18,140
Per Capita Landfill Waste (t/capita)	0.54	0.46	0.41	0.40	0.13	0.13
GHG Emissions (t eCO ₂)	23,168	20,914	19,581	19,791	12,653	14,883
Per Capita GHG Emissions (t eCO ₂ /capita)	0.26	0.22	0.20	0.19	0.11	0.11

Figure 15 shows the waste sector GHG emission trends. The bars show the trend on an absolute basis and the line provides the trend on a per capita basis. The BAU forecast assumes that waste will grow relative to anticipated population growth. The GHG emissions from waste are forecasted to increase by over 2,200 t from 2015 to 2020 if no further action is implemented.

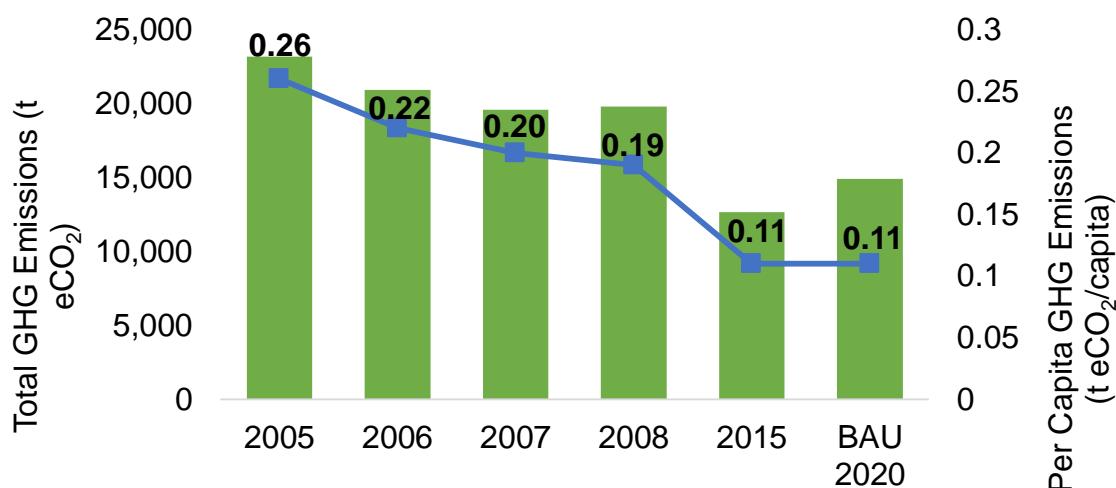


Figure 15. Waste GHG Emission Trends

3.0 PROGRESS SUMMARY 2013-2015

In 2013, The Integrated Community Sustainability Plan was adopted by Ajax Town Council. This plan is embedded with both corporate and community Local Action Plans which highlight the programs and action items that are to be implemented in order to reduce greenhouse gas emissions. For the Community Local Action Plan programs were divided into the following categories: air, energy, transportation, and waste. For each section, there is a clearly defined goal and several strategic directions. Since the plan has been in place, 63 of the 66 action items have been implemented or are ongoing with other additional items highlighted for implementation in the near future. For a full list of completed actions please see Tables 10-13.

Many of the actions that assisted with meeting the greenhouse gas reduction target were as a result of the leadership that residents, business owners and service providers took to help reduce greenhouse gas emissions and energy consumption.



Figure 16. DRT Pulse Rapid Transit

Some of the larger infrastructure include the construction of Durham regions first rapid transit system, the DRT Pulse. This new system included the construction of a bus exclusive lanes along the Ontario highway 2 corridor from Oshawa to Scarborough. Coming into service in June 2013, this service provides community members with a fast, reliable transit system within the local region, assisting with the incentive to take transit vs. single occupancy vehicles.

Other projects include the retrofit of Ajax's district energy plant. Having been in operation since 1941, this waste wood fuelled steam plant operated by Index Energy was upgraded and went back into operation in 2015. This biomass plant currently generates 7.8 mw of power and 19,400 lbs per hour of steam which is used to heat much of Ajax's downtown core, helping to reduce GHG emissions by an estimated 20,000 t per year.

In 2016, local public utility supplier Veridian Connections unveiled its multiphase micro grid project. This includes Canada's first utility installation of Tesla power walls as well as the addition of a solar powered carport canopy equipped with multiple level 2 electric vehicle chargers and a level 3 fast charger. The purpose of this project is to demonstrate the benefits of micro grids, battery storage, renewable energy and electric vehicles and make progress towards net-zero homes.



Figure 17. Tesla Power Wall at Veridian



Figure 18. Integration of pedestrian and bicycle lanes

The Town of Ajax has also completed a number of projects that have allowed members of the community to make small everyday changes to reduce their greenhouse gas emissions. This includes the ongoing investment to expand Ajax's 140 km cycling network of trails, dedicated bike lanes, and shared use lanes. This has resulted in the community being designated a bicycle friendly community by the share the road coalition.



Figure 19. Photovoltaic solar panels at the Ajax Operations Centre

In order to decrease Ajax's reliance on fossil based fuels the town of Ajax has committed to the use of renewable energy sources at a number of facilities. The installed technology either supplies the electricity grid directly, or directly provides some of the energy required to operate the facility. Renewable energy projects include:

- 120 kw of grid connected Photovoltaic solar
- 2,580 gallons of thermal solar for heating hot water
- Solar powered parking lighting
- 2,600 gallon geothermal heating and cooling system

3.1 Community Engagement

A number of programs have been developed by both the municipality and by stakeholders to engage members of the community into reducing greenhouse gas emissions transportation. These programs include:

Ajax Active and Safe Routes Campaign

A Town- developed program aimed to encourage children to take active transit to get to school, this involved the development of a school Ajax Active And Safe Routes manual, the initiation of a number of community challenges including bike rally's, family fitness night, walk to school day and the golden sneaker inter-schools challenge.

Ajax Green Living Guide

The Ajax Green Living Guide is a resource designed to provide useful tips and information to help reduce the community's environmental footprint. From energy conservation to waste reduction, this guide offers simple actions that can be taken at home or within the community,

Earth Hour Celebration

Earth Hour is an annual event that encourages everyone to switch off their lights for one hour from 8.30-9.30 pm.

This simple act is used as a symbol to show commitment to protecting the environment and creating awareness surrounding Climate Change. The Town of Ajax each year partners with local community organizations to host a celebratory event to encourage greater awareness within the community.**Electric Vehicle Expo**

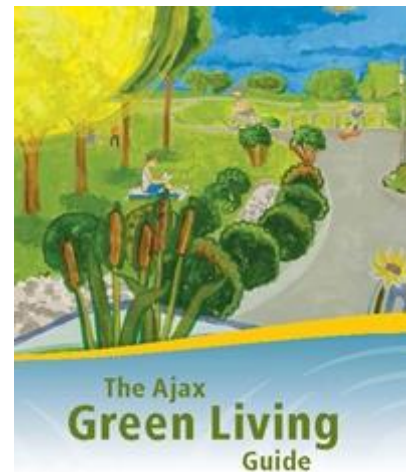


Figure 20. Green Living Guide

Since 2016, the Town of Ajax has presented in partnership with Plug' n Drive and Veridian Connection an Electric Vehicle Expo. This is an event where visitors will be able to ride and drive electric vehicles, see EV charging demonstrations, learn about environmental initiatives, and find out more about electric vehicle charging locations. The purpose of the event is to showcase greener options available to the community surrounding vehicles, in the hope that more people will make the switch to electric vehicles.



Every Minute Counts Anti-Idling Campaign

In 2009, Ajax Council approved an anti-idling bylaw. This bylaw limits the idling of vehicle engines to less than two minutes within the Town. Alongside the by-law was an extensive campaign to raise awareness with respect to the impacts of idling. A campaign was launched, known as “Every Minute Counts.” The campaign saw the installation of anti-idling signage at Town facilities, schools and local businesses as well as the creation of an idling fact sheet brochure.

Figure 21. Anti-idling signage

Get Ajax Moving

Get Ajax Moving is a transportation awareness initiative to give Ajax residents the tools they need to get around easier, faster and smarter. It includes specific toolkits to assist people who want to try transit, carpooling, cycling, walking and telecommuting.

#GetAjaxMoving



Figure 22. Get Ajax Moving



Figure 23. Durham Partners in Project Green

environmental impact, and address everyday operational challenges in a green and cost-effective manner.

Save on Energy

Save On Energy is a program administered by the Independent Electricity Supplier of Ontario and delivered by the local utility company. It provides tools and financial incentives to encourage homeowners, tenants, and businesses to conserve electricity. Financial incentives range from coupons for purchasing low-energy light bulbs to larger scale rebates for upgrading heating and cooling systems in homes and businesses.

Tree Planting

Trees are Ajax's largest sink for GHG emissions. The Town supports a number of community-based programs to help increase urban canopy cover. These include the hosting of community tree planting events in both the spring and fall seasons. These events typically see over 2,000 trees planted annually. The Town also provides subsidized tree planting programs for property owners who plant trees, which is implemented through LEAF's Backyard Tree Planting Program, and Forests Ontario's 50 Million Trees program.

Durham Partners in Project Green

Through new forms of business to business collaboration, Durham Partners in Project Green led by Non-governmental organization Durham Sustain Ability, delivers programming that helps businesses reduce energy and resource costs, reduce their



Figure 24. Family Volunteering to Plant Trees

Table 10. Community Local Action Plan – Air

AIR				
<p>Goal <i>In 2055, we will have good quality air that is clean to breathe and supports healthy ecosystems.</i></p> <p>Strategic Directions Strategy 1: Proactively control air pollutants generated from all sectors, including commercial, industrial, institutional (ICI) and residential. Strategy 2: Reduce air pollution.</p>			<p>Legend Low = <100 tonne reduction Medium = 100 – 1,000 tonnes High = >1,000 tonnes reduction Non-direct = no direct GHG reductions from action, but supportive of activities that lead to GHG reductions</p>	
Sector	Potential Actions	Potential GHG Reductions	Estimated Cost	Status
All	Advocate for stronger regulations to reduce air pollution.	Non-direct	Nominal	Active
All	Participate in inter-municipal clean air initiatives.	Non-direct	Nominal	Active
ICI	Develop strategies to invest in energy efficient vehicles and low emissions equipment for private sector applications (e.g. purchasing plan or equipment replacement schedule).	Approx. 50% reduction compared to non-green vehicle	Nominal to develop strategy	Active
ICI	Encourage businesses to provide incentives to their employees for employees to purchase green vehicles.	Approx. 50% reduction compared to non-green vehicle	Incentive dependent on level.	Active
Trans	Assess existing Anti-Idling By-laws and level of compliance (e.g. idling surveys) and determine areas for improvement.	Non-direct	Nominal	Active
Trans	Implement awareness campaign regarding the Town’s Anti-Idling program and the negative environmental impacts of vehicle idling.	Low (~200Kg/ vehicle/ year)	\$25,000/ year	Complete
Trans	Develop partnerships with Durham Transit and Public and Separate School Boards to institute Idle-Free Zones.	Low (~200Kg/ vehicle/ year)	Nominal	Complete
Trans	Create preferred parking spaces at Town facilities for visitors that	Non-direct	Nominal	Complete

	drive hybrid and electric vehicles.			
Trans	Investigate the feasibility of installing electric vehicle charging stations at Town facilities.	Non-direct	Charging station approximately \$5,000	Complete
Trans	Investigate the feasibility of installing electric vehicle charging stations at select locations around Ajax.	Non-direct	Charging station approximately \$5,000	Active
Trans	Promote 'car-free' special events or festivals.	Non-direct	Nominal	Complete
Trans	Advocate for the transition of Durham Region Transit to hybrid or fuel efficient vehicles where feasible.	10-20% reduction	Nominal to advocate; Hybrid model buses are ~\$150,000 more than convention diesel	Active
Trans	Continue to provide incentives to taxi companies that use eco-friendly vehicles.	Medium (~400 tonnes)	\$100 fee/ license/ year	Active
Other	Create a policy to restrict the use of gas powered lawn and garden equipment on smog days.	Non-direct	Nominal	Not Yet Started
Other	Implement the Urban Forest Management Plan to enhance the urban forest in Ajax: <ul style="list-style-type: none"> • Municipal arboricultural standards and practices, • Tree establishment and urban forest enhancement, • Urban forest pest management; • Through the planning and development process; • Developing a Private Tree By-law; • Protecting and enhancing wooded natural areas, • Awareness, engagement and partnerships. 	Low-Medium 1 tree captures ~ 0.734 t GHGs over an 80 year lifecycle	\$50,000/ year	Active
Other	Develop education packages about the Town's urban forest that offer information to homeowners and the business community.	Non-direct	\$25,000/ year	Complete

Other	Define urban heat island action areas for targeted greening.	Non-direct		Active
-------	--	------------	--	--------

Table 11. Community Local Action Plan – Energy

ENERGY				
<p>Goal <i>In 2055, we will conserve the amount of energy we use and will generate most of the energy that we do use from clean and renewable sources.</i></p> <p>Strategic Directions Strategy 1: Reduce the amount of electricity and gas that residents use in their homes. Strategy 2: Reduce the amount of energy that the Town, businesses and institutions use in their operations. Strategy 3: Meet more of the community’s energy needs through renewable sources. Strategy 4: Use vehicles that are energy efficient and that use alternative fuel sources.</p>		<p>Legend Low = <100 tonne reduction Medium = 100 – 1,000 tonnes High = >1,000 tonnes reduction Non-direct = no direct GHG reductions from action, but supportive of activities that lead to GHG reductions</p>		
Sector	Potential Actions	Potential GHG Reductions	Estimated Cost	Implementation Status
All	Work with all segments of the development sector to encourage and promote ‘green’ or sustainable building practices through design and retrofit of development and site alteration.	Medium – High (15 – over 500 tonnes)	Nominal	Active
ICI	Continue to redevelop the Steam Plant as a district energy facility that promotes energy efficiency and reduced greenhouse gas emissions.	High (~7,800 tonnes)	Private information	Complete
ICI	Partner with Durham Sustainability on the delivery of Durham Partners in Project Green (DPPG) program: <ul style="list-style-type: none"> Referral services for energy efficiency assessments and financial incentives Procurement assistance 	Medium (~200-300 tonnes)	Durham Region: \$25,000/ year; Ajax: \$5,000/ year	Active

	<ul style="list-style-type: none"> • Education, training, resources • Networking 			
ICI	<p>Continue with initiatives that encourage business energy conservation and efficiency:</p> <ul style="list-style-type: none"> • Demand Response • Small business energy-efficient lighting and equipment incentive program • Energy-efficient retrofit incentive program • peak saver Plus program • Audit funding incentive program • Existing Building Commissioning funding program for Chilled Water Systems • High Performance New Construction design assistance and funding program • Process and Systems program for funding toward major energy-saving upgrade projects • Training and support initiatives 	Low – Medium (100 tonnes/ year)	~\$100,000/ year	Active
ICI	Implement measures to reduce the energy consumed in evenings including advertising signage and overnight lighting.	Low	-	Active
ICI	Continue to provide support and incentives to social and assisted housing to improve energy efficiency.	Low (~100 tonnes/ year)	Included in cost estimate for ICI program above	Active
ICI & Res	Work with senior levels of government to enhance requirements for building construction, as well as greenfield/brownfield	Non-direct	Nominal	In Development

	development to meet energy performance targets.			
ICI & Res	Work with Durham Region to develop and adopt a Durham Green Building Guideline/Standard for all new construction with promotes a higher level of energy efficiency than the current Ontario Building Code.	25%-60% energy reduction depending on standard	\$65,000	In Development
ICI & Res	Promote renewable energy incentive programs from utilities and other levels of government.	Non-direct	Nominal	Active
ICI & Res	Encourage/support Durham Region to create an offshore wind farm in Lake Ontario, sponsored by the Region and funded through private partnerships.	High (~31,886 tonnes)	\$68,000,000 (entire project)	Not Yet Started
ICI & Res	Work with Durham Region on the creation of a Smart Grid Initiative to demonstrate key components of smart grid technology.	Unknown	Unknown	Complete
Res	Continue with initiatives that encourage home energy conservation and efficiency: <ul style="list-style-type: none"> • Fridge and freezer pickup • Heating and cooling system upgrade incentives • peak saver PLUS program • Coupons for energy efficient products • Equipment exchange events 	Medium (~175 tonnes/ year)	~\$110,000/ year	Active
Res	Continue with Home Weatherization Retrofit incentive program to improve energy efficiency of homes.	Medium	Included in cost estimate for residential program above	Active
Res	Develop an information package for homeowners to identify opportunities to conserve energy (smart meters, LED lighting, tree	Non-direct	Nominal	Complete

	planting, geothermal heating/cooling, renewable energy, appliance selection).			
Res	<p>Work with Durham Region on the development of a comprehensive residential energy retrofit program:</p> <ul style="list-style-type: none"> • Energy audit and investment plan (building envelope, HVAC, appliance, lighting, water heating, renewable energy retrofits) • Financing plan – grant programs and financing mechanisms • Assistance with contractor selection • Repayment of loans via property taxes or other mechanisms • Home energy label 	Medium (~200-300 tonnes)	Unknown	Complete
Res	Continue with Time-of-Use billing for electricity use to encourage conservation.	Low	Nominal	Complete
Res	Continue and expand program to make Watt Reader monitors available at public libraries to help residents understand how much energy their products consumer and manage use accordingly.	Non-direct	Nominal	Complete
Trans	Promote the purchase of energy efficient vehicles.	Non-direct	Hybrid sedans: \$25,000/vehicle Hybrid SUVs: \$40,000 Hybrid pick-up trucks: \$45,000/vehicle	Active

Table 12. Community Local Action Plan - Transportation

TRANSPORTATION				
<p>Goal <i>In 2055, we will have an integrated, efficient, and accessible transportation system that has sustainable options available for the movement of people and goods within the community and beyond.</i></p> <p>Strategic Directions Strategy 1: Create complete streets in Ajax to allow multiple modes of transportation. Strategy 2: Design neighbourhoods to facilitate walkability and other active transportation opportunities as convenient alternatives to the use of private automobiles. Strategy 3: Enhance public transportation opportunities to make public transportation convenient and a feasible alternative to the private automobile. Strategy 4: Reduce congestion and commute times.</p>		<p>Legend Low = <100 tonne reduction Medium = 100 – 1,000 tonnes High = >1,000 tonnes reduction Non-direct = no direct GHG reductions from action, but supportive of activities that lead to GHG reductions</p>		
Sector	Potential Actions	Potential GHG Reductions	Estimated Cost	Implementation Status
Trans	Implement complete streets through retrofits to existing roads as provided within the Pedestrian and Bicycle Master Plan.	10 - 15% reduction in auto traffic – shift to alternative modes of transportation (increased transit ridership, walking, cycling)	\$25,000 - \$75,000/ year	Active
Trans	Expand and connect the trails and pathways network.		\$250,000 - \$1,000,000/year	Active
Trans	Provide maps of cycling routes to the public.		\$2,000/ year	Active
Trans	Investigate appropriate major intersections for the installation of bike boxes.		Nominal	Active
Trans	Install biker lockers and/or canopies on bike racks at Town facilities.		\$1,200-\$1,600 for 2 bike storage locker	Complete
Trans	Investigate the establishment of a bike rental program.		Nominal to explore; cost to implement depends on application	Active

Trans	Continue promotion of bike safety for all riders.		Nominal – Ongoing	Complete
Trans	Integrate active transportation with public transit (e.g., bike racks on buses).		-	Complete
Trans	Continue to and enhance implementation of Transportation Demand Management initiatives as outlined in the Town of Ajax Transportation Master Plan Update.		Funded through the annual budget process	Active
Trans	Ensure that all development applications for major commercial, employment or institutional development include a TDM strategy.		Nominal	Active
Trans	Continue and enhance promotion of transit, carpooling, and active options for commuting (e.g., through Smart Commute Durham).		Funded through the annual budget process	Active
Trans	Improve local connections with other transit systems (e.g., GO Transit, TTC, etc.).		-	Active
Trans	Improve bus route coverage (e.g., by providing stops in convenient locations, running Durham Transit on a grid network, increasing schedule frequency for local events and attractions, etc.).		-	Active
Trans	Encourage transit ridership (e.g., by increasing bus frequency, reducing transit fares, occasionally offering free service, etc.).		-	Active

Trans	Explore use of smaller buses on routes with lower ridership.		-	Active
Trans	Explore service provision opportunities beyond buses.		-	Active
Trans	Implement shuttle services for inter-municipal transit.		-	Complete
Trans	Conduct Truck Route Study to determine best routes for truck traffic and restrictions in certain parts of the Town.	Non-direct	\$100,000 - \$200,000	Active

Table 13. Community Local Action Plan – Waste

WASTE				
<p>Goal <i>In 2055, we will use materials wisely, maximizing the lifecycle of materials and reducing the amount of waste generated.</i></p> <p>Strategic Directions Strategy 1: Reduce the consumption of material things. Strategy 2: Provide education and awareness relative to waste management practices. Strategy 3: Facilitate reuse and recycling of goods and materials in all sectors that are currently identified as waste. Strategy 4: Reduce the amount of waste generated in manufacturing processes.</p>		<p>Legend Low = <100 tonne reduction Medium = 100 – 1,000 tonnes High = >1,000 tonnes reduction Non-direct = no direct GHG reductions from action, but supportive of activities that lead to GHG reductions</p>		
Sector	Potential Actions	Potential GHG Reductions	Estimated Cost	Additional Information
Waste	Work with producers and retailers to reduce packaging and increase take-back initiatives.	Non-direct	Nominal	Active
Waste	Develop incentives for residential waste reduction.	Low	Nominal	Active
Waste	Generate greater awareness around littering, illegal dumping, composting and recycling.	Non-direct	\$5,000/ year	Active

Waste	Develop an awareness program to promote residential composting.	Low	\$25,000/ year	Active
Waste	Develop campaign to encourage the use of reusable mugs, water bottles and reusable lunch containers.	Low	\$10,000/ year	Complete
Waste	Develop and institute a Waste Management Leadership Program for businesses.	Non-direct	\$5,000/ year	Active
Waste	Implement programs targeted at the re-use of materials (e.g., Freecycle, swap meets, drop off sites, etc.)	Low	\$5,000/ year	Active
Waste	Continue to divert electronic waste, hazardous waste, pet waste and other items not captured by regular collection (e.g., batteries, printer cartridges, light bulbs, Styrofoam, mercury thermostats, etc.).	Low	Nominal	Active
Waste	Offer residents additional blue bins.	Non-direct	Blue bins: \$6/each Green bins: \$15/each	Active
Waste	Utilize thermal mass burn technology to dispose of residential waste and generate energy in a joint York Region and Durham Region Energy From Waste Facility.	Low (~14 tonnes/ year)	~\$280,000, 000 (entire project)	Complete
Waste	Create eco-business clusters where there are efficiencies through shared resources.	Non-direct	Unknown	Active
Waste	Conduct waste audits of commercial and industrial facilities.	Non-direct	Depends on application	Active
Waste	Develop program/policy to encourage responsible disposal of construction waste.	Low	Nominal	Active

4.0 NEXT STEPS AND RECOMMENDATIONS

It is recommended that the Town of Ajax continue to demonstrate leadership in climate mitigation by:

- ❖ Updating the Community Local Action Plan which is embedded in Ajax's Integrated Community Sustainability Plan (ICSP)
- ❖ Considering setting targets for long term greenhouse gas emission reduction, taking into account the target set by the province of Ontario in 2015, of an 80% GHG reduction by the year 2050

5.0 CONCLUSION

In the baseline year (2005), the Ajax community produced 521,250 t eCO₂. These emissions include those associated with the residential, commercial & institutional, industrial, transportation, and waste sectors.

In 2015, the Ajax community produced 443,189 t eCO₂. This represents a 15% decrease since 2005. This reduction is significant, despite growth in the Town's population of 33.2% from 2005 to 2015. On a per capita basis, GHG emissions declined from 5.9 t eCO₂ per capita in 2005 to 3.7 t eCO₂ per capita in 2015.

This inventory suggests that the Town has met the 6% GHG emissions reduction target. In order to continue to reduce GHG emissions, it is recommended that the Town's Community Local Action plan be updated to highlight future projects and programs, as well as consider setting targets that allow for ongoing GHG emission reduction beyond 2050. This will help ensure that the corporation of the Town of Ajax continues to demonstrate leadership in the battle that is global climate change.

APPENDIX A: GLOSSARY

Units

GJ	Gigajoule	1 billion joules
J	Joule	A unit of energy equal to the work done when a current of one ampere passes through a resistance of one ohm for one second. A common metric unit of energy frequently used for all sources of energy such as electrical energy (kWh), natural gas energy (m ³) and other fuels
kWh	Kilowatt hour	A measure of electrical energy equivalent to a power consumption of 1,000 watts for one hour
t	Tonne	Metric tonne, equivalent to 1,000 kilograms or 2,200 pounds

Acronyms

BAU	Business as Usual	The absence of any emissions reduction measures
eCO₂	Equivalent carbon dioxide	A common unit that allows varying strengths of GHG emissions (Such as CO ₂ and CH ₄) to be expressed in like terms
FCM	Federation of Canadian Municipalities	The national association of municipal governments
GHG	Greenhouse Gas	Any gas that absorbs infrared radiation in the atmosphere. The three main greenhouse gases are carbon dioxide (CO ₂), methane (CH ₄), and nitrous oxide (N ₂ O)
ICLEI	International Council for Local Environmental Initiatives	The international association for local governments implementing sustainable development initiatives
PCP	Partners for Climate Protection	A program implemented by FCM and ICLEI to assist local governments to reduce GHG emissions

APPENDIX B: SOURCES OF DATA

Sector	Data	Source
Residential	Electricity Consumption	Veridian
	Electricity Prices	
	Natural Gas Usage	Enbridge
	Natural Gas Prices	
Industrial	Electricity Consumption	Veridian
	Electricity Prices	
	Natural Gas Usage	Enbridge
	Natural Gas Prices	
Commercial & Institutional	Electricity Consumption	Veridian
	Electricity Prices	
	Natural Gas Usage	Enbridge
	Natural Gas Prices	
Transportation	Vehicle Kilometres Travelled (VKT), Average distance travelled by light-duty vehicles, Number of Vehicles per Household	2011 Transportation Tomorrow Survey – Town of Ajax http://dmg.utoronto.ca/pdf/tts/2011/travel_summaries_for_the_gtha/Durham/Ajax.pdf
	Average Fuel Prices (Toronto East)	Ontario Ministry of Energy http://www.energy.gov.on.ca/en/fuel-prices/
Community Waste	Amount of solid waste generated (tonnes)	Regional Municipality of Durham