



Community Climate Action Plan

For Reducing Community Greenhouse Gas Emissions

City of Vaughan
March 2014



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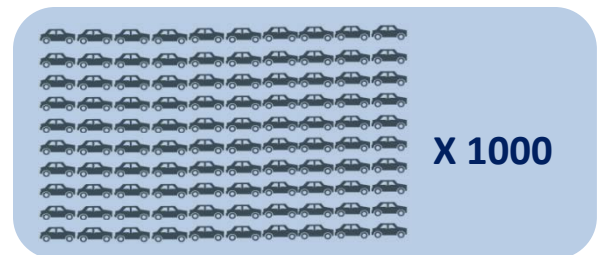
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Executive Summary

Climate change is a real issue that is impacting communities around the world, including right here in the City of Vaughan. The main contributor to climate change is the increasing amounts of greenhouse gas (GHG) emissions in the atmosphere. The types of activities that result in GHG emissions are largely influenced by decisions made locally; by businesses, schools, and industries in Vaughan, as well as by the people that live and work here. Greenhouse gas emission from the City of Vaughan municipal operations only account for about 1% of our GHG emissions each year. We need community, industry and government efforts to help meet our reduction targets. Everyone can help!

The purpose of the Vaughan Community Climate Action Plan (CAP) is to provide our community with practical ways to reduce GHG emissions from community sources. This Plan establishes a mission for climate action, and sets a target for reducing community GHG emissions by 20% per capita below the 2006 baseline year by 2026. To achieve this target, the Plan outlines a number of actions and additional opportunities to reduce GHG emissions at home, at work and as we move. The CAP presents a total of nine actions that will reduce GHG emission by 482,000 tonnes of eCO₂/year at 2026, which is equal to taking over 100,000 cars off the road each year. In addition to these nine actions, nine other opportunities are outlined that can reduce an additional 100,000 tonnes of eCO₂/year for a total of 582,000 tonnes of eCO₂/year at 2026. This will not only avoid the emission of a large amount of GHGs, but will also contribute to our health and provide social and economic benefits.



The Community CAP was developed through a collaborative and stakeholder-driven process. A Steering Committee made up of individuals representing various sectors across Vaughan was established to guide and help shape the Plan’s mission for climate change and establish goals, actions and opportunities and an implementation strategy. The Community CAP is based on best practices, and places an emphasis on integrating existing plans and initiatives, as well as connecting with community leaders. The citizens of Vaughan shared their ideas online and through face-to-face meetings, and their feedback was used to confirm that the ideas put forward in the Plan were ones the community felt would work in Vaughan.

Many of the ‘actions’ outlined are underway or planned for, while the ‘opportunities’ are some of the great ideas that will need to be further defined and partners established. As a result, the timing of implementation will vary as some actions and opportunities will be implemented sooner than others. As the actions and opportunities are implemented, the GHG emissions for the Vaughan community will change. GHG data will be monitored and catalogued on an annual basis to ensure we learn about the effectiveness of new initiatives, identify areas that have improved and areas that require more attention. This Plan has been developed to provide the Vaughan community with a strategy to reduce GHG emissions, and will require the efforts of many members of the Vaughan community to move it from a plan to reality.

Message from the City of Vaughan

The City of Vaughan recognizes the potential impacts of climate change – such as extreme weather events – are real issues that impact the Vaughan community. Our City is the place where we live, work, and play; and the effects of climate change will likely be felt most acutely at the local level. With evidence mounting that greenhouse gas emissions continue to contribute to climate change, the City of Vaughan has an important role to play to catalyze actions within the community to help reduce greenhouse gas emissions from our businesses, our institutions, and our residents. We all have a role to play and the City of Vaughan is committed to helping engage our community members and encourage action.

From September 2013 to January 2014 the City of Vaughan worked to advance its commitment to the Partners for Climate Protection program through the development of this comprehensive strategy to reduce greenhouse gas emissions from community sources. Seeking valuable input and expertise, proposed actions and implementation concepts, the City worked in partnership with a wide variety of local stakeholders - from businesses to community groups to engaged citizens – to help craft this strategic, made-in-Vaughan, approach to tackling climate change.

On behalf of the City of Vaughan, I would like to express my appreciation to everyone who participated in the preparation of the Plan. By working together to identify impactful and cost effective actions to reduce greenhouse gas emissions throughout our community, the City of Vaughan and the Vaughan community will demonstrate tremendous regional leadership in working to combat climate change. We look forward to continuing to work with the community to implement the actions embodied in this Plan and to further evaluate the opportunities to address greenhouse gas emissions which will help us continue to grow as a sustainable, world class City.



Joseph Pittari
Commissioner Strategic and Corporate Services
The City of Vaughan





Message from the Community Climate Action Plan Steering Committee

The Vaughan Community Climate Action Plan Steering Committee is pleased to present Vaughan's Community Climate Action Plan for reducing greenhouse gas emissions. We want to congratulate the City of Vaughan for showing leadership in developing this Plan and applaud Lura Consulting for guiding the process. We are grateful to have an opportunity to support *Green Directions Vaughan* and to contribute to addressing climate change.

Many Vaughan citizens contributed to this Plan, as well as individuals representing various agencies and sectors with a strong commitment to addressing climate change and to taking action to protect human health and the environment. The breadth of representation on the Committee and the input from individuals across the City demonstrates the importance of this issue. We want to thank all of those that contributed to this Plan.

We are all very well aware of the impacts of climate change. Many of us have been witness to extreme weather events such as tornadoes, heat waves and ice storms that we can expect to see with greater intensity and frequency as a result of climate change. We understand the serious health consequences associated with climate change – impacts to cardiovascular and respiratory health as a result of increases in air pollution and extreme heat events, increased incidence of infectious diseases related to waterborne diseases and emerging vector-borne diseases, and increased risk for vulnerable populations.

While climate change is a global issue that requires action at all levels of government, we believe that municipalities, and citizens, can do a lot to achieve action to reduce emissions that contribute to climate change. This Plan outlines those actions, and is our commitment to acting on climate change now and in the future.

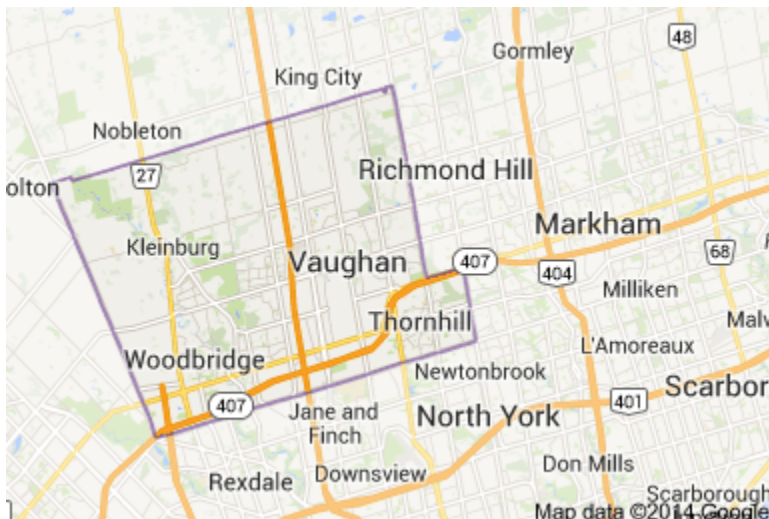
The City of Vaughan's Community Climate Action Plan is a comprehensive community plan that will address areas where great achievements can be made in reducing greenhouse gas emissions – at home, at work or school, and on the move. We all have a part to play in initiating action and achieving results in these areas. Let's get started!



1. Introduction

What Does Climate Change Mean to Vaughan?

The climate is changing. Weather records show that temperatures around the world and right here in the City of Vaughan, are increasing. Ontario's Ministry of the Environment reports that the average annual temperature in Ontario has increased by 1.4°C over the last 60 years, and models suggest that by 2050 the average annual temperature in Ontario could increase by another 2.5°C to 3.7°C. In December 2013, the Greater Toronto Area experienced firsthand the effects of extreme weather events with a prolonged deep freeze and ice storm. This event shows how extreme weather impacts our roads, trees, pipes and sewer and stormwater systems. In early January 2014 many communities in and around the Toronto area have been further impacted by heavy rains. We have been experiencing more extreme weather events, prolonged heat-waves, flooding, wind and ice storms. Climate change is a real issue and is impacting us all. The good news is we can all reduce the amount of climate-impacting greenhouse gas (GHG) we produce every day **at home, at work** and **as we move** through our community.



The Vaughan Community

The City of Vaughan is located in York Region, directly north of Toronto, and is made up of six communities with a diverse natural heritage network - Concord, Kleinburg, Maple, Vaughan Metropolitan Centre, Thornhill, and Woodbridge. Vaughan is a rapidly growing community. The City had a population of 288,301 in 2011, which has grown by 20.7% from the 2006 population. This is much higher than the national average of 5.9% growth for that same period.

Vaughan is one of Ontario's fastest growing cities in Canada. Its population is projected to increase by 56% between 2006 and 2026 to 388,800 people. This expected growth will have large impacts on the amount of GHG emissions being generated in Vaughan if nothing is done to address the current and expected emissions.

By the Numbers

- › Area: 273.52 km²
- › Population in 2006: 238,866
- › Population in 2011: 288,301
- › Forecasted population in 2026: 388,800
- › Private residential dwellings in 2011: 86,063
- › Population density in 2011: 1,054 persons per km²

Source:

https://www.vaughan.ca/business/market_indicators/demographics/General%20Documents/Population%20and%20Employment%20Growth%20Projections%202006%20-%202031.pdf

What is Causing Climate Change?

The main contributor to climate change is the increasing amounts of GHG emissions in the atmosphere. GHGs are naturally found in the environment and can fluctuate in nature through events like volcanic eruptions and forest fires. Humans-caused sources of GHGs are however, contributing large quantities of GHGs into the environment. The greatest human-caused contributor is carbon dioxide (CO₂) created from the burning of fossil fuels, such as coal, oil, and natural gas.

GHG emissions are a by-product of the actions we take in our day-to-day lives. The vast majority of these emissions are energy-related:

- Electricity used to power appliances, equipment and lighting
- Natural gas used to heat our homes and offices
- Gasoline and diesel used in automobiles

Greenhouse gas emissions are also linked to:

- Waste management practices (e.g. solid waste sent to landfills)
- Land-use decisions (e.g. dispersed development)
- Agricultural activities (e.g. livestock and manure management)



What Can We Do About Climate Change?

The window for avoiding serious climate change impacts—heat waves, droughts, floods and storms, rising sea levels and widespread loss of plant and animal species—is **shrinking**. We are dangerously close to the 2°C threshold that many scientists and organizations have identified as the “safe” upper limit for global warming. In order to stay below this limit, global GHG emissions must peak and decline within the next 10 years. For developed countries like Canada, the recommendation from scientists is to reduce GHG emissions by 25-40% below 1990 levels by 2020.

The types of activities that contribute to GHG emissions are influenced, to a large extent, by decisions made locally; by the businesses, schools, and industries in our City and by the people that live and work here. In April 2011, the City of Vaughan joined more than 240 other communities across Canada to address climate change through the City’s participation in the Partners for Climate Protection (PCP) program aimed at reducing GHG emissions from both municipal operations and community sources.

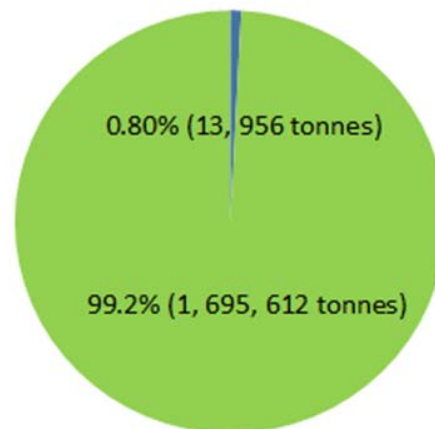
City of Vaughan municipal operations (i.e. facilities, vehicles, streetlights) only account for about 1% of Vaughan’s GHG emissions each year. Even if the municipality achieved net zero carbon emissions from their operations, we would still not meet our GHG emission reduction target without our community also taking action to reduce GHG emissions.

Partners for Climate Change Protection (PCP)

| | | | | |
|---|---|---|--|--|
| <p style="text-align: center; margin: 0;">Milestone 1</p> <p style="text-align: center; margin: 0; font-size: 0.8em;">Creating a greenhouse gas emissions inventory and forecast</p> | <p style="text-align: center; margin: 0;">Milestone 2</p> <p style="text-align: center; margin: 0; font-size: 0.8em;">Setting an emissions reductions target</p> | <p style="text-align: center; margin: 0;">Milestone 3</p> <p style="text-align: center; margin: 0; font-size: 0.8em;">Developing a local action plan</p> | <p style="text-align: center; margin: 0;">Milestone 4</p> <p style="text-align: center; margin: 0; font-size: 0.8em;">Implementing the local action plan or a set of activities</p> | <p style="text-align: center; margin: 0;">Milestone 5</p> <p style="text-align: center; margin: 0; font-size: 0.8em;">Monitoring progress and reporting results</p> |
|---|---|---|--|--|

The PCP program is a network of Canadian municipal governments that have committed to reducing GHGs and acting on climate change. The program uses a five-milestone framework to move municipalities towards a low-carbon future. The program has two distinct focuses: 1) Corporate sources of GHG emissions (municipal operations), and 2) Community sources of GHG emissions. Milestone 1 (baseline emission inventories) has been completed for both Corporate and Community sources in Vaughan. This plan addresses Milestones 2 and 3 for the Vaughan Community.

City of Vaughan Municipal and Community GHG Emissions



■ Municipal Emissions (2008) ■ Community Emissions (2006)

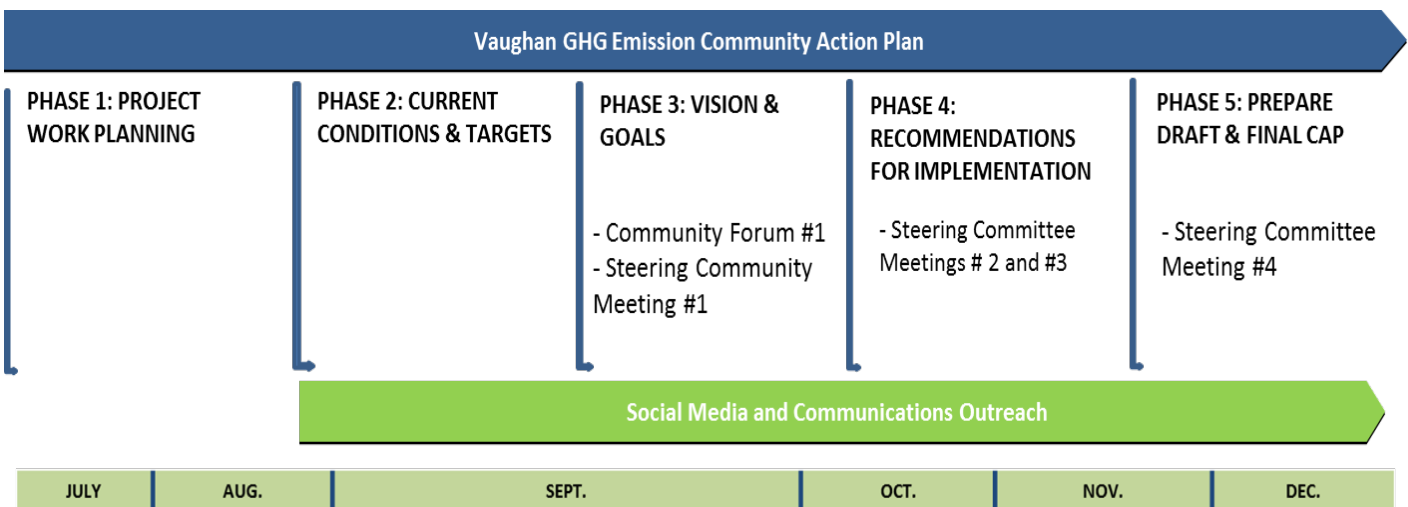
What is the Community Climate Action Plan?

This Community Climate Action Plan (CAP) is designed to provide our community with practical approaches to reducing GHG emissions from community sources. The Plan establishes a mission for climate action, sets goals and targets to reduce current and avoid future GHG emissions, and outlines a number of realistic and achievable actions and future opportunities to reduce GHG emissions, to meet these targets for GHG reduction, and outlines implementation mechanisms to help citizens and businesses contribute to a more sustainable Vaughan.

The Community CAP addresses requirements of the Partners for Climate Protection program. More importantly, it is a call to action. We will need community, industry and government efforts to get there! By creating a community action plan, businesses and citizens can take the lead to address the 99% of GHG emissions that come from community sources in Vaughan to help meet reduction targets. Because most of our emissions are from community sources, our plan is designed to be led by community partners. The City of Vaughan is a facilitator, to help foster and support partnerships and monitor and track progress in the community as well as take action to address GHG emissions in City operations.

How was the Plan Developed?

The Community CAP was developed through a collaborative and stakeholder-driven process, which is meant to be comprehensive and forward thinking, based on best practices, and integrated with existing plans and initiatives. A core component of preparing the Plan was a Steering Committee, made up of a committed group of individuals representing various sectors across Vaughan that have the capacity to lead or participate in GHG reduction activities in our community. The Steering Committee provided guidance to the overall direction of the plan and shaped the mission, goals, actions and opportunities, and implementation. Citizens of Vaughan provided input online and through face-to-face meetings, including social media, IdeaScale, a community meeting, and intercept interviews. Citizen feedback was used to affirm the actions and opportunities and to provide feedback on the plan at various stages.



How Does the CAP Relate to Other Initiatives?



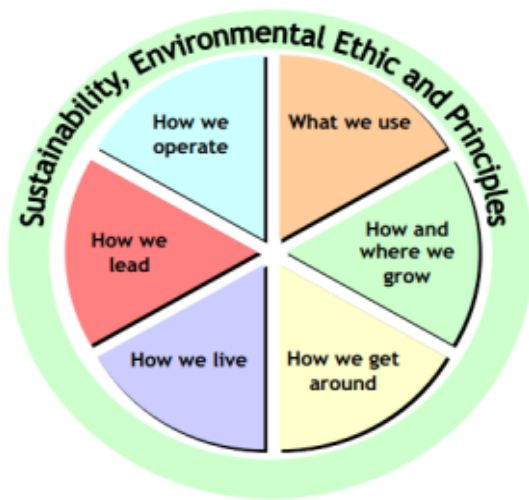
The City of Vaughan has taken a leadership role to encourage environmental sustainability. Direction for the Climate Change Community Action Plan is provided by *Green Directions Vaughan*, the City's Community Sustainability and Environmental Master Plan. It establishes a vision for environmental sustainability and an environmental ethic that is intended to guide development and decisions in the community. Completing PCP Milestones 2 and 3 also has direct or indirect outcomes for all six of *Green Directions Vaughan's* goals. Completion of PCP program Milestones 1 to 3 will complete a number of actions under *Green Directions Vaughan*: Objective 1.1: To reduce greenhouse gas emissions and move towards carbon neutrality for the City of Vaughan's facilities and infrastructure and will successfully complete actions 1.2.4 and 1.2.5 relating to target setting, completion of local action plan and establishment of frameworks for implementation and monitoring.

The Community CAP also builds on direction and established goals and actions from a number of other City plans and initiatives, such as the Vaughan Vision 2020 strategic plan, the City's Official Plan; and various other Master Plans for transportation, pedestrians and cycling, and waste. Our Community CAP is intended to capture direction and goals already established and apply a climate action lens to quantifying impacts in terms of GHG reductions and identify additional opportunities for reduction. It also lays the groundwork for municipal energy planning moving forward.

Leading by Example

Vaughan's climate commitments are supported by many City-led initiatives including:

- ✓ Completing energy audits of municipal facilities
- ✓ Preparing an energy conservation and demand management plan
- ✓ Developing a green fleet strategy
- ✓ Completing waste inventories and a waste management strategy
- ✓ Adopting LEED standard building practices
- ✓ Developing more walkable and transit-friendly services for residents
- ✓ Undertaking a Natural Heritage Network Study
- ✓ Developing an effective civic engagement strategy



Green Directions Vaughan

Green Directions Vaughan is the City's Community Sustainability and Environmental Master Plan. Approved in 2009, this long term plan is designed to guide the community to a more sustainable future. *Green Directions Vaughan* leads by example with a focussed strategy for reducing municipal building and employee GHG emissions as well as for reducing the GHG impact of the Vaughan community. It has developed six principle areas of focus (figure below) and one goal which corresponds to each of these categories.

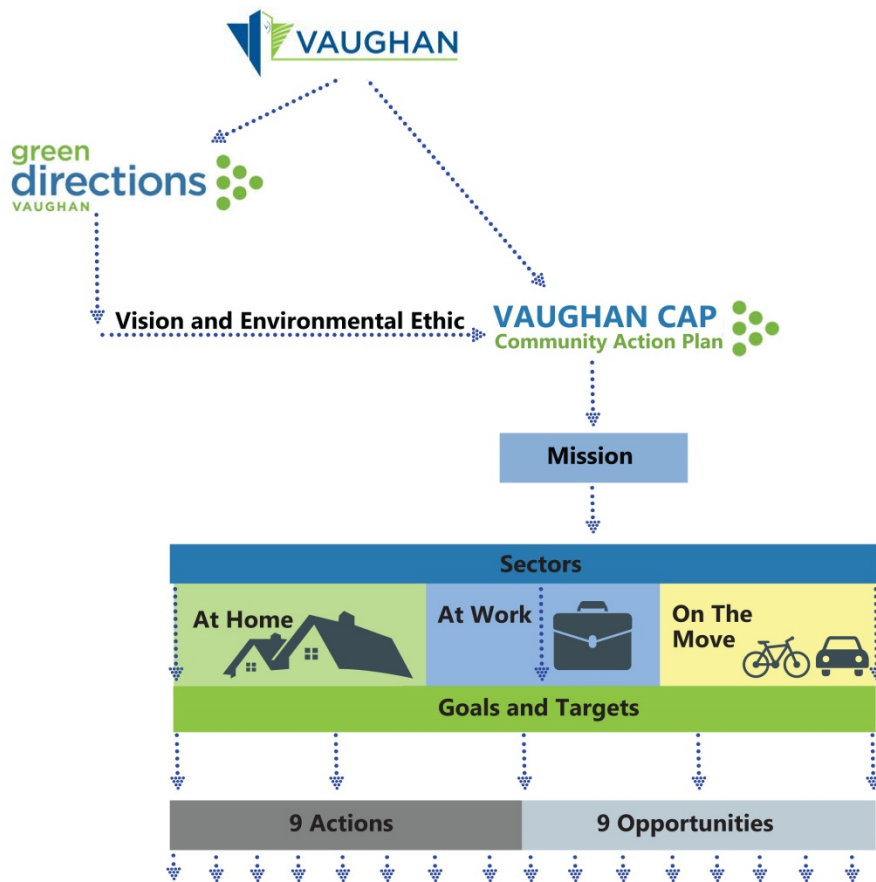
- What We Use*
- How and Where We Grow*
- How We Get Around*
- How We Live*
- How We Lead*
- How We Operate*

- Goal 1: To significantly reduce our use of natural resources and the amount of waste we generate
- Goal 2: To ensure sustainable development and redevelopment
- Goal 3: To ensure that Vaughan is a City that is easy to get around with a low environmental impact
- Goal 4: To create a vibrant community where citizens, businesses and visitors thrive
- Goal 5: To be leaders in advocacy and education on sustainability issues
- Goal 6: To ensure a supportive system for the implementation of Green Directions





2. Overview of the Plan



The following diagram provides an overview of the structure of the Vaughan Community CAP. Each of these various components is described in greater detail below.

Green Directions Vaughan Vision and Environmental Ethic: These are our highest aspirations for the Vaughan community in terms of sustainability. *Green Directions Vaughan* establishes a vision and environmental ethic that is intended to guide innovation and forward-thinking municipal and community action to achieve environmental sustainability in Vaughan.

Mission: Our mission defines the purpose of the Vaughan Community CAP, outlining what it intends to do and how we will get there.

Community GHG Reduction Target: The reduction target provides us with an overall quantifiable amount of GHG emissions we are aiming to reduce to be able to achieve our Community CAP mission.

Sectors: These are areas of focus that show us where GHG emissions are coming from in our community. The sectors are **At Home (Residential and Waste)**, **At Work (Industrial, Commercial and Institutional)** and **On The Move (Transportation)**. For each one we provide an overview of the amount of GHG emissions that are produced for this sector, what actions and opportunities exist for the community as well as tips for GHG reduction activities that you can do At Home, At Work or On The Move.

Goals: Goals are statements of aspiration for specific sectors that help direct our efforts.

Actions: Actions are projects, programs or initiatives that will be completed to help reach the emission reduction target. Actions are projects, programs or initiatives that are currently being led or investigated by partner organizations and have support and commitment from community members.

Opportunities: Opportunities are new ideas for projects, programs and initiatives that have strong potential to help reduce GHGs; however they still require further exploration to determine feasibility, and partners to lead them.

3. Vision and Mission

Our Vision from *Green Directions Vaughan*



Sustainability First

Sustainability means we make decisions and take actions that ensure a healthy environment, vibrant communities and economic vitality for current and future generations.

Our Environmental Ethic

- Lead by example as responsible stewards of our community
- Decisions entail determining the impact of our actions on the environment, weighing social/cultural consequences; and understanding financial implications
- Actions enhance both the natural and built environments

Our Mission for Climate Action

The Vaughan community is committed to acting on climate change now and in the future.

We will reduce greenhouse gas emissions through leadership and education, fostering a culture of social responsibility.

Our efforts will strive to improve human health and economic benefits while sustaining our planet.



4. GHG Emissions and Reduction Targets

Our Baseline GHG Emissions in 2006

A baseline inventory of community GHG emissions was completed by the City of Vaughan using the baseline year 2006. The 2006 baseline year was selected because it was the earliest year that complete data was available. The inventory was broken down into five sectors that contribute to GHG emissions: Residential, Commercial, Industrial, Transportation, and Waste. Total GHG emissions for the Vaughan community were estimated to be 1,695,612 tonnes of eCO₂ per year or 6.8 tonnes of eCO₂ per person per year.



How Much is 1,695,612 Tonnes of eCO₂/Year Anyway?

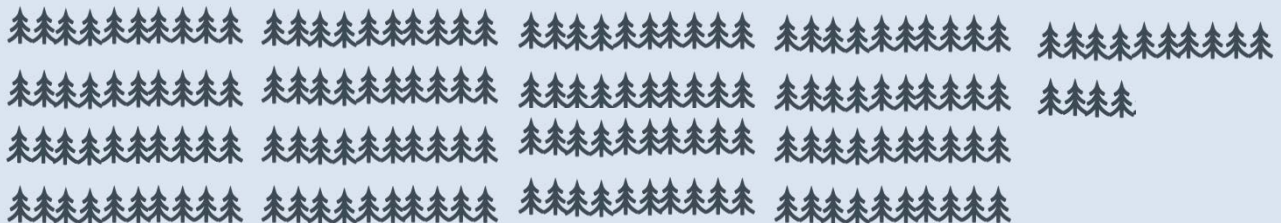
If we think about it another way that amount of GHG emissions produced by the Vaughan community in 2006 is about the same as:

-  The amount of GHG emissions produced by **353,253 cars** on the road each year
-  The average amount of **energy used by 84,696 homes** in 1 year
-  The same amount of eCO₂ that **43 million 10-year old trees** can capture and store in 1 year.

It also means that we would need **20 forests** the same size as the whole City of Vaughan to be able to capture and store all the eCO₂ we produced in 2006.

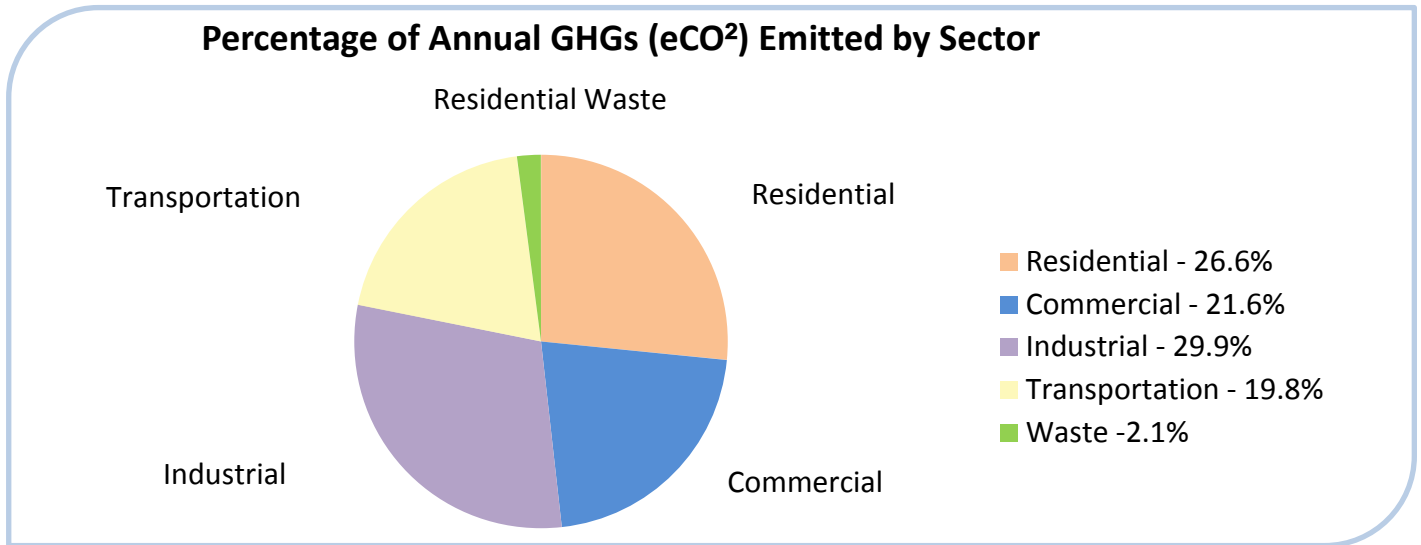
If we assumed that each person was contributing about the same amount of GHG emissions that would be:

- ✓ **6.8 tonnes of eCO₂/person** each year 
- ✓ Which is the same amount produced by **1.5 cars** on the road each year  
- ✓ It would take **174 trees** to offset that amount!



What are eCO₂s? “Equivalent CO₂” (eCO₂), also known as Global Warming Potential weighted greenhouse gas emissions (GWP), is a unit that allows emissions of greenhouse gases of different strengths to be added together. For carbon dioxide itself, emissions in tonnes of CO₂ and tonnes of eCO₂ are the same thing. For methane, a stronger greenhouse gas, one tonne of methane emissions has the same GWP as 21 tonnes of CO₂. Thus one tonne of methane emissions can be expressed as 21 tonnes eCO₂.

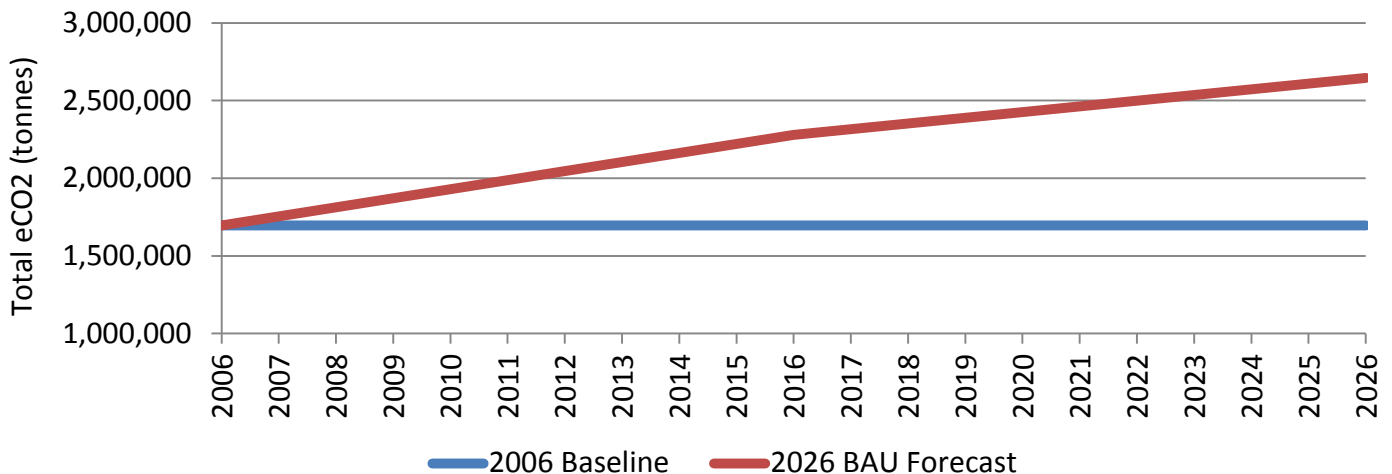
More detailed information about GHG emission for each sector can be found in the sector specific sections of this document (Sections 5 to 7). The chart below demonstrates that each of the categories represents approximately an equal share of annual GHG emissions, with the exception of waste which has negligible impact by comparison. This suggests that we all have a role to play as the most powerful actions to reduce GHG emissions can be made in **At Home** (Residential and Waste), **At Work** (Industrial and Commercial), and **As We Move** (Transportation) sectors.



| Sector | GHGs (t) |
|----------------|------------------|
| Residential | 450,778 |
| Commercial | 367,013 |
| Industrial | 507,293 |
| Transportation | 335,462 |
| Waste | 35,066 |
| Total | 1,695,612 |

Vaughan is unique compared to many other Canadian cities; it is facing tremendous pressures as the City continues to grow and develop. Population is expected to growth significantly over the coming decades as hundreds of thousands of new residents move into Vaughan. New residents and business add to the quantities of GHGs that are emitted in Vaughan through the regular day-to-day activities. If nothing is done to curb the amount of GHGs we emit, we can expect that by 2026 another

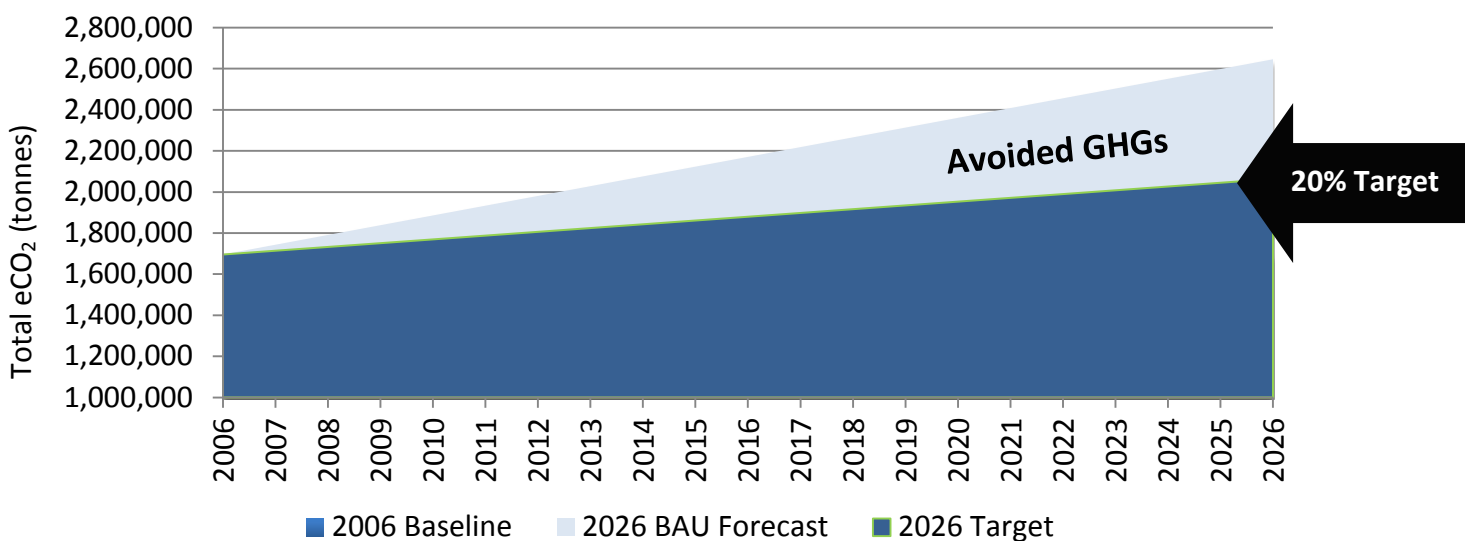
312,634 tonnes eCO₂ of GHGs will be emitted every year. The figure below presents a projection of GHG emissions to 2026 if we took no action at all and our population continued to grow at the expected rate (called a “business-as-usual” BAU Forecast).



Our GHG Emission Reduction Target

Given the large growth in GHG emissions that can be expected in Vaughan, the Community CAP outlines a number of realistic and achievable actions to help reduce current emissions and avoid future emissions. Through implementation of the Actions and Opportunities outlined in this Plan, we believe our community can reduce community GHG emissions by 20% per person below the 2006 baseline year by 2026.

The figure below compares our “business-as-usual” scenario (i.e.: if we took no action at all and our population continued to grow at the expected rate) to the reductions that can be expected with a 20% per capita reduction target. It is important to note that even if each person is successful at reducing GHG emissions by 20%, the total amount of GHGs emitted each year will still be higher in 2026 than they were in the 2006 baseline year because our population is expected to more than double in same amount of time.



What Impact will this Target Have?

Essentially the actions and opportunities in this plan will have the same impact as:



Taking **121,292 cars** off the road each year



Turning off the **energy used in 29,081 homes** in 1 year



The work of **14 million trees** capturing and storing carbon for 1 year.

What Does This Target Mean for Me?

This means we want each person to reduce their GHG emissions by **1.5 tonnes** to 5.3 tonnes of eCO₂ person. The following pages have lots of tips that can help you figure out actions you can take At Home, At Work and On the Move to reach your 1 tonne GHG emission reduction target.



5. Actions and Opportunities At Home



Where We Started

In 2006...

- GHG emissions from energy use were 450,778 tonnes eCO₂ per year or 6.48 tonnes eCO₂ per household per year
- Energy consumption was 8,938,811 GJ per year
- GHG emissions from residential waste was 35,066 tonnes eCO₂ per year

Where We Want to Go

- ✓ We will reduce the amount of electricity and natural gas used in our homes through conservation, improved efficiency, and use of renewable energy sources.
- ✓ We will reduce the amount of waste generated in our homes that ends up in landfill.
- ✓ The City will continue to look at a planning policy that supports more sustainable homes, developments and neighbourhoods.

At Home Emissions

Are the same as:



The amount of GHG emissions produced by **27,708 cars** on the road each year



The average amount of **energy used** by 6,643 **homes** in 1 year



The same amount of eCO₂ that **3.4 million 10-year old trees** can capture and store in 1 year

How We're Going to Get There

Actions

New Construction Requirements for Residential Buildings

Implement green building standards, checklists, or guides for new residential development based on the "[Measuring Sustainability of New Development](#)" project being conducted by the City of Vaughan in partnership with the City of Brampton and Town of Richmond Hill.

The *Measuring Sustainability of New Development* framework aims to reduce the overall ecological footprint of new developments and redevelopment projects in Vaughan and strives to move the Vaughan community towards becoming carbon neutral. The guidelines address activities to reduce energy consumption and GHG emissions, and focus on compact urban form, water conservation, waste reduction, improved mobility and connectivity, and enhancing natural heritage systems and the urban forest.

Residential Energy Conservation and Efficiency

Coordinate residential energy conservation and efficiency retrofit programs that target existing households (single family homes and apartments) to promote and increase participation in energy conservation at home.

A number of existing programs are offered by Enbridge and PowerStream that provide

Retrofit Program(s)

incentives to upgrade to more efficient equipment and to use energy more wisely. There is an opportunity to participate in the [Community Energy Conservation Program – Know Your Energy Score](#) that is a more coordinated effort to encourage participation in the existing programs, including energy auditing and determining energy scores before and after retrofits.

District Energy

District energy systems produce steam, hot water or chilled water at a central plant that can be used by a number of buildings for heating, cooling and hot water. This means that individual buildings don't need their own boilers or furnaces, chillers or air conditioners which results in increased energy efficiency, reduced GHG emissions and cost savings.

Opportunities are being pursued to establish district energy for the Vaughan Metropolitan Centre. A Vaughan District Energy Feasibility Study has been conducted and opportunities are being sought to attract developers.

Residential Waste Diversion

Deliver a comprehensive curbside 4Rs waste management program (reduce, reuse, recycle, recover) for residents by working with the Region to fully implement their [SM4RT Living – Integrated Waste Management Master Plan](#). The Plan focuses on reduction and reuse to help get the Region towards zero waste over the next 40 years, including a food waste reduction strategy. Organic waste materials have the most impact on GHG emissions since decomposition of organic waste in landfills produces a gas which is composed primarily of methane, which is a greenhouse gas.

Opportunities

Sustainable Neighbourhood Pilot

A number of communities in and around the Greater Toronto Area have begun to explore ways to accelerate sustainability and carbon neutrality in neighbourhoods. The Vaughan community could develop a pilot program aimed at creating a “carbon neutral” neighbourhood or street to demonstrate what can be done at the local level and test mechanisms to implement climate action and sustainability principles.

Program components could include:

- Social marketing to foster sustainable behaviours;
- Comprehensive residential energy and water efficiency retrofits;
- Connect with York Region’s Water for Tomorrow program;
- Incentives such as Local Improvement Charges (LICs) to undertake energy efficiency improvements on private property with willing property owners;
- Voluntary program for GHG emission offsets;
- Encouraging local food production (e.g. community gardens) and eating local food (e.g. farmers markets);
- Neighbourhood composting; and
- Climate adaptation measures to reduce climate change impacts (e.g. planting trees, conserving natural areas)



Spotlight on Community Leaders

Luisa and Luigi Caporale – Residential Energy Leaders

Maple residents Luisa and Luigi Caporale are doing their part to reduce GHG emissions. They:

- track monthly energy use
- have installed 42 solar panels on their home
- participate in the Ontario Power Authority's microFIT renewable energy program





What You Can Do at Home!

Energy inefficiencies cost homeowners a lot of money each year and contribute to our overall community GHG emissions. Initiatives like the saveONenergy program allow homeowners to conserve energy, save money and reduce residential GHGs.

Take these steps to help reduce energy costs at home:

1. Reduce your energy usage! Track your monthly energy bills to see how much you are using. Taking simple steps such as lowering your water heater, thermostat, turning off lights and unused appliances can have a big impact over time!
2. Use the saveONenergy program that offers incentives for reducing power use during peak periods, modifying the heating and cooling of your home, and even recycling old or inefficient fridges and freezers.
3. Generate your own green power! Participate in the microFIT program where residents can develop a small renewable electricity generation project, like solar panels, on their property. Not only will you reduce emissions, you will also be paid a guaranteed price over a 20-year term for all the electricity you produce and deliver to the province's electricity grid.
4. When you renovate, think energy savings (CMHC Renovating for Energy Savings research series).

While the percentage of Vaughan's GHG emissions from waste is much lower than that of the other sectors, there is still more we can do to improve our waste practices at home. Most waste related GHG emissions come from organic materials breaking down in landfills and creating methane gas. The most important thing for you to do is keep organic materials out of the landfills.

You can help by:

1. Visiting the City of Vaughan "What Goes Where Guide"! Follow it so your green, blue and waste bins are sorted correctly.
2. Composting your yard waste and fruit and vegetable scraps in a backyard composter. It reduces waste and you get to keep the compost! You can use the finished compost for your flower beds, garden, or lawn.
3. Participating in the Green Bin organics collection program. Other organic wastes, like meat, dairy and soiled paper products can be placed in the municipal Green Bin program for collection.
4. Reduce the purchases that you make each month. Make a conscious effort to avoid unnecessary packaging or products you could do without. Only buy the food you need to eliminate having to throw out spoiled or unused food.

Helpful Resources:

- **Ontario Green Energy Act** - www.energy.gov.on.ca/en/green-energy-act/
- **OPA's saveONenergy Program** - <https://saveonenergy.ca/>
- **OPA's microFIT Program** - <http://microfit.powerauthority.on.ca/>
- **20/20 The Way to Clean Air Program** - <http://www.cleanairpartnership.org/2020>
- **York Region's Water for Tomorrow Program** - <https://www.waterfortomorrow.ca/>
- **Backyard Composting** - www.vaughan.ca/backyardcomposting
- **What Goes Where Guide** - www.vaughan.ca/whatgoeswhere
- **Green Bin Program** - www.vaughan.ca/greenbin

6. Actions and Opportunities at Work



Where We Started

In 2006...

- GHG emissions from commercial and institutional uses were 367,013 tonnes eCO₂ per year and energy consumption was 7,328,622 GJ per year
- GHG emissions from industry were 507,293 tonnes eCO₂ per year and energy consumption was 9,764,852 GJ per year

Where We Want to Go

- ✓ Our businesses, schools, and industries will reduce the amount of electricity and natural gas they consume through conservation, improved efficiency, and use of renewable energy sources.
- ✓ Our businesses, schools, and industries will improve their waste management practices and demonstrate leadership in waste management activities.
- ✓ The City will continue to encourage more sustainable commercial developments through policies, standards and planning practices.

At Work Emissions

Are the same as:



The amount of GHG emissions produced by **53,125 cars** on the road each year



The average amount of **energy used by 12,737 homes** in 1 year



The same amount of eCO₂ that **6.5 million 10-year old trees** can capture and store in 1 year

How We're Going to Get There

Actions

New Construction Requirements for Commercial Buildings

Implement green building standards, checklists, or guides for new Industrial, Commercial & Institutional development based on the "[Measuring Sustainability of New Development](#)" project being conducted by the City of Vaughan in partnership with the City of Brampton and Town of Richmond Hill.

The Measuring Sustainability of New Development framework aims to reduce the overall ecological footprint of new developments and redevelopment projects in Vaughan and strives to move the Vaughan community towards becoming carbon neutral. The guidelines address activities to reduce energy consumption and GHG emissions, and focus on compact urban form, water conservation, waste reduction, improved mobility and connectivity, and enhancing natural heritage systems and the urban forest.

IC&I Energy Conservation and Efficiency Retrofit Program

Coordinate Industrial, Commercial & Institutional energy conservation and efficiency retrofit program targeting existing operations to promote and increase participation in existing programs.

Opportunities exist to improve coordination of programs, implement best management practices and increase participation in IC&I Conservation Demand Management programs delivered by Enbridge and PowerStream, including a Business Energy Advisor to assist with energy audits and provide advice for businesses on how to introduce preventative and predictive maintenance programs.

Opportunities

Environmental Leaders Network

Establish a Vaughan-specific network of environmental leaders to demonstrate and encourage sustainability and climate action leadership amongst the Industrial, Commercial & Institutional sector.

Program components could include:

- Facilitate sector-specific partnerships and knowledge/best practice sharing;
- Local business energy and GHG benchmarking (e.g. audits), disclosure, target setting, and monitoring (e.g. BOMA BEST, Sustainability CoLab)
- Carbon reduction commitments;
- Engagement and education for local businesses on energy and GHG emissions, opportunities for reduction and efficiency, and the business case (e.g. workshops, breakfast series, etc.);
- Opportunities for sustainability training;
- Foster technological innovation;
- Awards and recognition, company promotion and branding; and
- Green Procurement Guide to assist local businesses to purchase environmentally friendly products.

Eco-Business Zone

Eco-Business Zones promote business-to-business networks to work together on green programs or projects so that costs are shared and implementation can happen more quickly.

The Vaughan community can look for opportunities to pursue the creation of an Eco-Business Zone to allow businesses to collaborate and share resources in support of sustainability, GHG emission reduction and leadership.

Components of an Eco-Business Zone could include:

- Pursuing district energy projects;
- Energy audits and green building retrofits;

| | |
|--|--|
| | <ul style="list-style-type: none"> • Expansion of green space and natural landscapes; • Strategies to attract green businesses; and • Encouraging collaborative economic opportunities (e.g. office sharing, energy co-ops, auto-sharing). |
| Operator Training | Establish an Operator Training program to educate building operators and managers on ways to improve building performance. BOMA to lead initiative, providing an effective and low-cost option for training municipal building operators. |
| IC&I Waste Diversion and Leadership | <p>Work with local business to improve waste management practices and demonstrate leadership.</p> <p>Program components could include:</p> <ul style="list-style-type: none"> • Developing a waste management leadership program for businesses and institutions; • Partnering with and supporting the IC&I sector in conducting waste audits and plans to reduce waste generation at IC&I facilities; • Developing a program/policy for responsible disposal of construction and demolition waste; and • Encouraging participants to report on their waste diversion. |
| IC&I Food Waste Diversion | Investigate opportunities to facilitate organics collection for the food service industry and other larger producers of organic waste. |

Spotlight on Community Leaders

York Catholic District School Board's EcoSchools and Energy Champions

The York Catholic District School Board (YCDSB) is working to "green" their schools. In Vaughan:

- 34 YCDSB schools are participating in Ontario's EcoSchools certification program
- YCDSB Energy Champion schools have been outfitted with LCD screens and LED signs that report on energy use and remind staff and students to conserve energy
- Energy Champion schools often experience a 10% drop in energy use

Blue-Zone Technologies Ltd. – Addressing Climate Change through Technology

Blue-Zone is a Vaughan based company that captures and recycles anesthetic gas from hospital operating rooms. These gases have a 20 year global warming potential 3,766 times greater than carbon dioxide. By capturing these gases from one hospital, it equates to taking 400 cars off the road annually.

What You Can Do!

The Industrial, Commercial and Institutional sector accounts for the largest output of emissions; therefore participation from businesses, schools, and industry is essential to meeting community goals.

You can encourage Vaughan businesses, schools, and industries to reduce emissions by:

1. Identifying key decision makers in your workplace and making them aware of the Community CAP and resources available to them.
2. Reducing your personal carbon footprint by using fewer materials when possible, recycling and being aware of your water and electricity use at work. Turn your computer off at the end of the day; print double sided, start a composting program, carpool and more!
3. If you own your own business consider becoming part of a reporting initiative or seeking out your professional network to learn from their best practices.

These and other initiatives by the Industrial, Commercial and Institutional sector are helping Vaughan reduce GHG emissions.

- **Partners for Project Green** – <http://www.partnersinprojectgreen.com/>
- **BOMA BEST** – <http://www.bomabest.com/>
- **Sustainability CoLab** – <http://sustainabilitycolab.org/>
- **Green Biz** - <http://www.greenbiz.com/>



7. Actions and Opportunities On The Move



Where We Started

In 2006...

- GHG emissions from vehicles was 335,462 tonnes eCO₂ per year and energy consumption was 4,778,258 GJ per year
- Total Vehicle Kilometers Travelled (VKT) for all residents were 958,670,208 per year

Where We Want to Go

- ✓ We will reduce our reliance on cars, choose more efficient vehicles and take more sustainable forms of transportation.
- ✓ The City will continue to encourage more sustainable transportation in Vaughan through policies and land use planning practices.

On The Move Emissions

Are the same as:



The amount of GHG emissions produced by **40,458 cars** on the road each year



The average amount of **energy used by 9,700 homes** in 1 year



The same amount of eCO₂ that **4.9 million 10-year old trees** can capture and store in 1 year

How We're Going to Get There

Actions

Land Use Planning Policy

The City of Vaughan has a comprehensive [Transportation Master Plan](#) that aims to reduce automobile dependence and move the City closer to achieving the goal of a more liveable and sustainable community.

The City of Vaughan can support reduced GHGs from transportation by implementing the land use planning policies identified in the Transportation Master Plan. These policies include:

- Integrating transportation planning with the Official Plan;
- Focusing development in the Centres and Corridors;
- Creating “Complete Communities”; and
- Strengthening relationship between land use and transportation planning services.

Active Transportation and Transportation Demand Management

Implement active transportation and Transportation Demand Management (TDM) initiatives outlined in the City's [Transportation Master Plan](#) in support of its vision of reducing automobile dependence and moving the City closer to achieving the goal of a more liveable and sustainable community.

Active transportation and TDM policies include:

- Support TDM organizations;
- Work with large employers to develop TDM programs;
- Implement [Safe Routes to School](#) program;
- Implement 20/20 The Way to Clean Air program;
- Work with developers to encourage alternative modes of transportation;
- Require TDM plans for new development;
- Facilitate seamless connections between different modes of travel;
- Support the development of car-sharing and bike-sharing programs; and
- Develop a comprehensive and connected network of pedestrian and cycling facilities.

Public Transit Enhancements

Implement the “transit first” approach outlined in the City’s [Transportation Master Plan](#) in support of its vision of reducing automobile dependence and moving the City closer to achieving the goal of a more liveable and sustainable community.

Transit network improvements include:

- Rapid transit expansion;
- Improved access to GO regional transit service;
- Designated Transit Priority Corridors;
- Bus service expansion; and
- Transit fare and service integration.

Opportunities

Anti-Idling Efforts

Promote the City’s Anti-Idling Bylaw and establish Idle-Free Zones around sensitive populations (e.g. daycares, schools, long-term care facilities, hospitals) through enhanced awareness and outreach activities.

Electric Vehicle Charging Stations

Electric vehicles can have significant emissions benefits over conventional vehicles, with no tailpipe emissions for an all-electric mode and overall less GHG emissions compared to conventional vehicles, depending on sources of electricity generation.

There is an opportunity to facilitate installation of charging stations around the City for electric vehicles (e.g. work with businesses, utilities, etc.).

Use of Alternative Fuels

Implement initiatives to promote and encourage the use of alternative fuels, such as:

- Encouraging businesses to explore green fleet options (e.g. biodiesel, natural gas, electric, hybrid) through education, awareness, and incentives (e.g. provincial Electric Vehicle Incentive Program);
- Encouraging the uptake of alternative fuels/vehicles by residents (e.g. hybrid, electric, natural gas) through education and awareness initiatives; and
- Develop a program that provides incentives to taxi cabs operating in the City to switch to hybrid or low emission vehicles.




Spotlight on Community Leaders

York Region's Personal Travel Planning Pilot Program

York Region wants residents to rethink their transportation options.

- In 2011 a Personal Travel Planning (PTP) pilot program was launched in Thornhill
- Travel information kits, diaries, surveys, and face-to-face travel consultations were offered
- Thornhill experienced a 17% drop in single-occupant vehicle trips and an overall doubling of transit trips





What You Can Do!

Resident choices can have a large impact on GHG emissions from transportation. Vaughan and York Region have a well-developed transportation system and many alternative travel options available that can help reduce community emissions.

You can help by:

1. Getting a transit pass, joining a car share, or choosing to carpool.
2. Choose walking or cycling over driving when possible.
3. Turning off your car while waiting; idling is unnecessary and contributes to emissions!
4. Consider purchasing a car that uses an alternative source of fuel.

Helpful Resources:

- Travel Smart – www.travelsmartcornell.ca
- Smart Commute North Toronto Vaughan – www.smartcommutentv.ca
- Ontario Ministry of Transportation – www.mto.gov.on.ca
- Trans Canada Carpool.ca – www.carpool.ca



8. Summary of Actions and Impacts

The following table is a summary of the impacts of the nine Actions identified in the Community Climate Action Plan. More details about the Actions and Opportunities outlined in the Plan can be found in Appendix A and B, including assumptions and notes.

| Action | Environmental Benefits | | | Health, Social and Economic Benefits | Total City Investment Made to Date |
|--|---|---|--|--|------------------------------------|
| | GHG Avoidance Potential at 2016 (Tonnes eCO ₂ /Year) | GHG Avoidance Potential at 2026 (Tonnes eCO ₂ /Year) | Other Environmental Benefits | | |
| New Construction Requirements for Residential Buildings | 13,000 | 46,000 | <ul style="list-style-type: none"> Local air quality Stormwater management Water conservation Natural heritage | <ul style="list-style-type: none"> Reduced utility costs Increased value of homes Strengthened green technology industry Increase physical activity from better built form and connectivity Improved access to nature Improved air quality Reduction in Urban Heat Island | \$22,500 |
| Residential Energy Conservation and Efficiency Retrofit Program | 2,300 | 4,000 | <ul style="list-style-type: none"> Local air quality Stormwater management Water conservation Natural heritage | <ul style="list-style-type: none"> Reduced utility costs Increased value of homes Strengthened green technology industry Improved air quality Reduction in Urban Heat Island | In-kind support |

| Action | Environmental Benefits | | | Health, Social and Economic Benefits | Total City Investment Made to Date |
|---|---|---|--|--|------------------------------------|
| | GHG Avoidance Potential at 2016 (Tonnes eCO ₂ /Year) | GHG Avoidance Potential at 2026 (Tonnes eCO ₂ /Year) | Other Environmental Benefits | | |
| District Energy | N/A | 28,000 | <ul style="list-style-type: none"> Local air quality | <ul style="list-style-type: none"> Reduced business operating costs Strengthened green technology industry | \$100,000 |
| Residential Waste Diversion | 29,000 | 32,000 | <ul style="list-style-type: none"> Reduced waste/resources | <ul style="list-style-type: none"> Reduced disposal costs Cost savings in home | In-kind support |
| New Construction Requirements for Commercial Buildings | 28,000 | 166,000 | <ul style="list-style-type: none"> Local air quality Stormwater management Water conservation Natural heritage | <ul style="list-style-type: none"> Reduced business operating costs Reduced labour and maintenance efforts Strengthened green technology industry Increased climate resiliency | \$22,000 |
| IC&I Energy Conservation and Efficiency Retrofit Program | 25,000 | 45,000 | <ul style="list-style-type: none"> Local air quality Stormwater management Water conservation Natural heritage | <ul style="list-style-type: none"> Reduced business operating costs Strengthened green technology industry Improved corporate image Reduction in Urban Heat Island | In-kind support |

| Action | Environmental Benefits | | | Health, Social and Economic Benefits | Total City Investment Made to Date |
|---|---|---|---|--|--|
| | GHG Avoidance Potential at 2016 (Tonnes eCO ₂ /Year) | GHG Avoidance Potential at 2026 (Tonnes eCO ₂ /Year) | Other Environmental Benefits | | |
| Land Use Planning Policy | 1,700 | 7,200 | <ul style="list-style-type: none"> Local air quality Natural heritage | <ul style="list-style-type: none"> More efficient use of land Increased physical activity Stronger communities Shorter commute times Improved air quality Reduced travel costs Local economic development | Through Secondary Plans, Block Plans, and Transportation Master Plan (TMP) |
| Active Transportation and Transportation Demand Management (TDM) | 28,000 | 66,000 | <ul style="list-style-type: none"> Local air quality | <ul style="list-style-type: none"> Increased physical activity Reduced travel costs Improved air quality | \$60,000 (past 6 years) \$500,000 |
| Public Transit Enhancements | 42,000 | 88,000 | <ul style="list-style-type: none"> Local air quality | <ul style="list-style-type: none"> Increased physical activity Shorter commute times Reduced travel costs More job opportunities Improved air quality | Through Secondary Plans, Block Plans, and Transportation Master Plan (TMP) |
| | Total GHGs Avoided: 169,000/Year | Total GHGs Avoided: 482,200/Year | | | |

9. Next Steps: Implementing the Plan

Roles and Responsibilities

Community Partners

This is a community plan and the actions and opportunities described by this Community CAP will require the efforts of many members of our community to move it from a plan to reality. It cannot be implemented by a single organization, business, industry or the City alone. To succeed, the Community CAP must be implemented by all members of our community as a whole.



There is a wealth of knowledge and leadership in Vaughan as seen in community groups, businesses, institutions, municipal governments, branches of the federal or provincial government, and non-governmental organizations. Many of these groups and organizations are already taking action and contributing to achieving the City of Vaughan's actions under various master plans including the community sustainability, transportation, and pedestrian and cycling plans. To make sure the Community CAP continues to move forward, we will:

Create a Community CAP Committee



The City will coordinate and facilitate a committee of community partners that meet on a regular basis each year to reflect on the actions and opportunities completed, GHG emission reductions achieved, and to look at opportunities in the future for Community CAP work planning and prioritizing. The committee will consist of stakeholders with broad representation across the sectors of the Community CAP and will include those partners leading community GHG emission reduction actions. We expect that the partners who are leading and participating in the delivery of specific actions will self-organize their team.

Facilitate Collaboration through the City of Vaughan

Although community partners have a large role in implementing components of the Community CAP, the City of Vaughan also plays a key role. The City will continue to act as a facilitator, helping to implement the Community CAP in order to achieve benefits for the City and our community. The City's role is to guide the overall Community CAP process and annual work planning and prioritization process, reduce barriers, coordinate efforts, help information flow, build capacity, and leverage resources. This role can be fulfilled through the existing resources at the City under the banner of



implementation of *Green Directions Vaughan*. The City also has specific leading and supporting roles in a number of the Actions and Opportunities that will be coordinated on a per project or action basis.

Mobilizing the Community

The Vaughan community is committed to acting on climate change now and in the future. An ongoing conversation about climate change and its impacts in our community is important for the success of the Plan. Communication, education and outreach efforts to engage and mobilize the Vaughan community are necessary to help foster enhanced understanding of climate change and to encourage community members to take action. Such efforts will work to continually raise awareness of climate change impacts, encourage personal and organizational actions, continue development of community partnerships, and celebrate progress of partners and individual projects that move us closer towards our targets for reduced greenhouse gas emissions.



Components could include:

- Research barriers and motivators to climate action in Vaughan to better understand community perspectives
- Develop a branding strategy to promote climate action with common messaging that resonates with the diverse communities of Vaughan.
- Leverage and build on existing programs (e.g. Earth Hour, 20/20 The Way to Clean Air)
- Develop a community energy map to show energy consumption in Vaughan spatially
- Engage youth in an ongoing forum on climate action to raise awareness and motivate further action
- Develop a coordinated approach to encourage all schools in Vaughan to pursue EcoSchool Certification and incorporate 20/20 The Way to Clean Air into Grade 5 curriculum
- Work with community leaders to develop and support community champions of climate action

Resources and Funding

Ongoing resources and funding are required for continued implementation of the Community CAP. Leveraging existing initiatives and resources, both internal and external to the City, is imperative. The City of Vaughan should continue to find ways to leverage existing resources to ensure initiatives can be implemented to the fullest extent possible. Other organizations, including non-profit, government and businesses, are at the forefront of the Actions and Opportunities identified in the Community CAP and have an important role to play in implementation.

Coordination and Administration Services

The City of Vaughan will continue its role in providing oversight for the implementation of the Community CAP. This includes the regular monitoring and reporting of progress and coordinating community partners and regular planning and working meetings. The City will coordinate and facilitate the committee of community partners that meet on a regular basis (1-2 times per year).



Community Project Fund



A community project fund should be established to support the opportunities identified by the Community CAP. For example, a dedication of \$25,000 per year for the next four years could be made available for eligible projects. Community members, groups, or organizations would have to apply for a portion of the fund and demonstrate how their project(s) supports the Community CAP. It would be the City of Vaughan’s discretion as to how the funds would be awarded.

Seeking External Sources of Funding

The City of Vaughan, in partnership with community partners, should actively monitor and seek funding opportunities to help implement Actions and Opportunities outlined in the Community CAP.



Ongoing Tracking and Monitoring

Measuring and reporting tells us how well we are progressing with the implementation of the Community CAP. It also allows us to demonstrate activities that contribute to achieving the vision of *Green Directions Vaughan*, recognize partners, and further mobilize the community.

Monitor GHG Emissions



Each year, GHG emissions for the Vaughan community will change as the Community CAP is implemented and as the population grows. GHG data will be catalogued on an annual basis through ICLEI Canada’s PCP Milestone Tool by the City of Vaughan. The tool provides a framework to quantify, monitor and manage GHG emission data generated at the local level based on the methodology of the PCP program. It will be useful to analyze annual data and provide updates on GHG emissions for the year to better understand the effectiveness of new initiatives, and to identify areas that have improved and areas the need more attention. This will provide important information to the community committee for the purposes of work planning and prioritizing efforts.

Monitoring progress towards sustainability in Vaughan is conducted by measuring a set of 24 indicators. These indicators are a selected set of parameters related to the sustainability objectives of *Green Directions Vaughan* that allow measurement of trends over time. This gives an indication of where Vaughan is in terms of sustainability and how it changes over time. Community greenhouse gas emissions is one of the 24 indicators, which are measured with the PCP Milestone Tool. Progress on implementation of the Community Climate Action Plan should also be reported annually through the established *Green Directions Vaughan* implementation reports.

Community CAP Review

The Community CAP needs to be flexible in order to adapt to the Vaughan community as it changes, especially considering the anticipated population growth. Similar to how *Green Directions Vaughan* is a “living document”, the Community CAP also needs to be flexible. Accordingly, the Vaughan CAP should be refreshed on a regular basis, in line with the ongoing review of *Green Directions Vaughan*. The purpose of this review is to engage City Council and community members in a discussion on the progress of the plan and to review or revise it accordingly based on newly identified priorities and successes achieved.



Timing of Implementation



The Actions and Opportunities outlined in the Community Climate Action Plan will take time to implement, some sooner or later than others. Several of the actions identified are already underway or planned for and others still have to be mapped out and partners established. Impactful and easy to implement actions should be implemented first to build momentum. Implementation of the plan needs to be flexible in terms of timing in order to ensure the right program partners, delivery agents, and funding support are adequately aligned before moving forward with initiatives.

Next Steps

The Actions and Opportunities need to be further developed through discussions with potential delivery agents, identifying collaborators, leveraging and confirming funding and other resources, establishing the feasibility of the initiative, determining the level of community support, establishing the business case where necessary, as well as finalizing the mechanisms for monitoring, evaluating and reporting on implementation.





Get Involved!

For more information on how to get involved, please contact:

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Manager of Environmental Sustainability
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environment@vaughan.ca

More information on *Green Directions Vaughan* at: <https://www.vaughan.ca/environment>



@City_of_Vaughan



<https://www.facebook.com/thecityofvaughan>



Appendix A: GHG Avoidance Actions

| Action | Partners | | Status and Timing | GHG Avoidance Potential ^A | | Financial ^B | | Public Acceptance ^C |
|--|--|--|---|--|--|--|------------------------------------|--------------------------------|
| | Lead Partner(s) | Collaborators | | At 2016 (Tonnes eCO ₂ /Year) | At 2026 (Tonnes eCO ₂ /Year) | Total Cost | Total City Investment Made to Date | |
| New Construction Requirements for Residential Buildings | <ul style="list-style-type: none"> City of Vaughan | <ul style="list-style-type: none"> York Region Partner municipalities Building industry and stakeholders Canadian Green Building Council | <ul style="list-style-type: none"> Pilot testing: 2014 Implementation of guidelines: 2015 | 13,000 ¹ | 46,000 ¹ | \$180,000 | \$22,500 | +++ |
| Residential Energy Conservation and Efficiency Retrofit Program | <ul style="list-style-type: none"> Enbridge PowerStream Windfall Ecology Centre | <ul style="list-style-type: none"> City of Vaughan Ontario Power Authority Canada Mortgage and Housing Corporation QUEST Avacos Renewable Energy Earth Hour Vaughan Vaughan C.A.R.E.S. York Region Environmental Alliance York Region Public Health | <ul style="list-style-type: none"> Utility programs ongoing Coordinate Community Energy Conservation Program: 2014/15 | 2,300 ² | 4,000 ² | Utilities investment is \$8,500,000/year | In-kind support | +++ |
| District Energy | <ul style="list-style-type: none"> City of Vaughan | <ul style="list-style-type: none"> Developers PowerStream York Region | <ul style="list-style-type: none"> Efforts currently underway at VMC (initial work completed, ongoing efforts to attract developers) | N/A ³ | 28,000 ³ | Private Information | \$100,000 | ++ |

| | | | | | | | | |
|---|---|--|---|---------------------|----------------------|--|------------------------------|-----|
| Residential Waste Diversion | <ul style="list-style-type: none"> • York Region • City of Vaughan | <ul style="list-style-type: none"> • York Region Public Health • Windfall Ecology Centre • Earth Hour Vaughan • Vaughan C.A.R.E.S. • York Region Environmental Alliance • Goodwill | <ul style="list-style-type: none"> • Diversion efforts initiated in 1990s • Implementation of SM4RT LIVING Plan: 2013 and beyond • Food Waste Campaign development and composting pilots: 2014 | 29,000 ⁴ | 32,000 ⁴ | York Region investment is \$800,000/year (for 2014-2018) | In-kind support | +++ |
| New Construction Requirements for Commercial Buildings | <ul style="list-style-type: none"> • City of Vaughan | <ul style="list-style-type: none"> • York Region • Partner municipalities • Building industry and stakeholders • Canadian Green Building Council | <ul style="list-style-type: none"> • Pilot testing: 2014 • Implementation of guidelines: 2015 | 28,000 ⁵ | 166,000 ⁵ | Covered above in residential | Covered above in residential | +++ |
| IC&I Energy Conservation and Efficiency Retrofit Program | <ul style="list-style-type: none"> • Enbridge • PowerStream | <ul style="list-style-type: none"> • City of Vaughan • Ontario Power Authority • Vaughan C.A.R.E.S. • Faith & the Common Good • York Region Public Health | <ul style="list-style-type: none"> • Utility programs ongoing | 25,000 ⁶ | 45,000 ⁶ | Utility investment is \$9,000,000/year | In-kind support | +++ |
| Land Use Planning Policy | <ul style="list-style-type: none"> • City of Vaughan | <ul style="list-style-type: none"> • York Region • Metrolinx • York Region Public Health | <ul style="list-style-type: none"> • Policies integrated into Official Plan and implementation underway | 1,700 ⁷ | 7,200 ⁷ | Through Secondary Plans, Block Plans, TMP (Transportation Master Plan) | \$500,000 to develop TMP | +++ |
| Active Transportation & Transportation Demand Management | <ul style="list-style-type: none"> • City of Vaughan • York Region • Metrolinx (and Smart Commute) | <ul style="list-style-type: none"> • York Region Public Health • Windfall Ecology Centre • Earth Hour Vaughan • Large corporations | <ul style="list-style-type: none"> • Implementation of Transportation Master Plan underway | 28,000 ⁸ | 66,000 ⁸ | \$60,000 (over past 6 years) | \$60,000 (over past 6 years) | +++ |

| | | | | | | | | |
|------------------------------------|---|---|---|---|---|--|--------------------------|-----|
| Public Transit Enhancements | <ul style="list-style-type: none"> • Metrolinx • York Region • City of Vaughan | <ul style="list-style-type: none"> • York Region Public Health | <ul style="list-style-type: none"> • Implementation of Transportation Master Plan underway | 42,000 ⁹ | 88,000 ⁹ | Through Secondary Plans, Block Plans, TMP (Transportation Master Plan) | \$500,000 to develop TMP | +++ |
| | | | | Total GHGs Avoided: 169,000/Year | Total GHGs Avoided: 482,200/Year | Public Acceptance + = Low ++ = Medium +++ = High | | |

Notes

A – Potential GHG avoidance calculated using ICLEI Canada’s Excel-based Climate Action Database. GHG reduction potential is in comparison to the business-as-usual scenario. The 2026 GHG reduction potential encompasses the 2016 GHG emission reduction potential.

B – Cost data provided by the City of Vaughan and other contributing partners based on investments made or budgeted for.

C – Public acceptance levels of actions gauged based on community feedback collected at the Community Forum, from IdeaScale, and online/in-person surveying.

1 – Based on the *Measuring the Sustainability Performance of New Development in Brampton, Richmond Hill, and Vaughan* Report (August 30, 2013). Assumes the New Construction Requirements will come into effect in 2015 and will apply to all new homes constructed.

2 – Based on information on conservation demand management programs provided by PowerStream and Enbridge. Assumes continuation of comparable programs.

3 – Based on information provided by the City of Vaughan from the *Vaughan District Energy Feasibility Study*. Assumes full build-out of the Vaughan Metropolitan Centre Secondary Plan (approx. 80 buildings). Two residential district energy systems with Combined Heat and Power (CHP) are considered in the Vaughan Metropolitan Centre Secondary Plan. It is assumed that the district energy system will be built after 2016 and before 2026.

4 – Based on information in York Region *SMART Living Integrated Waste Management Master Plan*, using 2031 projected waste generation. Assumes the amount of residual waste created in 2010 is the same as in 2016 and that 30% of the Region of York’s waste is from the City of Vaughan (based on population).

5 – Based on the *Measuring the Sustainability Performance of New Development in Brampton, Richmond Hill, and Vaughan* Report (August 30, 2013). Assumes the New Construction Requirements will come into effect in 2015 and will apply to all new construction.

6 - Based on information on conservation demand management programs provided by PowerStream and Enbridge. Assumes continuation of comparable programs.

7 – Assumes land use policies may reduce vehicle kilometers traveled by 0.5 to 1.7 percent below the business-as-usual (BAU) scenario during time horizons of ten to forty years. Since the City of Vaughan’s Transportation Master Plan was published in 2012, the effect of land use policies on VKT in 2016 and 2026 are assumed to be 0.5% and 1.7% below the business-as-usual scenario respectively.

8 – Assuming the additional 70 km of bicycle and pedestrian network facilities identified in the Transportation Master Plan will be added after 2016 and that it will be split evenly between bicycle and pedestrian facilities, a total of 244 km and 196.88 km of bicycle facilities will be in place in 2016 and 2026 respectively. The addition of 244 km and 196.88 km of bicycle and pedestrian network facilities will increase active modal split to 7.5% and 12.5% in 2016 and 2026 respectively. If active transportation modal split increases, assumes auto driver modal split decreases by the same amount. The auto driver modal split in 2016 and 2026 would therefore be 63.5% and 58.5% respectively.

9 – Based on the goal of Vaughan’s Transportation Master Plan City to achieve 30% overall transit modal split in Peak Periods by 2031. Assumes that the ratio of peak period to 24 hour period of travel is the same in 2006 and 2031. If peak period and 24 hour auto driver modal split in 2006 are 66% and 69% respectively, then in 2031 the peak period and 24 hour period auto modal split would be 46% and 48% respectively.



Appendix B: GHG Avoidance Opportunities

| Opportunities | Potential Lead Partner(s) | Potential Collaborators | Status and Timing | GHG Avoidance Potential | Total Cost | Public Acceptance |
|--|---|--|---|-------------------------|-------------------------|-------------------|
| Sustainable Neighbourhood Pilot | <ul style="list-style-type: none"> City of Vaughan Toronto and Region Conservation Authority York Region | <ul style="list-style-type: none"> Windfall Ecology Centre PowerStream Enbridge Ontario Power Authority Canada Mortgage and Housing Corporation QUEST York Region Public Health School boards Faith and Common Good Earth Hour Vaughan Vaughan C.A.R.E.S. York Region Environmental Alliance Avacos Renewable Energy Project Neutral | <ul style="list-style-type: none"> Explore feasibility and define project scope: 2014 Implementation: 2015/16 | <p>↓↓↓¹</p> | <p>\$\$²</p> | <p>+++</p> |
| Environmental Leaders Network | <ul style="list-style-type: none"> City of Vaughan CoLab BOMA | <ul style="list-style-type: none"> Chamber of Commerce York Region Vaughan C.A.R.E.S. Canadian Green Building Council School Boards | <ul style="list-style-type: none"> Explore feasibility: 2014 Sustainability CoLab: 2014 | <p>↓↓↓³</p> | <p>\$</p> | <p>+++</p> |

| | | | | | | |
|--|---|--|---|------------------|-----------------|-----|
| Eco-Business Zone | <ul style="list-style-type: none"> • Toronto and Region Conservation Authority • Earth Rangers | <ul style="list-style-type: none"> • City of Vaughan • York Region • Enbridge • PowerStream • Windfall Ecology Centre • Avacos Renewable Energy • Faith and Common Good | <ul style="list-style-type: none"> • Explore feasibility: 2014/15 | ↓↓↓ ⁴ | \$ ⁵ | ++ |
| Operator Training | <ul style="list-style-type: none"> • BOMA | <ul style="list-style-type: none"> • City of Vaughan | <ul style="list-style-type: none"> • Explore feasibility: 2014 | ↓↓↓ ⁶ | \$\$ | +++ |
| IC&I Waste Diversion and Leadership | <ul style="list-style-type: none"> • York Region • City of Vaughan • Ministry of the Environment • BOMA | <ul style="list-style-type: none"> • York Region Public Health • Windfall Ecology Centre • Earth Hour Vaughan • Vaughan C.A.R.E.S. • Chamber of Commerce • Local businesses • School Boards | <ul style="list-style-type: none"> • Explore feasibility: 2015/16 | ↓ | \$ | +++ |
| IC&I Food Waste Diversion | <ul style="list-style-type: none"> • York Region • City of Vaughan • Chamber of Commerce | <ul style="list-style-type: none"> • York Region Public Health • Windfall Ecology Centre • Earth Hour Vaughan • Vaughan C.A.R.E.S. • Faith and Common Good • Local businesses (food service and event providers) | <ul style="list-style-type: none"> • Explore feasibility: 2015/16 | ↓ | \$ | +++ |
| Enhanced Anti-Idling Efforts | <ul style="list-style-type: none"> • City of Vaughan | <ul style="list-style-type: none"> • York Region Public Health • Earth Hour Vaughan • Windfall Ecology Centre • York Region Environmental Alliance | <ul style="list-style-type: none"> • Bylaw passed in 2004; enforcement ongoing | ↓ ⁷ | \$ | +++ |
| Electric Charging Stations | <ul style="list-style-type: none"> • City of Vaughan • Windfall Ecology Centre | <ul style="list-style-type: none"> • York Region Public Health • Enbridge • Local Businesses | <ul style="list-style-type: none"> • Explore feasibility: 2015 | ↓ ⁸ | \$ ⁹ | ++ |

| | | | | | | |
|---------------------------------|---|--|---|-----------------|------------------|----|
| Use of Alternative Fuels | <ul style="list-style-type: none"> • Windfall Ecology Centre • Earth Hour Vaughan • York Region Environmental Alliance | <ul style="list-style-type: none"> • City of Vaughan • York Region Public Health • Enbridge | <ul style="list-style-type: none"> • Explore feasibility: 2015 | ↓ ¹⁰ | \$ ¹¹ | ++ |
|---------------------------------|---|--|---|-----------------|------------------|----|

Key

+ = positive benefit (unquantified)
N/A = Not available

GHG Avoidance

↓ = < 5000 Tonnes eCO₂ avoided/year
 ↓↓ = 5,000 to 10,000 Tonnes eCO₂ avoided/year
 ↓↓↓ = >10,000 Tonnes eCO₂ avoided/year

Cost

\$ = <\$100,000
 \$\$ = \$100,000 to 500,000
 \$\$\$ = \$500,000 to 1 million (M)
 \$\$\$\$ = \$1M to 5M
 \$\$\$\$\$ = >\$5M

Notes

A – Potential GHG avoidance calculated based on case studies and best practices. They are estimates only to give an indication of the how much GHGs could be avoided based on results from other places and could be applied to Vaughan. Scope of initiatives could vary considerably from those defined in the case examples. It is important to note that the impacts of all these Opportunities are not cumulative; impacts of several Opportunities may overlap with others if all are implemented.

B – Cost data estimated from case studies and best practices for information purposes. Actual costs will vary depending on scope of initiatives implemented.

C – Public acceptance levels of actions gauged based on community feedback collected at the Community Forum, from IdeaScale, and online/in-person surveying.

1 – TRCA’s County Court Sustainable Neighbourhood Retrofit Action Plan (SNAP) in Brampton County has resulted in an estimated 39% reduction in residential energy consumption amongst the 1600 households within the project boundary for a total of 18% reduction in GHG emissions. Based on the City of Vaughan’s Community GHG Emissions Baseline for 2006, per household GHG emissions were 6.38 tonnes of eCO₂. Assuming a 1,000 household pilot area, GHG emission avoidance could be over 6,000 tonnes of eCO₂ per year. Pilot areas could range from small (street level) to larger or multiple neighbourhoods.

2 – SNAP programs can cost \$100,000 to \$200,000 to develop, including consultant fees and in-kind contributions from local partners. SNAPs have been successful in securing external funding sources. Ongoing implementation and oversight of SNAP programs vary depending on the types of projects and programs implemented.

3 – Sustainability CoLab, a local network of organizations setting and working towards GHG reduction targets in Waterloo Region, has 60 members – representing over 13% of the Region’s workforce. 16 of those organizations have collectively committed to reducing GHG emissions by 45,000 tonnes annually. Assuming a comparable initiative in Vaughan and a conservative estimate of 8 organizations making a commitment, GHG avoidance could be over 20,000 tonnes of eCO₂ per year.

4 – The GTAA Partners in Project Green Pearson Eco-Business Zone has established a 20% reduction target in energy consumption and a 10% target for renewable energy use (totaling 30% reduction in GHG emissions from energy). Assuming a comparable initiative in Vaughan and a conservative estimate of 5% of commercial and industrial sectors participating, GHG avoidance could be approximately 10,000 tonnes of eCO₂ per year.

5 – The Durham Partners in Project Green Eco-Business Program is supported by an annual contribution of \$100,000 from the Region, local municipalities, and utilities.

6 – Average energy use intensity for BOMA BEST certified office buildings is 30.76 kWh/ft²/yr (or 1.19 f GJ/m²/yr) with a median of 27.84 kWh/ft²/yr – a 16% improvement on the NR Can national average. Based on the City of Vaughan’s Community GHG Emissions Baseline for 2006, commercial sector energy use (electricity and natural gas) produced 363,502 tonnes of eCO₂. Assuming a 16% improvement in energy use and a 30% participation rate, GHG emission avoidance could be over 17,000 tonnes of eCO₂ per year.

7 – The BC Climate Action Toolkit estimates that for the average vehicle with a 3-litre engine (e.g. 2000 Nisan Patrol) every 10 minutes of idling costs more than a quarter of a litre in wasted fuel or approximately 0.6 kg of carbon dioxide. Potential GHG reduction = (number of cars estimated to stop idling)*(the average number of minutes a car idles in a day)*(0.06 Kg/min)*365 days/year.

8 – The Ontario Ministry of Transportation estimates electric vehicles can produce up to 88% less GHG emissions compared to gasoline given Ontario’s current electricity supply mix. Assuming a 2% update in Vaughan, GHG emission avoidance could be over 5,000 tonnes of eCO₂ per year.

9 – The cost of an electric charging station is approximately \$5,000.

10 – Green vehicles produce approximately 50% less GHGs compared to non-green vehicles. The average light-duty gasoline vehicle in Canada has a fuel efficiency of 10.7 L/100 km and travels 15,400 km per year, consuming 1,647.8 L of gasoline and producing 3.8 tonnes of CO₂e per year. In contrast, a 2012 Toyota Prius has a fuel efficiency of ~4.0 L/100 km. Travelling the same 15,400 km per year, the Prius would consume 616 L of gasoline and produce 1.4 tonnes of eCO₂ – an annual GHG reduction of approximately 2.4 tonnes. An average light-duty gasoline truck (includes SUVs) in Canada has a fuel efficiency of 11.8 L/100 km and travels 15,400 km per year, consuming 1,817.2 L of gasoline and producing 4.2 tonnes of eCO₂ per year. In contrast, a 2012 Ford Escape Hybrid has a fuel efficiency of 6.2 L/100 km. Travelling the same 15,400 km per year, the hybrid would consume 955 L of gasoline and produce 2.2 tonnes of eCO₂ per year--an annual GHG reduction of approximately 2 tonnes. Note that GHG reductions will vary depending on annual vehicle kilometers travelled. Assuming a 2% update in Vaughan, GHG emission avoidance could be over 3,000 tonnes of eCO₂ per year.

11 – The Province of Ontario offers an EV incentive program that can provide \$5,000 to \$8,500 towards the purchase or lease of a new plug-in hybrid electric or battery electric vehicle. The EV incentive program is open to persons, businesses, municipalities, non-government organizations and non-profit groups.