Northumberland County

Corporate Greenhouse Gas Emissions Reduction Plan

Land Acknowledgement

Northumberland County is located on the Mississauga Anishinaabeg territory and is the traditional territory of the Mississauga Anishinaabeg. Northumberland County respectfully acknowledges that the Mississauga Nation are the collective stewards and caretakers of these lands and waters in perpetuity, and that they continue to maintain this responsibility to ensure their health and integrity for generations to come.

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Glossary and Acronyms

The below key terms are used throughout the plan. Definitions are adapted from the Intergovernmental Panel on Climate Change (IPCC.)

Adaptation: The process of adjustment to actual or expected climate and its effects to moderate harm or exploit beneficial opportunities.

Anthropogenic: Resulting from or produced by human activities.

Business as usual (BAU): Scenarios that assume no mitigation policies or measures will be implemented beyond those that are already in force and/or are legislated or planned to be adopted.

Climate: The average weather over a period of time, typically 30 years.

Climate change: A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Co-benefits: The positive effects that a policy or measure aimed at one objective might have on other objectives, thereby increasing the total benefits for society or the environment.

Decarbonization: The process to aim to achieve zero fossil fuels.

Ecosystem: An ecosystem is a functional unit consisting of living organisms, their non-living environment, and the interactions within and between them.

Electric vehicle (EV): A vehicle whose propulsion is powered fully or mostly by electricity.

Energy security: The goal to maintain an adequate, stable, and predictable energy supply.

Equity: Equity is the principle of fairness in burden sharing and is a basis for understanding how the impacts and responses to climate change, including costs and benefits, are distributed in and by society in equal ways.

Fossil fuels: Carbon-based fuels from fossil hydrocarbon deposits, including coal, oil, gasoline, diesel, propane, and natural gas.

Greenhouse gas (GHG): Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation and cause the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary GHGs in the Earth's atmosphere.

Industrial revolution: A period of rapid industrial growth with far-reaching social and economic consequences, beginning during the second half of the 18th century. The industrial revolution marks the beginning of a strong increase in the use of fossil fuels, initially coal, and hence emission of carbon dioxide.

Light emitting diode (LED): Produces light up to 90% more efficiently than incandescent light bulbs.

Mitigation: A human intervention to reduce emissions or enhance the sinks of greenhouse gases.

Net zero emissions: Net zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.

Resilience: The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation.

Sink: A reservoir where a greenhouse gas is stored.

Sustainability: A dynamic process that guarantees the persistence of natural and human systems in an equitable manner.

Tonnes of carbon dioxide equivalent (tCO_2e): The amount of carbon dioxide emission that would cause the same integrated radiative forcing or temperature change, over a given time horizon, as an emitted amount of a greenhouse gas or a mixture of greenhouse gases.

Transformative change: A system-wide change that requires more than technological change through consideration of social and economic factors that can bring about rapid change at scale.

Transition: The process of changing from one state or condition to another in a given period of time. Transition can be in individuals, firms, cities, regions, and nations, and can be based on incremental or transformative change.

Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Well-being: A state of existence that fulfils various human needs, including material living conditions and quality of life, as well as the ability to pursue one's goals, to thrive, and feel satisfied with one's life.

Executive Summary

Climate change is happening all around us and requires immediate action. The Intergovernmental Panel on Climate Change, comprised of scientists from around the globe, stress the importance of limiting global average temperature rise to 1.5°C to avoid the worst impacts of climate change. Meeting this goal requires deep and immediate reductions in greenhouse gas emissions at all levels. In response to this, Northumberland County has created a Corporate Greenhouse Gas Emissions Reduction Plan. This plan looks to reduce greenhouse gas emissions from County operations and services.

In 2019, Northumberland County joined the Partners for Climate Protection Program to demonstrate municipal leadership on climate action. Over 500 Canadian municipalities are part of the Partners for Climate Protection network and are committed to reducing greenhouse gas emissions.

In 2023, total emissions from County operations were 27,355 tonnes of carbon dioxide equivalent (tCO_2e). Waste in our landfills accounted for 82% of total emissions; County owned fleet and employee commuting accounted for 13% of emissions; and the County's buildings and facilities accounted for 5%. This plan provides a pathway to reduce corporate greenhouse gas emissions from Northumberland County by 65% by 2030 and begin on the goal to reach net zero emissions by 2050.

This plan outlines actions Northumberland County can take across six focus areas:

- *Waste management*
- *County fleet and staff commuting*
- *County buildings and facilities*
- *Building a culture of climate action*
- *The natural environment*
- *Advocacy and influence*

The Corporate Greenhouse Gas Emissions Reduction Plan is intended to be the first chapter of the County's Climate Action Strategy, followed by an Adaptation and Resiliency Plan as the second chapter.

Northumberland County will measure corporate greenhouse gas emissions for the years ahead and publicly report on these emissions and the progress toward our targets through our Performance Dashboard. The County will create annual progress reports to monitor progress on the plan. An update to the plan will take place in 2029 to assess progress toward our 2030 target and outline a renewed pathway to reach our 2050 target.

Introduction

A Changing Climate

Climate change is already affecting us. The past ten years were the planet's warmest on record.[i] Every day there are more examples of how the change in climate is playing out around us. Northumberland County is experiencing the impacts of climate change through warmer and more extreme weather. A drought in 2016 had significant impacts on local agriculture. Flooding in 2017 and 2019 caused damage to infrastructure. The winter storm of 2022 involved strong winds and significant snowfall, leading to widespread power outages and service disruptions. In 2023, forest fires burning in Ontario and Quebec prompted a Special Air Quality Statement in Northumberland County. Events of this nature are becoming the new normal, creating new pressures around infrastructure planning and management, property maintenance, service delivery, economic prosperity and human health and safety.

The main cause of climate change is human activities that produce greenhouse gas (GHG) emissions. While the climate has changed in the past due to natural variability, it is now changing at a much faster rate. Humans have produced significant GHG emissions since the Industrial Revolution through burning fossil fuels such as coal, oil, and gas to produce energy. Other sources of GHG emissions are decomposing waste in landfills and land use changes such as deforestation. Greenhouse gases trap heat from the sun in the atmosphere, causing the average temperature of the Earth to rise. To date, the Earth has experienced 1.1°C of warming since 1880.[ii] Canada is experiencing approximately twice the rate of warming due to its northern latitude. This may not seem like a significant amount of warming; however, it is enough to throw our delicate ecosystems off balance. In a matter of decades, we are on track to lock in a 2.7°C rise in global average temperature.[iii]

Although climate change is a global and complex problem, we have the knowledge and solutions that are required to limit rising temperatures. The challenge ahead is to work to urgently deploy the solutions that are available. This plan acts as a starting point for Northumberland County to investigate the ways that we directly contribute to climate change and to implement strategies to reduce our corporate GHG emissions. Through implementing transformative policies and practices within our own operations, we hope to demonstrate to residents and businesses the feasibility and importance of acting on climate change.

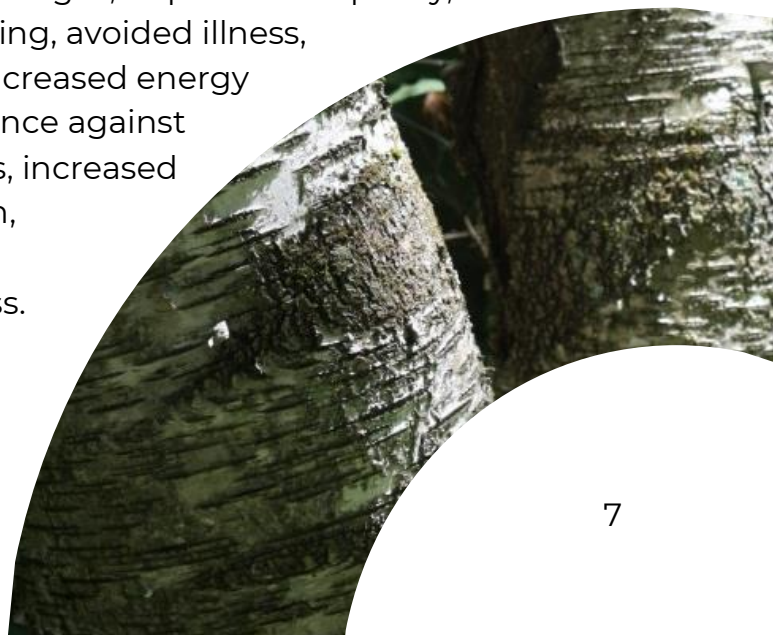
The Role of Local Governments

While climate change is a global issue, it requires action at the local level. Climate change mitigation looks to reduce the causes of climate change through reducing GHG emissions or increasing carbon sequestration. Climate change mitigation involves moving toward renewable sources of energy, creating a circular economy, and protecting and restoring nature. Municipalities are well suited to lead on climate change mitigation because they have authority over land use planning, waste management, and transportation planning. In Canada, municipalities have influence over approximately 50% of GHG emissions.[iv]

We are already experiencing the impacts of climate change across the globe through sea level rise, flooding, loss of biodiversity, more extreme heat, and more intense storms. Climate change adaptation involves managing the impacts of climate change that are already occurring or are expected to occur given future climate projections. Municipalities are well suited to lead on climate change adaptation because they are on the front lines of responding to these impacts.

Not everyone is impacted by climate change in the same way. Some people and populations are more vulnerable to the impacts of climate change than others. People with pre-existing health conditions, older adults, children, frontline emergency responders, and people living on low incomes are some populations that are more adversely affected by climate change. Climate equity involves reducing these unequal burdens while also ensuring the fair distribution of the benefits of climate action. The Haliburton, Kawartha, Pine Ridge District Health Unit recently developed a Climate Change Health Vulnerability and Adaptation Assessment that identifies the current and future impacts of climate change on the health of residents, identifies the most vulnerable populations, and provides recommendations on building adaptive capacity.[v]

The benefits of climate action extend beyond environmental benefits and can include improved public health, reduced operating costs, avoided costs from future damages, improved air quality, more active living, avoided illness, job creation, increased energy security, resilience against power outages, increased social cohesion, and avoided biodiversity loss.



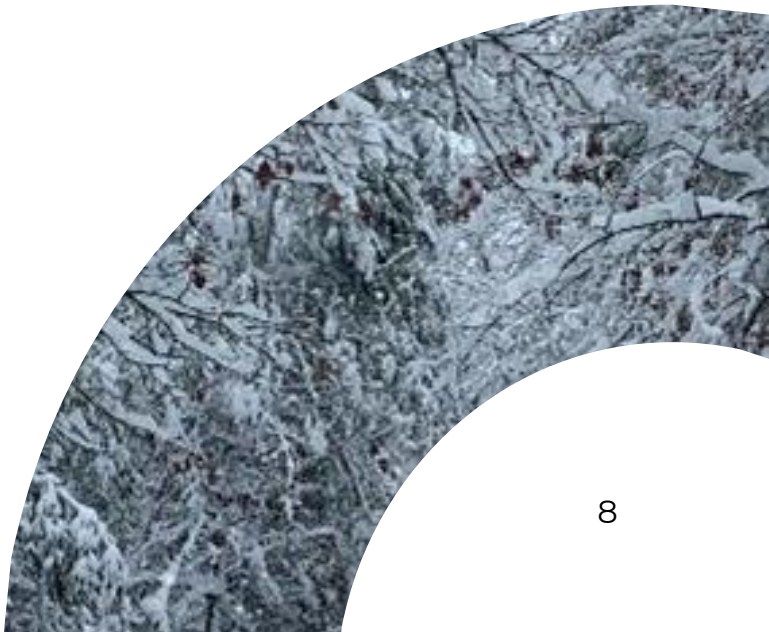
Global, National and Provincial Action

The global community signed on to the Paris Agreement in 2016, with the commitment to limit the increase of global average temperature to well below 2°C and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.[vi] The Intergovernmental Panel on Climate Change (IPCC), comprised of scientists from around the globe, stress the importance of limiting global average temperature rise to 1.5°C to avoid the worst impacts of climate change. Limiting global warming to 1.5°C requires deep and immediate reductions in GHG emissions.

Global climate strikes and the rise of youth climate activism in 2019 demonstrated the demand for climate action from citizens to governments at all levels. Concerned citizens across Canada encouraged bold leadership from municipal governments to set ambitious targets and create local climate action plans to reduce GHG emissions.

The Government of Canada released Canada's 2030 Emissions Reduction Plan in 2022. The plan provides a roadmap to achieve a 40-45% reduction in GHG emissions below 2005 levels by 2030. In 2023, the Government of Canada released the first National Adaptation Strategy, to reduce risk and build climate-resilient communities.

The Government of Ontario released a Made-in-Ontario Environment Plan in 2018 that aims to reduce GHG emissions by 30% below 2005 levels by 2030. In 2023, the Government of Ontario released the Ontario Provincial Climate Change Impact Assessment that provides an overview of impacts that are a result of a changing climate.



About Northumberland County

Northumberland County is located on the traditional territory of the Mississauga Anishinaabeg. The County weaves together seven municipalities: the Township of Alnwick/Haldimand, the Municipality of Brighton, the Town of Cobourg, the Township of Cramahe, the Township of Hamilton, the Municipality of Port Hope, and the Municipality of Trent Hills. The County is located on the north shore of Lake Ontario and has approximately 90,000 residents. County services include paramedic services, economic development and tourism, social services, forest services, waste management, land use planning, long term care, and roads.

In 2019, Northumberland County joined the Partners for Climate Protection (PCP) Program to demonstrate municipal leadership on climate action. Over 500 Canadian municipalities are part of the Partners for Climate Protection network, representing 70% of the Canadian population.[vii] The program provides technical support, training, and resources to assist municipalities with reducing GHG emissions. The program has a five-milestone framework:

Milestone 1: Create a GHG emissions inventory and forecast.

Milestone 2: Set a GHG emissions reduction target.

Milestone 3: Develop a local action plan.

Milestone 4: Implement a local action plan.

Milestone 5: Monitor and report on results.

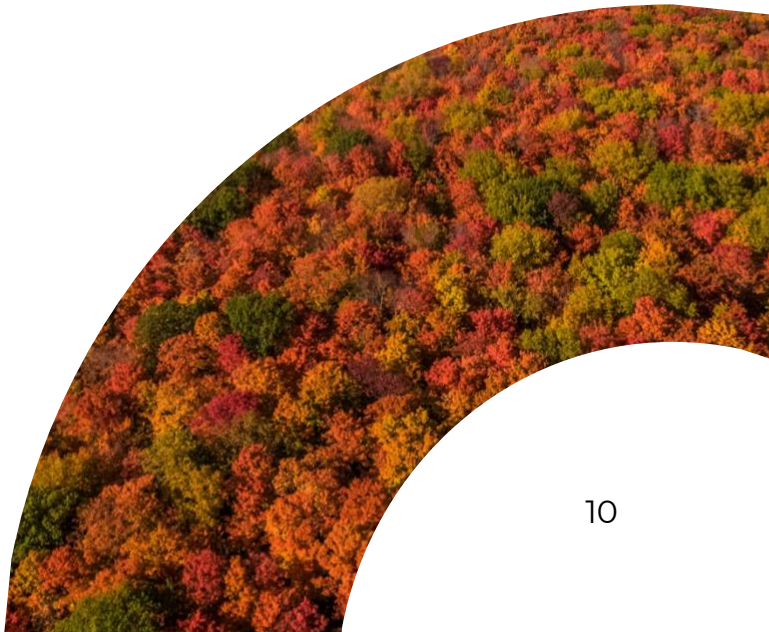
The County achieved Milestones 1 and 2 in 2019 and 2020. The County adopted a GHG reduction target in 2019 of 30% below 2005 levels by 2030; and 80% below 2005 levels by 2050. Northumberland County is a member of the Clean Air Council, a network of over 40 municipalities and health units in Ontario that collaborate on climate action initiatives.[viii]

Northumberland County adopted a Community Strategic Plan in 2023 with *Propel Sustainable Growth* as one of five strategic pillars. These pillars provide a framework to direct planning and decision making. The plan sets the goal to respond to the climate crisis through reducing the carbon footprint of County operations through the development of a Climate Action Plan, and through coordinating public education campaigns and municipal emergency exercises to enhance preparedness for extreme weather events and other community emergencies.[ix]

Background

Greenhouse Gas Inventory

Corporate GHG emissions refer to the GHG emissions produced from County operations and services. These emissions are within the County's direct control or influence. A corporate GHG inventory includes municipal buildings, fleet, street lighting, water and wastewater treatment, and corporate and/or community waste.[x] Streetlights that are owned and maintained by the County account for less than 1% of emissions since they are efficient LED lighting. The County's inventory does not include water and wastewater treatment since this is the responsibility of local municipalities. The County provides landfilling, waste diversion programs, and composting for all member municipalities. Since the County owns and operates the Brighton landfill, it is included in our corporate inventory.



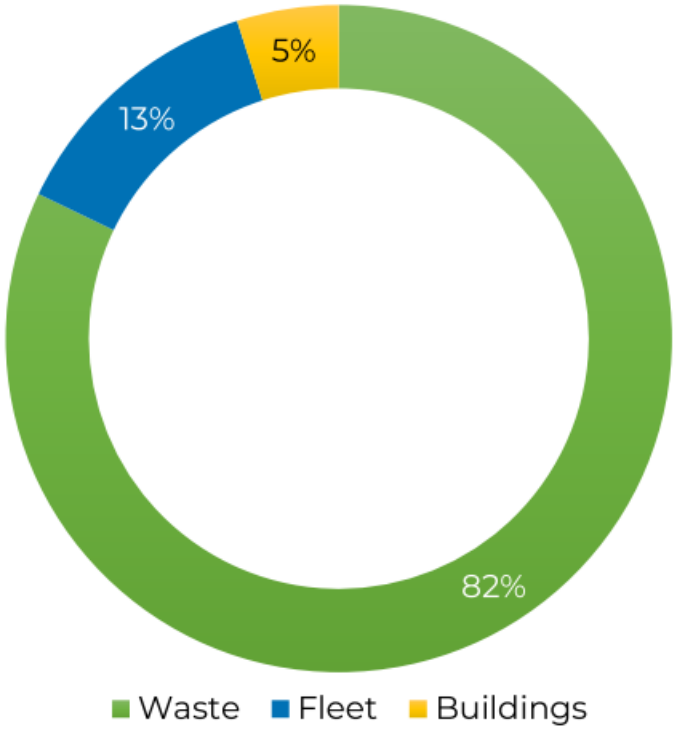


Figure 1: Corporate GHG Emissions in 2023

In 2023, total emissions were 27,355 tCO_2e. As Figure 1 shows, the vast majority of GHG emissions from County operations are the result of waste collection that ends up in landfill. Waste accounted for 82% of total emissions. County owned fleet and employee commuting accounted for 13% of emissions, and the County's buildings and facilities accounted for 5%.

Business-as-Usual Scenario

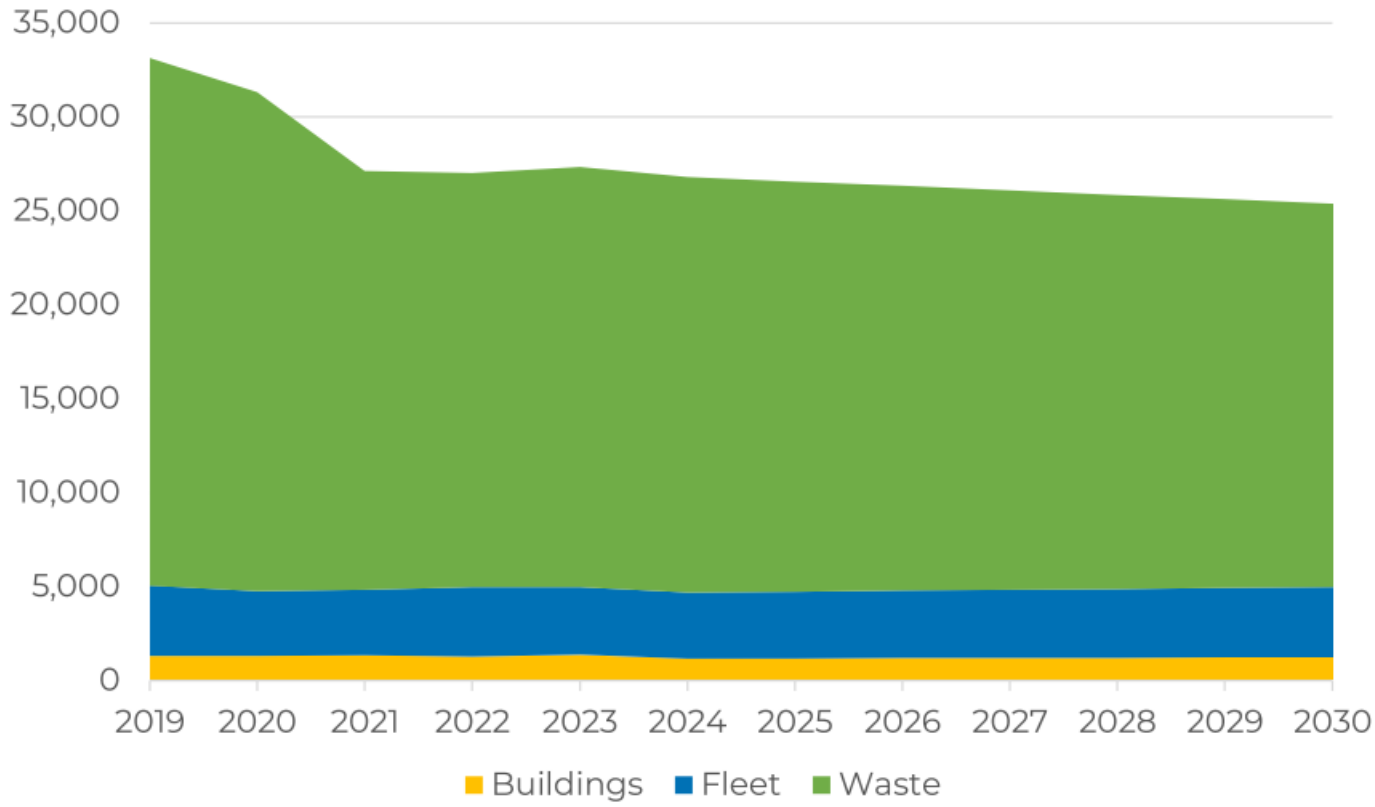


Figure 2: GHG Emissions (tCO_2e) in a Business-as-Usual Scenario

A business-as-usual scenario shows the projection of corporate GHG emissions under existing policy frameworks, meaning that no additional climate change mitigation measures are adopted. This scenario considers an average annual population growth rate of 1.0%[xi] in addition to other changes such as the sale of the Material Recovery Facility in response to the province-wide transition of the responsibility of the recycling system, and future planned waste diversion programs. Corporate GHG emissions are projected to be approximately 25,376 tCO_2e in 2030 in the absence of any additional measures. This is a reduction of 31% from 2005 levels.

Greenhouse Gas Reduction Targets

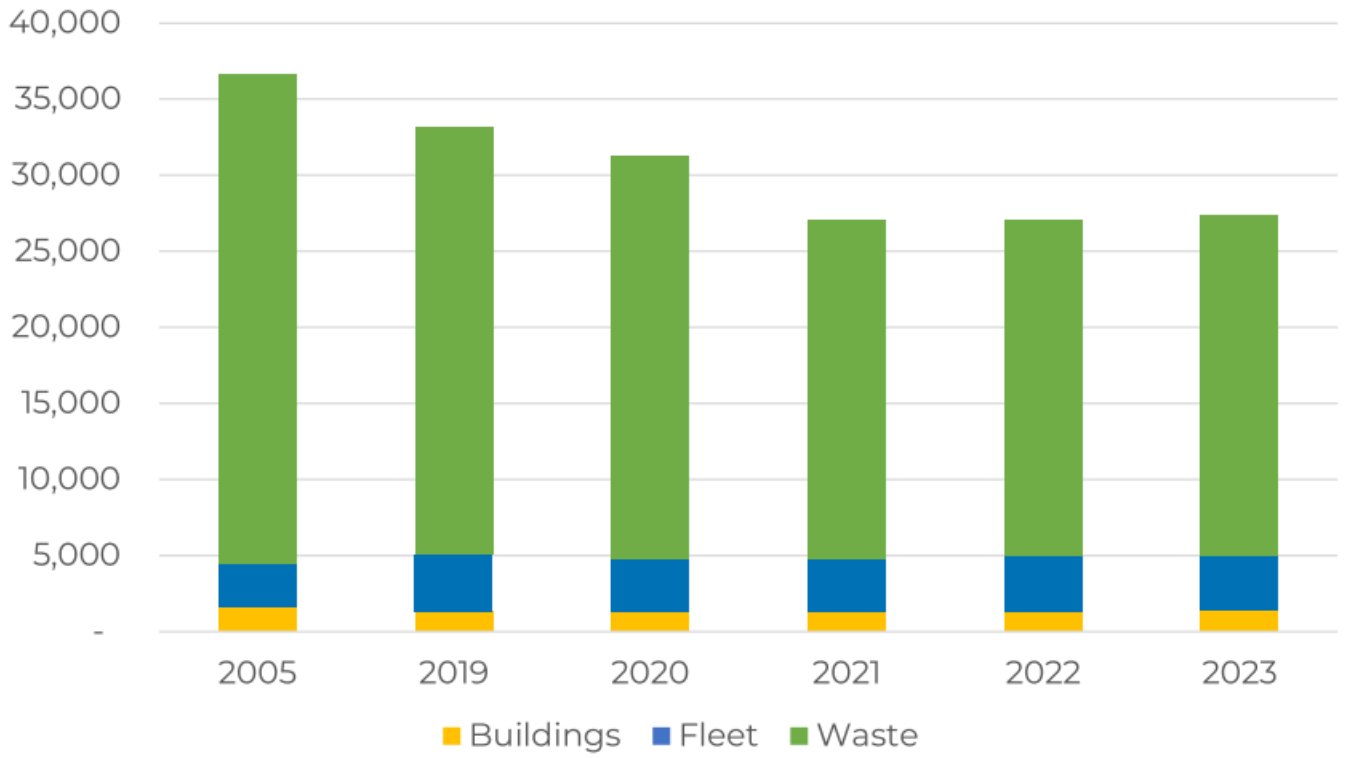
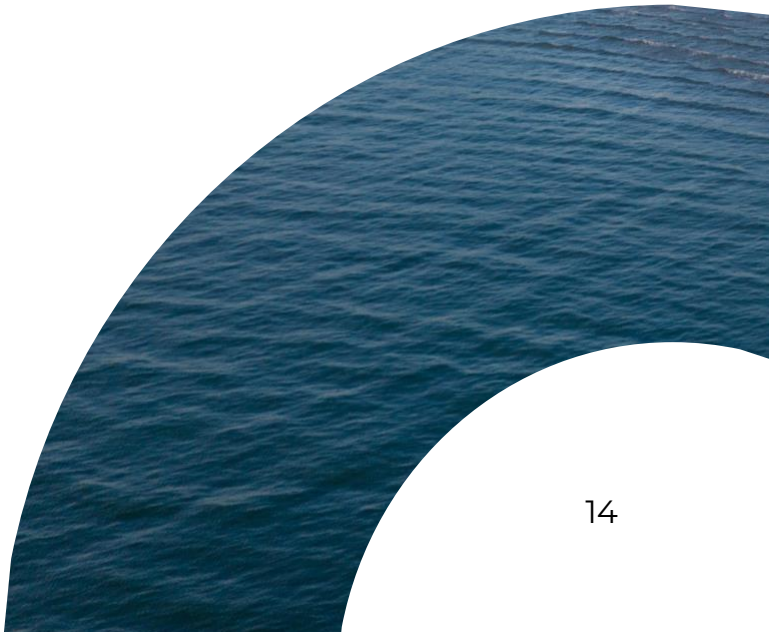


Figure 3: GHG Emissions (tCO_2e) by Year

In 2023, there had been a 25% reduction in GHG emissions since 2005 despite increased levels of service. This reduction is primarily due to keeping organic waste out of landfill sites through waste diversion programs such as the green bin program, the phase out of coal from the provincial electricity grid, and through constructing new County buildings to energy efficiency levels beyond what is required by the building code. This plan looks to build on this success to achieve a 65% reduction in GHG emissions by 2030 and begin on a pathway to reach net zero emissions by 2050. This is an increase from the current target of a 30% reduction in GHG emissions by 2030 and 80% by 2050.

Action Roadmap

Northumberland County will lead the way on climate action through reducing GHG emissions from our municipal operations and services. This will be done through completing plans and studies, establishing or updating policies and guidelines, developing or updating procedures, and creating new programs and projects. The Corporate Greenhouse Gas Emissions Reduction Plan has six focus areas of action: waste management; County fleet and staff commuting; County buildings and facilities; building a culture of climate action; the natural environment; and advocacy and influence. Actions were developed through engagement with staff and the community and prioritized based on their GHG reduction impact and the level of direct control or influence of Northumberland County.



Focus Area 1: Waste Management

Northumberland County provides weekly curbside pickup of household recycling, organics, and garbage. Limits and fees are in place for garbage collection to encourage waste diversion. The last remaining active landfill in the County is in Brighton, which accounts for 82% of the County's GHG emissions. Organic waste that decomposes in an oxygen-free environment, such as a landfill, releases methane. Methane is a greenhouse gas that has approximately 80 times more global warming potential than carbon dioxide over a 20-year timeframe.[xii] Organic waste includes food, yard, paper, and wood waste.

Action 1.1: Increase waste diversion.

Northumberland County is working to achieve at least 75% diversion of waste from our landfill through our Long-Term Waste Management Master Plan.[xiii] With the introduction of dual-stream recycling and green bin programs in December 2019, we have increased waste diversion to 53%. The green bin program diverts approximately 3,000 tonnes of food waste from landfill annually. The County has implemented household hazardous waste, electronic waste, bulky plastic items, Styrofoam, scrap metal, drywall, leaf and yard waste, and clothing diversion options at our three Community Recycling Centres. The County will be implementing a mattress and box spring diversion program in 2024, and dimensional lumber and asphalt shingle diversion programs in 2025.

The County will continue educational campaigns to increase participation in the green bin program and on reducing food waste with the goal of increasing waste diversion and reducing the amount of waste landfilled per capita. The County could further increase organic waste diversion through creating a policy that requires organic waste to be kept out of the garbage. This would include the implementation of a clear bag policy for garbage to allow for waste diversion policies to be monitored and for encouraging compliance. Clear bags allow for both residents and waste collectors to view the contents in the bag and ensure that they do not contain divertible items.

Additionally, the County can review waste management processes in County facilities to improve diversion. Waste audits could be completed to determine the composition of the waste in each facility. Increased signage, receptacles, and staff education can encourage diversion into different waste streams.

Action 1.2: Capture methane from the Brighton Landfill.

Organic waste that is already disposed of in the Brighton Landfill produces methane. Avoiding methane emissions through reducing and reusing waste, followed by recycling or composting to recover resources, are above landfill gas recovery on the waste hierarchy. Landfill gas recovery is needed to reduce GHG emissions from organic waste that has already been disposed of in the landfill and that will continue to be disposed of over the remaining life of the landfill. Methane is generated most rapidly in the first few years after organic waste disposal and continues for more than 20 years after disposal.[xiv] The County can complete a feasibility assessment and design study for a landfill gas capture and flare system at the Brighton Landfill. The federal government has proposed regulations to reduce methane emissions from municipal landfills that is intended to increase the number of landfills that recover methane.[xv] If the proposed federal regulations come into effect, it may be required that methane is captured and flared at the Brighton Landfill.

Focus Area 2: County Fleet and Staff Commuting

County fleet and staff commuting accounts for 13% of corporate GHG emissions. County vehicles and equipment range from plow trucks to ambulances to chainsaws. Staff commuting is included in the municipal fleet inventory since the County has significant influence over these emissions. Fleet emissions are a result of staff commuting (49%), transportation services (21%), waste management (14%), paramedic services (14%) and other departments such as forestry, facilities, planning and social services (2%.) Two-thirds of emissions are from gasoline consumption and one-third is from diesel consumption.

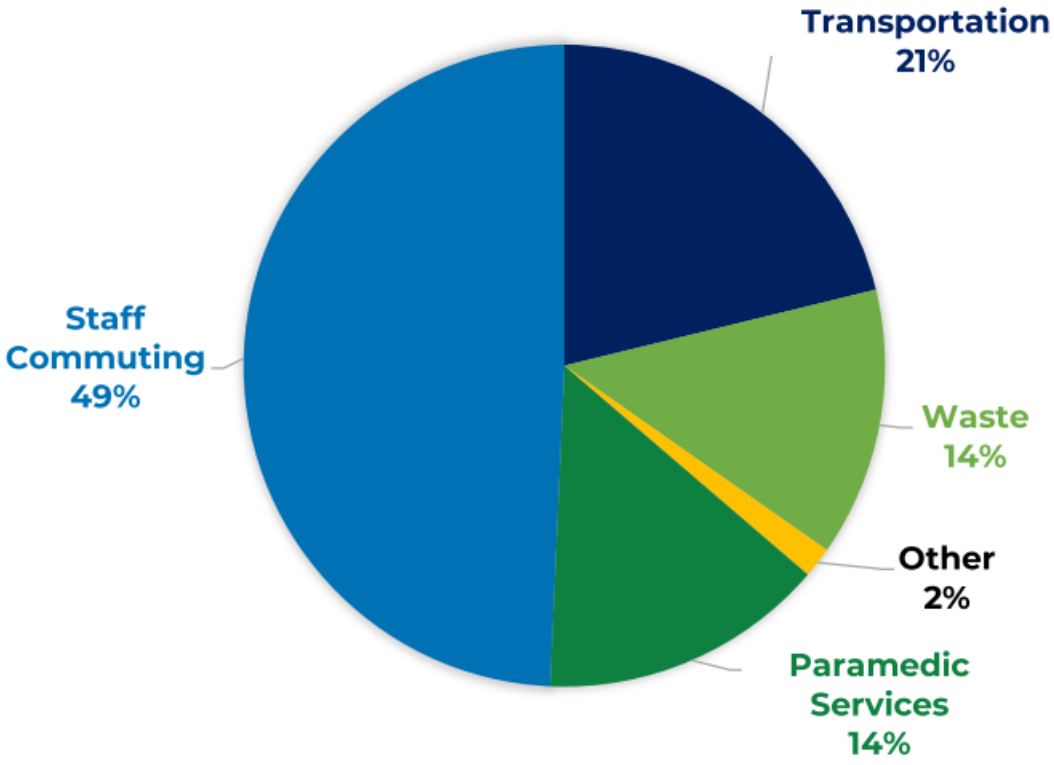


Figure 4: GHG Emissions from Fleet by Division

Currently there are zero-emission options for light-duty vehicles and small equipment. Medium and heavy-duty vehicles may be more difficult to decarbonize in the near-term due to limited available options on the market and high upfront costs. The Government of Canada has set sales targets for zero-emission light-duty vehicles of 20% by 2026; 60% by 2030; and 100% by 2035. Available zero-emission vehicles include electric, plug-in hybrid electric, and hydrogen fuel cell vehicles. Currently, there are no public hydrogen refueling stations in Ontario. Electric vehicles are slightly more expensive than internal combustion engine vehicles upfront, however, they are significantly less expensive to operate and maintain. These vehicles also reduce air and noise pollution. The table below outlines different electric vehicle types.

Electric Vehicle (EV)	Plug-In Hybrid Vehicle (PHEV)	Hybrid Vehicle
• Powered exclusively by an electric motor • Battery is recharged primarily through plugging in • Cost to charge is approximately 80% less than an equivalent gasoline powered vehicle[xvi] • Considered a zero-emission vehicle	• Powered by an electric motor and a gasoline engine • Battery is recharged primarily through plugging in • Provides all electric driving for a given range and then switches to gasoline engine once electric battery is used up • Considered a zero-emission vehicle	• Powered by a gasoline engine and an electric motor • A small battery is recharged through regenerative breaking only • Electric motor switches on when the vehicle stops and accelerates, while gasoline engine is used while cruising • Not considered a zero-emission vehicle since vehicles are mostly powered by gasoline

Table 1: Electric Vehicle Types

Action 2.1: Establish a Green Fleet and Equipment Policy and Action Plan

The County could develop a Green Fleet and Equipment Policy that requires the purchase of the lowest emission vehicle or equipment that is available on the market that meets the operational needs of the department. Consideration should be given to total lifecycle cost of ownership. Light-duty vehicles and small equipment are most likely to transition to electric options over the next five years. The County can begin to analyze where charging infrastructure may be required for this fleet and look toward installing this infrastructure at County facilities. Alongside the policy, the County could implement operator education programs such as avoiding vehicle idling and maintaining steady speeds and investigate methods for more effective route planning. Automated vehicle locating (AVL) software can be used to determine fleet requirements such as daily range and monitor progress toward the policy such as changes in vehicle idling time.

To move forward with decarbonizing our fleet on a larger scale once zero-emission options are available for most County vehicles, the County can create a feasibility assessment and action plan to replace fleet vehicles and equipment at the end of their life with zero-emissions vehicles while meeting current and anticipated levels of service. This plan should include details on the infrastructure that is required to support this transition, such as charging and refueling infrastructure and potential building upgrades. The Green Municipal Fund provides funding for studies to reduce fossil fuel use in fleets and for capital projects to transition fleet to zero emission vehicles.

Although GHG emissions from third party contractors are out of the County's direct control, the County can request energy and GHG information in procurement documents. This information can be utilized in the evaluation process to encourage the use of low carbon vehicles for contracted services such as waste collection.

Action 2.2: Provide solutions for sustainable employee commuting.

Northumberland County has a telecommute program that enables eligible employees to work remotely up to 70% of the time. This significantly reduces vehicle travel and fuel use from employee vehicles. The County will continue to implement and monitor uptake of this policy with the goal of maximizing participation where feasible.

The County can expand sustainable options for staff commuting, such as by adding fee-for-service electric vehicle charging stations in office parking lots, creating preferred parking for those who carpool, and installing secure bicycle parking. It is estimated that up to 26% of employee vehicles will be zero-emission vehicles in 2030. Staff education programs surrounding electric vehicles, carpooling, and active transportation can help facilitate this transition.

Focus Area 3: County Buildings and Facilities

County buildings and facilities account for 5% of corporate GHG emissions. Emissions are a result of the use of natural gas for space and water heating (90%), using electricity to power lighting and appliances (7%), and using propane to heat two roads garages (3%).

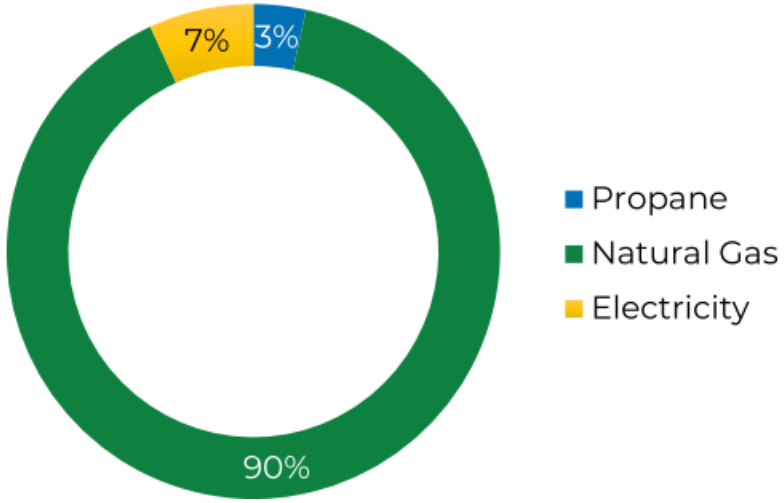


Figure 5: GHG Emissions from Buildings by Energy Source

County buildings include a long-term care home (45% of emissions), public works garages and depots (22% of emissions), office buildings (18% of emissions), paramedic services bases (9% of emissions), and a food manufacturing facility (6% of emissions.) Social housing is owned and operated by the Northumberland County Housing Corporation (NCHC) and thus not included in this inventory. However, it is important to note that the NCHC prioritizes environmentally focused design, for example through installing electric heat pumps for the Elgin Park Redevelopment. The Golden Plough Lodge long-term care home accounted for over 600 tCO_2e in 2023 and is the highest emitting County facility. The County began rebuilding the Golden Plough Lodge in December 2020. The County is pursuing Leadership in Energy and Environmental Design (LEED) Silver Certification to ensure energy efficiency and climate change mitigation are considered in the design of the new facility.

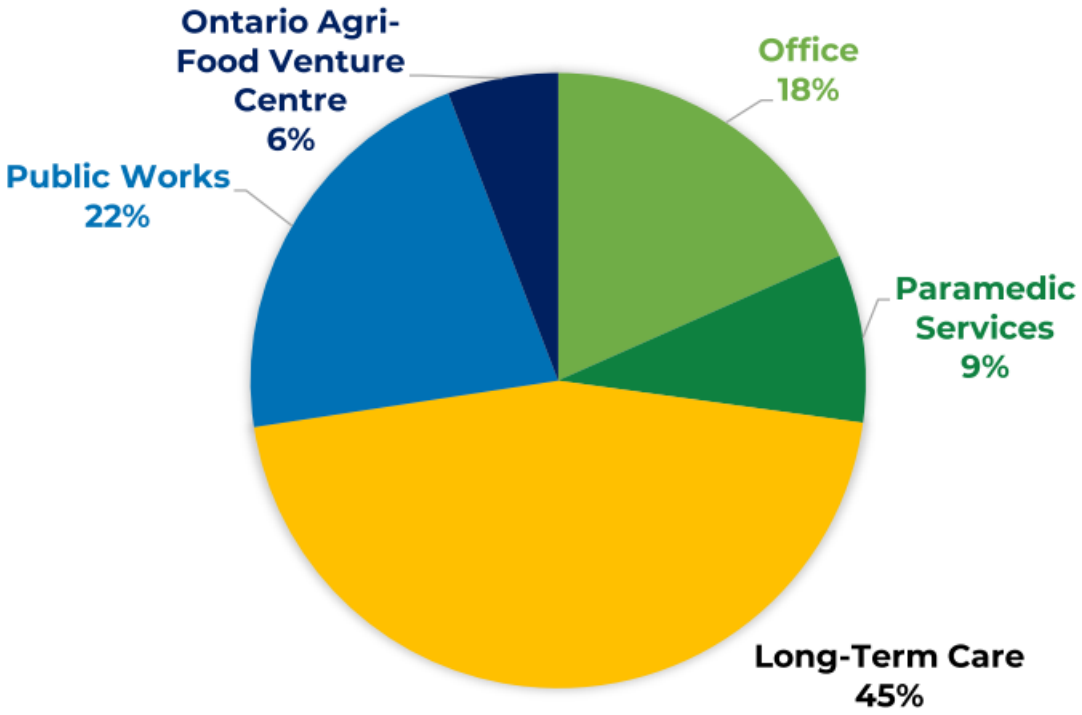


Figure 6: GHG Emissions by Facility Type

Reduce, improve, switch is a framework that is used to provide a hierarchy for energy management. Designing and constructing a building to use little energy is at the top of the framework because it minimizes energy demand from the outset. Improving the use of energy involves retrofitting a building to be more energy efficient going forward. The last step of the framework is to shift from fossil fuels to low carbon sources of energy for the energy that is still required. Switching to a low carbon energy source often involves electrification because electricity can come from emission-free sources of energy. In Ontario, electricity is generated from approximately 90% low carbon sources including nuclear, hydroelectric, wind, and solar power.

Action 3.1: Construct new buildings and major renovations to net-zero or near net-zero carbon emissions where feasible.

Northumberland County prioritizes energy efficiency in the construction of new buildings. County Headquarters was built to LEED standards in 2007 with geothermal heating and cooling, on-site stormwater management, and green roofs. Currently, there is a proposal by staff for a new Joint Operations Base, to be designed to net-zero with electric vehicle charging stations for corporate and public vehicles.

A policy that requires new buildings and major renovations to be net-zero or net-zero ready would ensure that GHG emissions from County buildings do not rise despite an increase in the overall number of buildings. It would also ensure that any new buildings would not have to be retrofitted down the road to reach net-zero emissions. Under this policy, new buildings would be prohibited from installing space and water heaters that use fossil fuels. Consideration should be given to the embodied carbon of the materials used to build new facilities to reduce the emissions that result from the construction of the building.

Any building or major renovation that is not designed to net-zero standards will increase the County's GHG emissions. A net-zero building produces as much energy as it consumes. This is achieved through building up to 80% more efficient than a standard new building and through producing energy through renewable sources to meet the remaining energy requirements.[xvii] A building that is near net-zero is one that is designed to net-zero standards but does not yet have the renewable energy system installed. While building to net-zero requires greater upfront costs, the operating costs are quite low. There is funding available to municipalities through the Green Municipal Fund and the Green and Inclusive Community Buildings Program to build new municipal buildings to net-zero standards. Once built, a net-zero building can be used as a demonstration to the public of what is possible.

Action 3.2: Retrofit existing County buildings and facilities for increased energy efficiency.

Reducing emissions from existing County buildings and facilities requires improving the energy performance of each building and transitioning away from the use of natural gas and propane for heating. The County currently considers energy efficient changes during building upgrades and renovations. The County could complete a feasibility study that outlines a pathway for reducing GHG emissions through building retrofits. A feasibility study for decarbonizing buildings would include performing energy audits at each facility and outlining the requirements (such as building envelope upgrades, automation systems, and HVAC and appliance upgrades) in order of priority and the associated costs and energy savings. This feasibility study should also identify opportunities for the installation of renewable energy systems. Beyond reducing GHG emissions, renewable energy systems on County facilities can provide resilience in the event of a power outage, protect the County against rising energy prices, and reduce the risk of rising GHG emissions from the electricity grid. The feasibility study should aim to reduce GHG emissions from existing buildings by at least 50% over 10 years and 80% over 20 years. Funding for this study and the associated capital projects is available through the Green Municipal Fund's Sustainable Municipal Buildings stream. A schedule of buildings upgrades resulting from the feasibility study should be integrated into the Corporate Facilities Asset Management Plan to align with existing equipment lifecycles.

Focus Area 4: Building a Culture of Climate Action

The Corporate Greenhouse Gas Emissions Reduction Plan will be most effectively implemented if it becomes embedded into the municipal culture rather than implemented in a siloed manner, living separately from other strategies. The purpose of this focus area is to integrate climate action into all aspects of County operations and the decision-making processes of all departments.

Action 4.1: Implement a climate change lens on strategic plans, policies, and decisions that come to council.

It is critical that each department understands their role in reducing the County's GHG emissions and reaching the GHG reduction targets. Decision support tools are available through the Clean Air Partnership to assist staff in applying a climate change lens to their decision making. Staff training and education sessions can be facilitated to raise knowledge and awareness of climate change implications. This training should also be integrated into the onboarding process to ensure that new staff are informed and aware. Updates of policies and plans such as the Asset Management Plan, Procurement Policy, and Official Plan should be considered through a climate change lens and integrate climate change goals and targets. Consideration should be given to lifecycle environmental impacts and the County's indirect or scope 3 emissions, where possible.

Action 4.2: Identify and manage current and future climate impacts on County operations.

We are already experiencing the impacts of climate change in Northumberland County and will continue to experience these impacts into the future. As the County experiences warmer and more extreme weather, we must plan to adapt our operations and services to account for these changes. Like climate change mitigation measures, these upfront investments will pay off over time. The Canadian Climate Institute estimates that for every $1 spent on climate adaptation measures today, $13-$15 will be returned in years ahead in savings and benefits.[xviii] The County can develop a Climate Adaptation and Resiliency Plan that would involve identifying and managing risks to municipal infrastructure and operations in a changing climate. This plan would complement the Corporate Greenhouse Gas Emissions Reduction Plan to create a more comprehensive Climate Action Strategy.

Action 4.3: Facilitate local collaboration on climate action.

There is already a significant amount of climate action occurring in Northumberland County between the work of community groups, local municipalities and environment committees, Alderville First Nation, residents, and businesses. The County could establish mechanisms to coordinate efforts and collaborate across the County on sustainability and climate action. This can include developing communities of practice to share information, resources, and best practices. The County may also assist member municipalities with developing greenhouse gas inventories and climate action plans or sustainability plans as a shared service.

Focus Area 5: The Natural Environment

Natural heritage systems in Northumberland County include wetlands, forests, and meadows that sequester carbon and act as carbon sinks. Additionally, they provide climate adaptation benefits such as stormwater management, water filtration, and creating shade. These systems also create more vibrant communities and enhance community well-being through recreational opportunities.

The Northumberland County Forest is 2,235 hectares of managed forest. The Forest has achieved and maintained Forest Stewardship Council certification. The Forest has a 217 km trail network for community recreation and has over 100,000 users annually as well as important ecological and forestry features including globally and regionally rare habitat. The Northumberland County Forest Management Plan sets the overall long-term direction for the County Forest.[xix]

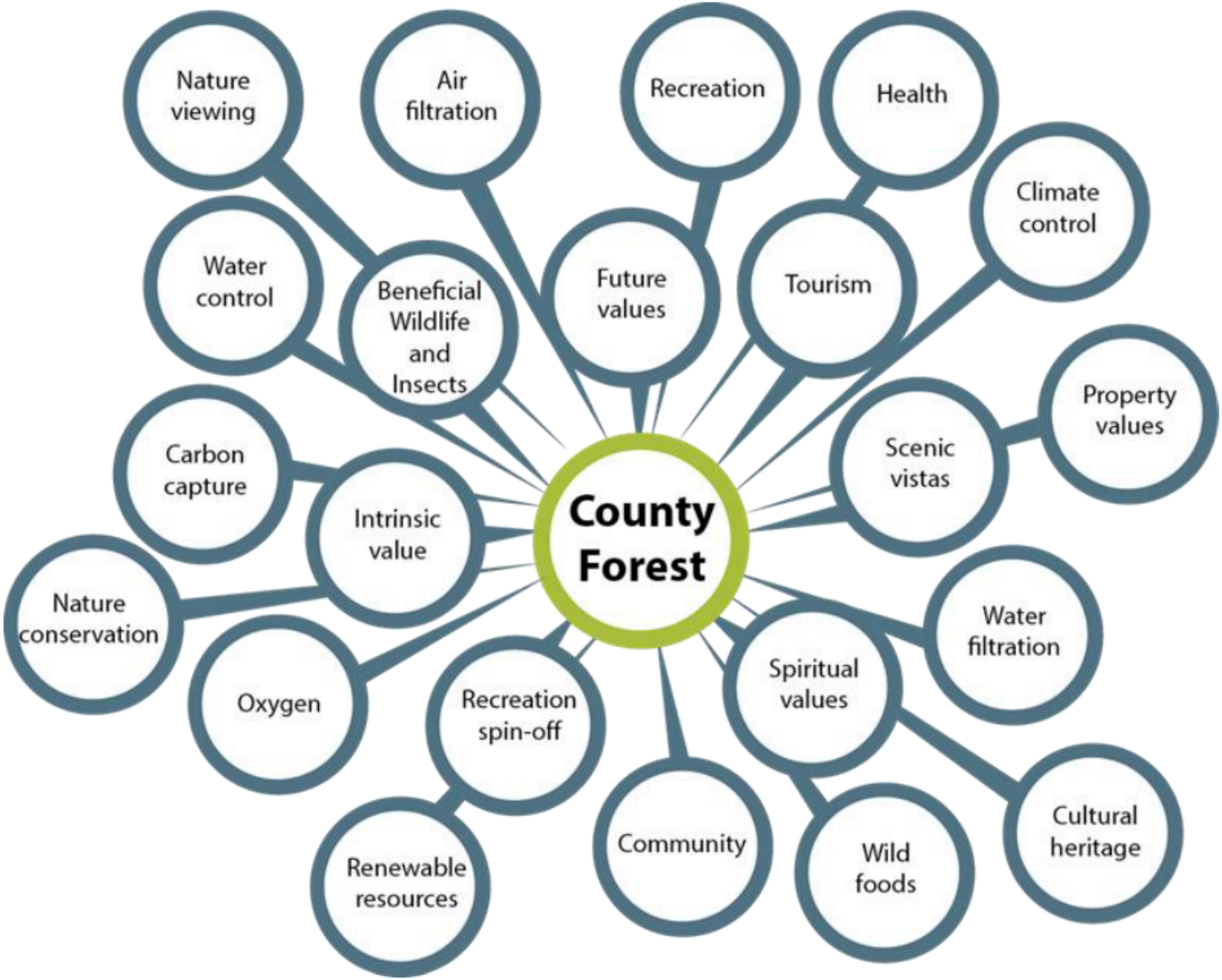


Figure 7: Some of the many benefits of the Northumberland County Forest

Action 5.1: Continue to preserve and protect natural heritage.

Northumberland County will continue to assess, protect, restore, and monitor our natural assets and green infrastructure. The County will monitor opportunities for measuring the carbon that is sequestered through the Northumberland County Forest. The *Toward Natural Asset Management in Northumberland County* report, as well as the Natural Heritage Asset Management Plan, provide a natural asset inventory with condition and risk assessments to inform asset management planning.[xx]

Targeted areas of the Northumberland County Forest have been designated as an Other Effective area-based Conservation Measure. The designation acknowledges that these areas have been monitored, assessed, and protected through management restrictions and considerations due to their ecologically sensitive habitats and species of concern. To maintain and enhance these unique species and habitats, the County has committed to active restoration in these conserved areas, including the removal of invasive species, and prescribed burns to encourage the natural growth of native species.[xxi]

The County can influence land protection beyond the lands that we own. The County has a Forest Conservation By-Law in place to maintain forest cover in Northumberland County and the associated ecosystem services. In 2021, Northumberland County adopted a Natural Heritage System amendment to the County Official Plan. This guides the preservation and enhancement of wetlands, woodlands, and watercourses. [xxii] The Natural Heritage System Plan was developed to manage community growth in a way that preserves and enhances our natural environment for future generations.

Action 5.2: Maintain and enhance naturalization in the County.

Northumberland County has an Emerald Ash Borer Replacement Tree Program that allows residents to apply for free tree saplings. Along County roads, the County is taking down ash trees in response to the invasive species. To replace these trees, the County is subsidizing the planting of ten native trees for every tree that is removed. This program will distribute 60,000 tree saplings over five years. Additionally, the County can increase the overall native tree canopy and pollinator habitat on County-owned properties. For example, the County could investigate planting native trees and shrubs on closed landfill sites.

Action 5.3: Enlarge the County Forest.

The Northumberland County Forest Management Plan provides information on priority attributes for additional County Forest lands. The Northumberland County Forest is ecologically significant partly because of its overall area. The large natural area provides habitat for many area-sensitive species. Increasing the area of land conserved as part of the Forest would enhance habitat, ecological services, and carbon sequestration.

Focus Area 6: Advocacy and Influence

While the focus of the Corporate Greenhouse Gas Emissions Reduction Plan is on direct action that the County can take to reduce GHG emissions from our operations and services, Northumberland County recognizes the ways in which we can play a role to influence broader change. Municipal governments can advocate to other levels of government, support and empower efforts in the community, and initiate collaborative opportunities.

Action 6.1: Advocate for continued decarbonization of Ontario's electrical grid.

Clean, emissions-free electricity is essential for meeting net-zero GHG emission targets. Ontario currently has a low carbon electricity grid. However, in the coming years, the use of natural gas to generate electricity is expected to increase. This will increase the GHG emissions produced from electricity use in our municipal buildings and from the homes, buildings, and electric vehicles across Northumberland County. The Canadian Climate Institute found that it is possible to transition to net-zero electricity systems in a way that is both reliable and affordable.[xxiii] The most effective way for the County to advocate to the province on this issue is through the Clean Air Council. The Clean Air Council brings together over 40 municipalities and health units across Ontario to advocate on climate change issues as one larger voice.

Action 6.2: Advocate to the provincial and federal governments for increased funding for climate change mitigation initiatives.

There is a need for additional funding support from the provincial and federal governments for climate change mitigation initiatives. This includes funding to cover the additional costs associated with building to net-zero standards, retrofitting existing buildings, capturing and flaring landfill gas, and transitioning to zero-emission vehicles and equipment.

Action 6.3: Encourage member municipalities to develop green development standards.

Green Development Standards are voluntary or mandatory measures to guide energy efficient and sustainable development in a community. These standards provide several benefits beyond climate change mitigation, including using municipal infrastructure more efficiently, improving community health and wellness, and reducing energy poverty.[xxiv] The Town of Cobourg is developing Green Development Standards aimed to support energy efficiency, active transportation, stormwater management, water conservation, and solar readiness.[xxv] This will provide a model that other local municipalities could follow.

Action 6.4: Support and encourage the expansion of public transportation options.

The County has advocated for public transportation solutions that connect Northumberland County with the Greater Toronto Area. In 2019, the County developed a business case and implementation strategy for the extension of GO Transit service to Northumberland County. In 2022, Northumberland County piloted a regional bus transportation service to determine the feasibility of establishing a full-time transit network connecting Northumberland communities with each other and with GO Transit services in Oshawa. The County has also successfully advocated in partnership with neighbouring municipalities for VIA Rail to restore commuter Train 651 that linked Eastern Ontario with the Greater Toronto Area. In April 2024, it was announced that Train 641 will offer early morning service between Ottawa and Toronto.

Public transportation options work to reduce transportation insecurity, which is defined as the experience of being unable to move from place to place in a safe or timely manner.[xxvi] To ensure a public transportation service does not increase GHG emissions, fleet should be hybrid or electric where feasible and there should be a ride sharing component associated with the service that results in vehicles being taken off the road.

Action 6.5: Integrate active transportation infrastructure into capital projects.

The County maintains nearly 500 kilometers of roads. The Cycling Master Plan was approved in 2012 to guide network facilitation, policy direction, and financing for cycling infrastructure in the County.[xxvii] The plan establishes a framework of cycling facilities that can be incorporated into regular business functions for County and local municipal governments to create a more cycling-friendly County. A Transportation Master Plan was developed in 2017 as an overall guiding document for transportation infrastructure and policy in the County.[xxviii] The plan aims to prioritize future multi-modal transportation networks and infrastructure. The County will continue to implement these plans to increase the accessibility of active forms of transportation in Northumberland County.

Action 6.6: Promote sustainable business and tourism and share decarbonization resources with local businesses and operators.

The County can share information with local businesses and tourism operators on programs and opportunities to reduce their carbon footprint. This can include directing tourism operators and businesses to funding programs for building retrofits, electric vehicle charging stations, supporting the circular economy, and implementing local food initiatives.

Action 6.7: Advocate for home retrofit financing for low-income households including renters.

The median annual home energy expenditure in the County is $3,151.[xxix] Retrofitting homes to be more energy efficient can significantly reduce these costs in addition to making homes more comfortable. Although retrofits have quick payback periods, many households cannot afford the upfront costs that are required. The County can advocate for provincial and federal government programming and encourage utilities and local municipalities to develop programs. There is a need for financing that goes beyond rebates to cover upfront costs for energy upgrades such as windows and doors, heat pumps, air sealing and insulation.

Action 6.8: Communicate the importance and benefits of climate action to the community.

Climate action engagement, outreach, and education to the community is an effective way that the County can inspire broader action. Climate scientist Katharine Hayhoe emphasizes that the most important action that you can take to fight climate change is to talk about it. The County can work with local community organizations to educate residents about the role they can play in addressing the climate crisis and empower them to act through promoting available programs, resources, and stories to reduce their carbon footprint.

Action 6.9: Encourage the expansion of electric vehicle infrastructure to support community shift to electric vehicles.

Range anxiety is the primary reason people are hesitant to purchase electric vehicles. Although the majority (over 80%) of electric vehicle charging takes place at home, the best way to overcome range anxiety is to increase the number of public charging stations. Local municipalities own properties that are well suited for public charging, such as downtown parking lots, community centers, and arenas. The County can work with the community to identify gaps in charging infrastructure and support local municipalities to secure funding for installation.

Implementation

The implementation table below outlines direct actions that the County can take to reduce our GHG emissions. Direct actions include the action items under focus areas 1-5. Each action corresponds with a particular initiative, department, timeline, and high-level cost. These initiatives will require more detailed assessments as part of the budget planning process, including estimated capital expenditures and the operational cost savings associated with each project. Funding and partnership opportunities will be critical for implementing many of the actions outlined below. Implementation of the plan will be led by the Environmental Officer and the applicable department leads.

Cost scale

N/A: Cost is covered by existing staff capacity or operating budgets.

Low: $0-$100,000

Medium: $100,000 to $500,000

High: $500,000+

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
Waste Management	Increase waste diversion.	Continue promotion of the green bin program and education on reducing food waste.	Public Works	Ongoing	N/A	• Waste diversion rates • Waste generated per capita • Number of campaigns • Number of engaged residents

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
Waste Management	Increase waste diversion.	Implement a clear bag policy while requiring organics to be kept out of the garbage.	Public Works	Next 3-5 years	Low ($50,000)	• Waste diversion rates • Waste generated per capita • Percentage of households using clear bags • Percentage of households without organics in garbage
Waste Management	Increase waste diversion.	Review waste management processes in County facilities to improve diversion.	Public Works	Next 3-5 years	Low ($10,000)	• Waste audits completed • Number of improved signage or receptacles installed
Waste Management	Capture methane gas from the	Complete a feasibility assessment and design study for	Public Works	Next 1-2 years	Medium ($150,000)	• Study completed

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
	Brighton Landfill.	landfill gas capture.				
Waste Management	Capture methane gas from the Brighton Landfill.	Initiate capital project to capture methane gas.	Public Works	Next 3-5 years	High ($1.5-2 million)	• Emissions avoided from landfill gas capture • Percentage of methane recovered
County Fleet and Staff Commuting	Establish a Green Fleet and Equipment Policy and Action Plan.	Develop a Green Fleet and Equipment Policy.	Public Works	Next 1-2 years	N/A	• Policy completed • Percentage of fuel savings • GHG emissions from County fleet • Number of vehicles or equipment replaced with low carbon alternatives
County Fleet and Staff Commuting	Establish a Green Fleet and Equipment	Create a feasibility assessment and	Public Works	Next 3-5 years	Medium ($100,000)	• Study completed • Percentage of fuel savings

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
	Policy and Action Plan.	implementation plan to replace County fleet and equipment with low carbon options, including the assessment of required infrastructure.				• GHG emissions from County fleet • Number of vehicles or equipment replaced with low carbon alternatives
County Fleet and Staff Commuting	Establish a Green Fleet and Equipment Policy and Action Plan.	Implement operator education for reducing fuel usage.	Public Works	Next 1-2 years	N/A	• Number of staff education materials completed • Percentage of idling time reduced • Fuel use from County vehicles

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
County Fleet and Staff Commuting	Provide solutions for sustainable employee commuting.	Continue implementing the telecommute and compressed work week programs and monitor uptake.	Corporate Services	Ongoing	N/A	• Total vehicle kilometers travelled by employees • Percentage of eligible staff participating in programs
County Fleet and Staff Commuting	Provide solutions for sustainable employee commuting.	Add fee-for-service electric vehicle charging stations and preferred parking for those who carpool in office parking lots. Consider adding secure	Public Works	Next 3-5 years	Low ($30,000)	• Percentage of employees with electric vehicles • Number of EV chargers installed • Hours of charging time completed • Mode share for employee commute (walking, biking, driving, transit, etc.)

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
		bicycle parking where there is demand.				
County Buildings and Facilities	Construct new buildings and major renovations to net-zero or near net-zero carbon emissions where feasible.	Create a policy that requires new County buildings and major renovations to be built to net-zero or net-zero ready standards.	Public Works	Next 1-2 years	N/A	• Policy completed • Number of net-zero facilities built • Energy use in new buildings • GHG emissions from new buildings
County Buildings and Facilities	Retrofit existing County buildings and facilities for increased	Create a formalized process that requires building upgrades to consider low	Public Works	Next 1-2 years	N/A	• Number of fossil-fuel free HVAC replacements • Number of energy efficient upgrades

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
	energy efficiency.	carbon and energy efficient changes.				
County Buildings and Facilities	Retrofit existing County buildings and facilities for increased energy efficiency.	Conduct a feasibility study that creates a pathway for reducing GHG emissions from municipal facilities. Incorporate recommendations into equipment replacement schedules.	Public Works	Next 3-5 years	Medium ($200,000)	• Study completed • Number of building retrofit projects completed • Energy use in existing buildings • GHG emissions from County buildings • kWh of renewable energy produced
Building a Culture of	Implement a climate change	Create and implement staff training	All	Next 1-2 years	N/A	• Number of staff training or education

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
Climate Action	lens on strategic plans, policies, and decisions that come to council.	and education on climate change and climate action.				sessions completed
Building a Culture of Climate Action	Implement a climate change lens on strategic plans, policies, and decisions that come to council.	Implement decision support tools and processes for integrating a climate lens.	All	Next 1-2 years	N/A	• Number of decisions updated with climate lens
Building a Culture of Climate Action	Implement a climate change lens on strategic	Ensure a climate lens is applied to new and updated	All	Ongoing	N/A	• Number of policies and plans updated with climate lens

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
	plans, policies, and decisions that come to council.	policies and plans.				
Building a Culture of Climate Action	Identify and manage current and future climate impacts on County operations.	Develop a Climate Adaptation and Resiliency Plan.	All	Next 1-2 years	N/A	• Plan completed
Building a Culture of Climate Action	Facilitate local collaboration on climate action.	Establish mechanisms to collaborate on climate action across the County.	Public Works	Next 1-2 years	N/A	• Number of meetings held • Number of collaborative projects initiated

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
Building a Culture of Climate Action	Facilitate local collaboration on climate action.	Assist local municipalities with GHG inventories and developing climate action or sustainability plans as a shared service.	Public Works	Next 1-2 years	N/A	• Number of GHG inventories developed • Number of plans adopted
The Natural Environment	Continue to preserve and protect natural heritage.	Protect existing natural assets.	Corporate Services, Public Works, Planning	Ongoing	N/A	• Area of land in restoration in the County Forest
The Natural Environment	Continue to preserve and protect	Monitor opportunities for measuring the carbon that is	Corporate Services	Ongoing	TBD	• Carbon sequestered from County Forest

Focus Area	Action	Initiative	Department	Timeline	Cost	Key Performance Indicator
	natural heritage.	sequestered through the County Forest.				
The Natural Environment	Maintain and enhance naturalization in the County.	Increase naturalization programs in the County.	Public Works	Ongoing	Low to Medium ($50,000-$150,000)	• Number of trees planted • Area of land restored
The Natural Environment	Enlarge the County Forest.	Increase the managed forested area.	Corporate Services, Planning	Ongoing	High	• Hectares or acres of land added to the County Forest

Timeline of Implementation

This plan proposes two timeframes for the implementation of actions: in the next 1-2 years or the next 3-5 years. It is important to consider that there must be remaining capacity and resources outside of this workplan for actions as part of the implementation of the Adaptation and Resiliency Plan and for collaboration on project opportunities that arise, including those that fall under Focus Area 6 of this plan.

Next 1-2 Years

- Complete a feasibility assessment and design study for landfill gas capture at the Brighton Landfill.
- Develop a Green Fleet and Equipment Policy.
- Implement operator education for reducing fuel usage.
- Create a policy that requires new County buildings and major renovations to be built to net-zero or net-zero ready standards where feasible.
- Create a process that requires building upgrades to consider low carbon and energy efficient changes.
- Create and implement staff training and education on climate change and climate action.
- Establish mechanisms to collaborate on climate action across the County.
- Implement decision support tools and processes for integrating a climate lens.
- Develop a Climate Adaptation and Resiliency Plan.
- Assist local municipalities with GHG inventories and developing climate action and sustainability plans as a shared service.

Next 3-5 Years

- Initiate capital project to capture methane gas at the Brighton Landfill.
- Review waste management processes in County facilities and to improve diversion.
- Implement a clear bag policy for garbage while requiring organics to be kept out of the garbage.
- Add fee-for-service electric vehicle charging stations and preferred parking for those who carpool in office parking lots. Consider adding secure bicycle parking where there is demand.
- Create a feasibility assessment and implementation plan to replace County fleet and equipment with low carbon options.
- Conduct a feasibility study that creates a pathway for reducing GHG emissions from County facilities. Incorporate recommendations into equipment replacement schedules and the Facilities Asset Management Plan.

Low Carbon Scenario

Figure 8 below models the potential GHG emission reductions that can be realized through implementing the key actions outlined in this plan. The steepest decline in emissions is anticipated to come from methane gas capture at the Brighton Landfill, which will have the most substantial impact on Northumberland County's GHG emissions and is a key action to achieve a 65% reduction in emissions by 2030 from 2005 levels.

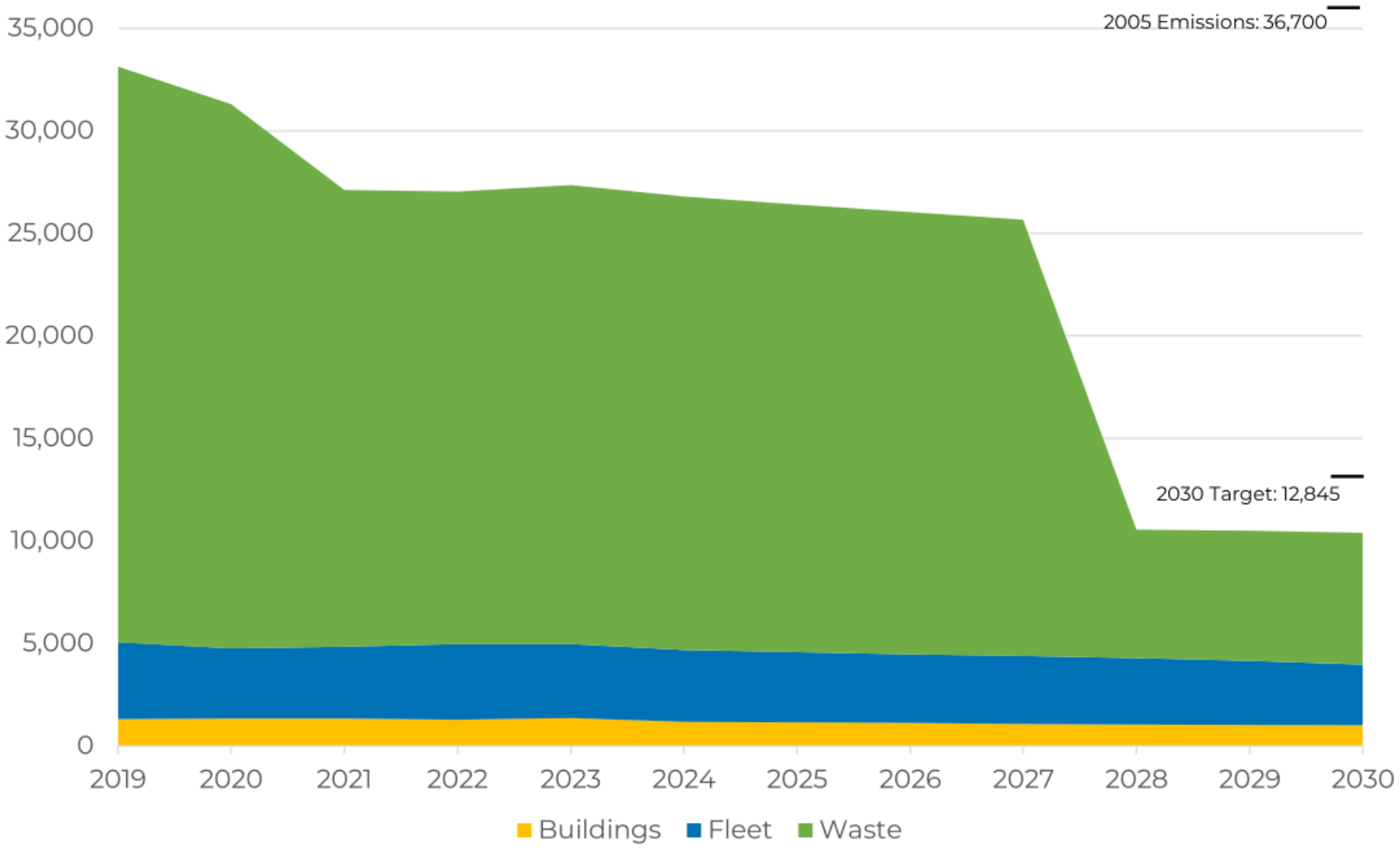


Figure 8: GHG Reductions (tCO_2e) by 2030 from Plan Implementation

Monitoring Progress

Northumberland County has a public dashboard tool that showcases key performance data from across the organization. This tool will be updated to demonstrate progress toward our GHG reduction target through tracking annual corporate GHG emissions. As implementation occurs over 2024-2030, County staff will review the actions outlined in this plan and their state of completion. Annual progress reports will document progress toward each action. These reports will be presented to senior leadership and County Council and subsequently made available to the public. Progress reports will help ensure transparency and accountability and that the plan stays top of mind for staff, council, and the community.

This plan is intended to be a living document that is updated as actions are implemented, and new technologies emerge. The next comprehensive update to the plan should take place in 2029, after five years of implementation, to further scope out a more detailed pathway to reaching net-zero corporate emissions by 2050.

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